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USAID'S HAITI HILLSIDE STRATEGY:

AN ASSESSMENT OF AN APPROACH

VOLUME II OF II

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LIST OF ACRONYMS AND ABBREVIATIONS

ADO	Agriculture Development Office
ADS--II	Agriculture Development Support--II Project
AGROFOR II	Agroforestry II Project
A.I.D.	Agency for International Development
AOPI	Agroforestry Outreach Project (U.S.A.I.D.)
APA	Agricultural Producers Association
ARC	Administrative Reform Commission
ARD	Associates in Rural Development
ARDO	Agriculture and Rural Development Office (U.S.A.I.D.)
ASA	Agricultural Sector Assessment
ASF	African Swine Fever
BCA	Bureau de Credit Agricole
BCI	Banque de Credit Immobilier (Private Mortgage Bank)
BCRS	Bureau de Credit Agricole Supervise
BDPA	Bureau de Developpement de la Production Agricole
BID	Banque Interamericaine de Developpement
BNC	National Bank for Agricultural and Industrial Development
BNDAI	National Bank for Development of Agriculture and Industry
BRH	Bank of the Republic of Haiti (Central Bank)
CBI	Caribbean Basin Initiative
CAC	Consoil d'Action Communautair
CARE	Cooperative for American Relief Everywhere
CCH	Cooperatives Cafeires d'Haiti
CDSS	Country Development Strategy Statement (U.S.A.I.D.)
CEP	Country Environmental Profile
CEPAL	Economic Commission for Latin America
CIDA	Canadian International Development Agency
CIF	Cost, Insurance and Freight
CIMMYT	International Research Center for Maize andWheat
CLUSA	Cooperative League of the U.S.A. (currently the National Cooperative Business Center)
CMCID	Consultative Mixed Committee for Industrial Development
CMP	Management and Productivity Center
CMRP	Comite Mixte de Recherche de la Politique
CNC	Comite National de Controle et de Supervision des Entites de Developpement Communautaire
CNG	National Government Council

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

CONACOS	Comite National de Controle et de Supervision des Entites de Developpement Communautaire
CONADE	Conseil National de l'Eau
CONAELE	Conseil National de l'Environnement et de la Lutte Contre l'Erosion
CPI	Consumer Price Index
CPNAP	Commissariat a la Pomotion National et l'Administration Publique
CRIES	Comprehensive Resource Inventory and Evaluation System
CRDA	Centre for Agricultural Research and Documentation
DA	Development Assistance Funds (U.S.A.I.D.)
DARNDR	Departement de l'Agriculture, des Ressources Naturelles et du Developpement Rural (Ministry of Agriculture)
DATPE	Direction d'Amenagement du Territoire et de la Protection de l'Environment (Ministry of Plan)
DCCH	Developpement Communautaire Chretien de'Haiti
DEC	Direction d'Evaluation et de Controle (Ministry of Plan)
DSE	Direction des Services Exterieurs (part of SEP)
ESF	Economic Support Funds
FAC	French Fund for Cooperation and Development
FAMV	Faculty of Agronomy and Veterinary Medicine
FAO	Food and Agriculture Organization
FDI	Fonds pour le Developpement Industriel
FME	Farmer Managed Experiemntation
FONDEV	Fonds du Developpement Rural
FSN	Foreign Service National Employee (U.S.A.I.D.)
FSR	Farming Systems Research
GDP	Gross Domestic Product
GIS	Geographic Information System
GNP	Gross National Product
GOH	Government of Haiti
HACHO	Harmonisation de l'Action des Communautes Haitiennes Organises (formerly Haitian-American Community Help Organization)
HAMPCO	Haitian American Meat Packing Company
HASCO	Haitian American Sugar Company
HAVA	Haitian Association of Voluntary Associations
HDF	Haitian Development Foundation
HIAMP	Export-oriented Regional Agricultural Project for Eastern Caribbean (U.S.A.I.D.)
IBRD	International Bank for Reconstruction and Development (World Bank)
ICO	International Coffee Organization
IDAI	Institut de Developpement Agricole et Indstriale

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

IDB/BID	Inter-American Development Bank
IHPCADE	Institute Haitien de Promotion du Cafe et des Denrees d'Exporation
IHS[I]	Haitian Institute of Statistics (and Information)
IICA	Institute Interamericano de Cooperacion para la Agricultura
IITA	International Institute of Tropical Agriculture
IMF	International Monetary Fund
INAREM	Institute National Des Ressources Energetique et des Mines
IRD	Integrated Rural Development (World Concern)
IRG	International Resources Group
ISPAN	Institut de Sauvegarde du Patrimoine Nationale
ISRP	Interim Swine Repopulation Project
JWK	A U.S. Consulting Firm
LC	Local Currency Sales Proceeds of PL 480 Commodities
LTC	Land Tenure Center (University of Minnesota)
MARNDR	Ministry of Agriculture, Natural Resources and Rural Development
MEDA	Mennonite Economic Development Associates
MOP	Ministere du Plan
MSPP	Ministere de la Sante Publique et de la Population (Ministry of Health_
MTPTC	Ministere des Travaux Publics, des Transports et Communication (Ministry of Public Works)
NGO	Non-Governmental Organization
OAS	Organization of American States
OCEAH	Office de Commercialisation des Essences Aromatiques d'Haiti (Haitian Office for Marketing Essential Oils)
ODH	Operation Double Harvest
ODN	Organisme du Developpement du Nord
ODPG	Organisme du Developpement de la Plaine de Gonaives
ODVA	Organisme de Developpement de la Vallee de l'Aribonite
ONAAC	Organisation Nationale d'Alphabetisation et d'Action Communautaire (part of Ministry of Education)
ONEC	National Office of Community Education
OPRODEX	Office for the Promotion of Exports (Office de Promotion des Denrees Exportables)
OPED	Office of Private Enterprise Development (U.S.A.I.D.)
OPVD	Office of Private and Voluntary Cooperatio (U.S.A.I.D.)
ORE	Organisation pour la Rehabilitation de l'Environment
PADF	Pan American Development Foundation
PAP	Port-au-Prince
P.C.	per capita

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

PDAI	Project de Developpement Agricole Integre
PID	Project Identification Document (U.S.A.I.D.)
PL 480	Public Law 480 (Food for Peace)
PMC	Mixed Committee for Investment Promotion
PMR	Project Managed Research (PSTO)
PP	Project Paper (U.S.A.I.D.)
PPMS	Projet Pic Macaya Sud
PROMINEX	Haitian Export Promotion Board
PSC	Personal Services Contractor (U.S.A.I.D.)
PSTO	Proje Sove Te O'Kay
PVO	Private Voluntary Organization
RDO	Rural Development Officer (U.S.A.I.D.)

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

CURRENCY EQUIVALENTS, WEIGHTS, AND MEASURES

Haiti uses a mixture of the metric and English systems. Their dollar is officially equal to U.S. dollar, but unofficially it is worth less.

1. Currency

1 U.S. Dollar = 1 Haitian Dollar (official)

1 U.S. Dollar = 1.4 to 1.5 Haitian Dollars (unofficial)

1 Haitian Dollar = 5 Haitian Gourdes

1 Gourde (Grde) = 100 Centimes

2. Weights

1 kilogram (kg) = 2.2 Pounds (lb)

1000 Kilograms = 1 Metric Tonne = 2204 Pounds

1 Marmite (Haitian Volume/Weight Measure) = 6 lb (GOH figure) or = 5.5 lb (GOH figure) or = 2 kg = 4.4 lb (quoted in writing by a consultant)

3. Distance

1 Kilometer (km) = 0.62 miles

1000 Meters = 1 Kilometer

1 Meter = 39.37 Inches

MASL = Meters Above Sea Level

4. Area

1 Carreau = 1.29 Hectares (Ha)

1 Hectare = 2.47 Acres

1 Hectare = 0.78 Carreau

1 Seizième = 1/16 Carreau

I. UNDERSTANDING THE HILLSIDE STRATEGY

A. Introduction

Solutions to hillside and watershed problems are immensely complicated. Interventions to solve such problems generally embody a new element, or input, or something physical and tangible; plus a new system of farming -- what to use for yield improvement, and how to use it. Most interventions are inter-related; changing one element of a farming system, itself very fine-tuned to the dynamics of the resource base available in any given location generally means, by definition, an iterative change in much, if not all, of the complementary system.

The Evaluation Team examines the technical interventions and policy directions with considerable care and their use or candidate use in the various Hillside Strategies projects in Chapters II and III. Annex 3 provides a detailed history and critique of the many scores of interventions proposed in the background documentation of, and in the course of implementing, Hillside Strategy projects.

The purpose of this Chapter is to provide an overview of the most common interventions carried out in the Hillside Strategy projects and of the effectiveness of these interventions and the Strategy to date.

B. Important Components of the Hillside Strategy

The Hillside Strategy was predicated on the use of technical interventions which would:

- Raise income and productivity of farmers;
- Foster soil conservation and enhancement; and
- Engender sustainable growth and improve levels of living for the upland population over time.

To date only a start has been made. There is some question as to whether the interventions can meet the objectives outlined above. Components of the Hillside Strategy are discussed below.

1. Farming systems approaches and their sustainability, adoptability, acceptability and attractiveness to peasant farmers

Inputs of various types, old and new, have been introduced in attempts to develop farming systems that will work for the farmer. Unfortunately, no single input or practice will conserve soil and be sustainable. Inputs are interdependent. Farming systems have not been designed yet, but six key components are described in the following paragraphs.

a. Tree nurseries

The projects' programs have all stressed the need for trees as a major component of a farming system. The agroforestry projects place particular emphasis on tree planting. A majority of the trees were destined for contour hedgerows. Others could be planted as field borders, small groves, fruit sources or hillcrest anchors. Local nurseries and project nurseries were established in most programs' areas. As a result, millions of trees reportedly have been distributed over the recent past. The tree nurseries are acceptable and attractive to farmers, although in some areas, it is difficult to get everyone in the local group to cooperate on taking care of their own tree production plot. Most farmers have taken some trees and planted them. However, the sustainability of the local tree nurseries is in question. While project personnel express hope that the local groups will continue to operate the nurseries when projects terminate, they are doubtful that this will happen. It is possible that one or two families could continue a nursery as a small business.

b. Soil and water structures and practices for conservation, fertility, and stability

The structures and practices are a little closer to a farming system than tree nurseries. Most of the structures and practices adopted by some farmers in project areas are on this list:

- Contour canals, rock walls, ramp-paille, legume hedgerows, grass hedgerows;
- Gully plugs;
- Hedgerow clippings spread over crop alleys between hedgerows; and
- Crop residues left on fields (i.e. not burned).

If built at distances from each other appropriate to the degree of slope, and if properly maintained, the structures will conserve soil because it builds up in the canals or behind the structures. Overall, this makes for a more stable slope.

Clippings and residues left on the cropland will perhaps increase the soil organic matter slightly and provide some much-needed nitrogen to the following crop. In combination, structures and residues help to retain soil but contribute little or nothing to increasing yields. In many cases, project structures have deteriorated somewhat. If farmers were true soil conservationists, they would fill the gaps with new trees, grass or residues immediately after the break was made.

The practice of planting contour hedgerow trees has been emphasized to farmers as a soil-conserving, fertility- and yield-increasing input. Farmers are looking for higher yields and profits. The listed major

soil conservation practices haven't provided them with what they need. As a result, neighbor farmers are not rushing to install contour structures.

Structures are acceptable to farmers because they want to save their soil. They have been presented as attractive because of perceived yield increases and are being adopted. However, if yields don't increase measurably, farmers will lose interest in maintaining structures and building new ones. It's hard work, even with a groupement, and it must pay off. In other words, the farmer has to <u>see</u> something happen. The structures and practices discussed here must be an integral part of a farming system.

c. <u>Cultural practices</u>

Cultural practices alone do not constitute a farming system. The projects and programs have not emphasized cultural practices, with the exception of Project Sove Tè (PST). Some cultural practices which have been adopted to a minimum extent or which need research, trails and/or demonstrations in order to assure their viability and ability to increase yields are:

- Legumes mixed with grasses on contours;
- Grass hedgerows cut for animal feed;
- Legume cover crop between food crops;
- Higher-yielding maize varieties;
- Commercial fertilizer; and
- Different crop rotations.

In the past, Haitian farmers have quickly adopted profitable new inputs as long as they were available at reasonable prices. Such inputs include new, improved bean varieties and commercial fertilizers. Any one or more items in the above list has the potential to be adopted by farmers because they'll be able to see it (them) as attractive, acceptable because of the potential to make money.

If the input is found to be profitable and continues to be available, farmers will continue to use it. Many farmers stopped using fertilizer when the Port-au-Prince blending plant went out of business since that plant was the sole supplier. Area stores didn't stock it and it was too difficult to arrange for transportation from, for example, St. Marc. Project farmers have not used commercial fertilizer because it isn't "pushed" by project personnel, it requires significant and difficult transportation, and "it costs too much." Cultural practices will be maintained ("sustained") on farms when found to fit into a farming system that is more profitable to the farmer that his previous system. In fact, the top five percent of farmers (the innovators and early

adopters.) will modify new inputs or practices in such a way as to increase their effectiveness.

d. New crops

New crops appear very attractive to farmers if their return on investments is potentially high. Care must be taken, however, to introduce not just a new crop, but a complete production system package. At present, a new crop for many farmers would be forage grass -- managed well and cut in order to be carried to the livestock. Another new crop would be a perennial legume grown in maize and left in the ground during the subsequent dry season. These crops must be fitted into systems. The systems approach is in its infancy in the PST area. As the number of variable inputs increases and as farmers become more knowledgeable through extension efforts, more complete systems will evolve. Such systems could include new cash crops such as tomatoes and black pepper. The prospect of growing a new crop that is highly likely to be profitable is exciting to farmers. However, its adaptability and sustainability will depend on the ability of researchers and extension specialist to package it effectively, i.e. in a module that farmers will accept and from which they will benefit.

e. Trees and grass

Together, trees and grass are, or can be, significant components of farming systems. However, at present, they are considered only as farm inputs intended to reduce soil erosion when planted on hillside contours. The exception is fruit trees: most farmers have very little room left in the area surrounding their houses. Some of that space is flat. A tree or trees on the slope near the house will not be a significant factor in soil conservation. However, that is where farmers plant fruit trees in order to minimize stealing. Fruit trees are attractive to farmers because they will be income-producers in a few years. Other trees not planted as hedgerows, and used as field boundaries, hedgerow anchors, or shade, will have value when sold for poles, fuel,or lumber in three or more years. These trees are not integrated into a farming system.

Hedgerow trees, primarily legumes, constitute the beginning of a system. The clippings can contribute to soil conservation and enrichment when spread on the cropped areas. Or, they can be removed and fed to livestock. Similarly, a properly-managed grass contour planting can provide animal feed as well as act as a barrier to eroding soil and moving water. In this respect, trees and grass are components of a very small system. Farmers have been "sold" on the attractiveness, utility, and crop yield increasing possibilities emanating form a hedgerow on grassy contour. The work involved in designing and planting the contour strip is usually acceptable, especially if group labor does it.

The adoptability by a majority of farmers, and the sustainability of tree and grass "structures" are questionable. Because no or little significant maize or bean yield increases have been seen and because

trees and grass are not components of a well-managed farming system, their continuing potential as "stand-alone" components is very low.

f. Livestock

Animals are very attractive to farmers. They are useful and potentially liquid assets. Pigs, sheep, and goats, in particular, are valued because they can be sold when emergency cash in needed. However, livestock are out of the system. They are usually on their own as far as feed is concerned and all too often are not provided with enough water. The beginnings of farming system involving livestock are in place. Forage is grown on the contours which are gathered near the buildings. Animal manure is collected and carried to the field to fertilize the grass.

Farmers will accept this and adopt the practices because of perceived value. The sustainability of a livestock system is less in question than that of a "tree system" because several benefits can be seen. In the long run, however, the livestock system should be more intensive and well-integrated with other farming operations. This will ensure sustainability by giving a rationale to the hedgerow which is profitable.

2. Concentrating efforts in smaller zones

To generate the desired physical impacts -- soil and water rationalization and stabilization -- the Hillside projects should have been designed to concentrate efforts in smaller and more compact zones. Instead, like the tree planting programs, the project has had a "shotgun" effect. That is, PVOs are working at sites which are widely separated from one another. Within each site, participating farmers are themselves greater or lesser distances from one another and even within any one farmer's land, soil conservation coverage (e.g., hedgerows) is rarely complete over the entire necessary surface.

3. Proposals to eliminate

The Hillside Projects not only add interventions and new systems. They also seek to get rid of existing practices thought to be inimical to resource stabilization. Four of these practices are discussed below using the names and phrases of the Hillside Strategy literature.

a. Migrant farming

Historically, and still where it is an option available to him, the farmer will move his area cultivated from season to season. Given his labor constraints, he can only cultivate a limited area in any case. He might lease out or sharecrop any land he himself cannot use, particularly the worst land. The amount of land put to fallow each season is now highly limited and decreasing rapidly. This moving around to permit the land to rest and recuperate is generally called "shifting

cultivation." When, however, the person moving onto a piece of land is landless, or nearly so, and is also from outside the area, then this is called "migrant farming."

The advantages of migrant farming to those involved are major, and critical. To the landowner (or person with some rights to their piece of land) it means a fee of some kind, or share of the crop, however meager. It also means that the land, usually the less productive areas (slope, eroded, gullied, dry, etc.) provides something to the migrant farmer. Most migrant farmers on the hillsides live in the river valleys themselves, or on the plains/deltas of those rivers. Most but not all will be people who have been farmers but have moved to town jobs or to seasonal jobs in irrigated and plains agriculture, e.g., on rice and sugar cane farms. Between such jobs over the year they can travel up to cultivate, plant, weed and harvest their farm.

The basic solution to the migrant farmer "problem" is the provision of opportunities to earn an income elsewhere sufficient to support a family. Most lands now cultivated by such farmers is land which should be abandoned in any case, protected, and covered with trees or pasture. Since there will always be people who want to farm in this manner, the solution is in the development of the areas where they live -- on the plains or in towns. It would take an army/police force of huge proportions to maintain any preserve for reclamation. Total, integrated watershed development is the more durable solution.

b. Burning

Burning regrowth developed during a fallow period following a harvest, or burning crop residues, is a tradition in the tropics. Burning makes the necessary plant nutrient potassium (K) slightly more available to succeeding crops -- if the K-containing ashes aren't washed down the hill during the first heavy rain. Burning kills some plant disease fungi; as a result, the following crop may be healthier. Burning removes the need for the farmer to scratch through residue when preparing to plant the next crop. Burning also destroys a small amount of already too-low organic matter, thus decreasing the soil's water-holding capacity. Burning leaves a soil bare, thus open to the ravages of heavy rain and intensifies soil erosion. Even if contour structures are in place, more soil will be lost from the tops of cropping alleys than if residues were left on the surface.

In every project area, animateurs have been encouraging farmers not to burn. As a result, burning has been reduced, but not eliminated. The advantages of burning outweigh the disadvantages as seen through the eyes of many farmers. Perhaps incentives of various kinds would result in less burning. The best incentive, however, would be an increased yield. The farmers won't see that unless "no burning" as a strong

suggestion is combined with other components of a more intensive production system such as:

- Varieties more resistant to plant diseases;
- Selected seed with higher germination rates;
- Sharper hoes that will cut through residues;
- Perennial legumes that will reduce weed populations;
- Commercial fertilizers that will raise yields; and
- Higher planting rates to give higher yields.

c. Unsafe hillside agriculture

Many hillsides should not now be farmed; they are a fragile system, unsafe for future crop production unless intensive cropping systems methodologies are started. In other words, "unsafe" or highly eroded hillsides should not continue to be farmed by present methods and probably should not be farmed at all, whether by "migrant farmers" or by their owners. This brings up two problems: Where will the farmers go and where will the nation's food be produced?

The first question is addressed later in this report. Essentially the valleys, plains and towns must provide more income-earning opportunities. The answer to the second question is: It will be produced on less steep slopes and on large plains (e.g., Artibonite, Cayes) where basic crop yields can be doubled easily over present yields and tripled or quadrupled over steep hillside yields. Farming on the plains is primitive in the extreme. As it will take time to phase in these solutions, hillsides remain unsafe for production. In the interim, the most efficient inputs and practices possible should be applied to hillside farming in order not to intensify its "unsafeness."

d. Land degradation

Degraded land, as delineated by soil surveys, should be planted to trees. Land that is a prime candidate for designation as "degraded" should be farmed very carefully. Crop production methods should be very similar to those instituted when land is designated "unsafe". Degradation is a gradual process, exacerbated by poor farming practices that are the rule rather than the exception in Haiti. We can't say, "eliminate land degradation," but its progress can be retarded by proven practices such as:

- Placing contour structures close together, i.e., at a 2-4 meter distance;
- Ensuring cover (plants or residues) are on the ground at all times; and
- Keeping grazing animals off the slopes.

Unfortunately, the Evaluation Team found that:

- o Contour structures are either non-existent, or, in most cases, where they have been established, too far apart;
- o Land is bare or has stubble only for part of the year.;
- o Crop plants other than beans are too far apart (but not too far considering the plant nutrient supply); and
- o Animals graze the slopes, eating crop residues, hedgerows, and contour grass strips, and trees.

4. Research efforts

Apart from the SECID effort in agro-forestry the only program where research is being conducted is the TWM Project. That research is done by two scientists and five agronomes at Camp Perrin (ARD contract) and one agronome with a specialty in plant breeding at ORE, just south of Camp Perrin. There is no need for research in other project areas at this time. Results from PST can be adapted to most other ares of Haiti. The research by ARD contractors has finally evolved into something that can have meaningful results. It involves evaluating cropping systems and contour plantings. This work doesn't duplicate other research in Haiti, and it responds partly to farmers' expressed needs. It does not, however, comprise complete, high-altitude systems research. Results from other parts of the world have been used or considered to a limited extent in the current designs. Yet such necessary inputs as reduced maize planting rates or higher rates with plants closer together and the use of commercial fertilizer are not currently a part of the work. However, the current research will provide a base for the evaluation of new inputs as part of a complete farming system.

The research at ORE is concentrated in plant breeding. Improved (i.e. more disease resistant and higher-yielding) maize and bean varieties are in the development stage. Grafting research has resulted in the successful development of many improved fruit trees. All of this work is farmer need-oriented. Farmers are asked, from time to time, what their needs are, and researchers respond. Research on the USAID-funded projects is in much better condition than it was two years ago. A base has finally developed that could evolve into limited, effective farming systems research.

5. Extension methods and services: Individuals versus groups

Extension means providing farmers with information regarding trees, soil conservation, and agriculture that will:

- o Improve their farming methods;
- o Increase their income; and
- o Conserve more of their soil.

This work is supervised in most program areas by an agronome. In larger organizations, this is his sole task. In small organizations or projects, there is usually a single supervising agronome who carries out both technical and extension functions. This works out quite well because they overlap.

The agronome recruits local people with good communication abilities to be animateurs. They are called TAPS by UNICORS. The animateurs are responsible for organizing groups of farmers who will work together on construction of contour barriers, maintenance of tree nurseries and community silos and who will have regular and frequent meetings to discuss problems common to the area and to get advice from the agronome.

The animateurs feed information to farmers and relay questions back to their agronome for answers. They are also responsible for keeping track of the numbers of trees planted by the farmers, as well as the tree locations. For the most part, farmers work well in groups as long as they have similar interests or family or good neighbor relationships. The animateurs are usually well chosen. They have no diplomas or degrees.

The services provided to farmers are limited, and normally include:

- Teaching how to use an A-frame to make contour lines;
- How to dig contour canals;
- How to plant contour canals;
- How to plant contour hedgerows or grass;
- Information about a new variety; and
- Descriptions of plant or animal diseases prevalent in the area.

At the current level of farm-applied technology, the methods and services just described suffice to get farmers together and help them conserve some soil. As farming systems become more complicated and individualized, changes in extension methods will have to be made.

The rural development environment in Haiti is replete with conflicting views and "black and white" positions are held on to doggedly. One example is the "physical works" (GOH) versus the "work with farmers" (USAID) route to soil conservation. Another is "group" versus "individual" extension approaches. Final decisions about what, when, how much and other farm items are made by the individual farmer. Regardless of how a new piece of information or technology gets to the farmer, only he decides what happens or does not happen. Given proper animateurs in sufficient numbers, groups/groupements/groupman become redundant, though possibly useful for group activities such as tending a tree nursery. Most PVOs and NGOs find the groupements a useful device for stimulation, collection of information and farmer input, and

dispensing general knowledge. There is no need to posit an "either/or" situation. Both are useful; both can be, and are, effective depending upon the site-specific circumstances.

6. Seed and seedling multiplication and approaches

Plant breeding involves making dozens or hundreds of crosses of plant types with known characteristics in order to insert a new and better characteristic to insert a new and better characteristic into the commonly used type or variety. Plant breeders cross-pollinate or use tissue culture methods to develop new varieties. Germ plasm is the key ingredient. It is the cytoplasm of a cell, hereditary characteristics in a cell or, basically genes. Germ plasm is maintained in seeds. The characteristics of a specific variety are expressed from the germ plasm in the plant. There is almost an indefinite number of characteristics expressed by the genes. A seed variety improvement program usually has two major goals: increasing yields and increasing resistance to disease.

Minor goals can include such items as: increasing or decreasing height, increasing size of root system, increasing resistance to nematodes, increasing resistance to bird damage, changing position of maize ear, and changing adaptability to high altitude. The plant breeder develops his new variety by making numerous crosses and selections therefrom for the desired characteristics. In order to make a significant change in the plant, several generations my be required.

Plant breeding activity does not currently fit into a soil conservation program. In the future, the only possibility is breeding plants with larger root systems to hold soil better and increase organic residues as roots. There is little need for a large plant breeding program. Eliassaint Magloire of ORE has this in hand. He is working on the development of corn and bean varieties that are more resistant to diseases commonly found in southern Haiti and that yield higher than currently used varieties. He is also working on a corn variety that will be more acceptable to peoples' taste than Maquina. For that, he could cross Maquina germ plasm with chicken corn germ plasm for several generations.

Once a new plant variety is developed, the seeds have to be multiplied. The selection process takes several generations, as the plants must be screened carefully and the off-type ones removed prior to pollination and seed formation. Seeds must be carried through to the next planting season under rigid conditions of temperature and humidity in order to ensure the highest possible germination percentage. Much the same type of process is involved with tree seedlings in a breeding program. Seedlings are grown from seed in tree nurseries until the plants are a year or so old, and then distributed. Seed of some varieties is sometimes scarce. The seed multiplication program at ORE and SECID are the only such programs we saw in the country. Work is necessary and is being done carefully and scientifically.

7. Training services

There are three levels of project staff whose work is primarily with farmers:

- Agronomes who have a BS degree in agriculture from the University of Haiti; if graduated since 1985, they have studied for five years and have a specialty; some have an MS degree or additional course work or study leaves at foreign institutions;

- Technicians or moniteurs who have a diploma from a 2-year course in agriculture at one of the Ministry's 2-year institutions; and

- Animateurs who have some education, in some cases a high school equivalent.

At present, there is no provision within projects for regular, structured in-service training programs for these three groups. Occasionally, funds will be available to send an agronome to another country for a short study leave or tour. Lack of on-going training for project personnel hampers efficiency of management, the identification of field problems, the ability to communicate on a sub-technical, program-centered basis with farmers, and the general advancement of projects and their intended beneficiaries. It would be relatively simple and certainly beneficial to build a training component into each project and an overall component to serve all the projects. There are many competent people in Haiti. With additional training and the opportunity to earn a good salary in the country, they would be less likely to emigrate. The PADF training program and the facilities at Limbe could be structured in this respect to TWM activities.

8. Profit proposals

Students of traditional peasant small farm systems are especially aware of how basic the need for cash income is in those low-productivity systems. Key constraints are labor supply at peak demand periods, good land available, and cash flow needs for both production and consumption purposes.

Hillside projects generally recognize this dominating need for "profit" in these farming systems. But it took some time, e.g., in Agroforestry Outreach (I), to somehow try to build this awareness into operational activity. As indicated above, the intervention itself had to be at once technically sound and financially attractive, more attractive in fact than other optional uses of the farmers' resources at any given specific time.

Enough farmers, enough of the time, are not finding the proposed interventions profitable enough to adopt them. World-wide, efficacious interventions tend to "sell themselves." The truly effective demand by farmers for project outputs (as distinct from certain "incentive"

goodies) is not high. Planting and keeping alive several million trees which have been issued/sold does not seem to have been a priority. It is also too early to judge the financial impact of hedgerows, though combined with a livestock program and full animateur and farmer training in such technology, it could be very attractive indeed.

The TWM project's umbrella agency had devised a program which was an excellent approach to finding out just what farmers would find attractive. It is discussed further in Annex 4. Between start-up delays, an excessive squeeze on the actors for rapid results, and staffing and management problems, the process collapsed and has not been resuscitated. The Rapid Rural Appraisal Survey (Sondeo) which would have provided a base-year income/welfare assessment of participating project farmers has also fallen behind. Economic analyses embodied in the background documentation to the Hillside Strategy projects are generally highly naive and do not reflect a necessary knowledge of the systems into which the projects are attempting to induce financially attractive interventions.

C. The Effectiveness of the Hillside Strategy

1. Introduction

The key objectives of development agencies, public and private, domestic and external in Haiti must be greater food supply, employment creation, and resource base rehabilitation and stabilization. Programs must concentrate on getting people off the hills and slopes by developing more intensive agriculture on the plains and in river valleys and by light establishing manufacturing, assembly and processing plants and their support systems on those plains and in their municipalities. While elements of these objectives and strategies are present in the USAID/Haiti's Hillside Strategy, they do not present a conceptual whole for the rural sector. The elements present are not integrated in a coherent sectoral plan, staged over time: nor are the individual constituent projects going to achieve their more specific objectives. "Shotgunning" 30 or so major watersheds with trees, even if 25 percent of the nearly 30 million trees distributed have, in fact, been planted and survived, has yet to be shown to have had any real impact on erosion and soil conservation. While the potential is there, the present portfolio of projects has experienced only a modicum of success to date.

USAID/Haiti is not, on balance, "getting its money's worth" with its Hillside projects, singly or in combination. Rather, it is scattering its efforts within its total portfolio, losing opportunities to "parlay" impacts. The Hillside Strategy as now constituted is not in accord with many of Haiti's basic and pressing needs for food and rural income earning opportunities. Nor will the strategy achieve the goal of erosion control and soil stabilization as presently designed and implemented. While the Mission and AID/W are inclined to believe that the Hillside Strategy is well on its way to success, this is not true.

A 1982 Strategy Paper made it very clear that integrated regional strategies are in order, stressing the need for agricultural growth complemented by other sector stimulations in a regional development environment. Thus, for the Les Cayes southwest region, the following recommendations were tendered:

> "The team recommends a concentration of A.I.D.'s activities in the agricultural sector in the Southwestern region. This area has high absolute levels of poverty due to population density and is severely disadvantaged in terms of infrastructure and services. In spite of this, however, it has considerable agricultural potential and promises a good return on investment. Unless other donors can be persuaded to support this initiative, however, A.I.D. must be prepared to launch a multi-sectoral effort in the region -- including rural roads, agro-business development, agricultural production, health (especially malaria eradication, and nutrition programs to support the possible short-term loss of income associated with reforestation programs), and disaster preparedness programs (due to the hurricane risk in the region).
>
> A major A.I.D. effort to support industrial and business expansion in the secondary towns, independent of any particular region, is an essential complement to any agricultural development strategy. Given the mobility of labor in Haiti, it does not appear critical where this activity is located so long as it is labor absorbing. Nevertheless, Gonaives, and Port de Paix would be highly supportive of any regionally focused strategy." [1]

This basic development strategy wisdom has apparently been ignored. By the time of the 1987-1988 Action Plan, the country development strategy focussed on three basic goals and four components. The goals included "(1) Reversing natural resource degradation and stimulating agricultural production; (2) increasing employment by expanding industry; and, (3) up-grading Haiti's human resources through reduced population growth, better health, and basic education reform. The first became the task of the ADO in USAID in Haiti. The agricultural and conservation strategy has four components: Hillside strategy development; Technology generation and dissemination; Institutional change; and, Policy dialogue." [2]

By and large, the integrative and regional thrust is being lost at this point and the Hillside Strategy is moving toward the soil erosion focus:

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[1] USAID/Haiti Food and Agricultural Sector Strategy for Haiti, Port-au-Caine, 1982, pp 17-18

[2] USAID/Haiti, Action Plan, FY 1987-1988, Port-au-Prince, 1987, p 1

"The improved technology component of the strategy generates appropriate technologies for application in A.I.D. targeted and other watershed projects. The institutional component concentrates on organizing participating farmers and delivery systems for critical credit and technology inputs. Through cooperation with the GOH, NGOs and other donors, we will also seek to expand these initiatives nationwide." [3]

The population, agribusiness, and health programs are not linked to agricultural growth and more supportive mutual help in particular growth areas, e.g., Southwest/Les Cayes. The 1987 Agricultural Sector Assessment advised a market-oriented strategy for both hillsides and plains, tilting it to agro-industry development and the enhancement of supporting linkages and infrastructure.[4] Agricultural development details recommended for further work do not appear to suggest a tie-in with Hillside development, augmented food supplies, or with getting people off the hillside. Discussions with present Mission personnel suggest that the numerous programs (health, agriculture, business, population) are run rather independently of one another without any real attempt at integration, or search for planned, mutually supporting linkages, even using, say, the health activities as incentives on the targeted hillsides.

Hillside management strategies should be placed in the general circumstances of the country. In an atmosphere of chronic political instability and environmental degradation resulting from mismanagement and use of natural resources (vegetation, soil, and water), both the population and the level of their needs are increasing as well, despite migration. The point of natural equilibrium supporting the life of the people has been bent severely. No one has found the answer to Haiti's soil conservation/erosion/resource instability problem. As designed, the projects in USAID/Haiti's Hillside Strategy cannot do so either. However, there is sufficient progress to date to permit a judicious reconstruction of the Hillside Strategy which not only by-passes, negates, and otherwise avoids the recent and present constraints, but also builds upon the already positive, hard (and expensively) won, real accomplishments.

2. The good things in the Hillside Strategy Projects

In spite of the major doubts and criticisms expressed later in this evaluation, the combination of USAID/Haiti Hillside Strategy projects, over some 15 years, has led to important advances and features on which redesigned and restructured projects could be based.

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[3] Ibid

[4] Ronco Consulting Corporation, Agricultural Sector Assessment: Haiti, Washington, DC, November 1987, pp 288-296.

a. Institutional capabilities

Though differing markedly between themselves in their structures and proclivities, the involvement of PVOs/NGOs in USAID-funded projects has generally resulted in an upgrading of their financial management and organizational skills (if only to meet USAID reporting requirements). Training and teaching systems for technical personnel and extension staff generally have been improved or have the basis for improvement.

b. PVO/NGO cooperation

Meaningful improvement has occurred in the degree of mutual support and assistance engendered between non-profit organizations involved in the Hillside Strategy, particularly between NGOs. This is most marked in the TWM project. What began as a shared negative reaction to project authorities has evolved into a mutual interest in one another's work programs and problems. This is now expressed in one-to-one working relations, and in a "Conseil" which puts the four NGO directors in the role of a Board of Directors. Cooperation between PVOs, generally operating at an "umbrella" level and servicing NGOs (e.g., PADF, CARE) appears reasonable. Cooperation between NGOs and PVOs tends to be unsatisfactory nonetheless, and in need of improvement, especially between PADFs agroforestry outreach activities and several NGOs in the TWM project area. A "truce" was signed to allow TWM/ARD and PADF to delineate territory.

c. Farmers' income

The team has very serious doubts about the claimed level of impact these projects have had on small farmer income. Nonetheless, there undoubtedly have been some financial impacts in terms of charcoal and pole revenues and cash and real income from fruit tree establishment. Since financial impact measurements are absent or unreliable, judgments must wait. In the TWM project, future prospects for farmer cash income from pigs, healthier chickens, fruit (trees and grafting), and particularly goats (using hedgerow feed) are real. Their contribution to soil conservation is, of course, questionable, There are no observable cash benefits to soil conservation measures, such as higher yields. Over the longer term, such benefits are possible, at least for some farmers, but highly modified projects are likely to be required.

d. Outreach to peasants

The Government of Haiti has never done any serious strategy development to modernize the rural sectors of Haiti. In so far as this is an intention of the projects and the Hillside Strategy, the activities are commendable. The projects are utilizing a wide variety of channels to reach peasants who have been traditionally isolated. This is a key to the development of mechanisms to allow development agents to function. Hopefully with time and experience the delivery

system could become more efficient and ultimately more effective by integrating the farmer into the development process.

3. Project design

The Hillside Strategy embodies several characteristic, or needs. These include the need to:

- "Move uphill" with many technologies and ways of doing things;
- Collate, synthesize, and apply agroforestry, soil conservation, and agricultural improvement experience from Haiti and elsewhere to the individual project farming systems;
- Allow enough time in project design to try out interventions on the farms; to build up administrative capabilities and capacities in the agencies/organizations involved; and to train field workers at all levels;
- View the development process through the eyes of the farmer. It is outsiders who have decreed that soil conservation and erosion control are priority problems;
- Identify the key constraints at the aggregated level to the adoption process.

All the projects under review have been designed in violation of most of these necessary design features. To be implemented successfully, the constituent projects must feature, to the degree relevant:

- Simple, uncomplicated, and realistic, targets and work plans;
- Organizational structures which are not cumbersome or top-heavy;
- Administrative and financial systems which are simple but effective; and permit routine examinations and adaptive management decision-making;
- Implementing agencies whose sole or clearly primary interests are those of the project;
- Management processes, from top to bottom, which are adaptable and can adjust as needed to solve new problems or take advantage of opportunities;
- Competent, trained, and motivated staff at all levels;
- Clear short, medium, and longer-term goals and objectives;
- Clear and well understood strategies by which to design work programs;

- Desire and ability to cooperate with other organizations within the same project, e.g., between the four NGOs in the TWM project working under a common "umbrella" supervising, coordinating and evaluating mechanism;

- A program for the "indigenization" of cadres (more Haitians, fewer expatriates); and

- Ability to engender "accountability" through the project structure.

None of the implementing agencies, from USAID through "umbrella" organizations (ARD, CARE, PADF) down to "front line" NGOs and PVOs and various GOH agencies, meet these basic requirements completely. The implementing organizations do not have the responsiveness component suited to the rigorous communications conditions of Haiti. They are very top-heavy. Given the bureaucracies and staffing structures (with their expensive expatriate elements), only a small share (10%) of the budgets actually redund to the farmers' benefit. Even if there is some room for change within projects, existing project personnel are not change-oriented. New procedures to meet identified needs are difficult to implement.

Good things are not easy to introduce if they are not already approved, e.g., livestock feeding trials in the TWM project. Yet the livestock component, almost ignored in project design, could prove to be a key element in farmer motivation and soil protection through hedgerows. USAID has been particularly insistent that certain sorts of farmer incentives are "OK," and others are a "no-no." This is not the best way to manage change. Incentives can only be approved or disapproved on an experimental basis. USAID/Haiti's umbrella organizations' insistence on complicated, detailed and (often) unwieldy reporting and accounting processes do not help solve Haiti's pressing development problems nor do they succeed in getting the accounting and accountability done.

USAID did not insist on performance by contractors. By not doing so, USAID allowed the creation of a "network" of individuals in PVOs, consulting and advisory firms, and some universities. This network has created the illusion that the projects in the Hillside Strategy have been successful. "Activity" has often been mistaken for achievement and results exaggerated. Few have insisted on reliable, real measurements of such matters as the improvement in farmers' income. Good measuring systems are not in place on the physical impact of the projects on soil conservation, hydrology, sedimentation rates, or overall resource stabilization. Yet USAID has continued to insist on project "outputs" and "verifiable performance indicators" -- get out more trees, plant more hedgerows, etc. The USAID/ADO has also been judged on this "numbers" game, reflecting an inadequate appreciation or understanding of the field problems NGOs face in pressurized five-year projects. As a

result of these numbers games, it was not surprising to find that data were being juggled to suit project expectations.

The project elements in the Hillside Strategy have called for minor miracles within a few months of project start up. The NGOs are quite convinced that USAID's prime concern is quantity, not quality, of performance. So the emphasis is first on numbers. How far down the line quality and the felt needs of the farmer came was not clear, but it was way down.

4. Implementation

The cornerstone of an effective and sustainable Hillside Strategy is the adoption by farmers of interventions (described above) clearly in the interest of soil conservation. For adoption, however, these strategies must also meet the felt needs of the farmer better than other and alternative uses of his combined cash, labor, and land resources and the nature and timing of the systems' constraints on their use.

What is required to acquire momentum among most small farmers (thus meeting a desirable equity/democracy requirement) to achieve sustained agricultural intensification and improvements in productivity? There are at least four basic requirements. These include:

- A detailed awareness of the farmers production systems. The rationales, linkages, options, and implications of changing even one piece of the farming system must be fully understood. These systems will vary over cropping cycles (1, 2, and 3 seasons) depending on rainfall, soils, degrees of slope, and other physical/climatic circumstances. It is probable that the TWM area alone has 5-6 discrete hillside systems. Other parts of the country e.g. the Northwest will contain other systems not found in the TWM project zone. Those systems themselves are highly dynamic; they already reflect farmer adaptation to alterations in resource quality and quantity. The degree of adaptability, in what system components, is also useful knowledge;

- A detailed awareness of the farm families economic/financial system and its imperatives. The developer must know the system of financial priorities in the family's collective mind. To continue to insist that an intervention must be "financially attractive" means that the developer must be aware of what attracts, and why: is it temporary until another option comes along; is it agreed to by the farmer as an investment in good relations with institutional layers above him because he might need them in the future; is it catering to his pressing daily and seasonal cash needs or it will appeal to his need for lump sums -- ceremonies, school fees, taxes; or, is it relieving him of a labor, land, or cash input constraint to alternate more financially productive use of his scarcest resources? Annex 4

provides an analysis of how farmers react to project-related incentives;

- A firm understanding of the relationships between the intervention and the Hillside Strategy's objectives of resource conservation and stabilization. Do the trees in the agroforestry projects prevent erosion or otherwise impact favorably? Can this be demonstrated? How do fruit trees impact favorably? Unless established properly in the first instance, and then maintained and managed well on a continuing basis, hedgerows and alley cropping are dangerous in the extreme; and

- A firm understanding of how farm-level interventions, assuming they meet these technical and financial requirements, aggregate into protection on a hillside or sub-watershed. A critical mass, a density of protection, is required for physical impacts. If only every third field is partially protected; if gullies are not stopped; if rehabilitation and reconstitution works are not developed in the worst areas -- then the erosion problem and hydrological destabilization continues and worsens.

There is little evidence that these four requirements have been met in USAID/Haiti's Hillside Strategy, which is still in search of a definition and grounding in the Haitian context. Agroforestry I was to achieve the first two requirements above and Targeted Watershed Management was to aim at the last two. They have been quite timid in their approaches.

5. The GOH and the Hillside Strategy

Haiti's government agencies concerned with development have never been truly effective for the same reasons as in other poor countries. Salaries and conditions are miserable and there are virtually no funds for services and enabling infrastructure. Lack of accountability, nepotism, and deal-making seem to be basic features of many past governments of Haiti. Honest, responsible, and rigorous development work, especially conducted within Haiti's power structure, has been virtually impossible, though individual officials always provide refreshing exceptions to an ineffective and rather moribund system.

There are some good reasons why USAID chose to virtually by-pass the GOH system for rural development projects. The result has been the overall worsening of USAID-MARNDR relations at the operating level. Without USAID support, the Ministry cannot bolster and train its cadres; cannot attract back from the "outside" competent and trained Haitians; and cannot maintain regular and routine research, extension and related services (many of which were just getting bolstered and enhanced in the mid-1980's with USAID assistance).

The MARNDR was barely coming out of its decades-long historical neglect and malaise--and hardly had a chance to prove itself. Indeed, USAID seems to have had an equally difficult experience designing and implementing workable rural development activities with or without GOH participation. USAID is now tending to think in terms of continued development efforts without MARNDR. However, a continuation of non-participation as a result of non-assistance to the GOH line development agencies may be a mistake for several reasons. First, foreign PVO/NGOs are in business for their own reasons. The administrative and technical assistance structures normally do not encourage senior Haitian participation, are often top-heavy and have been able to avoid the high degrees of accountability normally required of them by USAID. Institutions like CARE, PADF and Save the Children have more clout in Washington than the agricultural section of USAID in Haiti.

Second, the share of aid funds actually reaching the farmer in a productive way may not be less through the GOH than through existing PVO/NGOs, if payment after performance is adopted. Additionally, PVO/NGO senior officials often do not have the technical skills in engineering, agronomy, and extension that are needed. They are not always the best prepared to foster effective economic development -- if only because their continuity can be challenged at any time. Lacking conceptual, technical and managerial skills in the substantive issues, their leadership visions and capabilities suffer.

Third, a dominant feature of rural/agricultural/soil conservation effort in Haiti is its piecemeal, fragmented nature. Each of the hundreds of groups is doing its own thing, trying its own system, developing its own policies and trying to achieve its own objectives. The GOH must plan and coordinate, and ensure basic commonalities in strategy and design. The continued support of PVO/NGOs by external agencies severely postpones further and makes yet more difficult the formulation, articulation, and implementation of national strategies and development processes.

It is in both Haiti's and USAID's longer-term interests to begin to think out ways to gradually re-adjust this institutional structure. Changes could evolve under a more sympathetic political environment. Payment after performance would be a good place to begin. A new cooperative agreement using this principle as a cornerstone is in order. USAID has world wide experience in dealing with "difficult" host governmental circumstances. A strategy of approach and action needs to be worked out in meeting these contingencies successfully. Haiti is a good place to start.

Chapters II and III evaluate the specific projects in the Hillside Portfolio. Chapter II provides an evaluation of the Agroforestry I and II projects and the Local Resources Development I and II projects in depth. It also reviews the progress and problems of five other projects in the Hillside Strategy. Chapter III provides an in-depth evaluation of the Targeted Watershed Management Project.

II. HILLSIDE PORTFOLIO PROJECTS (EXCLUDING TWM)

A. Introduction

The purpose of this Chapter is to present the results of the Evaluation Team's examination of the projects in USAID/Haiti's "Hillside" portfolio other than the TWM Project. The Evaluation Terms of Reference called for a special look at the USAID-supported projects, including the agroforestry and resource development projects, plus quicker examinations of several more modest efforts. These projects provide the context for the TWM Project as it was to be built on their successes.

B. Agroforestry I and II

1. Overview

Haiti has many problems. Indeed one expression used by both the upper and lower classes (there is no effective middle class) is the proverb, "behind every mountain there is another mountain." This implies that problems are interlocked and the attempted solution of any one problem may not arrive at the desired result because of the contextual situation in which the problem is imbedded.

USAID manifested its intention to help in the solution of one aspect of Haiti's problems when it developed the Agroforestry Projects (I and II) to achieve sustainable increases in on-farm productivity and farmer income, as the present level of over 80 percent of farmers income is somewhere between $60 to $100 per year. To do this in Agroforestry II, USAID intends to integrate into existing farming systems appropriate land use and soil conservation measures involving trees, shrubs, grasses, and other plant materials which will enhance soil fertility (see item 13 Project Data Sheet authorizing Project 521-0217) and to institutionalize this demand. Agroforestry I (Outreach) has already carried out "tree" outreach activities for several years.

Thirty million dollars are to be spent over a five year period (1990-95) in five major areas in the Agroforestry II Project which continues the work of the Agroforestry Outreach I Project (Project number 521-0122). Included are nursery production, seed and germplasm improvement, outreach and extension, training and research.

The implementing agencies and their responsibilities are as follows:

- The Pan American Development Foundation--PADF gives contracts to 79 NGOs to produce seedlings and provides extension support to secure a good outplanting. They have thirty-one seedling production contracts, 79 extension contracts and have thirteen years' experience in Haiti. They use some 873 agents to reach 29,000 families per season.

- The Cooperative for American Relief Everywhere--CARE maintains 14 centralized nurseries. They have projects in five operating regions and have 300 agents. Assuming a caseload similar to PADF, they touch about 18,000 families.

- Auburn University--Auburn University is occupied with the research component of this project using six expatriates and six technicians to meet the needs of PADF and CARE. The International Resources Group (IRG) is a part of the Auburn University research project. IRG uses one expatriate and three local staff to control quality of seed and outplantings. Five major sites have been selected, and fifteen seed orchards are planted or are to be planted.

The work of these three agencies is to be coordinated by a Management Committee and a Research Committee. The sections immediately below describe and analyze primarily the work of PADF and CARE. The work of Auburn University is reported separately in Section C.

This type of agroforestry project is not new to Haiti. FAO/UNDP sponsored an erosion control/reforestation project (HAI 72/012) near Les Cayes. It set up a nursery (LEVY Farm) and erosion control structures. The latter was paid for by Food for Work. According to the Project Paper 521-0122, page 15, not much written information is available about this project, however.

In 1977, FAO/UNDP pulled out of Les Cayes and started a project in Limbe (HAI 77/005). It focused on watershed management and hillside agriculture, and featured an eleven hectare demonstration parcel. The use of bench terraces, hillside ditching, and contour planting was advocated. Some fruit trees are being used. Food for Work is used for payment for construction work and agronomic assistance is given to farmers through FAO/DARNDR. Training is provided at all levels with a center constructed by Swiss financial help.

Other schemes have been proposed. In 1981, for instance, the Government of Haiti proposed the National Association of the Friends of the Tree. The IADB, the World Bank, the Fonds Agricole and many private voluntary organizations have also been involved in tree planting. Community councils and groupements have also been active. Depending on who provides the data, there have been as many as one thousand identifiable efforts to plant trees. About three hundred of these efforts are extremely active at this time.

2. Project assumptions

The organizational instruments and the functional components of the project were predicated on certain assumptions about the peasant as follows:

- Haitian peasants are the managers of complex farm enterprises;

- The unit of production and consumption is the peasant household;

- The overwhelming majority of peasant households has secure access to one or more plots;

- Peasants are not subsistence farmers but are fundamentally market-oriented producers;

- Peasant lands are under utilized in certain respects particularly in terms of their potential for the cultivation of hardy, deep-rooted, perennial species;

- Peasants are risk averse but seek to spread risk through the diversification of the farm enterprise;

- For most peasants labor is the least scarce factor of production;

- Peasants are staunchly self-interested and will work hard to improve their own lot;

- Trees occupy a special place in peasant life and culture;

- Relatively near-term regular cash returns are not the primary peasant production goal;

- Trees have supplanted pigs and livestock as a store of value;

- Trees are being used for: domestic use, to improve soil conservation, provide shade for coffee groves, and serve as a lazy man's crop since labor is scarce;

- Goats kill most trees which are planted;

- Peasants are interested in a variety of low input soil conservation and land improvement techniques; and

- Peasants use hedgerow for green manure, mulch, forage, and firewood.

3. Expected achievements

By the end of the project in 1995, the following quantitative accomplishments are expected according to the Project Design Paper:

- An increase in seedling survival rate to 50 percent after one year, from a rate of 42-45 percent officially recorded under the current Agroforestry Outreach Project (AOP). (This is already being offered as the official rate by PADF and CARE although the first planting season under the new program was hardly completed);

- An increase in the number of hillside farmers planting trees, shrubs and grasses to 400,000 from the estimated 200,000 who presently do so under the AOP;

- Two hundred thousand farmers effectively practicing agroforestry techniques, including planting new multipurpose trees, hedgerows, and forage species; and

- Fifty thousand project participating farmers practicing on-farm plant propagation, including direct seeding, stem and root cuttings, stump-propagation, and bare rooting.

In addition, a number of qualitative achievements are expected to take place. These include:

- Continued improvement in the local genetic resource base for tropical forests species through the production of seed by the seed orchards established under AFII;

- Effective operation of a central seed processing and storage facility for each of the grantees;

- Strengthening Haitian capability to manage the of productive natural resource base through the intensive training of agronomists, agricultural technicians, extension agents, and peasants;

- An increase in the volume and variety of wood products produced by hillside farmers to increase household income. At present, reliable data on either volume of production or household income are virtually non-existent;

- Establishment, by PADF and CARE, of pilot environmental eduction programs in selected, interested regions; and

- Plan for oil palm and other endangered species to provide biodiversity.

However, difficulties will arise in measuring these achievements because of the monitoring and evaluation provisions of the agreement. These are left in the hands of the research and implementing institutions. It is their responsibility to present the information in a readable form to USAID on a timely basis. The criteria to be reported on are the following:

- Number of tree seedlings produced and distributed;

- Number of participating farmers;

- Number of linear kilometers of hedgerows; and

- Number of hectares protected by soil and water conservation measures.

Other details are left to the PVO regional and field offices. Since annual reports describing essentially the above will be submitted and these reports will be reviewed, what actually happens in the field, at the farm level, may

never actually be reviewed by USAID, as was the experience in Agroforestry I. The usual external evaluations based on that paper work are projected. Project goals such as soil conservation, growth in farmers' incomes and sustainable development will not be assessed.

There are other issues in the approach to agroforestry, such as "who should implement?" For example, the contract is being reserved for CARE/PADF because of the bases and community presences which they have developed. It cannot, therefore, be given to another contractor through an open and competitive bidding process because there are no community presences and bases which are readily usable. Also, the GOH might object because the new prospective grantee may not be an NGO, though NGO status is relatively easy to obtain as proven in the Cayes area where four NGOs arose virtually from the ashes to receive money.

Finally, the Agroforestry II project does not appear to have overcome some of the limitations of Agroforestry I, particularly the need for attention to the "agro." While USAID had some clear ideas about new features to be incorporated into the Agroforestry II program, these are not yet evident in field activities. For example, while more hedgerow activity should be built into Agroforestry II, unless it is properly done by trained extension agents (not yet on staff), it might be counterproductive.

4. Project activities

There are five principle project activities:

- Nursery production--The necessary seedlings and other cuttings to serve for planting material will be obtained via the nursery production activities. There exist 45 regional and 30 community level institutions across all of Haiti carrying out this activity.

- Seed and germplasm improvement--This activity will supply farmers and nurseries with high quality planting material. Two seed orchards will be organized and a central seed processing and storage facility created.

- Applied research and technology--Hedgerow technology for soil conservation on farms and catchment basins are to be generated and findings as to how to deal with fragile lands will emerge.

- Outreach and extension--This activity will distribute the seedlings, cuttings, seed and technical assistance provided by the project so that peasants will have additional options for management and production on their plots.

- Training--Project coordinators and animateurs working directly with the peasants will be trained in the practical skills to present, in a pragmatic fashion, the products of the project in an effort to persuade the peasants to accept the project offerings.

5. Questions yet to be answered by the project's experience

There are a number of questions to be answered regarding the agroforestry programs. Those listed below are those which program administrators seriously need to answer if project targets are to be reached.

- Is Haiti's ongoing degradation of natural resources being reversed and is the productive potential of land starting to be maximized?

- Are Haitians planting and maintaining substantial numbers of trees and will they continue to do so once the project ceases?

- Has any tree planting made major contributions to soil conservation, increased supplies of wood or rural income generation?

- Are trees being planted and harvested as a cash crop. Has this cash crop factor been appreciated sufficiently to generate any wide scale increased planting?

- Have the University of Maine or Auburn University contributed meaningfully to the development and improvement of the condition of the rural and hillside poor?

- Are the PADF and CARE models effective in dealing with the peasant population?

- Is tree planting for cash (via charcoal, wood, etc.) sufficiently profitable in the short-term to attract entrepreneurs?

- Could the agroforestry NGO exist if USAID funds were terminated?

- Is there a positive real rate of return from the agroforestry exercise?

- Will every nine million dollars invested by A.I.D. result in $35 million worth of benefits (data from Agroforestry II documentation), and will this further generate another $12,000,000 dollars worth of revenue in the countryside as is stated in the project document?

- Is there a need to juggle the survival rate by introducing the new concept of standing rate since trees are being cut after six months for gainful purposes? (PADF has since removed this concept);

- Has the $3.9 million spent on the Agroforestry Resource Center produced an acceptable return on investment and how has PADF made use of the center in program activities?

- Is there indeed a big difference between tree distribution, tree planting, and tree survival, possibly on the order of 100, 50, and 15?

- Are the training programs improving animateurs' ability to assist their clients?

- Have the extension services of these projects produced significant results?

- Have these projects significantly improved the standards of living of many local farmers?

- Have these programs benefitted the landless and land-poor peasants most in need of assistance?

- Has the "Agro" in Agroforestry been neglected and would a focus on that have contributed more to soil conservation, increasing levels of productivity and farmer income?

- Have the trees generated by the project contributed towards reducing the drought and semi-drought conditions existing in the Northwest and Central Plateau?

- Have leguminous species actually restored soil or soil fertility by an identifiable, quantitative percent?

- Have the trees planted helped farmers to enter a subsistence economy or, better yet, a market economy? Is the program confusing the peasant's need for cash to say he is in a market economy?

- Does the one acre/one carreau farm lend itself to a tree economy?

- Can the claimed rate of success be quantified?

- Has the use of expatriate dominated PVO/NGOs not smothered the development of local personnel? and

- Has the apparently modest percentage of total monies spent on local personnel and locally procured project inputs made much impact on the Haitian economy?

These questions must be answered in detail before a clear picture of the success or failure of this strategy can be developed. There is no doubt that Haiti needs a good tree planting and vegetation restoration project. Lack of trees and vegetables combine with population growth, erosion, shrinking farm sizes, and soil exhaustion to create an ever-increasing environmental harshness in which other adverse factors such as african swine fever, coffee rust, natural disasters, and extractive depredations of large landowners can readily flourish.

The new Agroforestry II Project attempts to meet this crisis in the agrarian system. But as it is only an incremental increase in agroforestry activities, it cannot really meet the need for a total attack on the shortcomings of the farming system.

6. Findings and Conclusions

a. Introduction

Contrary to general belief, the 11,000,000 trees produced by this program in 1989 were not intended to reforest Haiti. Program administrators distinguish between reforestation and social forestry or agroforestry. The project is now being interpreted as covering the latter two categories.

Agroforestry, as the Evaluation Team understood it, is a combination of trees and agriculture on the same piece of land at the same time or in sequence to secure optimum land use. This can only be achieved by good land management. However, the approaches employed by both CARE and PADF do not involve land management. Thus, no specific plan to arrive at a judicious use of products and yields while enhancing the quality of the environment clearly emerges at the overall level, the regional level, or the site-specific level. This is the major failure of the project--the inability to arrive with a technology or intervention to meet the site-specific needs of small land holders. The agricultural component of the Agroforestry Project must be made real.

This project is an attempt at the environmental enhancement of rural Haiti. Land values increase when trees are present. The exact amounts are yet to be determined, but trees on the land has nudged the value of rural land upwards. It is clear that the project must continue. For it to continue successfully, however, the issues and questions raised above should be answered. The demise of Peter Welle through illness and the departure of several good field staff, some to join PADF, CARE and USAID, raises serious concern as to the capacity of CARE to carry out the agro-forestry project. None of the people the Team encountered in the CARE management structure, especially those recently promoted or hired from U.S., appear to have all the skills, management capability, or technical capacity to develop the conceptual approaches necessary to implement the technical interventions and site specific actions which would be involved.

b. Accomplishments to date

Agroforestry and soil conservation technologies can provide multiple benefits on a farm. These include cash income, food supply, energy supply, shelter infrastructure, assist generation of savings and investment, raw materials for crafts/cottage industry for home use or sale, social production, positively affect the labor profile, improve land utilization and soil fertility values, and positive effects on water balances. To date, the Agroforestry Project has accomplished the following:

- A good to excellent tree production system. It will be superb if it can deliver valuable tree species which meet peasant needs and which meet climatic and soil conditions;

- Training of many people in nursery work, peasant animation, etc. This provides rural Haiti with a cadre of people who have been exposed to different ways than the traditional ones. This group will be a tremendous building block in any sustainable economic development project; and

- Institutional development among groups dealing with PADF. Persons are being trained to meet standards of external PVOs. This could be invaluable in future working relationships with the external world and in the design and operation of their own internal systems. Haiti could use much more of this--good internal systems that work.

- Participation by peasants in the program to produce and deliver products within the short window of opportunity provided by the weather. The fact of participation in a system augurs well for any future systematic development in the country nationwide.

- Promotion of trees as a crop, thus adding a new dimension to the Haitian range of alternatives. By teaching care of trees it may encourage peasants to see them as a resource which could be beneficial if properly used. Many amateurs, coordinators and farmers are being trained. The value of this community service and the groupement factor for future rural development is inestimable.

- Payments made by task to field personnel which builds a work ethic. There is follow-up so they learn how to do their job better. The payment by task system should be extended up the line to the program managers wherever practicable.

- Attainment of self sufficiency/survival levels in fuel wood production. The program has not begun to measure that component yet, although it is beginning to be significant especially in local peasant production. In the same spirit, farmers' need for poles and wood are being realized, albeit slowly.

- Inclusion of a component which says it is "farmer driven." Insofar as that component guides program operations it is good. Responsiveness to farmer needs--hopefully can carry over into the emergence of a hither to nonexistent farmer/rural force.

- Determination of land ownership by trees around farms. This is a start in solving the extensive problem of who controls what area. Every case that is defined by trees is one less instance to be ultimately reckoned with.

c. Tree survival rates

Perhaps the most controversial aspect of the Agroforestry Project is the survival rate of trees. After a number of field visits, the Evaluation Team concluded that economic calculations on which the project is based appear to be questionable. For example, fifty million trees benefiting 400,000 farmers were projected. It was assumed that each hectare would contain 2,000 trees, of which half would be used to make charcoal and half to make posts. However, after 10 years of project experience, 2,000 trees cannot be found on any hectare in Haiti. Thus, to transpose this 2,000 tree/hectare estimate to 10,000 hectares skews the results.

Many Haitians are dubious about the existence of the millions of trees claimed to have been planted. Several persons who have questioned these claims (former Project Advisor Richard Pelleck and SECID researcher Pierre Rousseau) have left their positions. Some expressed the belief that figures for the survival rates had been exaggerated so that the Agroforestry I Project would continue to receive grants. It was asserted that the lack of accountability is a result of the project being funded by a grant which required less accountability than might exist under other circumstances. However, the project has not transferred much money to Haitians, as most project funds are handled by foreign PVOs or foreigners in the local NGOs.

The question of tree survival rates required a second trip by the Team Leader to Haiti in July 1990. At this time PADF made a special effort to showcase the project. Extensive trips were undertaken to Region 1 Les Cayes, Region 5 Mirabalars and Las Cahobas, Region 3 Terrier Rouge and the vicinity of Cap Haiti. Nothing the Team Leader saw led him to conclude that the tree survival rates should be substantially changed from the Evaluation Team's first estimates. This second visit confirmed that large numbers of trees reported are not evident in the field despite the 80% survival rate claimed in CARE's 1989 Annual Report (now 50% in the most recent meeting with the team leader) and the 50% PADF survival rate reported by CARE. Overall, the survival rate appears to be 10-15%.

The Team Leader interviewed Ron Smith, an expert with 15 years experience in tree planting in Haiti, who said in the presence of the PADF Director, the USAID Project Officer, and the USAID Evaluation Officer that under optimum conditions in the plain Linbe a 35% survival rate was being achieved. There were exceptions, including several church groups, a magistrate, and one person who had worked in tree planting programs and inherited some land, who had about 300-400 trees. What appeared to be the rule was the farmer who had 150 trees standing plus 25 that he had cut and which were growing back. He, however, had received 750 for a survival rate of less than 25% in the most ideal of conditions in the plains. PADF either did not have many hillside plots or the Team Leader did not see them. On the hillsides, however, the actual survival is closer to (2%) two percent and so put to question the contribution of PADF to the Hillside Strategy.

CARE's hillside growings were meager. The Team Leader and CARE personnel drove for 16 hours in Regions 3 and 4 of the N.W. and saw about a thousand trees. CARE did show the Team Leader a site with approximately 200

seven or eight year old neem trees growing, but CARE has only been in that area for about 4 years. Even if the 50% survival rate claimed by CARE and PADF were accepted for the sake of argument, twenty-seven million dollars were spent (excluding USAID ADO direct costs) on the project. The project by the admittance of its executors is either half successful or half a failure. Annex 9 provides a detailed explanation of the methods used to calculate the survival rates for both CARE and PADF project activities.

The Project was not really a hillside project. There were some trees around homes which may have been grown without the project. There were also some trees around boundaries which could be ascribed to the project. An occasional farmer had 25-40 trees which he was pollarding for firewood needs, but that was it. The few project trees existing on marginal land are beginning to show signs of stunting. This may be caused by insufficient soil, the inability to penetrate leechates, or other factors. Program administrators have not noticed this problem yet.. But the fact is that these trees will never become pole or plank making material. In sum, the hillsides of Haiti continue to be bare. The social and economic assumptions underlying the project have been invalid or have become invalidated over time. The Team was unable to find any Haitian sociologist/economist willing to say that these assumptions continue to be valid--yet the program is predicated on them.

There are other issues as well. The pattern of plantings do not contribute to soil or water conservation. The pollarding technique and the fine leaves of the species also accelerate this feature. To assert, as PADF managers have, that trees planted around a house had changed a micro-climate and were, therefore, a program "benefit" seems far fetched. Fruit trees and valuable trees (teak, cedar, tavernon: Lysillonia latisiliqua (L) Benth and acajou swietenia mahogani (L) Jaq) continue to be neglected. So too are cash crop trees including cocoa, coffee, and coconut. Moreover, the assumption that trees will grow in marginal land where crops will not grow is not proven. For trees to grow in these areas, special interventions are needed such as are being employed by Brice Gaspard in region I. Finally, the expensive model of delivery by foreign PVO's is not in the long-term interest of the program.

d. Economic impacts

The goals of raising farmers' incomes and standards of living are not yet attained. More importantly, even if the project is 100 percent successful, farmers' incomes may not rise enough to be of substantial benefit. Actually, peasants have decapitalized in the last few years. Perhaps the sale of older trees will improve this situation, but not enough older trees are available to make an impact. The program has no impact on the significant numbers of peasants who are landless, landshort, or have insecure land titles.

The program has not evolved to meet economic opportunities. For instance, since nursery technology is widely available one would have expected to see the emergence of flower production for urban centers and ornamentals for export, but this is not the case. The projects have not really looked at trees from the perspective of forestry products production. Tree species have not been planned for uses such as furniture production and carving. Had this

been done, quick maturing, relatively large revenue-generating species like teak, blue mahoe and cedar would have been more widely utilized. Moreover, gearing the species more to the economics of tree and forest products might provide greater incentives for the farmers to plant trees.

The Evaluation Team concluded that program development has been hampered by a "temperate zone" perspective and a failure to consider alternative economic possibilities available from forest products. Potentially valuable foreign inputs have been ignored. Thus, a fast growing species such as teak has not been introduced because it is unfamiliar to the program directors. Ten year old teak trees in Trinidad and Tobago are being sold to the Scandinavian countries for use in veneer. Similarly, blue mahoe, a species which flourishes in Jamaica, is a beautiful wood for carving and furniture. However, it is not a major component of the activity despite the demand for wood for carving and furniture making which are far more profitable than charcoal making.

Fruit tree production has also been de-emphasized. Not only can such production promote soil conservation and provide shade, more importantly fruit trees can provide fruits year round to improve the rural food supply. They can also increase income generating opportunities and have the potential to increase other agriculture-related activities such as honey-making, production of leaves for green manure and insecticides. At present, the program is producing 5% fruit trees. This is surprising in that fruit trees are most easily adapted and cared for by farmers. One good example is the dire need for Malayan dwarf coconuts. However, the coconut does fit into a plastic bag used by the project or in root trainers, and is not suited to stump propagation. Thus, the technology employed has driven the needs of the program and, by definition, eliminated coconut tree production.

e. Seeds and seedlings

After 10 years of operation the program is still in need of seed sources. The person in charge of this activity has been in Haiti in forestry on a continuous basis for more years than the program has been in existence. However, this work has not resulted in a seed source capable of meeting genetic and bio-diversity needs. Similarly, after 10 years peasants were only just being allowed to grow their own seedlings. In Region One of PADF (run by a Haitian) this practice has been most successful. It is not clear whether there will exist a need for the PADF superstructure and its infrastructure of regional nurseries if the peasants are growing all their own seedlings and planting them. If not, the bulk of the money could be redirected into animateur or peasant activity. Whether PADF is willing to do so is not clear.

Haiti's tree problems may be categorized as follows:

- An absence of trees in high altitudes;
- An absence of trees in saline soils;
- An absence of drought resistant trees; and

- An absence of trees which are useful in agroforestry, e.g. flowering trees useful for honey production, etc.

The program, however, has not addressed Haiti's problems in this fashion. Originally the same mix of trees were given out. Now some consideration is being given to what peasants want, e.g. eucalyptus for making poles. An effort is being made to accommodate peasant needs along these lines. At the request of the Team, a list of trees relevant to the above areas was provided. It is to be hoped that these trees will be produced by the nurseries and will be distributed appropriately.

f. Hedgerows, forage, and alternative forest activities

The question of hedgerow production by the program should be reviewed in the light of hedgerow production experience in Haiti and elsewhere. The project implies the use of other conservation techniques like hedgerows. It is difficult to get farmers to use hedgerows in the best of circumstances. Poor use of hedgerows can lead to gullying. As slopes become steeper, hedgerows have to get closer together. In slopes greater than 35 percent, hedgerows four meters apart is recommended. Even at that distance, there is little room for an actual agriculture. Slopes over 50 percent call for spacing two meters apart. If this is done, 1/3 of Haiti will be one large hedgerow.

The question is, should this be done at all? Perhaps it would be better to find alternative lands for the farmers or to cover the hillsides in forage and pasture and devise some system of raising animals. These alternatives are not being addressed. There is talk of utilizing hedgerows for green manure, but a green manure that in itself is deficient in nutrients will not provide the nutrients needed for the soil from which it came. The program is generating a false sense of security. Program targets should be examined and revised because they cannot be reached if they start from false premises.

The major fallacy in the assumptions of the project is that seedlings dispensed by the project will grow into trees on marginal hillside lands where food will not grow. This is not correct. At best, these areas recover their green outlook from invading suitable shrubs. The areas might be able to carry forages as these require less soil and can survive on fewer nutrients than can agricultural crops.

Forage coverage on these hillsides with bunch grass could help, but the effort to establish these have not yet been demonstrated in Haiti even in the less hostile environmental conditions of the Les Cayes watershed. Program administrators have also not established the rationale for this kind of activity. The Team found no studies which would support the conclusion that a farmer could be convinced to turn his hillside plot into a forage producing activity. The whole technological package for grass remains to be determined and above all the actual achievements of the proposed technological packages in field trials still remain to be seen. Whether grass as a replacement for agriculture can ever raise income levels above what agriculture used to supply is not yet clear. Similarly, it is not clear what income level forage

production will produce, and whether this will support farmers and their families.

Alternative forest activities on these marginal lands have not yet been established. The management plans are in need of "debugging." Specifically, despite the claims, not only were very few trees visible during the Team's field visits in CARE and PADF areas, but none of the following issues have been successfully addressed by PADF, CARE, or SECID--although the ability to do so is not out of the range of their competence or experience.

- The optimum time for conversion of plants to fuel wood or charcoal;
- The correlation of soil characteristics and plant species to be placed thereon;
- A determination of the income producing potential of existing trees;
- Preferred utilization patterns for standing wood biomass;
- Pruning and coppicing techniques to enhance wood and biomass levels;
- Stands management, especially on marginal lands, and the use of ground cover under trees for pasture; and,
- The judicious use of fruit trees, including valuable hardwood species, and coconuts, etc.

7. Recommendations

- Conduct an audit of the tree survival rates to determine why hillsides have only a two percent survival rate.

  USAID should also assess the responsibility for these low numbers and develop a a plan to improve the survival rate and assure more accountability in the future;

- Focus on the production and possible export of forest products.

  USAID should hire a technical specialist with extensive experience in forest products production and use the agroforestry research team to develop possibilities in this area;

- Place more emphasis on fruit trees.

  The Project should investigate fruit and nut trees in addition to mango trees. Farmers want to plant more fruit trees, but wish to do so near their homes in order to protect against thieves or goats. Fruit trees may also be planted in gullies or potential gullies and used to slow water flows by laying branches or other

plant matter across their trunks. Neem trees may also be appropriate for the production on neem-based insecticides;

- Stress seedling survival.

  Farmers should be encouraged to place seedlings in temporary nurseries near their houses for the first 1-2 years in order to reduce the chances of theft or goat damage. After this period the trees can be transplanted to their permanent location. Farmers should be taught how and when to transplant the seedlings and how to maintain them in these temporary nurseries. Trees should be planted in groups or interspersed along hedgerows or property lines rather than as "occasional trees." This will further increase their chances of survival; and

- Expand hedgerow plantings.

  Additional hedgerows will retain soil that would otherwise be lost to erosion and will provide sources of fodder and biomass. As noted above, fruit trees or other trees may be interspersed in hedgerows in order to provide an additional source of food or plant matter.

C. Agroforestry Research Project (SECID/Auburn University)

1. Overview

The objectives of the Haiti Agroforestry Research Project funded by A.I.D. through Auburn (SECID) are to reduce erosion, improve agricultural production and raise farm income. This is done by carrying out the research required to facilitate the implementation efforts of CARE and PADF, and is therefore discussed as part of the agroforestry package. Auburn has approached its task through the following activities:

- Acquisition and diffusion of information on agroforestry systems;
- Associated tropical crops;
- Nursery production;
- Economic processes;
- Socio-cultural factors; and
- Extension work.

The project had a false start in November 1987 and began for the second time in June 1988. The November, 1987 - December, 1989 staffing pattern in SECID included a Sociologist/Chief of Party, a Resource Economist/Deputy Chief, an administrative officer, a nursery specialist, a tropical agronomist and an agro-forester. There are also six assistants and five field assistants in different communities, two with CARE and three with PADF. The

new team combined the agro-forestry and agronomy position, dropped the long-term economist position and added a germplasm position.

This team, through systematic research for CARE and PADF, expects to produce:

- Greater agro-forestry production;
- More resilient seedlings;
- Less erosion;
- Increased participation; and
- Improved extension efforts.

Activities outside the Petionville headquarters occur at Bombardopolis (agronomy, agroforestry, social and economic), Mirabalais (agroforestry, economic and nursery), Vialet and Maniche (agroforestry, economic and social), and Bassin Bleu (sociology).

2. Project activities and work accomplished

In the first six months, the team developed field methodologies, collected primary data, and analyzed economic benefits and nursery production. All this work was carried out in a collaborative and cooperative fashion. Specific activities are described below.

a. Research on the economics of agroforestry impacts

In each of four regions of Haiti twenty or more farms have been examined. Basic information has been gathered among farmers on such agroforestry operations as woodlots, borders, hedgerows, and alley systems. Opportunity costs are being calculated. Probable yields and prices have been estimated. Socio-economic data includes that on labor use, planting and land use patterns. Four studies have been completed, and four are currently being carried out.

b. Expanded socio-economic baseline study

The socio-economic baseline study was designed to measure the socio-economic conditions in a community before agroforestry was initiated. The households studied could then be re-studied or compared with those where agroforestry had been in place for some years. One hundred households have been studied in the Bassin Bleu area, most of them in very remote areas. Information has been collected on household composition, property, labor inputs and costs, use of agroforestry and selected attitudes and experiences. Because interviewing progressed so well in the areas selected for the economic impact study, an additional 150 sociological interviews were recently completed in three of those areas. Data from these areas, which have had agroforestry for some years, will be used in comparisons

with Bassin Bleu. Valuable information on household agroforestry has been gathered and is being analyzed. No formal publication has yet been made.

c. Nursery research

Five major nursery studies have been completed involving container and potting mixes, nursery inoculation with nitrogen-fixing symbiotic microorganisms and seedling growth. Six more studies are in progress. The container and mix study determined which combination of containers and mixes are best suited for the AOP. The results will increase seedling production and decrease mortality, saving substantial resources by producing more trees at less expense. Companion studies will use the same seedlings to examine planting stock effects on field growth and survival. Preliminary results have recently come from the nitrogen-fixing study. Under certain conditions, inoculation with such a "natural" fertilizer provides for improved tree growth and that of other plants.

d. On-Farm research in agroforestry

On farm research is examining specific tree-crop-site relationships within different systems used by farmers. Five studies have been completed; there are more underway. The agroforester and tropical agronomist have developed and adapted methodologies suited to Haiti and are concluding a comprehensive descriptive survey in which farmers' cultivation practices are considered as treatments. A minimum of 20 farms in each of the four areas are being measured for such characteristics as landform, location on landform, soil parent materials, apparent fertility, texture, rockiness, depth, moisture regime, erosion, slope, elevation, and aspect. Information has also been acquired from farmers about their management practices before and after the establishment of tree/crop systems. These data provide basic information required for field trials. A number of farmer-managed or superimposed trials have been organized and are in the process of being set up. The results will indicate the most effective ways to implement appropriate packages of technology for different sites.

e. Contributions of short-term technical consultants

Short-term technical consultants from the Auburn School of Forestry staff and elsewhere have been used to help conduct the research. The seven short-term consultancies include those on silviculture, rhizobium inoculants, forest pathology, socio-economic research, logistics, and on-campus research and support of efforts.

f. Additional AOP support services

The SECID/Auburn team has worked closely with the field and central staffs of CARE, PADF, and sometimes those from other organizations under a wide range of conditions and on a variety of subjects. Useful monthly technical/research coordinating meetings are held with CARE, PADF, USAID, and ARD staff. They are routinely contacted for advice, suggestions, and other support on numerous aspects of agroforestry activities. The bulk of the team's field activity has been accomplished with local PADF or CARE staff.

In short, the SECID/Auburn team feels that it has been progressing extremely well and is meeting the needs of Haiti and of the grantees. Collaboration with CARE and PADF is successful and is intensifying. Greater contributions can be expected but more time is required to accomplish the research needed to benefit agroforestry in Haiti and be of use in other comparable regions of the world.

In 1989, the first complete year of operation, a new dimension was added to the original objectives--help Haitian peasants use agro-forestry technology. On review, it is now stated that implementation of this objective is clearly a CARE/PADF function. In the course of the year, their long range goals were further refined as follows:

- Improve the production of vigorous planting stock in the decentralized nurseries operated by non-governmental organizations;
- Develop ways to promote the planting and maintenance of trees within integrated production systems on small farms;
- Improve understanding of the economic and social aspects of agroforestry in Haiti, and of current and potential participant groups, organizations, and communities; and
- Enhance extension resources and methods.

To do this, research was advocated and pushed in the following ways:

- Determining and ranking, in collaboration with CARE, PADF, and A.I.D., major issues in agroforestry requiring research;
- Reviewing available data on the characteristics of potential sites, species, and populations and accomplishing a preliminary reconnaissance of them;
- Selecting and modifying methodologies appropriate to Haiti;
- Determining the role of local assistants, recruiting, and training them;
- Operationalizing and pre-testing instruments in the field;
- Gathering data with on-going monitoring and evaluation;
- Doing initial coding and analysis of data;
- Carrying out selected re-evaluation and recording of data;
- Analyzing results;
- Releasing research reports; and

- Working with clients to apply the results in current and future implementation and research programs.

3. IRG Component

The Haiti Seed and Germplasm Improvement Project was implemented by International Resources Group, Ltd., under USAID Contract No. 521-0122-C-00-7077-000. The project was initiated in May 1987 and completed in December 1989. Virtually all Project activities were designed to complement the extension efforts of PADF and CARE. The main foci of this germplasm project were:

- Conservation and genetic management of native tree species in Haiti through controlled seed collection, genetic testing and seed orchard establishment;

- Genetic management of exotic species used by the USAID Agroforestry Outreach Project (AOP), through introducing and testing new provenances, selecting and testing superior individuals of superior provenance, and establishing orchards to ensure adequate seed supply; and

- Building and infrastructure to ensure sustainable production of improved germplasm in Haiti.

The accomplishments of the Project included:

- Selection of 343 parent trees of 20 species;

- Establishment of 11 seed orchards;

- Establishment of 25 progeny tests;

- Establishment of 101 provenance trials;

- Establishment of seed testing and storage facilities (in conjunction with PADF);

- Preparation of a long-term plan for tree improvements in Haiti; and

- Preparation of a management plan and conservation strategy for Attalea crassispatha, an endangered palm species.

Consultancies were conducted to address special problems in the areas of tree improvement (2 consultancies), data management (1), tropical seed technology (1), conservation and management of Haitian palms (3), and diseases of coconuts (1). Additionally, research was conducted in azadirachtin levels in Azadirachta indica seed to assess the possibility of developing a commercial source of bioinsecticide.

International conferences on germplasm development and tropical forestry research were attended in Zimbabwe, Thailand and Puerto Rico. Participation in these conferences facilitated the integration of current knowledge into project design and development. Relevance to the specific project goals of raising farm income, reducing erosion and improving agricultural products is not clear.

4. Findings and conclusions

Research has always been presented as a needed component in Agro-Forestry/Targeted Watershed Management issues. At one time, Operation Double Harvest, CARE and PADF were all conducting their own research. The results were diffuse, so SECID was contracted to execute this component. What they will succeed or attempt to do beyond what the University of Maine--one of SECID's predecessors in Haiti--accomplished was not totally clear to the Team.

The basic research task is simple. USAID is interested in raising farm income, reducing erosion, and improving agro-forestry production. Research is being undertaken to arrive at these goals. SECID's purpose should be to help make those goal attainments possible by providing direction to the activity. This should come from an examination of current research, and an analysis of what needs to be done. SECID's work should provide clear recommendations concerning the best way to meet program objectives.

The basic question facing SECID is how a low output agriculture can be converted into a high-output intensive agriculture through the utilization of an Agro-Forestry component as practiced and promoted by PADF and CARE. In pursuing these goals, SECID has published eighteen reports and papers. A content analysis of these raises the following questions:

- Could this research have been carried out by Haitian nationals, either Faculty of Agriculture graduates at Damien or Haitian graduate students pursuing degrees in agricultural programs in U.S. universities? Would the results of such research have been substantially different?

- How have these studies impacted the agronomic intellectual life in the country and how are they being incorporated in present approaches to agriculture/forestry problems in Haiti so as to contribute to their solutions?

- Is the research targeted appropriately?

- What use has been made of these studies by USAID/CARE/PADF in determining project practices or policy orientations?

The impact of the eighteen titles on Haitian agro-forestry is yet to be felt. For example, CARE was unable to indicate how this research has been applied. Agronomes in related organizations were aware that the publications were being produced, but were not sure what useful information they contained. PADF's Mike Bannister appears to be pleased with the work done by Kent Reid. These efforts, however, need to start filtering into the system so that the original

goals of farmer income and production and natural resource enhancement are not forgotten. SECID should review these documents in its research committee meetings, and prepare summaries listing critical information contained in each of these documents. These summaries should then be provided to the persons who could benefit from same.

Research protocols have been signed with CARE and PADF which detail research needs. There is one significant area which may not have been addressed, however. The original assumptions underlying these programs have been changed not only by program impacts, but also by socio-economic changes which have occurred over time. The physical arena of project activity has also changed significantly. USAID needs to keep abreast of these developments in order to recommend program evolutions. SECID should be able to help with this and, therefore, should be charged with this responsibility.

SECID also has several other important functions to perform. If CARE and PADF's tree survival rate of 50% is provisionally accepted (survival rates observed by Team members appear to be much lower) it means that 50% of the $27 million spent on the project did not have its intended impact. If SECID could focus on this problem and help to increase the survival rate, the expenses incurred through its involvement would have been well justified.

SECID should also take charge of all the research efforts geared toward meeting the needs of the Hillside strategy. With the pending departure of the University of Florida and ARD, SECID should coordinate this research nationally. In addition, SECID should disseminate this research, beginning with materials already available in the USAID library.

SECID has the potential to do good work. The question is now to try and make it happen. The protocols are a start in this direction and the experience of the eighteen documents is the first building blocks of the new effort . However, a number of possible problems may hamper this work. These include short time frames, on farm situations not conducive to research, the inability of recipients to absorb and utilize research, the large amount of work to be done, the need to begin with case studies which may not prove valuable, personnel changes, changes in the social and political environment, and the need to train Haitian counterparts within the limits of the presently prescribed congressional mandates.

However, certain themes are there to be tackled. Research conducted in Haiti could be applied internationally and international research could filter through this unit to the field actors. Other research themes include:

- Evaluating the social and economic assumptions of the project;
- Studying the role of women in Haitian development and how to get Haitian women involved;
- Using oral history to monitor project changes over time; and
- Strengthening PVOs in the project area.

The Evaluation Team believes that the research team is equal to meeting these tasks, and that this assessment will be borne out over time since their actual accomplishments so far (18 volume series) is still in the process of being evaluated/appreciated.

5. Recommendations

- Re-target and re-design research efforts toward farm-level issues and problems, both technical and financial.
- Redesign the Project on the basis of a better understanding of the farm system and of the constraints which now appear to be inhibiting rapid, effective tree planting and use.
- Orient agriculture toward an improved agriculture which involves trees instead of just "doing trees" in isolation.
- Embody this research and field work in on-going projects which are or should become agricultural in focus, such as the TWM and Coffee Revitalization Projects and in irrigation farming.

D. Local Resources Development I (LORD I)

1. Overview

The history of the Maissade area and the reasons for its being chosen for the first Local Resource Development (LORD I) project are well-documented in the original proposal (1985) of the Save the Children Foundation (SCF). The project was initiated in 1986 and the original funding plan carried it through June 1989. Unused project funds plus money from PL 480 allowed a continuation through July 1990. A proposal from the Save the Children Foundation to USAID for funds to continue the project for three more years was turned down by USAID because of lack of funds, but was continued for at least a year by the allocation of yet more PL 480 funds.

The area of the commune of Maissade is about 240 square kilometers. It contains three rural sections: Savane Grande, Narang and Hatty. About 4,000 people live in Maissade and 36,000 in the rest of the area. The average family size is five (SCF Proposal, November 1989). Topography is mixed, varying from flat in the river basins to steep slopes. The upper slopes have generally been deforested. However, there are few long steep slopes like those in mountainous areas. The steeper slopes are generally short (25 - 50 meters). Some are farmed and some grow grass, trees and/or shrubs.

Textually, the soils in Narang are clay, in Savane Grande clay to sandy clay, and in the Hatty area sandy. The largest river is the Canot, a tributary of the Upper Artibonite network. It passes to the northeast of Maissade. The Rio Frio empties into the Canot east of Maissade. The fond Bleu, Fond Gras, and Rio Frio rivers are also tributaries of the Canot. All must be forded to cross. There is sufficient water in the Canot and Rio Frio to irrigate a few hectares in parts of the alluvial plains. However, structures need to be put in place for irrigation.

Bananas are the major crop in the irrigable areas. Other major crops include sugar cane, corn, sorghum, bananas, rice, cassava, beans, peas, sweet potatoes, peanuts, and plantains. Some pumpkins, taro, and squash can also be seen. Mango trees grow throughout the area. Other fruit tree species include avocado, citrus and coconut. Grass and scattered trees grow in non-farmed areas.

Most farmers have chickens, some have pigs (which are becoming a more significant livestock item following elimination of swine due to African Swine Fever in 1983), a few have a cow and some have goats.

The project originally envisioned small groups of farmers organizing themselves by area, family or common interest. This type of organization was apparently started in Haiti many years ago under the auspices of various Catholic organizations. In the LORD I project area, the animateurs are responsible for organizing these small groups. Each little group of seven to ten farmers is called a groupement. Several agricultural areas in Haiti are so organized. Wives frequently and actively participate.

In this project, groupements have bi-monthly meetings to get information and air problems. Sometimes the farmers in a groupement have joint undertakings relating to betterment of their area. They can also pool capital for a joint commercial venture such as purchase of a plow. In the Maissade area, members of all the groupements have a yearly meeting with presentations by project administrative personnel; awards to top farmers and responses by them explaining what practices they initiated and how they were successful; and a general feeling of camaraderie.

As of November 1989, there were 122 farmer groups averaging eight members each in the foothills of the Maissade Commune (SCF Project proposal, November 1989). These groups average three years of experience. The farmers appear to have developed a group-centered philosophy which combines enthusiasm and ambition. A few of the farmers can be classed as innovators. They have moved ahead of the project's technical people and are generating new, progressive practices to conserve soil and make money.

The next voluntary step in informal farmer organization is, logically, a group association. In 1989, three associations were formed averaging eight groupements each. Because there is greater strength in larger numbers and more ability to be concerned with larger projects, the associations are involved with mango marketing, grain storage and school construction.

Many farmers in the project area who have not yet organized themselves are very interested in forming groupements. The main reason appears to be that they have seen new methods of soil and water conservation that lead to more family income. Some of the best farmers in existing groupements have volunteered to assist other farmers organize into similar groups. Two members of the Evaluation Team attended a groupement meeting with an attendance of eight men and two women. We were impressed by the sincerity and the abilities of the members. It appears to us that the groupement method of organization is working well in the Maissade commune.

2. Project objectives and outputs

The objectives of LORD I were chosen within the overall goals of Save the Children: improving quality of life, forming self-sustaining organizations, encouraging inter-institutional development and providing effective models of technical and financial assistance. The specific objectives were to:

- Demonstrate to area farmers the technical feasibility and economic attractiveness of soil-conserving techniques;
- Enhance the acceptability of ecological behaviors by tying them to generation of cash for farmers;
- Ensure the continuity of activities, mainly through effectively functioning groupements;
- Give credit to farmers who performed soil conservation and restoration activities on their land; this was to be done through the groupements; and,
- Achieve an improved rural development programming strategy that would be replicable in Haiti and perhaps other countries.

Measurable project outputs were identified to quantify, in so far as possible, the achievement of objectives. These outputs included:

- Formation of 150 groupements averaging eight members each;
- Disbursal of $400 credit to each groupement;
- Planting of 750,000 trees; and
- Construction of 120 km of soil conservation structures.

3. Project administration and finance

The project has drawn upon the resources of several institutions and agencies. The Ministry of Agriculture has a two-year school near Hinche. Graduates receive a diploma. Project semi-technical personnel (technicians) have a diploma; four-year agricultural graduates from the University at Damien have a B.S. degree. The Ministry has an Extension Office in Hinche, but there is no provision for direct contact between the Ministry and the Project. The SCF office in Port-au-Prince added no additional staff for the Project. USAID/Haiti provided a project officer and coordinator. Currently, the coordinator performs both functions. A Peace Corps volunteer has been in Maissade since April 1990. Most of his work has been with the SCF health projects in the town. However, he spent several days with the accountant at Dos Bois Pin to help get the account in order and make the accounting function more efficient.

The headquarters staff included a Program Manager, an Agronome who supervise the demonstration plot and provided information to technicians, an Agronome for soil conservation, a Veterinary Technician who provided animal health advice and inputs to farmers, an accountant, a secretary, a driver and two cook/housekeepers.

Project field staff included eight Animateurs (Promoters), who must be from the area they work in. A diploma or certificate was not required for these positions which involve organizing groupements and meetings and working with technicians to solve farmers' problems and answer their questions. There were also four Technicians on the field staff. These hold a certificate in agriculture and provide technical information to farmers and animateurs. Field personnel met twice a month at the project headquarters for communication and exchange of information.

The project also has ties to the city of Maissade and, to a lesser extent, with the town of Madame Joie. The SCF has a health and school project in Maissade. That city also has a large market every Thursday where farmers or wives involved with the Project have opportunities to discuss it with others.

The approved proposal called for a four-year (1985-1988) funding of $1,440,750. The SCF share was 31 percent or $442,095. Additional funding of $200,000 was provided from PL 480 funds to carry the project through July 1990. All expenditures are approved by the Program Manager (Ronald Toussaint) at the Project headquarters near Maissade and by Elias Tamari, Field Office Director for SCF in Port-au-Prince.

While only a short time was allocated for reviewing LORD I, the Team reviewed available documentation, travelled to project sites and carried out interviews and observations sufficient to put LORD I into a national hillside perspective.

4. Findings and conclusions

a. Project design, objectives, and strategies

The Project objectives were logical. The quality of life in the Central Plateau and specifically in the Maissade area must be improved. The strategy of forming and utilizing groupements to strengthen farmers' desire to move ahead is a good one. However, the design of the project did not enable project objectives to be fulfilled with the staffing and work plan as stated. The original Project Document said that many good things would happen as a result of people grouping together to save the soil. In fact, much has not happened because significant improvement in the quality of soil was not envisioned or planned for.

The needs for credit, potable water, better roads, better schools and a better life for farm families were not addressed in LORD I, but were being met by other activities implemented by SCF. All these components are being integrated in a comprehensive package. Only limited or no attention was given to on-farm needs that include:

- Better quality seeds;
- Use of commercial fertilizer;
- Modified seeding rates and plant population;
- Gully plugs; and
- More fruit trees.

These activities all relate to soil conservation and can be introduced one at a time or two or more at a time in packages specifically designed for individual farmers. When these are combined with effective, contoured living hedges or "rampe-paille" (dead plant material) barriers on the contours, yields and farm incomes will increase materially. Some provide a "kick-start" essential to successful and sustained improvements.

b. Project implementation

(1) The establishment period

There were a number of political problems during the first two years. This complicated project activities, especially in relation to numbers or groupements and their membership. These problems also resulted in underspending. Nevertheless, when the political climate became calm, the work advanced.

(2) Staffing

Currently, the project has on-site three Agronomes, a Veterinary Technician, four Agricultural Technicians, eight Animateurs, a Bookkeeper, a Secretary, a Driver, a Guard and a Housekeeper

The three-year budget renewal request (November, 1989) for these people, including bonus, leaving indemnity and insurance, was $547,344. In the Evaluation Team's opinion, many of the project people are under-employed. Some, especially animateurs, are under qualified. The project manager spends too much time in administration and not enough in the field. The technicians or animateurs do not have a solid enough grounding in both technical and extension matters.

(3) Monitoring process

Emphasis has been on numbers because quantification is easier than evaluation of something more nebulous such as farm yield measurements at the top and bottom of a cropped alley between contoured structures. Also, USAID/Haiti has insisted on such "quantity" reporting. The major indicators used by USAID/Haiti are the number of meters of hedgerows planted and the number of trees planted.

Quantifiable numbers include number of trees distributed, meters of hedgerows planted, number of chickens vaccinated, number of hectares with conservation methods applied, number of groupements and number of farmers per groupement. Such figures tell only part of the story, and project successes can be measured in additional ways.

(4) Research, trials, and demonstrations

Some confusion has occurred about the difference between trials and demonstrations. Trials are defined as comparisons between inputs and methods in order to determine which treatment is better or best. Trials are usually carried out by agronomes on project land. An example would be planting three species of grass in side-by-side rows, and cutting and weighing the grass to determine which species yield highest. A demonstration would then be made on a cooperating farmer's land by planting the best grass from the trial beside the farmer's grass in order to observe any differences.

The main idea seems to be to avoid exposing a farmer to an input or practice that might not work. However, when the land for trials is limited, an agronome should be able to allocate project money to rent land from a farmer to carry out a trial and explain in detail to the farmer the purpose and methodology of the trial. In light of this, LORD I has concentrated on some trials and many demonstrations. These efforts should be intensified. Any research carried out should meet important local priorities, but should be programmed from a central unit.

(5) Influence of organic farming

Much literature in Haiti describing past and present projects emphasizes organic farming and de-emphasizes or rejects the use of commercial fertilizer. This "organic influence" shows up in the SCF/Maissade Project but references are also made to the need for evaluating the effect of chemical fertilizer on yields and profits. Deficiencies of phosphorus, nitrogen, and zinc were found on most crops. A farmer's sugar cane next to the project's trial field was deficient in potassium and nitrogen.

Use of a legume to provide a little nitrogen to an associated maize plant (e.g. by planting a congo bean seed with maize) is logical up to a point. Under conditions of low soil organic matter, non-leguminous crop residues and the possibility of insufficient amounts of the appropriate Rhizobium species to colonize the congo bean (or other legume) roots, the legume will be able to provide very little nitrogen to the maize. Thus, the technique has to be properly used to be appreciated.

Use of legume hedgerow material (e.g. Leucaena) spread over the soil surface will provide a little nitrogen to the following crop. So will properly made compost. Manure contains some plant-available nitrogen. These practices, however, may only marginally increase the soil organic matter content. The higher the organic matter, the higher the water-holding capacity of the soil, and therefore, the better the water and soil conservation.

Recent research confirms that when insufficient nitrogen fertilizer is added to a soil for a specific crop yield and plant population, the soil organic matter nitrogen is used up faster by plants and soil organisms. This is especially true in the tropics where soil chemical and biological reactions proceed more quickly. A comment frequently heard in the area was "fertilizer costs too much". A very small amount, however, costs very little and can easily return at least double its cost.

(6) Motivating and servicing farmers through groupements

The project intended to organize farmers by groupements; it has been generally successful. The number of groupements has stabilized and many farmers outside these organizations have expressed interest in being part of one. The progressive farmers expressed frustration with non-groupement neighbors who have not installed conservation inputs. The result is often too much water flowing down gullies through the groupement members' land at too fast a speed.

About 1200 farmers are currently in groupements. The animateurs appear capable of motivating the farmers, although additional training could be helpful. The agronomists and technicians are providing some good information. The annual meeting is one of the best motivating techniques. We were told that it has a carnival-like atmosphere. Families exchange news and information. Farmers tell the assembly about their successes. Prizes such as a plow and tools are presented to top farmers. T-shirts have been made each year for the project; appropriate slogans relating to good farming are printed thereon. More could be done in the area of providing good on-farm advice, especially specific to fields and farms.

Livestock is an important adjunct to crops, and all (pigs, cattle, horses, donkeys, and chickens), especially pigs, are a measure of prosperity. The project is not involved with breeding or distributing livestock. However, the veterinary technician is helping to maintain good health of the animals and birds.

(7) Soil conservation on slopes and in gullies

The project has emphasized planting of hedgerows on the contours. For the most part, the distances between hedgerows are appropriate for the length and steepness of the slopes. Leguminous trees, such as Leucaenae have been emphasized because of the nitrogen added to the soil when the clippings are returned to the alleys. This practice, together with clipping every four months to 50cm, is encouraged by project personnel. One ingenious farmer planted perennial cotton on the contour because of its strong stalks. Soil in combination with plant residues laid against it was being held. Canals and ridges were not observed, perhaps because the hillsides between Maissade and Madame Joie are generally not as steep or long as in some other parts of Haiti.

Although much less burning of crop residues is currently being done, we saw occasional fires and evidence of fires in the area. Residues, especially those of leguminous crops, should be spread on the soil surface to help hold

soil in lace. When planting is done before the scattered residues have deteriorated, the process is called zero-till or no-till. We saw very little evidence of this, and yet it is an excellent way to help keep soil from moving down steep slopes.

Some farmers have installed gully plugs made out of stakes and other vegetative material. Our observation was that not enough of this is being done. Farmers not in groupements have stated they lack the time or money to help in plugging gullies. However, many are now beginning to see the benefits of the program, so increased numbers are expected in the project. Some farmers have even started small conservation and reclamation projects on their own.

(8) Funding processes and administration

Funds for the current year, made available through the PL 480 program, are scheduled to run out at the end of July 1990. A proposal submitted to USAID/Haiti by SCF in November 1989 was rejected. There have apparently been no problems relating to flow of money to the project. The SCF office in Port-au-Prince approves all expenditures made at the project headquarters near Maissade. The accounting procedure was aided by a business specialist now in the Peace Corps.

(9) Output targets, measuring, and reporting systems

The following life-of-project land treatment goal was stated in the Cooperative Agreement: "The treatment of 1500 hectares of fragile hillside lands within the target area, through the construction of soil conservation structures and/or contour plantings of trees and other stabilizing vegetation."

According to the project evaluation (June 1988), this proved to be a controversial issue. Field staff asked for a life-of-project goal of 80,000 linear meters of contour structures.

The area originally targeted for project services is nearly 9[illegible],000 hectares. This was too great an area for the proposed budget. Therefore, coverage was limited to Maissade commune. Providing "treatment" on 1500 hectares involved only about 5% of the land in that commune. As a result, the project personnel have been more effective by concentrating on forming groupements and providing services in the Maissade area.

Reporting conservation methods as either hectares or meters is not really important. What is important is knowing what each cooperating farmer gains (if anything) from installing hedgerows or performing other conservation-oriented activities such as planting beans closer together to reduce raindrop impact.

It is impossible, of course, to quantify and measure such practices. Yet information from farmers relating to gains in soil, yield, income or quality of life can be reported in text form if not in numbers.

c. Project impacts

There were no farm or city community benchmark figures to use as a base for evaluation. Therefore, it was basically impossible to evaluate the direct impact of the Project on the area. Such evaluation had to be on qualitative, rather than quantitative, grounds. The following are, for the most part, indirect impacts of LORD I:

- Erosion--The river water was clear when we were in the area, but there had been little or no rain. Because not all the area has anti-erosion structures in fields and gullies, it is unlikely that there has been a major positive impact on reducing erosion. The project covers 17,000 hectares. The Peligre headquarters cover 530,000 hectares;

- Sedimentation at Peligre Dam--Figures from the Government of Haiti state that the lake is filling with sediment much faster than expected. Even if erosion is reduced significantly in the Project area, sedimentation will continue because the Dam watershed is so large;

- Hydrology and groundwater--To the best of our knowledge, no measurements have been made. Springs and wells were running even though the spring rains were late. More wells and/or spring caps are needed in the area;

- Flooding--No comments were made by local people except by farmers who had seen less water damage in gullies after gully plugs were constructed;

- Financial impact on farmers--We reached no conclusions regarding farmers' finances. Crop yields reportedly are equal to or slightly higher than pre-Project as a result of utilizing soil conservation measures. This was not checkable; and

- Overall area economy--We were told that more buses can now be seen on the Hinche-Maissade road than five years ago. Several new houses were under construction in Maissade. It is still a big market center. Thus, it appears that the area economy is improving.

d. Reaching the farmer

Since the major objectives of the Project were to improve farmers' living standards and income, the project was examined from the farmer's point of view. Farmers are pressured by low income, lack of significant access to credit, and unavailability of inputs. They live from day to day, not year to year. These problems are being addressed in the new project proposals. The project has reached some farmers in some ways. The groupement method of getting people together for a worthy common purpose has worked out reasonably well. However, the system may not yet be sustainable; some groupements have dissolved in the last couple of years. More education

of project staff and farmers, together with judicious incorporation of more inputs, are needed to ensure sustainability of groupements and the creation of new groupements. This section indicates that the impacts of the Projects' activities on farmers have varied considerably.

(1) Research, trails, and demonstrations

The project rented a field near Maissade to carry out trials. Several grass species were planted to observe and measure growth and dry matter production for animals.

On a short, 15 percent slope, several tree species were contour-planted as living hedges. After a year, soil was building up behind the trees. The latter are trimmed three times a year to a height of about 50 cm, and the clippings scattered over the cropping alley above each hedgerow. Maize, sorghum and beans are planted in these cropping alleys. Several tree species have been planted for observation.

The technicians meet at the site at least once a year to make observations and discuss them with the agronomes. The findings are reported back to farmers either directly or through the animateurs and the groupements. Findings are in terms of checking height of soil build-up behind the hedges, observing effectiveness of different species in blocking soil movement, and evaluating yields of crops.

Treatments are not replicated and few measurements are made. The farmers are told that hedges retain soil and that crops are likely to have higher yields when there is less erosion.

(2) Role of crops

Farmers rely on their crops for both family food and cash income. Crops play an extremely important role in the area. The Project is currently reaching about 1200 farmers with conservation techniques, but with minimal effect on crop yields or quality.

(3) Role of livestock

Next to crops, livestock are very important to farmers. Pigs are a measure of prosperity and the best means of reducing risk, as a pig can be sold when there is a need for cash in a family emergency. The only project work dealing with livestock is that a veterinary technician is providing some medicines and inoculating chickens against Newcastle disease.

(4) Role of trees

Trees *per se* are not a soil conservation device unless planted in groves on hillsides. Farmers have been asking for fruit trees and hedgerow trees, especially Leucaena, rather than pole/lumber/charcoal species. The majority of trees planted since the inception of the Project are in hedgerows.

(5) Role and supply of inputs and services

The project currently has a small supply of three species of tree seedlings available for transplanting. Services of the field agronome, veterinary technician and agricultural technicians are available. At each annual meeting of the participants/members of the groupements, some prizes are given out--for example, a plow or hoes.

(6) Extension

The animateurs provide the major contact with the farmers. The set up the groupements and their meetings. The major "plus" of the animateurs is that they are local people who know the farmers. The major "minus" is that they are not trained in technical inputs and extension methods. However, on-the-job training provided to animateurs by agronomes results in their being able to make soil conservation technique presentations at meetings. The technicians also are involved with extension activities by providing information to the farmers on both an individual or group level. Both methods are effective, and both are needed.

(7) Farm improvements

Improvements brought about by the Project center mainly on the establishment of contoured hedgerows. Gully plugs are needed; few were seen. Micro-catchment basins in ravines are needed; none were seen or described. Improved quality crop seed is needed but is not distributed. Commercial fertilizer is needed but is neither used by farmers nor experimented with by the agronome or technicians: "it costs too much."

All of these constraints are holding back yield increases. Soil conservation alone cannot bring about significant increases in farmer yields and profits. Much more has to be done in order to improve the agricultural economy of the area.

5. Recommendations

o Extend the project for three years.

At the time of the evaluation funding was about to run out and a project renewal request had been turned down by USAID. However, enough had been learned to justify further effort. USAID subsequently provided PL 480 funding to extend the project. In this context, it is important to note that there is no assurance of sustainability of the progress made under LORD I. It will likely take three more years of intensive extension work to consolidate the existing groupements and assure that the conservation work can continue under the guidance of a single agricultural specialist.

- Strengthen project management.

The maintenance and intensification of the groupements and their farmer-members can be continued effectively with the following organization:

-- Project Manager - Spend less time in administration; more time keeping up with technical matters and relating them to the field personnel, including the provisions of technical advice from Haitian or outside technical specialists;

-- Veterinary Technician - Continue as currently employed, but begin to train animators and other project personnel in basic diagnostic skills in order to have a multiplier effect in the community;

-- Bookkeeper/Secretary - Upgrade the bookkeeper to free up the manager as noted above;

-- Technicians/animateurs (8) - Combine these positions; personnel should be from or near the area and have capabilities of organizing and maintaining groupements as well as learning and providing technical information and new practices. Provision should be made in the proposed budget for one to three additional animateurs to provide services to new groupements;

-- Driver - Eliminate or combine with mechanic; and

-- Housekeeper - One full-time and one part-time as presently detailed.

This configuration would enable the project to continue to be effective on a "leaner" basis in order to assure groupement stability and sustainability. This was the intention stated in the original proposal, with "Save the Children available for technical support."

- Improve assessment of project impacts.

A key conservation input has been the construction of hedgerows. Little or nothing has been done to evaluate their effect. This activity must be initiated. The depth of soil built up behind hedgerows should be measured. Farmers should determine yields from two areas in the alleys, high and low, and provide the animateurs with the figures. The animateurs can help with this activity by teaching yield estimation methods.

The effect of gully plugs can be described in a report by a description of the controlled flow of water compared to the pre-plug situation. If bananas can be planted in a gully as a result of having gully plugs, that impact should be stated.

A groupement, with adequate credit, should purchase improved seed (e.g., more disease resistant bean varieties, graded and inoculated bean seed, Maquina corn) and follow up with each farmer-member by collecting information on crop performance in the field, yield and value to the farm family.

The number and location of newly planted trees should be recorded by the animateurs. On the same sheet of paper, a one-year and two-year follow-up observation should be made.

Every animateur should have a one-drawer file to maintain records relating to administration, technical bulletins and individual farmers' practices.

- Improve extension/training work.

  All personnel should be given additional courses on extension methods including communicating with farmers, organizing farmers, and designing and utilizing field demonstration plots.

- Develop staged strategies for new inputs and practices.

  Staged strategies for new inputs and practices could be incorporated into the existing yearly workplans. All these should be periodically reviewed to determine if new strategies or existing accomplishments have made a revision necessary. Utilize the information in the existing workplan.

- Strengthen the on-going relationship with the SCF/Maissade health and community welfare project.

  A spin-off from that work should included construction of wells and capping of springs in the agricultural areas. Another activity could be a traveling nurse in the zones chosen for intensive agricultural development.

- Strengthen and maintain communication with such projects as Proje Sove Tè and SECID.

E. Local Resources Development Project II (LORD II)

1. Overview

The three-year project, LORD II, began in January 1988, following an application by CARE to USAID/Haiti for funding of an agricultural project in the Léger area, about 50 km northwest of Port-au-Prince. Access to the LORD II Project area is difficult. The village of Léger is 27 km by road from Highway 100, and 22 km of that road are little more than rough mountain trails. The only town on the route is Ti Bois. Altitude in the project area ranges from 1000 to 1200 meters.

Subsistence crops in the area include beans, maize, sorghum, and plantains/bananas. Food trees include citrus, mango, and avocado. There is a little coffee on some farms. Beans are marketed out of the area. A CARE health project is also headquartered in Léger. Current activity (May 1990) also includes building cisterns and capping springs. Title III (PL 480) funding is used for this. The structural specialists are on assignment from the CARE district office in Cayes. A mid-term evaluation was carried out on-site from late April to late June 1989 and published in 1990.

An application for funding for a five-year ongoing project (LEAP) was written in 1990. LEAP was written with a July 1990 to June 1995 plan. As of June 9, 1990 funding had not been obtained.

2. Project goal and objectives

The project goal was "to achieve a sustainable increase in income and/or nutritional status of 1000 households in the upper watersheds of the Matheux and Courgolles Rivers." The objectives were to:

- Achieve a sustainable increase in land productivity of 1000 target area farmers through the adoption of improved hillside farming practices;
- Achieve an increase in income of the 1000 farmers through the adoption of project-promoted activities; and
- Improve the knowledge, attitude, and practices of the farmer group as they relate to soil conservation, agriculture, and agroforestry.

At the time of the evaluation (late May 1990), the emphasis was on sustainability. The hope was expressed that whenever the project ended the farmers would continue with their major activities: building contoured stone walls, trash lines, and hedgerows; planting bio-intensive gardens; plugging gullies and maintaining community tree nurseries.

3. Project administration and structure

The expatriate Project Coordinator works out of CARE's Port-au-Prince office. All other personnel are Haitian. The assistant project coordinator, two agronomes, and one monitor, are located at the project headquarters. Nine animateurs live in their homes in the project area.

The monitor is a new position. Basically, he is an assistant to one of the agronomes and to the assistant project coordinator. He is a sharp, articulate individual who was promoted from animateur because of his ability to communicate especially well with groupements and farmers. As in the LORD I project, the animateurs are responsible for organizing groupements, for showing and helping farmers how to install contour barriers, and for planting trees.

Funding from USAID/Haiti is requested and accounted for through normal methods. Because this is a lower dollar project than the Agroforestry work (also CARE), it requires less time and paperwork on the part of the Project Coordinator.

Two local "organizations," a Catholic church and a Protestant church, exist in Léger. The groupements can be considered new organizations.

4. Findings and conclusions

a. Project design, objectives, and strategies

The LORD II Project was designed to involve at least half of the 2000 - plus farmers in a large area near Léger to improve their livelihood. The area demarcated was too large to work intensively with new techniques. Training in soil conservation methods and community tree nurseries has been the primary strategy to sustain and increase food production. An in-kind bean seed loan program addressed the problem of farmer debt and excessively high interest rates changed by local lenders. The seed loan program was not originally the in package but was added by CARE in response to community demand.

The bean seed program was successful; training in soil conservation methods less so. CARE also built 10 of 12 silos for seed storage using PL 480 funds.

b. Project implementation

(1) The establishment period

The development of the Project was rapid in terms of involving farmers. This was partly due to a pre-project baseline survey and agricultural census being made. Because there was "political instability" during the time the survey was being made (late 1987), no names or ages were asked for. This helped to elicit valid information. The survey gave a good indication of important farmer needs. The goal of reaching at least 1000 farmers was quickly reached. The in-kind bean seed program was very successful.

(2) Staffing

The Project utilized methods determined to be successful in other areas to establish its administrative and technical/extension structure. The technical personnel need more technical and managerial training. The animators as a group are doing well; only one has been let go because of incompetence. However, their technical abilities in the field are limited. CARE's managerial ability to deliver from the highest levels down also needs to be examined.

(3) Monitoring processes

It is the responsibility of the animateur to keep track of the number of trees in the local nurseries; of the number and species of trees delivered to each participating farmer; and the number of trees surviving. He is also required to report the length of conservation hedgerows established.

Extension work requires the recording of minutes of groupement meetings and summaries of on-farm and other activities on behalf of individual farmers. The mid-project evaluation found that extension reporting activities were lax. As a result, reporting forms were revised and requirements tightened. Monitoring is now more effective. The Project Coordinators are able to evaluate progress by animateurs and farmers.

(4) Research, trials, and demonstrations

No research is being done, as none of the personnel involved are trained in research techniques. The only trials are those of the bean varieties, corn varieties and bio-intensive garden. There is no need to evaluate 16 bean varieties: the agronomes should be able to select about four or five that are common to the area and new. No on-farm demonstrations were seen or referred to.

The local nurseries are, in a way, demonstrations of how to plant tree seeds and take care of seedlings. Although at least one nursery was abandoned and another changed sites, they were effective in terms of growing trees and the groupement members were caring for them in an average to above-average way.

(5) Influence of organic farming

The pervasive influence of organic farming was evidenced by the bio-intensive garden. For a small area like this, using compost and no inorganic fertilizer is fine until nutrient deficiencies show up. A farmer, however, cannot produce enough compost for all his fields. The greatest danger is that he will intensify mineral nutrient deficiencies by putting deficient materials in the compost pile and on the land, then removing minerals in the grain or forage.

The follow-up proposal (LEAP, 1990) places even more importance on organic farming methods. Growing legumes and spreading leguminous materials on alleys between hedgerows is a satisfactory method to provide crops with nitrogen. However, yield is dependent on the first limiting factor. If, for example, that factor is phosphorus, adding nitrogen and phosphorus-deficient green manures and residues to soil will not increase yields.

Fortunately, for the farmers, crops examined in the Project area are not seriously deficient in phosphorus or zinc, the two minerals most noticeably absent in other parts of Haiti. It is possible that slight deficiencies of

nitrogen and/or potassium are causing intensification of bean diseases. If the latter is the case, organic methods will not help.

(6) Reaching, motivating, and servicing farmers

Reaching farmers was very successful, as was the original motivating and servicing (bean program) of farmers by the project. The second stage of farmer servicing (bean seed storage "silos") is just beginning. If groupement members continue to cooperate, that endeavor will also be successful.

On-farm "servicing" is average or below average. Construction of hedgerows, whether rampe-paille, tress or walls, is sporadic even in fields. Distances between structures are not spaced according to slope. Some structures have unrepaired gaps.

(7) Soil conservation on farms and in gullies

Soil conservation techniques in fields are being instituted and maintained to a limited extent. Although much soil has piled up behind some walls and residue barriers, additional structures have not been built in the same fields. Some gullies have been plugged correctly (top to bottom) and successfully with stones. Others have some walls built, and plans are made for the rest. The work is being done by groupement members, and is their other successful activity, growing of tree seedlings being the first.

(8) Output targets, measurements, and reporting systems

Current emphasis is less on target numbers than on training animateurs and farmers to an extent that the projects will be self-sufficient if the funding is not renewed by November, 1990. In the meantime, animateurs continue to maintain their records of trees and conservation structures. Records of what happens to transplanted trees (for example, robbery and goat fodder) were not apparent.

(9) Economic impacts

Although the baseline survey provided information on the pre-Project economic status of farmers, no effort has been made to determine if the trees and the contour structures have increased farmers' incomes or financial status. The bean seed program helped to do this, and some farmers would like to have some sort of similar supplemental program.

c. Project impact monitoring

The Project was established to conserve soil and raise family income. The inputs to be monitored were: the number of trees grown in nurseries, the number of trees transplanted; and the number of meters of contoured anti-erosion devices installed. A baseline survey was conducted in order to have base data for measuring increases in family income. No measuring of yields or significant changes in crop management were expected to

be made. The mid-term Project Evaluation carried out in mid-1989 recommended that:

- Minutes of meetings should be kept;
- Animateurs weekly reports must be made and more information included;
- Project staff and participating farmers need more training; and
- Demonstration plots on farms should be set up to measure yields under soil conservation conditions.

d. Impact on the farmers

The goal of reaching about half the area's farmers was reached a little over a year after the Project began: 1000 farmers were enrolled in groupements.

(1) Role of soil conservation methods

Conservation of soil was the number one objective. Therefore, reaching the farmer with explanations of soil conservation techniques was done through the groupements. Emphasis was placed on using rampe-paille because some farmers had heard about it and used it, plant material was available and it was easy to install. Farmers were taught to:

- Establish contours with an A-frame;
- Use stakes to hold the dead plant material (sticks, branches, crop residues) in place; and
- Cover the rampe-paille with soil to help to discourage rats.

The next most popular form of soil containment on contours was the rock wall. These were constructed in fields where stones were present. Very few contour lines of trees have been made. Some of the early ones have deteriorated and gaps have not been re-planted. Several gullies have been successfully plugged and others are being worked on by groupements. The hope is that water flow will be retarded enough to permit planting of bananas.

(2) Role of trees

Trees have been "sold" as important in soil conservation. Seeds are obtained through the Agroforestry Project or PADF and planted in small community nurseries. The tree seedlings are distributed on request to members of each groupement with a community nursery. About five or six species are planted. Farmers have used them for hedgerows, anchoring hedgerows, field borders as well as investments in future fruit, poles, firewood or lumber.

(3) Trials

A trial bio-intensive garden was established at Project headquarters. Compost was mixed with soil to make a much more friendly plant environment compared to the area's red and yellow clays. Beets, carrots, onions, and cabbage were growing. The health project also used the garden and its results for demonstration purposes. Sixteen bean varieties and two corn varieties were planted in a trial plot at the headquarters. Yields will be measured and results made available to farmers through animateurs to groupements.

(4) Role of groupements

The groupement method has worked well here: in fewer than two years about 1200 farmers have been/are associated with groupements. The animateurs establish them, hold regular group meetings and follow up on-farm visits to discuss conservation techniques and follow up on tree plantings. Both group and individual extension work is necessary. Members of a group seem to reinforce each other. The joint caring for the local nurseries strengthens cooperation as long as arguments over time put in do not ensue.

(5) Role of other inputs

The initial work in the area was the in-kind bean seed loan program. This was very successful in attracting farmers to the Project because interest rates for seed beans are very high--around 100 percent for the bean growing season, and beans are the major cash crop.

As a result of the bean seed program, which is not being continued, nine bean storage buildings (one per animateur area) are being constructed or have been completed. These will store labelled farmers' seed safely from harvest to next planting season and materially increase farmers' net income because of the reduction in interest payments of either gourdes or beans. Fertilizer is not being used.

5. Recommendations

- Extend the Project for another three to five years with more specific goals and activities for the local people.

- Improve the assessment of project impacts.

  The following actions will ensure an accurate assessment of impacts:

  -- Devise an efficient way to account for transplanted trees and their survival rate;

  -- Compare yields from slopes with contour structures to those without; and

-- Compare yields from other introduced inputs such as a more disease-resistant bean variety to those from the variety usually planted.

o Improve extension/training work.

Improving extension/training work starts with training the trainers. The animateurs need staged training in dealing with people. They also need good extension methods. Training should start with a one- or two-week short course and be followed up with a one- or two-day training session every 6 to 12 months with different extension experts. The latter should by preference be Haitian for certain sessions. Other speakers should be expatriates who are familiar with Haiti or Haiti-like conditions. Having better-trained animateurs will ensure that farmers will be better-trained as groups and individuals.

Agronomes need training also. They know many technical points, but their knowledge needs broadening. They need to inter-relate, for example, soil conservation, crop rotations, surface residues crop nutrient deficiencies and yields. Their supplemental training should begin with a week of intensive non-textbook technical work by expatriates, some in the field. It should be followed up every six months with a "refresher" day when updates would be provided by expatriates and Haitians. The agronomes from this project could meet jointly with others to make the sessions and the training more cost-effective.

o Develop staged strategies for new inputs

This Project's stated goal was to improve family living standards. This cannot be done while yields remain the same or drop. Yields must be increased. Commercial fertilizer must be introduced, along with new varieties, more intensive soil conservation methods and agricultural practices in relation to farmers ability to pay. The following inputs and practices need to be introduced to farmers. If the Project continues, priorities can be changed depending on individual farmers' needs as perceived by agronomes and animateurs. This should be done on a site-specific basis.

-- New bean variety

A bean variety more resistant to prevalent diseases should be introduced via at least one demonstration plot in each of the nine animateurs' areas. Yield and disease resistance must be noted and compared to the "usual" beans growing side-by-side. The headquarters area should also have a plot. Headquarters should also evaluate benefits and developments in the PREPIPA bean project. The improved variety (assuming successful evaluation) could then be introduced by a new in-kind bean seed program.

-- More and better contour structures

Agronomes and animateurs must explain to each farmer the best type of soil erosion structure for his conditions. They need to discuss the farmer's situation in-depth, and conclude with a firm contour structure recommendation for each field, including the distance between each structure, details of construction, and methods of maintenance. If desired, provision could be made for getting yields from contoured fields and comparing them with pre-contour yields from the same fields over time. This will ensure that rainfall will be less of a factor in the evaluation.

-- Legume residues

Emphasis should be placed on planting legume trees in the contoured hedgerows. When these trees are pruned, the clippings must be spread over the alleys above the hedgerows. This will add a little nitrogen to the soil for the following grass crop (e.g., maize, sorghum). Leguminous green manures are also effective. These should be planted after a bean harvest and cut prior to planting the following crop. Both techniques will also reduce the impact of raindrops and movement of soil down the slopes.

-- Grass contour plantings

Many farmers have animals. Grass planted on a contour, especially on a ridge made by digging a ditch on the uphill side of the grass, can be cut at intervals and carried to animals. The Guinea grass grown in the zone is ideal for this. Times of cutting should be such as to maximize protein and yield.

-- Commercial fertilizer

As noted earlier, crops in this zone are less deficient in nutrients than crops elsewhere. Nevertheless, deficiencies in phosphorus and zinc (or corn), nitrogen (on corn and beans) and manganese (on beans) were noted. Phosphorus is most important, as without enough the germination of seeds from that crop is reduced.

A small amount (e.g., 3 gm) of an appropriate analysis (e.g., 12-24-12 for corn) should be placed in one hole near the seeds of corn prior to covering them. A total area of one or two square meters will suffice for a demonstration or if the farmer has little or no available cash to pay for the fertilizer. Yields must be compared with those from the same number of corn plants growing beside the fertilized plot.

If available, zinc should be added to the mixture. On alkaline soils, both zinc and manganese should be used for corn, beans, and sorghum. An appropriate analysis for beans is 6-24-12.

Under conditions of very low organic matter and no seed inoculation, beans and other legumes can develop nitrogen deficiency.

-- Plant populations

Once soil fertility, quantity and quality are increased, the number of seeds planted per hectare can be increased. This will give additional yield as all plants will be better fed.

Lord II will be influenced by the PREPIPA Project being carried out by the European Economic Community in conjunction with the Ministry of Agriculture. This project will be giving nursery trees away and paying farmers to place conservation measures in lands that need them. As a result, CARE may wish to complement rather than compete with these activities.

6. Overall comments concerning LORD I and LORD II

The principle lesson which comes out of the LORD I and LORD II projects is that concentrations in mini watersheds have a good chance of succeeding. It may take some time for the demonstration effect to catch on but the possibilities of it so doing are quite good.

Conservation techniques, however, must be offered to the farmer in a more palatable form; hence, the redesigns suggested for these projects. The LORD I has already incorporated many of the proposals made by the Evaluation Team as discussed at the site. These proposals were to:

- Seek a few site-specific cash generation activities;
- Offer new technologies which farmers will accept. These might consist of grafted trees to be followed up with new technologies in soil conservation or new farming systems, such as alley cropping;
- Develop irrigation and other sources of water as a reward for or in connection with soil conservation adoption practices;
- Provide tools, water pumps, ploughs, etc. as appropriate projects to farmers adopting conservation and farming techniques;
- Foster production of honey, chickens, pigs, fruits for processing; and
- Encourage new supporting cultures like fish raising in ponds by groupements. Old technologies like cane milling can be improved not only in the squeezing of the cane, but also in the utilization of the cane juice and its by-products.

Site specific, income generating interventions such as these will bring about sustainable development. USAID/ADO should concentrate on site-specific

interventions in micro basins. This above all will bring a measure of equity to the rural areas so long neglected in Haiti.

F. Secretariat Technique a l'Amenagement des Bassens-versants (STABV)

1. Overview

In 1985 public and private sector organizations, met at a workshop held at Damien and agreed upon the need to create a coordinating structure for watershed management projects in Haiti. Among the organizations represented were governmental institutions, international agencies and NGOs. The "Secretariat Technique a l'Amenagement de Bassins Versants" (STABV) was born from this consensus.

The STABV is part of the Direction of Natural Resources (DRN) of the Ministry of Agriculture, Natural Resources and Rural Development (MARNDR). It was funded by USAID until November 1987, when the US Government cut off the aid to the Haitian Government. It also received technical assistance at its inception. Currently, it is supported by the PL-480 Title III fund.

2. Project objectives and structure

The Project objectives are as follows:

- Define the main orientations and strategies of the different interventions in the watersheds of the country;
- Coordinate the actions of the different watershed management projects;
- Conduct the follow-up and assessment of these projects; and
- Gather relevant data as a tool and a basis on which to formulate realistic strategies.

To meet these objectives, the STABV has been divided into four sections--coordination, follow-up and evaluation, computer and mapping, and documentation (library). In addition to these sections, the STABV has set up a standing committee of about 15 members, consisting of the most important actors operating in the hillsides of Haiti. This committee works together with the STABV sections. Recently, a committee for methodology support to help define relevant and better socio-economic and technical approaches, was created.

3. Project activities

The STABV has done a tremendous amount of work in gathering and generating data about the projects operating in the hillsides of Haiti, and about some characteristics of the watersheds. One hundred thirty-two projects of varying importance have been inventoried to date (Ministere de l'Economie et des Finances, 1989). The following information can be found in the computerized database: type of organization, source of funding, investments

(for some projects), staff, types of technical interventions (soil conservation structures and practices, nursery production, water control structures etc.) strategies in reforestation, plant material production, soil conservation, water control etc, cost/seedling, when possible. Some projects have been evaluated, among them the BREDA's work, an evaluation of 22 watershed management projects. Criteria and forms have been developed and used to monitor the projects.

A well-organized and computerized documentation center has been set up at STABV. This library has relevant documents concerning in watershed management in Haiti and elsewhere, but is under-utilized by professionals and practitioners. According to the Director of STABV, the data indicates that environmental protection, as it has been done so far, is costly. Forty million dollars was spent in one year to plant 4 million seedlings or $10/seeding! Also, the real role of these trees in protecting the hillsides is not clear, considering that a lot of them are planted in isolation or integrated in agroforestry systems, instead of in woodlots. He also noted that the projects are too centered on fighting soil erosion and that they should instead stress increasing agricultural productivity, soil and water conservation, and the provision of techniques reproducible by the farmer. Projects should focus more on storage and processing of agricultural commodities to add surplus value, increasing peasant incomes, and consequently decreasing pressure on the lands. Projects such as OER which have a diversified plant material improvement and production component are the most successful. Such projects bring more of a range of values which can be incorporated into the production process, and so has a greater chance to meet farmers needs.

4. Findings and conclusions

a. General impact of the STABV

Despite of all the work accomplished, the organization and the efforts made so far, STABV has not yet reached the point where it truly fulfills its coordinating role, in terms of determining policy and strategy in watershed management, controlling and channeling the multiple interventions in the hillsides of the country. It has not yet defined a research agenda for itself, for others to follow, or action research on behalf of the participants. Moreover, it lacks support from the MARNDR where it is supposed to be integrated, in order to get the strength to exert this control. Finally, the removal of US assistance did not allow the "suivi-evaluation" of functions of STABV to occur. Also, access of STABV to international information died.

b. Quality and use of data

The data gathered are incomplete, and are not quantified and precise enough to be a basis for relevant decisions and strategies. Some projects are hard to follow and to evaluate because of lack of documents or because the their managers are reluctant to make their papers available to the STABV staff. They even refuse to declare their sources of funding.

Because of this unavailable data, the cost-efficiency of the projects is difficult to evaluate. Moreover, apart from the number of seedlings produced--about 87% of the projects keep track of this data--much potentially useful information is not recorded. The number of cisterns, the number of check dams, the number of kilometers of soil conservation structures, and other factors are not registered. Also, less that 10% of the projects monitor seeding survival rates. (MEF, 1989). In addition, the outputs reported are questionable. The efficiency in quantitative terms, are generally not monitored by the projects. These constraints and others, prevent STABV from making good quantitative evaluations of the watershed management projects.

c. Staffing

The staff is not stable, possibly because they are not paid on a regular basis. STABV is suffering from "sporadic funding", and is unable sometimes to pay its employees. The use of consultants to carry out some studies, as they have already done could partially solve this problem.

d. Impact on watershed management

The STABV has not been able to make an inventory of water resources. This is now being done by another section of the Ministry, Service de Resource en Eau, and will be published by UNDP. It has also been unable to evaluate what is going on in watershed improvement efforts or to assist efforts in watershed management to define their policies, strategy tactics or operational procedures. Significant quantities of information concerning watershed management have not been distributed. As yet the STABV has done little to prioritize actions to be taken in individual watersheds or to prepare a program of action for individual watersheds.

5. Recommendations

- Strengthen the management of the STABV
- Improve the collection, analysis and dissemination of data on watersheds; and
- Establish a research agenda and prioritize for action to improve watershed management.

G. Title III

1. Overview

In 1985, the Governments of Haiti and the United States signed a PL 480 Title III agreement. This continued the program whereby food products (to a value of $45 million U.S.) provided gratis to Haiti would be sold at their domestic market value (for the equivalent of $51 million U.S. in Haitian Gourdes). The proceeds from these sales were to be used for developmental purposes and were earmarked to develop macro-agricultural policy, build institutional capacity in agriculture, health and population, and lay the basis for public works projects, including roads. The bulk of the funding was

to be directed to projects designed to raise rural income; enhance nutritional levels; increase agricultural productivity; and improve Haiti's balance of payments, since the products were provided at no financial cost to the country.

In return for assistance with these projects the Government of Haiti was to provide policy changes and execute specific projects between 1985-1988. These years were largely transitional times in Haiti. Policy changes which resulted from this effort included helping to lift the export tax on coffee and most of the import tax on basic foods. Policy related to petrol was improved by the creation of a structure to monitor prices. However, institutional mechanisms to secure and perpetuate these changes were not developed.

2. Project activities

Eleven agricultural activities received support. These included:

- Production of coffee and cacao seedlings;
- Rural credit;
- Promotion of food crops;
- Agricultural protective services;
- Applied research for agricultural development;
- Animal health;
- Improvement of watersheds;
- Rehabilitation and extension of irrigation systems;
- STABV (discussed elsewhere in report);
- Improvements in the Artibonite watershed; and
- Development of local resources.

These projects have been evaluated by an in-house team in a report entitled "Rapport Final d'Execution du Program PL 480 Title III (1985-1988). This in-house team favorably evaluated these projects, noting that approximately 72 percent of target objectives were achieved and that the projects took up 48 percent of all funds expended.

3. Findings and conclusions

a. Overview

The Evaluation Team's objective was not to evaluate these projects individually, but simply to see how, as a group, they related to

Haiti's overall agricultural strategy and to the Hillside Strategy. In this respect the Evaluation Team had several questions, some of which can only be answered by additional research. These questions were:

- What are the linkages not only within individual project, but also between projects, but also between projects, an Agricultural Strategy and the Hillside Strategy?;

- Do these projects have a momentum of their own or are they simple attempts to subsidize personnel and activity in places where the Government is falling short?;

- Do these activities constitute an integral part of an overall Government development effort, or are they ad hoc measures implemented to meet the needs of client-based partisan politics?

- Does project activity produce project achievement and does the institutional basis exist to provide long-term sustainability, viability?;

- What were the identifiable themes on the basis of which projects were selected for financing?;

- Why were these activities not a part of a general program of activities rather than an activity in itself?; and

- Could PL 480 funds be used to promote projects developing cash crops, agribusiness and business skill and acumen? If so, where in the total program portfolio of PL 480 were such activities carried out?

Other questions could have been asked. For instance, the Team wanted to know who had gotten the most benefit out of the PL 480 program after so many years, and where were those benefits in Haiti. The Team was pleased that some Title III money was being used to support Title II activities. It did not stop to ask which Title II sponsors were having financial difficulty with food distribution. The Evaluation Team was also concerned that the in-house evaluation did not raise the following questions:

- What was massive food aid doing to the emergence of a viable food program in the country? (See Deaton, et al: A Food Aid Strategy for Haiti, 1/14/88) For instance, were potential middle and large scale agricultural activities deferred in favor of surer returns from participation in food redistribution? Also, were these profits invested in agriculture, conspicuous consumption or were they repatriated?; and

o What happened with the original goals of the project; including:

- -- Raising rural income;
- -- Enhancing nutritional levels;
- -- Increasing agricultural productivity; and
- -- Improving the balance of payments.

The brief sections below present findings on several specific PL 480 supported projects.

b. Cocoa and coffee project

The cocoa and coffee project appears to be a success in terms of tree distribution. This is in keeping with the observation that in spite of the risks USAID should follow through assiduously with the new coffee project on the projected scale. This effort should include follow up for field requirements and system input upgrading. PL 480 funds should be used for combatting the coffee rust problem. A cocoa project may also be useful. PADF has experience with trees in Haiti and cocoa in the Eastern Caribbean. IICA has project experience with Haiti and is very familiar with coffee projects. Perhaps those two sources could be solicited for material to begin serious work in this regard. The Mennonite experience in Haiti is also very instructive. Other geographic areas could be investigated for potentially productive varieties.

c. Cereal production

PL 480 funds are projected to help with increased food production in cereals, eg. for improved varieties of corn, and other crops. USAID should distinguish between food security, food survival and food self-sufficiency in this effort. How assistance is geared [illegible] any of these levels is not clear. A blanket allocation of $400,000 for food in a nation which has a 145,000 ton food deficit does not appear to have any directional goal. Allocations of this nature can produce only diffuse results at best. It must be noted, however, that improved varieties did result from previous projects and that this project popularizes and makes available the successes of previous work. This allocation would be more productive if applied to an activity such as the production of a drought resistant cereal such as amaranth. Serious consideration should also be given to developing disease resistant coconuts.

d. Use of PL 480 fund as supplementals

PL 480 funds are being used to supplement major USAID investments. In this respect the continuing aid to Save the Children in Maissade is instructive. The PL 480 money was used for item-specific activities and was not provided as an overall grant. In the case of the PIC Manaya project, however, all funding should be provided under the same umbrella in order to simplify future evaluations of the project's effectiveness.

Several projects supported by PL 480 funds were described as "hillside" or "watershed" projects. The Team was not sure how to judge these, as the majority of the ADO portfolio is already in that sector. Individual instances may exist where PL 480 funds should be used, but they should not come to be regarded as a funding source for regular repair and maintenance work.

e. Rural credit and irrigation projects

The rural credit program did not perform well. This is not surprising in that credit programs often focus on a peasantry living below subsistence levels. USAID should pay particular attention to the levels of credit being provided and to instances in which credit is being allowed before acceding to any request to make money available for credit purposes.

The irrigation projects supported by PL 480 funds also failed in part because of externalities outside USAID's control. Project effectiveness will improve if the Government will delegate authority to field staff to act and to enforce contractual requirements with the private sector parties doing the work.

4. Recommendations

- Investigate the possibility of supporting a cocoa project;
- Consider the use of PL 480 funds to increase cereal production;
- Continue use of PL 480 funds to supplement other USAID projects on a case-by-case basis; and
- Evaluate the rural credit and irrigation projects to identify "lessons learned" before embarking on similar activities elsewhere.

H. Assessment of Interventions In L'Acul Watershed

1. Overview

When USAID resumed working in Haiti in the early 1970s, it initiated the Agricultural Development Support I (ADS I) in Les Cayes area with a soil conservation component. Peasants were paid to build soil conservation structures (check dams and bench terraces) in the lower part of the l'Acul Watershed. Some forest and fruit trees were also distributed, of which a few were planted in woodlots and in contour on the hillsides. These trees were from a nursery established at the Levy Farm, about 15 kilometers from the plantation sites at the bottom of the l'Acul watershed. In 1977 the PDAI (Project de Development Agricole Integre), began a $24 million dollar, five year MARNDR/USAID project. The project goals were:

- Institutional reinforcement of the DARNDR, to make it more functional and efficient;

- Protection of watersheds in four areas of the country: Cayes (Acul watersheds) Jean-Rabel, Marigot-Seguin, and Thomazeau; and

- Increasing agricultural production in the irrigated areas of the plains by rehabilitating irrigation systems already on place, improving agricultural techniques and inputs, and increasing the incomes of local small land holders.

The project had five components: Irrigation, Soil Conservation, Research, Extension, and Peasant Organization/Community Development. The Ministry of Agriculture took over in 1983, supported by the ADS II, and then by the PABV (Project Amenagement de Bassins-Versants) financed by the PL 480 Title III.

2. Assessment

The project has not involved interventions large enough to bring significant changes to the lives of the local farmers. Interventions have been sporadic, and limited. Workers and technicians (even members of community councils) building soil conservation structures or in the rehabilitation systems sometimes were not paid for months, due to the lack of an administrative system. This decreased their motivation, and caused some of them not to come to work.

People in this watershed are accustomed to being paid, and are still being paid, to build conservation structures on their own lands on the hillsides. Since they are not paid to maintain the structures, these structures are neglected. Construction and motivation are tied to pace of payment, or to other rewards (cisterns, etc.). A 1988 evaluation of the soil conservation program (PABV) by STABV, has showed that only 1.5% of the structures have been maintained, and 40% are already gone. The fact that structures have not been maintained may not indicate non-acceptability by the farmers, as it is noted in STABV's report, but rather may reflect their inability to devote time and resources to construction and upkeep.

The effectiveness of the soil conservation structures and the planting of trees and biological structures have not been assessed quantitatively. No one knows how much soil accumulates in a given time or what is the quantitative impact on the agricultural production. Also, a USDA team at the end of PDAI period recommended integration of soil conservation as a component of the agricultural and livestock programs (see J. Geter, 1983). A soil survey of the l'Acul has been carried out, but has not used. The technicians working in the area were not even aware of the soil survey.

There has not been assessment of the environmental impact of the interventions. The University of Florida is trying to protect the upper watershed in the Macayo. However, they only know that there was no flood this year, despite heavy and continuous rains. Base hydrological data is absent. The road to Platons, in the upper part of the watershed, has received sporadic maintenance, depending on the availability of money. The accessibility to the upper part of the watershed is thus limited and most of the activity is confined to the lower slopes.

I. Swine Eradication an the Interim Swine Repopulation Project

When Haitian pigs began to contract African swine fever in 1980, the US Government agreed to assist the Haitian people to eradicate existing pigs and to supply them with new disease-free pigs in order to prevent the spread of the disease to the US. The project was handled for USAID by IICA. The project encountered difficulties because project personnel did not anticipate the higher costs of feeding the new variety of pigs. The pigs required a level of nutrition that could only be provided by "sondeble", wheat residues from flour production. This drove the price of sondeble up to a level where farmers were unable to buy and the feed-to-meat conversion did not justify purchases.

The basic fact was that peasants' Haitian pigs could eat feeds with 15% fiber content or more, and were less demanding in terms of nutrition than were the improved pigs. Thus, only large owners with special access to feeds and the resources to house the pigs really profited from the exercise. Some still say that only "gros negre" got pigs.

No one seemed to anticipate that peasants who could hardly feed themselves would feed and house the new "cochon grimelle". Political groups began to call for a return of the cochon Creole. As a result, a new French pig center has been established at Thomassin. They are attempting to develop pigs which will be able to live on the diet the normal peasant can supply by crossing pigs from Guadelope with pigs of chinese peasant ancestry.

In this instance then the farming technique failed because no one realized what nutritional value peasants could supply to their pigs. Follow-up projects were promised to provide improved pig feed to meet cochon grimelles needs, swine health and education needs and the construction of abbatoirs. Much of this still remains to be realized. A new pig project was announced August 3, 1990 by the Haitian Department of Agriculture. It made no mention of the cochon grimelle.

There is no doubt that pigs were distributed, but the project was not successful. However, the project papers for the Targeted Watershed Management Project refer to the pig project as a successful model of implementation to be used to serve as the base of action for future USAID projects in Haiti. It was not farmer-focussed however and so it was less successful than it could have been.

Trees cannot replace igs for many peasants. When the Evaluation Team asked peasants whether they prefer the present market price for a young pig or twice its value in tree seedlings, the peasant always chose the price of the pig. Some experts have ascribed Haiti's accelerating deforestation to an absence of pigs in the rural economy, but that is too simple an assumption to establish a correlational or associative relationship.

J. Coffee Revitalization Project

1. Overview

Haiti has produced excellent coffee since the 1700s. Some of this coffee production has also been an important crop in traditional farming systems. Peasants have grown coffee because of its actual economic value, but also because they could always obtain a loan from the coffee buyer based on the projected crop. Thus, coffee is valued as a crop in good coffee growing areas even when prices are relatively low.

Coffee has an integral role to play in the agricultural hillside strategy--not only for its income potential but its hillside protection capabilities as well. In addition to its economic benefits, coffee production is valuable because of several externalities. When coffee is grown in combination with trees, the total deposited foliage increases organic content in the soil. Fertility increases not only from this organic matter and fertilizers used in coffee cultivation, but also from deep root systems which bring trace elements and fertilizers from the subsoil to the surface. Coffee cultivations can also carry a ground cover useful for animal forages. Coffee culture is already familiar to the farmer. He would not have to be sold on the project. As a cash crop, coffee will bring income to the farmer and foreign exchange to the country both so badly needed a this time.

The Coffee Revitalization Project has encountered four major problems. These are:

- Unstable world market prices;
- Declining production due to soil exhaustion;
- Coffee rust disease; and
- The coffee tax.

As a result of these problems, peasants in some marginal coffee growing areas have cut down exhausted mature (Arabica) Typica coffee trees in favor of short term returns from corn and beans. In the difficult situation facing the industry today something has to be done in Haiti or the crop potential will be killed forever.

The GOH recently removed its tax on coffee, partly as a result of a special effort by USAID and others at the policy level It is hoped that this will result in higher farm gate prices.

Coffee production in Haiti is relatively poor. For example, Costa Rica exports 2 million 60-kilo bags of coffee from 100,000 hectares. In Haiti 140,000 hectares exports 220,000 60-kilo bags of coffee. With appropriate inputs, Haiti's productivity in a labor surplus economy can only improve.

2. Project goal, outputs and structure

The goal of the Coffee Revitalization Project is to increase coffee productivity and farmer income among small farmers in Haiti. The project has two components: farmers in two pilot zones (8,985) and farmers through extension (2,120). The aim is to double farmer productivity and to get at least 60 percent of participating farmers to adopt improved technology and farming practices. Five distinct project outputs are envisioned. These are:

- 5.5 million seedlings of high yielding rust tolerant varieties;
- Four technological packages geared to seedling production, research, fertilization and fungus control, and cropping systems management;
- Introduction of packages in Jacmel and Beaumont pilot zones;
- National distribution of coffee information; and
- Improvement of local organizational capability to support improved coffee production.

A total of just over $8 million is to be expended. This is made up of $4.48 in grant money, $1.6 million in PL 480 funds, and $2.2 million in local currency.

The work is to be implemented by the Interamerican Institute for Cooperation in Agriculture. Five long-term senior advisers are to be used (four expatriates, one Haitian). They will be supported by a regional field support staff and 164 animators. It is hoped that IICA can draw on its successful experience in Costa Rica to work in the Haitian context. PVOs are to be utilized for growing seedlings as in the agro-forestry project. The main difference here, however, is that coffee is a crop that the peasants want. Unlike hedgerows and trees grown for cash crops, no sales effort will be needed to get peasant acceptance. The animators will provide any reinforcement necessary to secure target goals in keeping with the best technology available.

3. Observations

This project could be a resounding success, given stable world market price, inexpensive labor and the provision of quality inputs. When this is added to the externalities of contributing to cash crop hillside production, increasing rural income, and soil protection and enhancement, the value of the project is clear.

The high cost of project initiation and the high ratio of foreign to local staff in the key decision making spots is a concern. However, Haitian staff need to be exposed to and interact with the best. Expatriate personnel should spend most of their time in technical matters and technology transfer rather than in administrative duties. A training component should be included

to enable Haitian agriculturists to eventually take over the running of the project.

It is also not clear where the institutional base in credit availability and fertilizer availability will be developed. These institutions are vital to the success of this type of project, as demonstrated by IICA's experience in Costa Rica. One possibility for providing credit is that the caisse populaire so successful around Jacmel can be upgraded to meet credit needs. Fertilizers could be provided if a new fertilizer blending plant is developed in Haiti.

Overall, this project has the potential to become one of the most profitable and valuable projects in USAID's agriculture portfolio in terms of its contribution to rural development and the hillside strategy. If it is a success, its positive elements should be identified and applied as appropriate in other hillside development projects.

III. THE TARGETED WATERSHED MANAGEMENT PROJECT

A. Overview

The Evaluation Team examined the voluminous historic project documentation that dates back to the late 1970s and early 1980s. Figure 1 summarizes this history. Earlier conceptualizations of this project must be placed in the context of a sequence of some decades of rural and agricultural project failures by all donors (not just USAID) in Haiti. Most of these projects (perhaps 400 or more over the last 30 years or so) had design flaws and serious implementation problems. Further, the process of failure was institutionalized; good resources were thrown after bad, particularly in soil conservation and in irrigation.

The handful of projects which survived have been those that started out by asking the farmer what he needs and designing to accommodate those needs to the extent possible within the resources available. Linkages and cross-fertilization between projects have been minimal in Haiti. Indeed, the case can be made that many of these projects and activities have been undertaken to promote a particular theme or objective (often religious) and such "turf" has been guarded jealously. Under these conditions, it is not surprising that lessons--good and bad--have rarely been shared or even documented. The successful experiences, in particular, are used to solicit funds, especially in those cases where competition is keen for public and private monies, external or domestic. Even the bilateral donor agencies appear not to have profited as much as they should have from their own in-house experience. Each major project carried with it high hopes of all kinds that it would be a model and a pace-setter, just like this one, e.g., the Integrated Agricultural Development Project (PADI).

Perhaps as a result of this experience, USAID appears to have been extraordinarily careful and conservative in the Targeted Watership Management (TWM) Project. Appraisals, surveys, studies, reconnaissance teams, consultative reports, and in-house professional work culminated in a Project Paper and an RFP from an implementing U.S. contractor (see Figure 1). Despite this apparent caution, there was pressure to move it along, as evidenced by rather naive or deliberate "cooking" of an economic analysis. The project at that stage included substantial related institutional development in the MARNDR to bring together a data base on conservation projects, the beginnings of which were also embedded in previous projects.

Total project preparation and development costs were extremely heavy. No attempt has been made to assess this cost accurately, but it put added emphasis on the need for more benefits, more quickly, from the TWM project.

Two of the most important design changes during the evolution of the project concerned the role of extension in the project and in project life expectancy. These changes were simultaneous in that during the PID preparation USAID/W dropped all physical, soil conservation instruments in favor of extension as the key device. It used that change as the reason for

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Figure 1: The Iterative States of Watershed Management

	Conceptual		Targeted Watershed Management Project	Notes
ning	Project/Program Formulation and Planning	1980-85	Early conceptualization Early Action Plan USAID/H Assessment by Fragile Lands Review of Assessment Economic Analysis	ADS II Project, Hillside Secretariat (STABV) Detailed economic analysis needed prior to PID preparation. 10 year project including land reclamation
ing	Project/Program Design Monitoring	1986-early 1987	PID Preparation Papers PID Review Process PID Approval (1.21.86) Project Paper (9.03.86 Project Funding and Final Approval (9.03.86) (PACD 9.30.91)	30,000 ha (1/3 of farmed hillside area) in zone of 6 watersheds. Land reclamation not needed or possible. Cost/ha to be reduced to $465. Make extension project for 5 years but include MARNDR development of public works e.g., check dams. STABV to do market absorption studies, hillside land improvement planning and watershed policy development. $15 m for 5 years.
ing	Establishment and Installation Monitoring	Most of 1987 and 1988	RFP (02/04/87) Best and Final, Umbrella Contractor (6/87) Contract with Main "Umbrella" Org. (7/87) Agreements with PVOs and Sub-Contractors First Funding Establish Operating procedures between organizations DAI Design Team	No accomplishments on the ground over reporting periods 10/86 - 3/87 or 4/87 - 9/87. Basic organizational work. Beginning organization of farmers' groups, grafting fruit trees, finding farmer field test sites, etc. Political difficulties until early 1988.
menta	Doing it - operations and training; early stages Monitoring	1989 to early 1990	FST Advisory Council and working Group Established 3rd Semi-Annual report of ARD/FST 1st time all 4 NGOs worked with farmers over a complete agric. season Obligations through fiscal 1989 are $10.1 million	Major turnover/dropout of key umbrella staff in mid-to-late 1989. Resulting redirection of effort. Initial survey base not compete and technical "intervention" inquiry just beginning. Meaningful work on animal health commencing successfully. NGOs with improved (mandatory) financial management/reporting system. Record keeping on "outputs" or "interventions" improving. Cooperation and mutual assistance among NGOs improving markedly.
enta-	Maintenance, repair, upkeep, re-investment Monitoring Information Flows			

scaling a ten-year perspective down to a five-year project (USAID/H - USAID/W correspondence).

These were major design flaws. Experience should have indicated that two-three years are almost always needed to develop the institutional structure to staff, fund, and otherwise organize and begin implementation of this kind of project, especially in these sorts of more remote areas. Where research, variety selection, testing and trials, training of staff and animateurs, base-line surveys (Sondeo), etc., are involved, one must count on three-four years to really get under way. What goes out through the extension process must be both financially attractive and technically correct. If the farmer decides to trust the animateur, and it goes sour, the project might as well go home. What could not have been foreseen beforehand with any certainty was the disruptive influence of the political climates over the late 1980s. Their inhibiting effect (first year lost) lends weight to the position, however, that the project is now barely underway, though funding was approved four years ago. It is a bit early to expect results of any magnitude.

Another background element which disturbed project implementation, very seriously indeed for some of the NGOs responsible for implementation, was the announcement by U.S. officials that the project would affect 20,000 families. Since nearly all USAID funding, directly or indirectly, had historically been seen to be in the form of paid employment (conservation, irrigation, etc., under Title III and Food for Work) the announcement led to an immediate demand for jobs in the project area. This centered on the projects' "front-line" agencies, the four NGOs, and served to bruise their credibility very badly. Certainly the "umbrella" organization, a U.S. company, lost a very great deal of support and good-will they may have had from the NGOs at that time. This is not to say that they have not lost credibility in other ways; they have, and these matters are discussed later. But this announcement certainly didn't help.

Project documentation makes it clear that the Les Cayes region was selected as the location for a watershed project for several reasons. First, project work on the hillsides had been minimal in this southwest region other than some historic Food-For-Work terracing and contour-walling, long since abandoned. Some Title III work implemented through GOH continues, however, on a modest scale. Second, USAID had projects on hillsides elsewhere in the nation; areas over 400-600 m of altitude, particularly in agroforestry and "resource" projects (LORD I and LORD II). So a TWM project in the Les Cayes region would diversify the approaches by looking at the farmer for soil conservation efforts on-farm and would move uphill with those efforts. USAID projects on the Les Cayes plains in irrigation, integrated projects, and resource development activities all had been remarkably unsuccessful.

Third, the Les Cayes hillsides in the early 1980s reportedly were the least eroded and desiccated in the country. Certainly the area's hillsides, down to the plains from Pic Macaya and surrounding heights of land, contain

severely eroded areas[1]. But compared to Haiti's center and northwest, for example, the region was relatively greener and moister. Tables 1 and 2 present and briefly analyze the nature and dimensions of the six watersheds in the TWM project.

As explained in its footnotes, Table 1 was presumably an initial attempt at about the time of the PID to try to document some of the main features and costs of rehabilitating the six watersheds involved in the TWM project. The analysis of the included data provides further insights into the nature of these data. These analyses are found at Table 2. It seems clear that project designers were "shooting in the dark" with the sorts of information available and the kinds of factors used to cost out the improvement of the watersheds. The Tables indicate, for example, that the same factor of $1,200 per hectare was used as the cost of rehabilitating cultivable hillsides (lands between 10 percent and 40 percent of slope) and the majority of the lands in the watershed which are on hillsides (over 40 percent of slope). There is no indication that the cost of rehabilitation and reconstruction, as it were, of those lands above 40 percent is even considered separately from the cost of soil conservation on lands still being cultivated--that is, with lower degrees of slope.

Nor do we know either where the $1,200 itself came from. The same percentage factors have been used to also determine the share of cultivable land in a watershed. That is to say, it has been assumed that 83 percent of each of the six watersheds and, therefore, the project area as a whole, is land on hillsides over 40 percent of slope. This is arrived at by several routes within the analysis. For example, line 2 of Table 2 indicates that for each watershed the share of the total project hillside area, which is over 40 percent, is the same as the share of total land and the share of land between 10 and 40 percent.

What differs is the share of land in each watershed which can be considered plains--that is, less than 10 percent of slope (see Table 2, line 7). The watershed with the greatest share of its total land under 10 degrees of slope is Cavillion, and the watershed with the least share of its land in the form of plains or slightly modulating hills is Port-a-Piment at only 7.6 percent of its total area. All other things being equal then, for plains development the relative proportions are highest in Cavillion and Torbeck, and least in Les Anglaise and Port-a-Piment.

Population densities also vary significantly with an overall watershed (including hillsides and plains together) density of 2.3 persons per hectare. The contrasts are quite marked, however, rising as high as 3.4 persons per hectare in Torbeck, down to the lowest density in Les Anglaise at 1.6 persons per hectare. It is unfortunate that the data do not split the population out into plains versus hillsides. A bit more homework on the early 1970 census could perhaps have made this partitioning because for planning purposes

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[1]USAID even developed a plan for the L'Acul watershed. It seems to have fallen between the stools and (possibly) is used by the MARNDR in their Les Cayes/Sud office--see Chapter III G above on the L'Acul plan.

Table 1: Targeted Watershed Management Project

Areas and Basic Description of Constituent Watersheds, plus Cost of Rehabilitation Options

Watershed in Project Area	Les anglais	Port a Piment	L'Acul	Torbeck	Grande Ravine Du Sud	Cavillon	Total TWM Area
a Total has.	13,000	10,000	23,000	9,000	20,500	38,000	113,500
b Total Hillside (ha.10% slope)	9,230	7,100	16,330	1,000	14,555	26,980	75,195
c Cultivable Hillside (ha. 10-40% slope) 2	1,569	1,207	2,776	170	2,474	4,586	12,783
d Total Plain (a-b)(ha.)	3,770	2,900	6,670	8,000	5,945	11,020	38,305
e Irrigable Plain (ha.)	900	130	2,969	3,350	2,700	1,415	11,464
f Irrigated Plain (ha.)	500	40	1,000	684	1,439	250	3,913
g Cost of b	$11,076,000	$8,520,000	$19,596,000	$1,200,000	$17,466,000	$32,376,000	$90,234,000
h Cost of c	$1,882,800	$1,448,400	$3,331,200	$204,000	$2,968,800	$5,503,920	$15,339,120
i Cost of Rehablitating (f)	$1,000,000	----	$200,000	SDA	MISEREOR	$500,000	$1,700,000
j Cost of (e)-(f) New Construction	$250,000	----	PDAI	$4,000,000	MISEREOR	$500,000	$4,750,000
k Population	20,976	25,555	43,751	30,561	55,857	84,723	261,423

Cayes Region, supervised by MARNDR/Sud with UNICORS, MARNDR/Cayes, DCCH, IRD taking the lead in their respective water sheds.

Source: Table located in USAID/H offices. Part of larger presentation also showing watersheds in Chaine des Matheux, upper Artibointe and Trois Rivieres watersheds (covering sites of other USAID/H projects).

Notes: (1) While there undoubtedly notes accompanying this table, they were not available. The sources of the are demographic and cost data re equally unknown. Given the nature of general data base available, they no doubt are best estimates.

(2) The data indicate that some 66% of the watersheds is hillside, or over 10% slope, of the 75,195 ha of slope, some 12,783 is of slopes between 10% and 40%. That area is some 17% of the total hillside. The inference is that the hillside balance (of 62,412, ha) is ctd, land over 40% slope while some experts insist that this is the maximum which should be cultivated, other feel 50% is more realistic. In principle it is the 17% which should be targeted for soil conservation; the balance of 83% if the hillside should be subject to rehabilitation, without farming.

Table 2: Analysis of Watershed Basin Data in Table 1

\Watershed	Les Anglais	P-a-P	L'Acul	Torbeck	G. Rav de Sud	Cav	Total Actual	%	Notes:
tal Area	11.50	8.80	20.30	7.90	18.10	33.50	113,500	100.00	
tal Hillside ᵃ of Slope)	12.30	9.40	21.70	1.30	19.40	35.90	75,195	100.00	
ltivate 0-40%)	12.30	9.40	21.70	1.30	19.40	35.90	12,783	100.00	Cultivable taken as same share in each watershed as share of total land > 10% slope.
lance over 40% #2 - #3)	12.30	9.40	21.70	1.30	19.40	35.90	62,412	100.00	Balance over 40% also same percentage of total and same percentage within each watershed
er 40% w/in Each tershed (% of Hillside)	83.00	83.00	83.00	83.00	83.00	83.00	83.00	.	
pulation %	8.00	9.80	16.70	11.70	21.40	32.40	261,423	100.00	
nd on Plain 0% of Slope)	9.80	7.60	17.40	20.90	15.50	28.80	38,305	100.00	
p/Total ha. ersons/ha.)	1.60	2.60	1.90	3.40	2.70	2.20	2.3/ha.		
arative Pop. Density	69.60%	113.00%	82.60%	147.80%	117.40%	95.70%	2.3/ha.	100.00	
st of Total Hillside r Capita	$528 00	$333.00	$448.00	$39.00	$313.00	$382.00	$345.00		
st of Cultivable llside Per Capita (10%-40% slope)	$90.00	$57.00	$76.00	$7.00	$53.00	$65.00	$59.00		
tal Cost of Cultivable llside (10%-40%) s % of Total Hillside	17.00%	17.00%	17.00%	17.00%	17.00%	17.00%	$15.3m as % of $90.2m = 17%		Same result by taking line 11 as % of line 10.

:

cost of total hillside > 19=0% = $1,200/ha.

cost of cultivable hillside (>10% - 40%) = $1,200/ha.

cost of total hillside ($90.234m) per capita = $345

cost of cultivable hillside (>10% - 40%) = $59/capita

cost of lands > 49% = $90.234m - $15.339m = $74.895m

above 40% = 62,412 ha.

per ha. of lands > 40% = $74.895m/62,412 = $1,200

Figure 3: GDP and Value Added in the Haitian Economy 1976-1988

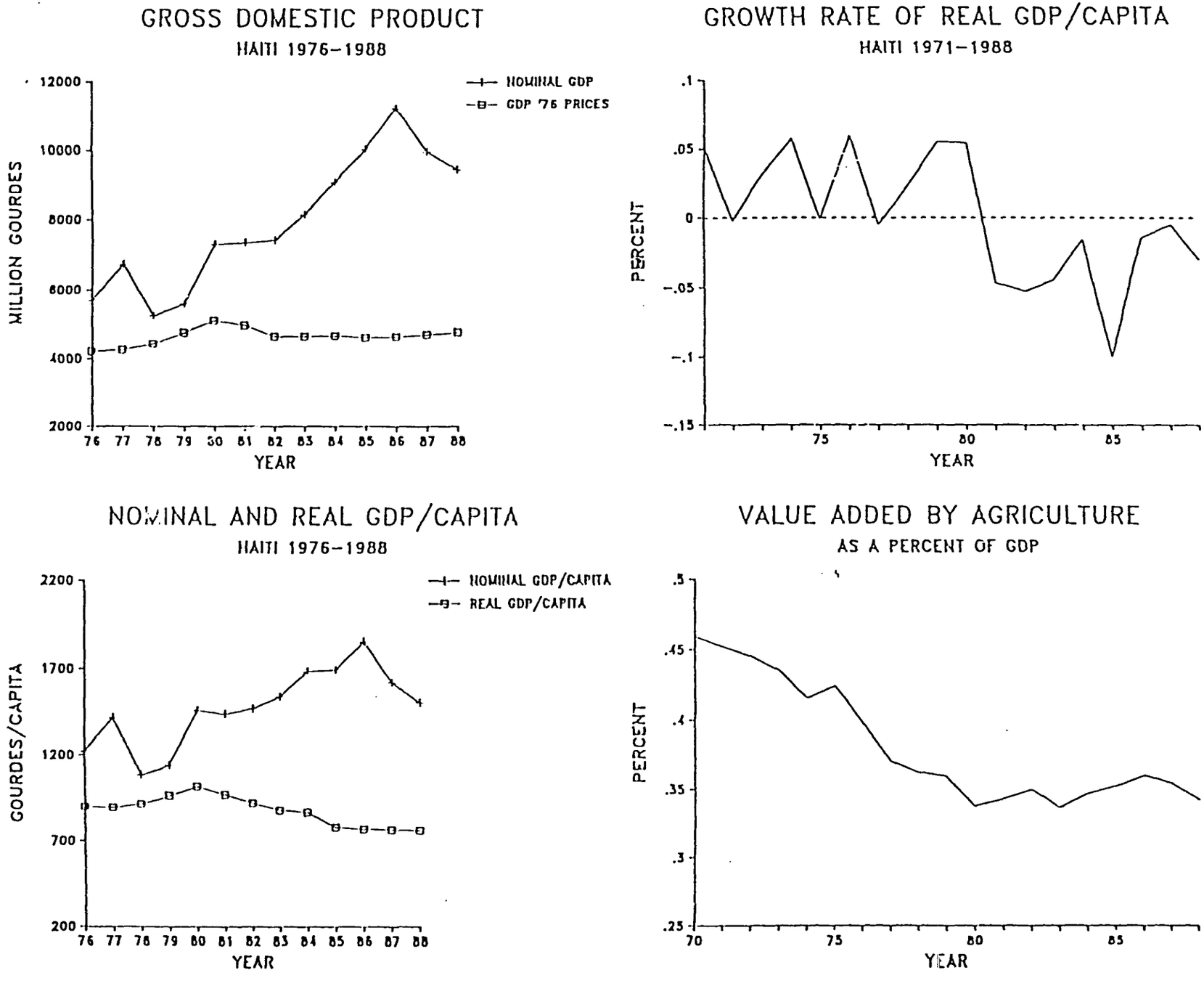
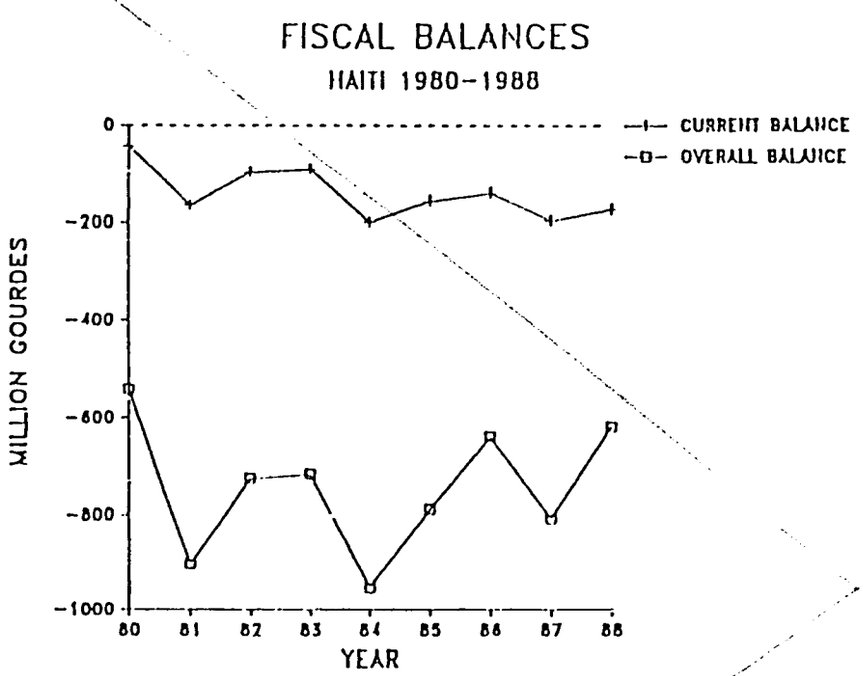
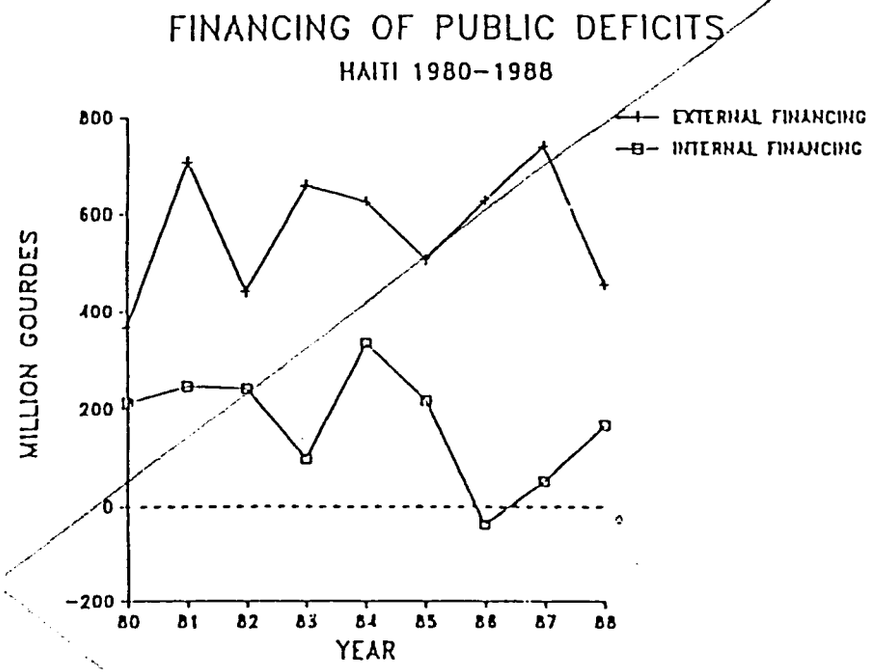
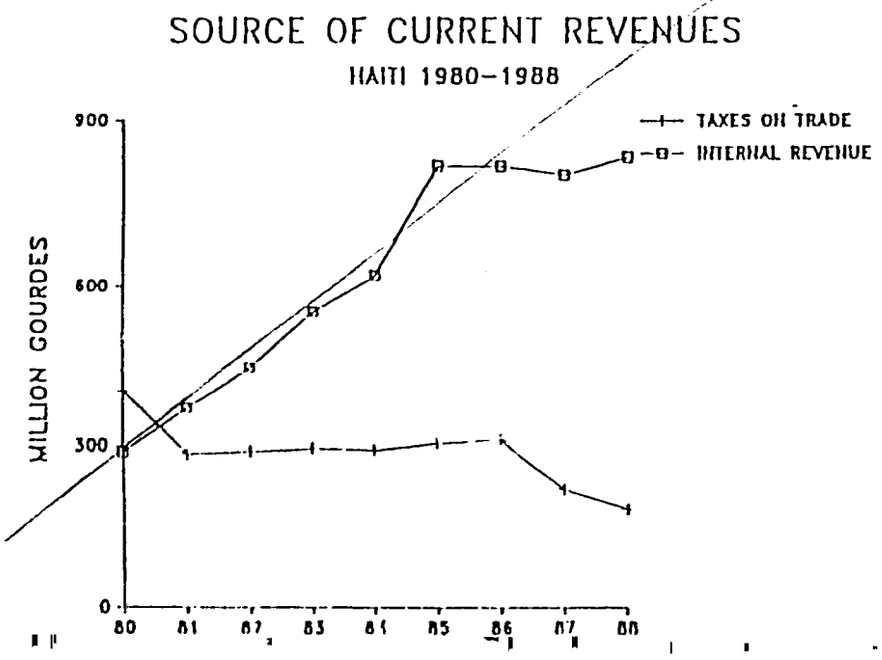


Figure 4: Macro Financial Information 1980-1988







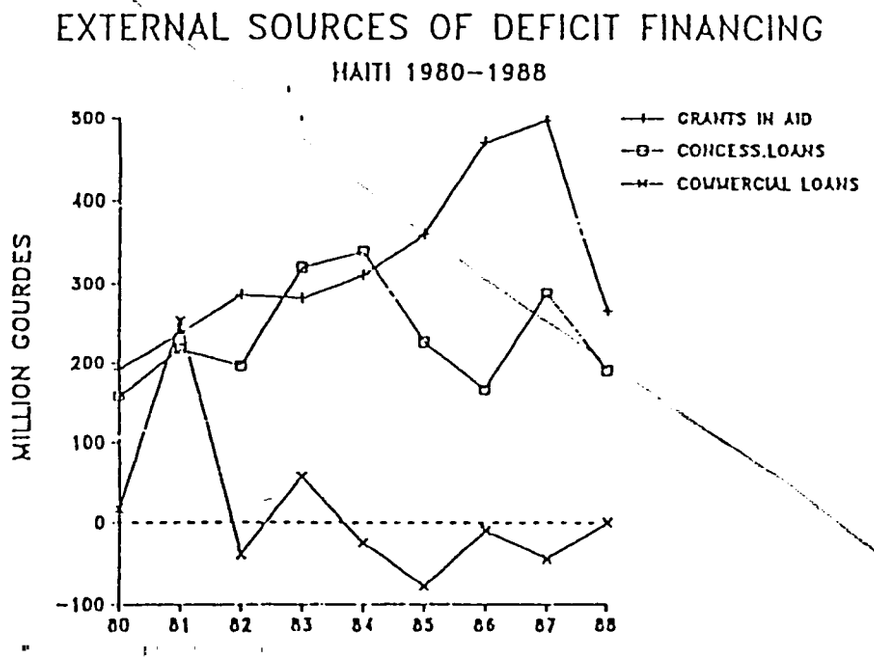
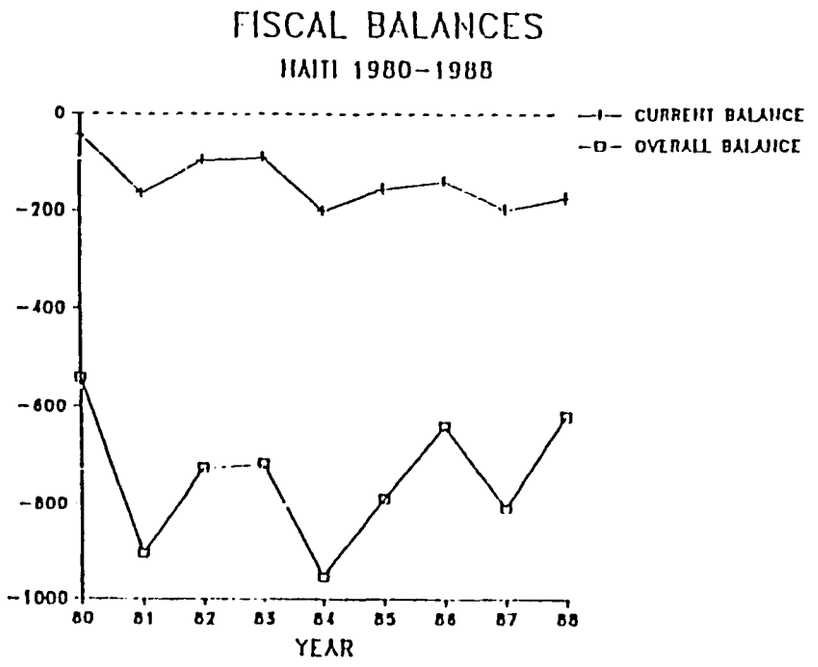
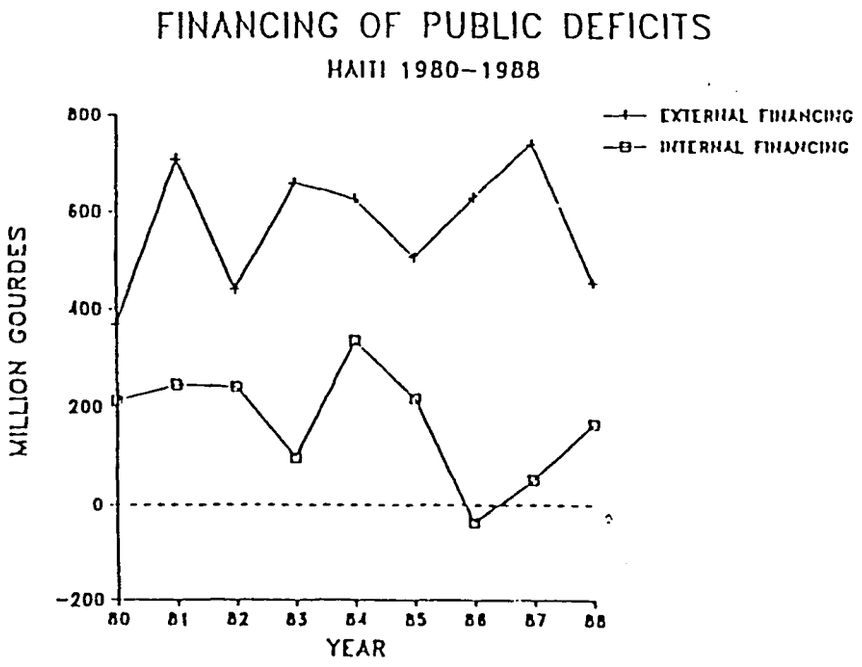
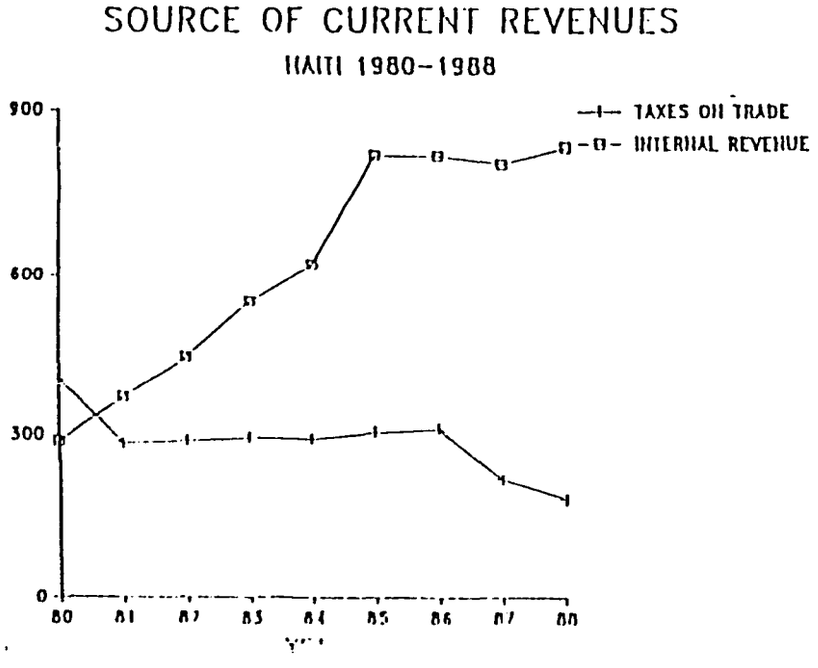
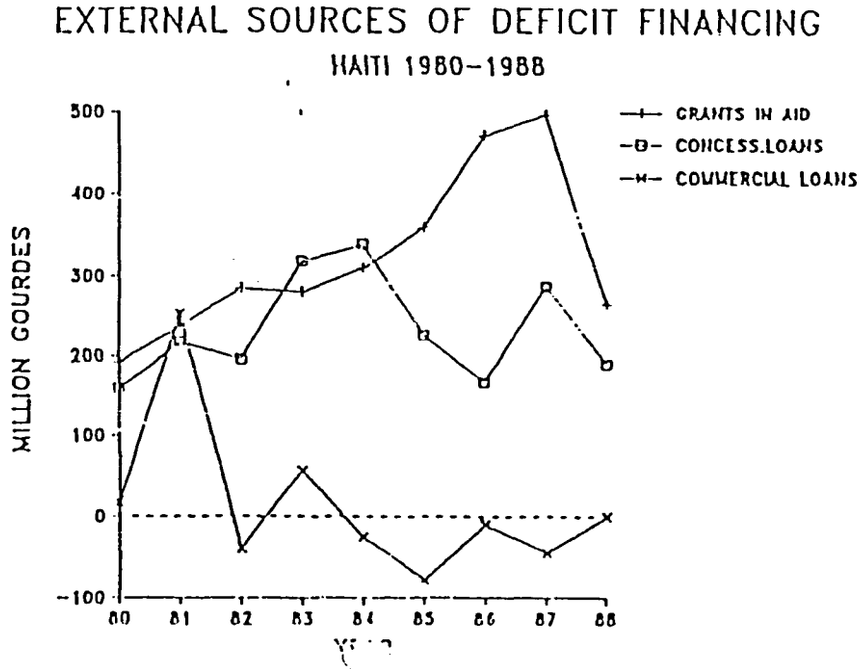


Figure 4: Macro Financial Information 1980-1988









presumably one needs to know the density on the hillsides which are being subject to the project's interventions.

Although it was conventional wisdom that population on the plains was more densely settled than population on the hillsides, the Team's field observations would suggest that, except for those hillsides which are virtually denuded of cover and have no people on them since they are bald or nearly so, the bulk of the hillside systems indicate fairly dense settlement. While it may not be quite as high as on the plains, it certainly is not very much lower per kilometer or per square area of watershed. Certainly, when one gets into the valley bottoms, high up in the watersheds, settlement density clearly must be as great as it is on the plains.

The cost data were also rather primitive in the sense that, regardless of slope, regardless of where it is on the hillside, whether it is cultivated or whether or not it is cultivated, the total cost for each hectare was estimated to be $1,200. This seems naive in that the majority of the land which is over 40 percent of slope (which is 83 percent of the total hillside area) would seem to be much more costly to rehabilitate with terraces, rock walls, gully stopping, grass cover and trees than it would be for hillsides which are cultivable and which are being targeted by the project. The $1,200 figure undoubtedly is based upon experience with the Ministry and experience with other USAID projects elsewhere in Haiti.

What one notices, however, is that the total cost of rehabilitating the hillside areas which are cultivable--that is, which are considered to be between 10 percent and 40 percent of slope--is just over $15 million at $1,200 per hectare. This is remarkably similar to the authorized amount for the Targeted Watershed Management Project, but that may be coincidental. If it is not coincidental, then the $1,200 per hectare cost must include all of the costs of overhead and administration, as well as the costs of implementing, through the NGOs, an extension program with developed and useful and financially attractive interventions for the farmer.

There are some conundrums when one looks at the cost per capita, again recognizing that the population data are for the entire watershed and densities do vary somewhat. Nonetheless, as shown in line 10 of Table 2, the average cost per person of rehabilitating the total hillside is $345, whereas the average cost per person of rehabilitating the cultivable hillside per capita, the 10 % to 40 % areas, drops to $59. This would seem to be an implicit awareness that the cost of rehabilitating slopes of over 40 degrees is significantly higher since the same population factor is being used to divide through both of those cost levels. Once again, Tourbeck shows a very reduced cost per person for total hillside and for cultivable hillside. They have the highest population density as well, and they are the smallest watershed of the six flowing south from Pic Macaya. Proportionately, their area of slope, the cultivable area, is also less (see lines 1, 2, and 3 on Table 2). Torbeck has no TWM work as yet.

B. Project Objectives

1. Introduction

This Chapter's purpose is to spell out the various objectives of the project as garnered from project documentation including, particularly, the Project Paper and the PID. The objectives are described under five broad headings: Soil Conservation, Improving Farm and Family Income and Welfare, Achieving Sustainability, Lessons for Elsewhere in Haiti, and the Monitoring of Project Impacts.

The objectives of the project are rather imposing since the time frame for the project, while originally ten years which was imminently sensible, was cut back to a five year period. To achieve some of these objectives in such a very short period of time was unrealistic. Another aspect to consider is, "objectives for whom?" The Team found that the objectives written into the project tend to be those from the top, meaning those of USAID and the implementing agencies, rather than of the farmer and farm families themselves. Whether what came out in the original plan meets the need of Haitian Hillside and the Haitian Farmer thereon needs to be reexamined in the light of project experience.

2. Soil conservation

Paramount in project designers' minds has been the priority need to prevent Haiti's farming hillsides from washing away. This erosion clogs and suffocates the valley bottoms and the estuarial plains. This resource base deterioration has made officials and professionals in international agencies shudder. So does the declining volume of food supplies available; some 80% - 85% (estimate) of Haiti's people are already malnourished. Thus, the key objective of the project was the conservation of soils on the targeted hillsides. The preventing of soil erosion in turn was tied to overall resource base stabilization and particularly, to the costs and benefits engendered downstream of the hillsides. Although not very well achieved, the conservation efforts were to build on other USAID assistance efforts, including the L'Acul Watershed and work done under PL-480, Title III.

3. Improve farm family income and welfare

The overwhelming characteristic of the rural populations settled on the six watersheds is one of poverty. The peasant, working constantly at the margin on an hourly and daily basis, seeks to minimize risks and maximize his cash flow. He will, in fact, disinvest because of his cash flow requirements and at the same time will try to build up his capital assets including the value of his land, in order to meet emergency expenses or to pay large routine costs such as school fees. This is where trees and livestock play a particularly important role.

The general strategy to achieve the objective of improving farm income was to use the interventions, which would have been developed by project staff, to simultaneously conserve the soil and assist soil conservation in any number of ways, and also improve the family's income. That is, the

intervention would give him a product which he could sell, or which would otherwise improve his cash flow. It would raise the productivity of the soil. It could fill in income gaps and food supply gaps over the calendar year.

4. Achieve sustainability

This objective intended to put in place a working system which, with the eventual departure of USAID funding and management, would be able to continue soil conservation effort. Thus, the project needed to engender within all its individual components, and in the system of linkages and mutual relationships, a working process by which the farmers would continue to expand on each farm the use of interventions. Simultaneously, the number of farmers would continue to increase who were using these resource stabilization interventions. The intensification process, in other words, would continue on all farms and the number of farmers affected by the project, would proliferate to such a degree that a threshold protection level on any given hillside, would be achieved which in fact, did impact on soil conservation.

The other key component in the concept of achieving sustainability would be the development of financial management and technical skills within the PVOs and NGOs, in the administrative structure, and within the local organizations, to continue the work of extension, of input supply, of farmer training, and the like. Thus one goal of the project was to develop permanent acceptance of improved practices. Farmers indicated that they needed to see that a new way of doing things worked. Once they saw its success, they would be likely to continue using that input or method. A second way to ensure a high probability of having sustainability was to develop in farmers the desire to innovate; to try something new even if there is no agronome, technician or animateur present to provide detailed explanations. It takes at least ten years under optimal development conditions for a project area to reach a point of sustainability.

5. Lessons for elsewhere in Haiti

Both USAID/H and AID/W have viewed the Targeted Watershed Management project in some respects as an "experiment." It has been a testing ground for intervention modules, for extension systems, and for other processes which, hopefully, would control soil erosion on farmers' fields. The history of soil conservation effort in Haiti is rather dismal with a very great deal of good money having been thrown after bad, all over the map. It would be fair to say that no one part of the country has been exempt from projects and schemes which had either no success or modest success, and usually temporary, success. The project was designed to provide a model which could be replicated, possibly with some adjustments, elsewhere in the country and even outside.

The concepts of sustainability and of proper extension techniques and incentives to farmers, the use of the PVOs and ONGs, the development of intervention modules in both their technical and financial attractiveness, and the whole issue of hillside strategy versus plain strategy were all to be tested and fine-tuned individually and collectively in this project. The

total package as adjusted and fine-tuned over time could then be employed for other programs elsewhere. Results from well-executed programs of research, trials or extension/teaching were to be made available to other organizations and projects in Haiti. Some potentially adaptable practices were to be evaluated elsewhere because of differences in soil, altitude or rainfall. One example of an already successful traditional practice that is being popularized with farmers elsewhere in Haiti is the grafting of improved fruit varieties on native root stock.

C. Project Administration and Implementation

The project implementation structure is shown at Figure 2. It is important to recognize that there are or were other actors in the "Save Parc Macaya" program. Though they are not officially involved, regular interaction takes place to further program objectives. Those organisations include ISPAN, the MARNDR (Les Cayes Region) and STABV. As well, the University of Florida manages the Biosphere work on Pic Macaya. These, plus other PVOs and interested organizations also sit on the Advisory Board which is really designed as a basin-wide management committee. The four NGOs have their own Conseil which meets regularly, with a rotating chairmanship. The USAID Coordinator works with all groups as a communicator and professional liaison since USAID's Project Officer for the TWM Project can spend insufficient time on-site.

D. Project Monitoring and Evaluation Processes

1. Introduction

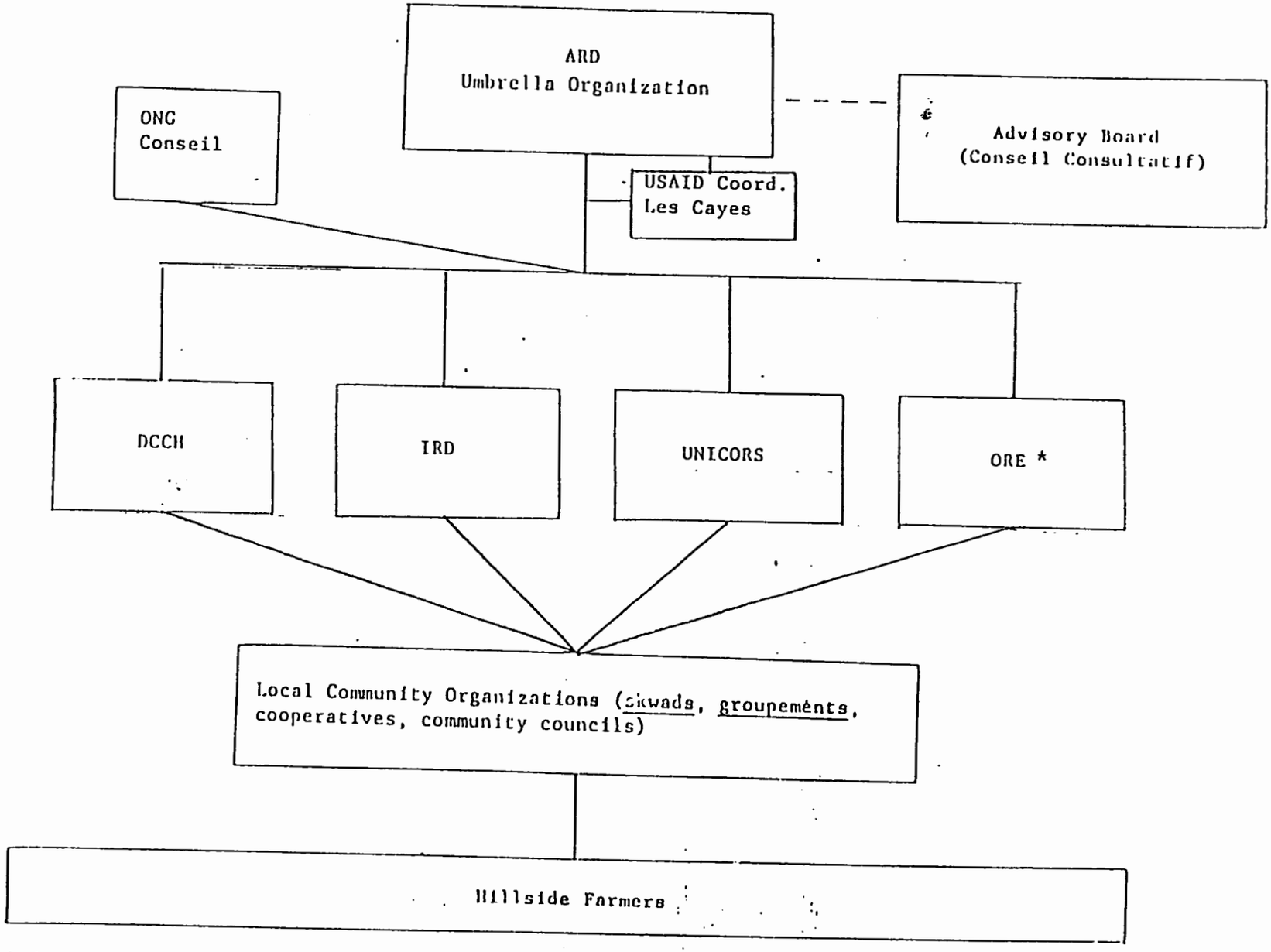
The purpose of this section is to present the processes built into the project and its implementation for monitoring, recording, and otherwise keeping track of the performance of the various actors and institutions involved in it. The project had monitoring systems for the administration of the project, for measuring the impacts of the project, and for in-house assessment to make sure that processes and administration were on the right tracks at all times.

It became clear at an early stage of project development that there were different opinions as to the types of measurements to be used and the confusion of those indicators of performance on the one hand with physical and financial impacts from the project on the other. The four participating NGOs in their work plans were asked to establish targets for a range of interventions such as live hedges, trees planted, groupements formed, etc. These were considered over time as <u>outputs</u> from the project. They were, in fact, used as measurements of the performance of the agencies involved. They should not be confused with the impact of the project on soil conservation, on resource stabilization of the hillsides, and the like, the "bottom line" impact areas. Those "outputs" are <u>means</u> to an end, not the end.

2. Administrative Performance

Given the pyramid structure of the project, every level was to ensure adequate administrative performance of the system or systems below it.

Figure 2: Organization of the PSTO



* Note that ORE tends to concentrate more on working with individual farmers rather than through local groups

The NGOs were to monitor themselves; ARD (Camp Perrin and Burlington) was to monitor the four NGOs; Burlington and USAID were to monitor ARD-Camp Perrin; the USAID representative in Les Cayes (Coordinator) was to monitor ARD and the NGOs; and USAID/ADO was to monitor administrative performance of the entire project system.

The single most important inhibitor to effective monitoring of administrative performance in this project area has been the sheer cumbersomeness and difficulty of transport and communications. These difficulties precluded frequent meetings or discussions. Once some administrative matter started going off the track, it was only after an inordinate time before it was noticed and remedied. Indeed, the position of Coordinator, with a radio link to USAID/Port-au-Prince, was established partly to perform this communications and administrative function.

Regular meetings were organized with the main actors, and were generally useful. The four NGOs established a Conseil which evolved into an effective coordinating and experience-sharing body. The priority activities were defined relatively early on, but the particular strategies, incentives, NGO "spheres of influence," etc. evolved over time and were adapted to changing situations. Particular delays were experienced in developing Cooperative agreements with the NGOs. The financial and administrative requirements implicit in those Agreements proved rather onerous. USAID and ARD established rather detailed reporting systems. These were especially difficult to administer, as was the evolution of more formalized work plans (every twelve months), since these NGOs historically have had significantly lower required (pre-project) levels of administrative and financial control.

On balance, the monitoring of administrative performance is easier--the levels know one another better. More specifically, USAID contracted with ARD to provide technical assistance services in financial management and administrative matters to the NGOs. These services were included in the Scope of Work to ensure that the NGOs had the requisite accounting and administrative systems to receive, disburse, and properly account for the funds embodied in the Cooperative Agreements. To this end, ARD hired accounting consultants to set up the accounting systems at the NGOs and to conduct training and reviews. ARD "certified" the NGO accounting systems for USAID.

Further, ARD hired a series of Administrative Specialists to be responsible for the monthly review and certification of the NGO financial reports and vouchers. This work has included:

- Financial review of vouchers to ensure that numbers total properly, information is correctly presented, and supporting documents exist for each disbursement;

- Regular visits to the NGO to review accounting system development, voucher preparation from the accounting book, and on-the-job training;

- Maintenance of a voucher tracking system to monitor that vouchers in process move forward and to be able to respond to questions about delays;

- Liaising for the NGOs with the USAID's Controller's Office and the Project Manager to resolve finance questions; and

- Initiating and managing the financial audits of project activities for each NGO.

In addition to this role, the Administrative Specialist, together with ARD/Burlington, provides support in administrative matters as requested by the NGO. This work includes:

- Coordinating off-shore procurement of equipment and vehicles. (The Livestock Specialist has developed channels of supply for vet supplies.);

- Reviewing the compliance of procurement activities with USAID regulations;

- Reviewing the property control systems;

- Assisting in US Dollar bank transactions, opening US accounts;

- Obtaining health insurance to facilitate NGO training programs outside Haiti; and

- Coordinating the visits of the Vehicle Maintenance consultant.

ARD also has attempted to foster an internal planning evaluation and monitoring process within the NGOs. This includes reporting on physical progress (discussed below). Additionally, ARD and USAID employ outside consultants to check, verify, and otherwise report on performance; these generally have been qualified Haitian agronomes and sociologists.

3. Objectively verifiable indicators

NGO performance is measured by the quantities of physical "outputs" generated, e.g., linear meters of hedgerows; and by the number of farmers participating in the programs. Annex Tables 5-1 and 5-2 indicate the sorts of "verifiable indicators" in use. There is dispute occasionally when moniteurs cannot locate all of the reported outputs. There is no assessment of the quality of the outputs or the farmers' ability to optimize their use. There is also no real attempt to relate these to farmer income or to soil conservation, per se.

4. Project impact monitoring

a. Physical impacts

This project is intended to promote resource stabilization on the hillsides and downstream onto the plains and to the ocean. The project's purpose is to control erosion, to minimize sedimentation, to stabilize the hydrology including the ground water and surface water systems, to reduce the peaks and incidence of flooding, to even out the flows in the rivers over the year, and the like. These are all physical impacts. The question is, have they been measured and if so, how? And what are the results?

Other impacts that should be measured are the financial impact on the participating farmers themselves, their cash flow and their capital resources, including livestock, trees, and the value of their land in terms of risk abatement. Several other impacts could have been monitored, such as the impact on the overall basin economy as a result of improved farming. More difficult to measure, but very real, are the possible impacts of the project in terms of reducing out-migration of families, or young people at least with some education, from the region.

Surprisingly, there are no significant monitoring/measuring systems, within the project at any level, for monitoring the physical impacts. Therefore, whether or not the project is reaching its objectives of reducing the impacts of rainfall and erosion, cannot be judged except by inference.

Although early efforts were made to produce some measurements of pre-project financial and income levels of farmers, this objective has not been achieved. Thus other than some very crude estimates, it is not really possible to have a system of monitoring the impact of the project on farmer income, reduction of risk, improvement of assets, and the like. Yet it is the financial impact on farmers, as seen by the farmer, which was designed to attract him to put in place the interventions on his land which would, in turn, bring about soil conservation, with particular emphasis on the live hedges, (using elephant grass in particular), and the impact of that on livestock.

b. Financial impact on farmers

The Project Paper (September 3, 1986) states that the Contractor was to devise an automated (computer) system to process data generated by project activities, including base-line surveys and regular monitoring. In addition, it stated that soil loss and soil use, changes in soil fertility and effects of "interventions" were to be measured, estimated and/or evaluated for their effects in each watershed. The Project intended that demonstration plots would be established with baseline information included and that changes in soil depth, fertility, yields, and farmer income would be monitored. Risk-averse farmers are slow to change. They have already made efforts to reduce risk by planting several areas thus reducing the risks of having crops on the same soils, the same slopes and the same altitudes with similar micro-climates.

Farmers need to be shown that a potentially-profitable new practice or input will work economically. This is the purpose of area trials and demonstrations. Once the new item can be shown to farmers as a risk-reducer and profit generator, they can be expected to adopt it following a period of teaching and showing. The results of utilizing risk-abating practices were to be computerized and therefore easily summarized. This would make the task of extending the process to other areas in and outside of the project much simpler. This has not been done, though a start was attempted.

E. Reaching the Farmers

1. Introduction

The purpose of this section is to describe in some detail the means by which the project's institutional structure and administrative and technical processes have attempted to reach the farmers to encourage them to adopt interventions which will provide soil stabilization. Very early in the project planning process, the decision was made by USAID to avoid the mistakes and problems associated with capital works for soil erosion. Haiti has experienced, (including earlier USAID experience), a series of what must be considered failures when it comes to rock work, terraces, benches and the like. The decision was made quite clearly to try to achieve erosion control through a process of working with farmers to change their farming, so as to provide that conservation end result.

Questions which should have been asked during this design phase involved how to reach the farmers, with what, and on what scale. A scale provides two problems: First, how many farmers doing what does it take, and at what density on a watershed or mini-watershed, to reduce soil erosion? Second, do the proposed implementing agencies which will work with the farmers have the capacity to provide these interventions and to implement those packages of changes required in the farm system? In other words, is there a minimum scale that must be reached to impact on soil conservation? If there is that minimum scale, do the implementing agencies including the umbrella organization, have the capacity to reach that scale and in what time frame? When the project designers decided to move to extension rather than rock work and physical capital structures, they also decided to move from a ten year to a five year perspective, which the Team feels was a design error.

There is also the very deep issue of understanding fully the existing farm system and its dynamics. The earlier project documentation (1985 and 1986) was replete with various studies of the farming systems. In it's first period, ARD staff attempted to build on some farm systems management work which was never completed to the degree necessary. There is also farm-level material developed by other agencies such as the World Bank, the Inter-American Development Bank, the FAO, etc. All of these in combination try to describe the existing farm system recognizing that, given the micro-ecologies and the different dynamics of time and resource use, and population pressure, there can be marked differences between farm systems at different altitudes on different slopes and in different conditions of population density and

resource degradation. Generalization is often not possible, even over small areas.

Perhaps the most important work, certainly from this Team's point of view to date, is the recent work undertaken by Agricorp, at USAID request, in five project sites in the total project area. These sites include one from each NGO, plus one from the University of Florida, higher up on Pic Macaya. The purpose of this work, among other things, is to study the farmers and examine the interventions being promulgated by the different NGOs and to see whether their recording systems of interventions and their reporting processes are accurate or inaccurate. And if so, how can they be improved?

The difficulty in the project has been that in so many cases, awareness of farming systems on the hillsides, as distinct from the plains, is minimal. Interventions have been developed or brought in from elsewhere. Crops and products have been proselytized, which are not necessarily either financially attractive to the farmer or suitable to these particular ecologic conditions. When the farming interventions move up hill, as it were, then varieties and species, crops, cropping patterns, seeds suitable for lower altitudes may or may not be relevant the higher up one goes.

2. Research, trials, demonstrations

a. Introduction

In order to "reach" farmers successfully, technical findings must be translated into practical terms and economically viable practices implemented by farmers and monitored by technical specialists. The typical path of findings that benefit farmers is research --> trials --> demonstration.

Research relating to crops and livestock is designed for statistical analysis and probability of findings being repeatable. The treatments are carefully selected and are repeated randomly within a small project area or with a small group of animals. Research from outside Haiti can, and should be, reviewed and the findings compared with Haitian research relating to the same or similar inputs.

The input or practice having the best results from research should be compared with a similar practice commonly utilized in the area chosen for that input to be introduced. This side-by-side comparison is a trial. It should be carried out by an agriculturalist who monitors all stages of the work and who can therefore evaluate the validity of the findings. Even though results from one side-by-side trial are not statistically valid, results from a large number (i.e., more than ten) of trials carried out under supervision in areas of similar climate and altitude can be compared statistically. If the same result can be expected statistically at least seven times out of ten, that treatment (input or practice) can be the basis for an on-farm demonstration.

A demonstration is a side-by-side comparison in a farmer's field of a proven new treatment with that farmer's usual treatment. There is a high probability that greater yield, higher quality, and/or higher income for the farmer will result. However, agronomes, technicians, and animateurs must

continue to follow up to ensure that the new input/practice is utilized correctly and fitted into other on-farm practices.

b. Technical intervention modules

Interventions, defined elsewhere as crop inputs or farmer practices, can be introduced to a farmer as single or multiple items. A module can, by definition, also be considered a single or multiple item although in this discussion it is more pertinent to consider it multiple.

(1) Agronomy

The PID stated that the Project would "extend known techniques" via production packages to farmers in the area. The Project Paper (9/86) re-stated this objective and further indicated that the "umbrella" agronomist was to establish a number of small farm trials (experiments) as well ("demonstration plantings in year 1 and at least 20 new "demonstration experiments" on farmers' lands during each year of the Project. The "proposed interventions for the sites described are designed specifically to control erosion and at the same time increase soil fertility and net income to the farmer."

"The criteria in selecting major interventions were based upon the following conditions: (1) farmers must be familiar with most of the varieties used in the rotation; (2) the program must be easy to implement and maintain; (3) quick results are expected; (4) the package must be aimed at increasing soil fertility and retention of available water; it must (5) prevent soil erosion; and (6) appreciably increase farm income. The proposed major interventions include: alley cropping, improved food crop varieties, fruit trees, firewood species, forage species, adapted agronomic practices, perennial cropping methods and inorganic fertilizers."

It was further stated that all interventions were to increase farmer profitability by decreasing erosion and increasing soil fertility. A module implies a group or package of practices. Certain aptly-chosen inputs within each module could result in nearly immediate farmer profitability. Others, such as fruit trees, would take more time to benefit the pocket book. Increasing soil fertility was to be a major goal. The following sections address key "interventions" that have been proposed and sometimes used, and that relate to crop and livestock production.

(a) Crops

Inputs and practices relating to crop production in the area were outlined in the pre-project reconnaissance survey of 1985. Other documents (Project Identification Document 1986, Project Paper 1986, Request for Proposal 1987, and Best and Final 1987) repeated some of the proposed "interventions" and changed some emphases. In-depth descriptions of many proposed inputs are found in Annex 3.

(b) Alley cropping

This is the practice of installing contour strips of vegetation or rampe-paille (plant residues) and farming in the "alleys" between the strips. This has been the major new practice recommended.

Emphasis was placed on planting fast-growing legumes in the strips or hedgerows. The width of the alleys varies according to degree of slopes: the steeper the slope, the closer the hedgerows. Pruning must be done regularly to minimize shading, and clippings are spread over the alleys to provide nitrogen and reduce erosion. Replicated research plots were established near the Project headquarters in mid-1989. Evaluations of performance of hedgerow species and alley crops will be made. No trials and very few demonstrations have been done.

(c) Grass contour strips

This "intervention" was proposed as an alternative to legume-planted hedgerows on farms with livestock. The grass is cut periodically and clipping carried to animals. The commonly used species is Elephant grass. Clumps for planting were obtained from the Ministry of Agriculture at Damien. Replicated contour strips of different grasses and grass-legume combinations were established by PST research personnel in 1989. No trials and few good on-farm demonstrations have been laid out.

(d) Better varieties/improved seed

Beans and corn are staple food crops, and so recommendations were made for on-farm testing and using available seed of new varieties or both. The major advantage of these inputs is higher yield. However, farmers who have grown the new Maquina maize do not like it as well as the local "chicken corn." Maquina needs fertilizer and is less suited to Haitian conditions than the hardier chicken corn. Therefore, one goal of the plant breeder at ORE is crossing the Maquina with the chicken corn to improve yields and processing and eating quality.

In 1988, seeds of an improved bean variety were distributed by UNICORS' TAPS (animateurs) as incentives for installing hedgerows. In addition, each TAP was to establish a demonstration site where the beans would be grown under supervision, and all practices (erosion control, planting method, weeding, harvesting) were to be carried out in the best way possible.

According to Linn (1988) beans at most of the demonstration sites were not well cared for, and contour treatments (hedges, ditches) were not well laid out. This shows the danger in having on-farm demonstration plots.

(e) Commercial fertilizer

More emphasis was placed on the need for fertilizer in the Project Identification Document than in the succeeding Best and Final document from ARD. The Team did not find evidence of fertilizer

being used in demonstrations in the areas served by the NGOs and no research or trials have been conducted by PST personnel. However, commercial fertilizers are available in the project area and ARD indicated that they are widely used on the irrigated plains of Les Cayes. Judicious use of small amounts of fertilizer would increase yields (and ground cover) much more than will hedgerows. For many small hillside farmers, however, fertilizer costs exceed their means.

The one exception to the non-use of fertilizer was found at Formond. The agroforester mixed two analyses available at Cayes and used that fertilizer in a vegetable trial at the University of Florida camp and in demonstrations in farmers' home gardens. Beets and carrots had the best growth in the fertilized plots; compost and compost plus fertilizer produced smaller plants.

(f) Current interventions

"Interventions" listed but not emphasized in earlier documents, together with examples of current "intervention" needs, were recently stated at PST (Cunard, 1990):

- Furrow/berm construction along the contour (SC[2]). Water and soil are caught by the furrows. Hedgerows can be planted on the berms (AF).
- Tying of ridges to prevent lateral flow of water in furrows (SC).
- Spreading legume hedgerow clippings in alleys to provide nitrogen (C).
- Composting, followed by application to soil (C).
- Planting leguminous species as cover crops (C).
- Selection of crops and species for alley planting (C).
- Leaving plant residues on the surface without clearing or cultivation (no-till) (C).

Additional inputs and practices requiring evaluation or dissemination were listed as follows (Treadwell, 1990):

- Use of guinea grasses planted along the contour (SC, A);
- Use of tree species for contour conservation barriers (SC, AF);
- Green manure/herbaceous cover crops (C);

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[2] SC = Soil Conservation; AF = Agroforestry; C = Crop Production; A = Animals

- Use of perennial, herbaceous legumes in association with vegetative contour barriers (SC, A);
- Contour planting of perennial herbaceous legumes (SC, C);
- Underplanting coffee with leguminous manure crops (C);
- Improved hillside pasture (A);
- Livestock feed supplements (A);
- Livestock feeding trials (A);
- Inoculation of legume seeds (C).

(2) Livestock

Few "intervention modules" pertaining to livestock were described in the pre-Project documents. The following five were listed in the Best and Final Proposal:

- Cut-and-carry animal feeding systems;
- Simple veterinary practices;
- Forage crops for small animals (pigs, sheep, goats);
- Forage storage;
- Improved animal breeding.

Between 1987 and the spring of 1990, the only practices to grow and be accepted significantly were the PST Livestock Health Program and the Livestock Vaccination Campaigns. The veterinarian in charge is associated with IRD. He has trained veterinary technicians for the PST area as well as for other areas of Haiti, including the LORD I project at Maissade. Many demonstrations have shown farmers the importance of maintaining animal health.

Additional animal-centered "intervention modules" are listed in the previous section. Recommendations for improvement of livestock production were much less specific (Project Paper) than those for crop production. Targets for investigation included:

- Collection of land use data;
- Collection of socioeconomic baseline data;
- Applications research relating to seasonal forage nutrient content, storage of feedstuffs, and forage species selection; and
- Methods of increasing forage production.

Recommendations for improvements in livestock watering and animal health were made. Most of the inputs involve, at the farmer level, his making a change in livestock management. Examples of such changes that relate to soil conservation are:

- Growing forage in hedgerows;
- Elimination of grazing crop stubble; and
- Growing forage in a small area for harvesting and storage for use in the dry season.

3. Role of livestock in the system

Animals are important to farmers. They represent sizeable amount of cash when sold. Project activities did not encompass animals to a great extent three years ago. However, emphasis has intensified over time.

The most significant and widely-publicized efforts relating to animal extension work have been those of the veterinary at IRD. He has shown hundreds of farmers in the TWM area how to take better care of their valuable animals, and has trained several dozen Project area and other area's technicians. Vaccinating poultry against Newcastle disease has been a major activity of these "graduates." PST scientists are involved with evaluation of grasses, legumes, and mixtures as feed for livestock. The livestock and forage specialist has developed a better system for feeding cut forage to confined goats, mules and horses. As results are noted, NGO specialists in technical agriculture and extension are invited to Camp Perrin to observe and study the "intervention." They return to their own project areas to pass along the knowledge to farmers.

4. Role of Mutual support and learning

As the Targeted Watershed Management project has progressed in time, some lessons in cooperation have been learned. For example, the talents of the plant breeder on the ORE staff are recognized by PST and other NGO staff. Observations and ideas relative to variety development and fruit tree grafting are frequently exchanged. DCCH has expressed interest in growing a mixture of grass-legume seed for pasture on several farms. The mixture was developed by PST. One of the IRD-trained veterinary technicians is working part of the time for the PST forage specialist. UNICORS is interested in using the legume mix to plant under coffee trees; it was suggested by PST. This could have striking results, particularly if used on their plantation. Livestock could then be run, no doubt profitably.

Ideas for research, trials and demonstrations are now apparently generated by all the organizations and possible follow-through discussed openly. The NGOs and PST scientists are much more mutually supportive than they were when the Project began. They are learning from each other. The base for continued cooperation and expansion of number of on-farm demonstrations has been constructed. This need for a 2-3 year "breaking-in"

period should have been foreseen, nonetheless to serve as a more efficacious base for action.

5. Role of trees in the system

Project personnel have emphasized education/extension work relating to trees as soil-conserving enhancers when planted on contours. Emphasis has been on Leucaena; it is recommended for elevations up to 500 meters above sea level. Above that, other leguminous species must be used. Research is needed to determine the best one(s).

Trees, per se, are not major inputs required to reduce soil erosion, except for those planted close together in HDS. Good crop production results in soil conservation. The role of fruit trees as a major contributor to a farmer's cash income is much more visible to agronomes and farmers than the role of trees in HDS. Even though it takes a minimum of four years before trees start to bear, it's important for farmers to have them. Most fruit trees have been planted near the houses to minimize the danger of theft of fruit.

Because fruit trees are so important, the plant breeder at ORE began successful grafting of improved mangoes, citrus and avocados as early as 1985. He then showed other agronomes the technique, and they in turn began demonstrating and showing farmers in the NGO areas how to graft. As a result, improved fruit trees have "caught on." The role of trees in the future will not be minor, but there will be less emphasis on them relative to crop-related inputs.

6. Role and supply of inputs and services

Inputs and services were intended to reach the farmer to conserve soil, increase soil fertility, and increase farmer income. It was expected that certain inputs such as an improved bean variety or commercial fertilizer would fulfil those roles almost immediately. Others, such as hedgerows or grafted fruit trees would take longer to increase farmer income.

The major service envisioned was educational: providing farmers with information on cultural practices that would result in early and correct adoption. The related service was the provision of animateurs or TAPS who would be in a position to provide answers to farmers' questions and problems by referring them to the NGO agronomes. The technical specialists of the umbrella organization were to be the back-up sources of information.

The supplying of inputs was considered to be a necessary part of the Project. The methods were not always clearly defined. It was recognized that the existing NGOs had certain strengths. ORE was recognized for its abilities to graft fruit trees and improve seed quality. In order to improve and expand existing practices, vegetable seeds, breeding stock, tree seeds and seedling, grass seeds and clumps, and commercial fertilizers were needed. It was left up to the umbrella organization to determine the best way to obtain and distribute these or any inputs.

Inputs and services (or "interventions"/"intervention modules") have so far played a relatively minor role at the farm level. Emphasis has been placed on providing trees for contour hedgerows and utilizing the A-frame for laying out the contour lines prior to constructing ditches or planting. Supply of trees from PADF or ORE has met demand.

Grasses for contour planting have "caught on" and account for 68 percent of soil conservation techniques. Elephant grass and Guinea grass are planted as vegetative bunches. They are popular because of their feeding value for livestock. The supply is adequate because areas have been dedicated to their reproduction.

It is also important to provide farmers with seed of improved varieties because the latter have higher yields and usually more disease resistance. Also, the seed itself is usually larger than farmer-produced seed and is therefore more likely to produce a vigorous plant. Improved bean seeds were provided to some of the farmers in the UNICORS area as incentives for digging contour canals and/or planting contoured grass or HDS. Currently, ORE's multiplication of Tamazulapa beans is limited to small quantities for breeding with local varieties. Seed of a perennial herbaceous legume (Siratro) is being produced on a trial plot at Camp Perrin. This plant can be included either in contour plantings or in alleys. Other than having to be trimmed at certain stages of growth, it appears to be excellent ground cover and supplies some nitrogen to crop plants (i.e., maize and sorghum). Demand is expected to increase.

Veterinary services have been utilized more and more by farmers . . . and have been paid for according to a standard fee scale developed by PST and utilized by all four NGOs. Fees are also charged for standard vaccination services. Campaigns have been conducted against anthrax, swine Erysipelas and poultry Newcastle disease.

Educational services, such as training in use of the A-frame, in planting trees and grass, and demonstrating to NGO agronomes at the PST research and trial sites the value of potential new inputs and practices, were provided to ORE's own extension agents and the farmers and, in the case of grafting techniques, to the PVOs. The NGO agronomes then take their newly-gained knowledge to their own watershed development areas and pass it along to animateurs, TAPS and farmers.

In summary, the channels for introducing and increasing the supply of inputs have been developed, as have the channels for teaching/extension. Cooperation is good among the entities involved.

7. Different approaches for extension/incentives

Five organizations are involved with extension, i.e., showing farmers how to do things better.

a. ORE

This NGO employs an agronome as the chief extension person. It is his job to help the area extension supervisor and his agents (animateurs) to organize farmers who have shown interest in applying new soil conservation technologies demonstrated at the ORE sites into konbits. These are traditional work groups who work on each other's land in turn.

The interactions with the farmers are:

- Registration and planning meeting held prior to each planting season. The program and its conditions are clearly defend. "Interventions" are planned (choice of techniques and crops; plant material requirements are calendarized);

- Soil conservation seminars. The group meets to get information on soil conservation techniques;

- Implementation of hedgerows and similar techniques. The group meets with the extension agents on a farm. Contours are established. Plant materials are provided by ORE;

- Seminar prior to distributing improved plant material. At a meeting, recommended planting methods for improved alley crops (maize, beans, yams) are demonstrated;

- Alley crops are planted by farmers. The extension agents follow up to observe and record relevant information;

- Control of hedgerow and alley by extension team. Soil conservation and alley cropping "interventions" are monitored, recommendations are made to farmers, and data entered on forms;

- Evaluation of improved alley crops. Farmers are surveyed to get their reactions and preferences; and

- General evaluation meeting. Following the seasonal harvest, a meeting is held with all the farmers in each combuite.

Direct and indirect incentives are used. Direct incentives include:

- Seeds of improved maize, beans or sorghum are made available on credit to farmers who have implemented soil conservation techniques or are about to do so. Repayment is in cash at harvest time according to a rate previously agreed to; and

- Hedgerow plant materials and alley crop plant materials are distributed free of charge to farmers who are implementing soil conservation techniques.

Indirect incentives include:

- o Tools, available through small tool banks which have been set up at Saut Mathurine and Formond. Combuites can borrow tools for agriculture or road work;
- o Agricultural supply stores (boutiques), which are expected to be operational in Saut Mathurine, Camp Perrin, and Formond by the end of 1990;
- o Blacksmith's forge operated by a blacksmith trained at Formond to sharpen repair, and build hand tools; and
- o Basic veterinary services currently provided by six people trained by IRD.

b. UNICORS

The organization for extension is similar to that of ORE. An agronome provides information to the 16 animateurs, who are called TAPS in UNICORS. The animateurs established groups or work with individuals to introduce and establish conservation techniques and better farming methods. No details of the current program were obtained by the Team.

In 1988, seeds of an improved bean variety were used as an incentive to encourage farmers to institute soil conservation techniques. The record indicates that there was some abuse of this incentive and lax supervision.

c. DCCH

An agronome is in charge of extension and public relations. DCCH concentrates its work in two areas with a female extension specialist and an animateur in each. They form groupements which participate in meetings and field sessions.

During the current year (February 1990 - January 1991), the following activities are being carried out:

- o 12 seminars on techniques of preparation and planting trees plus integration of trees with anti-erosion structures;
- o 8 seminars on techniques of soil conservation;
- o 6 seminars on crop production;
- o 10 seminars on rabbit raising; and
- o 12 sessions for women and children on both domestic science and agriculture.

Several farmers went on a field trip to Limbé to see the agroforestry plots. Other farmers were on local field trips to ORE and the DCCH extension center.

d. IRD

Extension activities are carried out by ten monitors and two animateurs under the direction of an agronome. Farmers have some crop demonstrations on their land and attend local meetings. Topics of the latter are set by the audience. A field trip is scheduled approximately every two months, either for a local trip to demonstration sites or for a more extensive trip to , perhaps, Madian Salagnac or Maissade. The veterinarian will train agronomes, technicians and/or animateurs on how to organize animal health clinics. He also makes a monthly trip to each NGO to train the technicians or animateurs.

e. University of Florida

The agricultural extension process in the Formond-Pic Macaya area involves an agronome and three animateurs, one in each of three zones. Emphasis is placed on installation of soil-conserving measures such as contour trees and on improved gardens. The animateurs helped establish the latter as demonstrations to show the effect of commercial fertilizer, compost, lime, and lime plus fertilizer on beet, carrot, and onion growth. Another extension activity is a continuing educational effort to ask farmers to stay out, and keep animals out, of the Biosphere Reserve. This is gradually meeting with success, particularly with regard to "no crop growing." However, the temptation to get free tress growing in the nearby hillside remain.

8. Group versus individual extension work

Most of the NGOs organize groups of farmers, present information to the groups, and follow up with individual farmers to determine how many trees were planted, how much contour work was done and how effective it was in conserving soil. On the farms or at meetings, questions from farmers are answered. The most effective extension work is done by maintaining contact with both groups and individuals. On-farm resource "use" decisions are individual and family decisions, not made by groups of outsiders.

9. Farm improvements and soil conservation

Emphasis to date has been on soil conservation, not crop production directly. For the farmers to increase incomes, contacts with them to explain needed improvements and conservation measures would have to be made. It was felt that farmers would understand the need for initiating soil conservation measures.

The first improvement on conservation inputs considered necessary were contour hedgerows and bean seed of an improved variety. Agronomes were shown how to use the A-frame to establish hedgerow lines. This knowledge was transferred through animateurs and TAPS to farmers, In the same way, bean

seed was distributed. This was an incentive in some areas: a farmer would get bean seed if he planted a certain length of hedgerow.

It was felt that intensification of the initial measures would be relatively easy as the "extension" people (TAPS, animateurs) did their work and farmers saw results. However, it takes several years for crop yields to increase in fields with hedgerows. Other inputs/improvements are needed in conjunction with the tree or grass rows. Therefore, intensification or expansion of areas using improved farming techniques has moved slowly.

a. Intensification

There are more groups of farmers, more animateurs and in some cases more knowledgeable animateurs than there were when the project began. At this stage, there needs to be better training of extension personnel, better care of contour plantings by farmers, and intensification of agricultural inputs.

b. Nature of sequential constraints

The greatest constraint is the lack of training of all people involved in reaching the farmer. Upon the reflection of the programme, however, efforts are now being marshalled to deal with this bottleneck. Availability of inputs, especially hedgerow trees, is no problem. Some seeds and grasses are scarce at times, but multiplication efforts continue. Other constraints are land tenure, scattered fields and discontinuous soil-conserving efforts. These all result in occasional fields in a watershed being "shotgunned." For development in one area the constraint could be the lack of proper/sharp tools; elsewhere the constraint may be transport; elsewhere lousy seed storage; and so on. Releasing the first constraint in a given area will mean that the next one will still restrict development. The route to better farming is the sequential releasing of those constraints.

c. Farmer view, needs, cash flow

Farmers participate in the process of choosing soil conservation techniques and new seeds or trees. This participation is most evident in the ORE areas. Farmers have not seen significant yield results so far from the contour plantings. Some soil is building up behind some of the structures. However, yield is unlikely to change significantly because the eroded soil is just as infertile as the soil left higher up in each alley. Farmers need higher yields and higher gross incomes. These can be achieved by a low-cost crop input module: commercial fertilizer, new variety, perennial legume ground cover, higher planting rate.

F. Macaya Biosphere Reserve Project (MBRP: University of Florida)

1. Background

The Parc Macaya (1983) in Haiti is in the southwest peninsula in the Massif de la Hotte near the communities of Formond, Cavalier, Riviere Trois Sources and Glacie. The park itself contains some of the last vestiges

of natural forest in Haiti manifesting some 300 plants, 20 bird species and some 12 mammal species. Recently, six new orchid species were found therein. It is also the water catchment area for seven major rivers serving some of the most agriculturally productive areas of Haiti. The park and its environs contain some 50,000 hectares from which two escarpments arise--Pic Macaya (2347m) and Pic Formond (2250m).

2. Program

For a three year period, September 1987 to September 1990, USAID/Haiti contracted with the University of Florida to achieve the following objectives in the park:

- Protect natural ecosystems (especially forests);
- Enhance natural resources;
- Stabilize biological diversity; and
- Ensure the sustainable development of said (soon enhanced) watersheds

The Institute of Food and Agricultural Sciences at the University or Florida was responsible for this project. They hired a Technical Coordinator, a MBR coordinator, a Steep Slope Stabilizer, a Market and Economic Analyzer, a Site Supervisor and nine Haitian technicians. Help was also expected from ISPAN and MARNDR and a Haitian agronomist.

In one of the world's poorest and most environmentally degraded countries, this team hoped to achieve environmental preservation and rehabilitation by:

- Creating a biosphere reserve;
- Assisting 1500 peasants to increase agricultural production;
- Rehabilitation of critical zones; and
- Creating a database of past history, natural history, and the experimental base acquired in successfully dealing with the above.

This overall effort aimed at getting the surrounding community to avoid abusive exploitation of their own environment (the park) by helping them attain a higher standard of living by increasing productivity from resource bases in those communities. Also, an organization was to be created to help manage the park constructively and to encourage local farmers to act responsibly and constructively. The Government of Haiti has been involved, even if only passively at times.

3. Evaluation Team's approach

The Evaluation Team visited the park, the project headquarters, reviewed the literature, and conducted an in-depth study of papers and reports generated by the Project.

4. Project activities

The UF/MBRP only started on-site activities in early 1989 due to the renegotiation of the CA necessitated by the Congressional ruling on Haiti after the November 29 election. Since the original CA included many forestry activities, a forester was chosen as Technical Coordinator instead of an agronomist. An agronomist should have been assigned to assist the Technical Coordinator from the beginning. A Haitian agronomist was hired in July 1990.

The preliminary project period has been beset by various difficulties in the areas of staffing, monitoring, equipment, the continuous effort to define roles between the actors (ORE, UF, PST/ARD), and farmer/MBR relations. The project has been hampered by Hurricane Gilbert, and political changes in Port-au-Prince. Police and military assistance were required to remove farmers who were invading the park. Also, UNICORS/COSAR cut a forest to plant coffee (with international assistance).

The project has been preoccupied with a number of logistical constraints, specifically transport, communications, and staff member housing problems due to the extremely difficult access to the isolated target areas. One vehicle was wrecked; and another will be shortly, since it is inappropriate. All vehicles are often in need of frequent garage repairs. One new vehicle arrived recently. Staff members are coming and need homes refurbished. Temporary quarters have been constructed, and permanent quarters are being built. The radio commmunication system and computer arrived after some delay, but their use has been hampered by the need for adjustment/repairs. Some personnel work in Port-au-Prince or Florida; personnel based in Florida pay short visits. Pic Macaya is visited by personnel as circumstances permit. Most project personnel are stationed in Les Cayes/Camp Perrin area.

A farming systems manual was sent from the University of Florida; a logo was designed; a statement was produced as to where landslides were; and ARD/Plaskett helped with a soil survey (some maps were started).

The project is engaged in developing a database devised in both Florida and Haiti. To date Florida has acquired a 386 computer with a scanner and a fax machine, while Haiti received two 286 computers with printers. Remote sensing and photographs are proposed and spot imagery is being used. How far the sophistication in technique is helpful is not noted.

Peasant involvement has included: educating MBRP/UF teams as to what trees would be most useful; the participation of 60 peasants in rural research interviews; attending meetings to discuss the project; the participation of 35 out of 1,500 farmers as cooperators; and maintenance of farmers' test gardens established by the project. The pig project is a major thrust.

Agronomic work has not been successful in the main, especially with vegetables. Several check-dams were constructed in Ravine Ford-Bleu. Two tree nurseries are being set up. Accomplishments are sparse and there are no hard core findings on which this Team can base judgments. No reports have been made on all of the agricultural research, trials, and demonstrations.

5. Achievements to date

- Conduct of a sondeo to accurately assess the needs and problems of the peasants in the three targeted areas;
- Installation of over 91 successful check dams in gullies;
- Installation of 3 kilometers of fence protecting one of the critical parts of the core zone;
- Improvement of 3 kilometers of access road to one site using both heavy equipment and local hand labor;
- Conduct of a floristic study to stabilize landslides;
- Establishment of a local guide organization;
- Completion of a land tenure study for park areas;
- Distribution of 300 pigs (either produced or traded for) in three target areas;
- Acquisition of spot satellite imagery;
- Introduction of cabbage, carrots and improved black beans as crops;
- Formation of a Groupe d'Interet for Macaya;
- Conduct of two farming seminars;
- Obtained funding for a boundary survey;
- Completion of a large housing headquarters facility; and
- Near completion of the housing at the park.

6. MBRP Findings and conclusions

- The MBRP/UF team has not yet been able to operationalize the biosphere reserve concepts which were originally developed in the early 1970s. Five zones were identified as part of a biosphere:

  -- Core zone - to stay as natural as possible under primitive original park conditions;

-- Special uses zone;
-- Forestry zone;
-- Agroforestry zone; and
-- The agricultural zone.

A map showing suggested zones was completed in 1989 and is constantly being revised using SPOT imagery and ground truthing.

Once these zones are clearly delineated, a nature technician should be put in charge of each category to determine the restorative/rehabilitative work which needs to be done in each. Fortunately, tropical vegetation grows quickly and most of the area will need no human help. There are some key areas, however, which need land reclamation work because of landslides, and hill, gully and sheet erosion. The MBRP/UF does not have in its present team the capability to handle these situations adequately;

- "Optimum Land Use" in the five zones is a major part of the program. Using technicians available in Haiti, a land tenure/land use map must be completed for each zone. Michele Oriole is compiling a land tenure map for the project;

- The Pig Project is one of the most promising, yet most distressing, features of the project. In a recent litter, for example, 15 piglets out of 18 died. With simple devices requiring no cash expenditures, an active exemplary pig project could be made operational very quickly. The local animal technician can take charge of this activity under the administrative guidance of the on-site manager and with the appropriate technical inputs. The University of Florida's input into the pig project at this time is not at all clear and should to be examined so that this activity can get on-line, be on time (responsive), and targeted to meet peasants' needs. It was the Team's understanding that new personnel were to be attached to this task.

- The international agencies who contributed to the clearing of land and subsequent establishment of a coffee plantation under the auspices of COSAR near Riviere, Trois Sources should be made aware of the negative demonstration effect they promoted. Apparently, their pattern was also followed by peasants coming into the area and planting black beans near Randele where UNICORS is active. It would have been hoped that UNICORS, a grantee under Project Sauve Tè, would have been more sympathetic to land conservation activities. Apparently their coffee interests came first.

- Park agents have apparently been appointed by the Government but they have had marginal positive impact since they have not been paid. The agents could have been under the direction of the Haitian technicians responsible for each zone and be given permanent employment in the rehabilitative restorative work noted above. The guarding activities would then become incidental to their employment and their continuing employment be directly

related to the successful prevention of trespassing in the park. As the "agents du parc" are GOH employees they cannot be directly employed by the UF/MBRP;

- Soil work has failed to build on the activities of Plaskett/ARD. Instead, in these naturally poor soils in need of stability, fertility, quantity, depth and restoration, project personnel have chosen to plant vegetables. Zinc and phosphorus deficiencies were apparent to the naked eye. Composting cannot appreciably remedy trace element deficiencies and no amount of variety element juggling can suffice. Even if the small farm demonstrations are appropriate (which is questionable given the successes of the Kenscoff experiments), the dispersion of these activities was premature as seen in the failure of the experiments. These poor results in agriculture have not gone unnoticed by farmers who themselves have rich crops of sweet potatoes and yams. Major blame for the failures appears due to the absence of technical competence. The key question, however, is whether all this will raise the farmers' income to a level where he would see them as a viable substitutes to the hitherto free possibilities provided by the State lands;

- The park idea is too valuable to lose. However, the park must now become a viable, non-profit organization. An effort should be made to get the park to become the beneficiary of a debt-for-nature swap to establish a fund for long-term sustainability of the development and protection efforts;

- The rationale for the Technical Director living in Les Cayes, the Coordinator in Camp Perrin, and the research sociologist in Camp Perrin is unclear. Such an arrangement accounts for high transport costs and the logistical inability to set up a site-specific, effective work schedule;

- Several visits have been made to the site by UF personnel. However, the sites seem to have benefited only marginally from these visits. UF personnel should only come if they have a clear contribution to make to the site's evolution, and research assistants provided by UF should clearly demonstrate just how their work benefits the advancement of the concept of the establishment of the park;

- Roads are being repaired on both sides of the park. They provide a study in contrasts. One road crew tries to follow road building principles and tacitly observes environmental considerations. The other does not, and government bulldozer operators can soon be expected to come and repair what is being only haphazardly established;

- There are 1500 families in the area. The project has touched the lives of approximately 50 families, including those who got pigs

and work as cooks, gardeners, and manual laborers in building the new project site;

- No institutional mechanism exists or it seems likely to be in place for indigenous assumption of the project if present trends continue. Haitians should be brought in as quickly as possible to replace foreign project managers; and

- Biomass-intensive gardens are promising, but nothing has been really done in this respect. Bio-intensive home gardens should have been introduced long ago and popularized.

7. MBRP Recommendations

The presence of the Parc Macaya activities have drawn attention to the need for such programs. Whether this is a primary need in a country where people are excruciatingly poor can be debated but, while that debate is made, the facility once destroyed can not be replaced. It is likely that had the UF/MBRP not been active, the forests of Parc Macaya would surely by now, at least in part, be destroyed. The project has had set-backs in terms of the relationship between United States and the Government of Haiti. There is no doubt, however, that work should continue and, as a first step, some innovative way of working with the Government should be found. The following recommendations are important for the Parc Macaya to become economically viable, socially sound and ecologically responsible.

- Raise farmer's disposable income by improving soil, crop varieties, farming techniques and post harvest systems.

  Viable animal and forage components must be institutionalized at an acceptable quality level immediately. Higher-yielding black beans, yams, sweet potatoes, and manioc are indispensable. New cash crops like garlic and pigeon peas must be planted if they can succeed at these altitudes. Make a determined effort to stabilize all the factors of production so new productive levels can be maintained;

- Operationalize the concept of the five zones.

  Project personnel should delineate the zones on a map and develop "Optimum Land Use" plans for the zones. Establishing land tenure could be a part of this effort;

- Sustain the operations by producing relevant supporting services.

  Extension and evaluation services are needed, and Haitians should be trained to undertake the work. Also, more prominence should be given to local persons;

- Focus on equity concerns.

  The smallest farmers need special consideration. To ensure equity, those without land must be given primary opportunities for work. All farmers should be encouraged to meet basic consumption needs (calorie, protein, and vitamin) on a consistent and continuing basis before selling their product. Infrastructure improvements such as cisterns and community development activities both to save and generate money are critical but are not yet present. These will provide infrastructure to meet cash needs of the peasants so he can have more to eat even if he sells some;

- Launch an effort immediately to develop and actively protect the park.

  This is key because project achievements to date do not lead us to conclude that sometime in the near future the peasants will be sufficiently developed so that they will not have to poach on park premises. This effort should focus on compensating the park agents;

- Establish a Haitian-based institutional mechanism to manage the project for the long term.

  Such an institution could draw upon the resources of the University of Florida's reservoir of technical, human relations, conceptual, and managerial skills; and

- Establish clearly who owns land in the park and which GOH agency will be responsible for the park.

G. TWM Findings and Conclusions

1. Introduction

This project has been undertaken in one of the most difficult areas of the Third World. Communications, transport, and other infrastructure are primitive, and living and working conditions very difficult indeed. A particular event or issue which could be "recoverable" in most such project situations, where the institutional structure and processes could absorb reasonably high levels of shock, could not be easily recovered from in this project.

The project has had a number of successes. This is meant in the sense of providing, in years 3 and 4 of the project's life, a set of bases and guidelines, foundations, on which a more effective project can be designed and built. These building blocks have been expensive lessons learned, and some of the wheels have been (needlessly) re-invented. But they are there and should be used.

On balance, the Team decided that the project should continue, but in a more effectively designed and implemented form. Though the beginnings have

been expensive, they have been worthwhile if USAID builds on the lessons learned. This project stands a chance under certain controllable and redirected conditions. Having made that decision, the Team's findings were organized to support it. The findings reported below are relevant to moving the project forward and to future project design, strategy and implementation needs. If the project has a defect, it is in the question of how to implement a poorly designed operation. Adjustments were not made for that aspect as quickly as possible and the recommendations here are addressed to these design issues. There is common agreement that the ARD component has been of marginal significance to the entire operation. As such, it should be very carefully reviewed at this point and consideration given to ending or dramatically rerstructuring their role in the project. There is also common agreement that, based on the experiences of the project, sufficient time has elapsed to allow the project to reformulate on its strengths and illuminate its weaknesses.

2. Project design and strategies

a. Overall strategies

To "take on" an ecologically heterogeneous, socially complicated, reasonably isolated region such as this, with some 60,000 families on 80,000 ha. of land, and with highly underdeveloped communications, movement and other infrastructure requires a structure of strategies as per Annex 3. That is, goals and objectives need to be agreed upon. A decision must be made as to where you want to be at a future time. The nexus of strategies is the road map and the transport to get you there to help achieve the agreed-upon goals, even if the ultimate beneficiary and implementation device, or instrument, the farmer, is barely consulted when setting the goals. Soil conservation is often the external developers' goal, not necessarily the farmers'. And, if the goal is not quite appropriate, then the package of strategies is may also be inappropriate.

A few select components of the strategy structure can be found in project documentation. Most pronounced is the strategy of reaching the farmers to encourage and motivate the farmers to adopt soil conservation practices on their land. The Terms of Reference developed by USAID for ARD and the NGOs, precluded meaningful consideration of national and regional strategies. They also confined the watershed strategy to the hillsides only, thus precluding conservation strategy development of the total watershed. The project is mis-labelled, since it is hillsides which are targeted, not watersheds.

Within this confined strategy, there is ample room for strategies to decide on priorities as to place, people, techniques, technologies and systems. However, given the apparent inadequacies of the data base, a lack of detailed knowledge of the area (soils, rainfall, hydrology, cropping systems, etc.), and the nature of the NGO implementation structure, it should have been recognized that up to three years might be needed to develop proper strategies. Instead, it appears that in ARD's scattered efforts in agronomy and farming systems both USAID and ARD failed to understand that such strategies were needed and that their development should have been insisted

upon. In a very real sense, USAID has been ill-served by earlier consultants and advisors. Within USAID as well, there seems to exist no overt recognition of this integrated, site-specific strategy requirement.

b. More specific design and strategic considerations

(1) Better farming strategies

It has been shown that the most effective and sustained soil conservation and resource stabilization process is improved and more intensive farming. That not only means active financial attraction for the farmer. It also means that all sorts of available strategies must be employed, as relevant, to induce the farmer to improve. Thus, depending on the area, an upgraded road, a marketing improvement, changed pricing policies, discrete water supplies, or whatever, and no doubt in sequence, could induce the desired resource stabilization. As the first constraint is released, another one soon kicks in. To develop an approach based upon only discrete technical interventions can only be construed as a general system failure to understand the process of resource stabilization under these environmental and land use circumstances. Indeed, USAID personnel strictly forbade NGOs from employing any incentives, technologies or "interventions" which were not strictly and technically agricultural.

(2) Moving uphill strategies

One way of approaching the project's strategy development would have been to conceptualize what was needed for higher altitude farming. This process would have encompassed:

- Irventory of soils, land use capabilities, population densities, hydrology, etc., centering on areas where development effort was likely;
- Crops, trees, livestock, water by zone;
- Agricultural systems, including cropping, livestock, trees (fruit and wood), rainfall/water/drainage/drought, and bottleneck/constraints/"windows" of opportunity;

A strategy to "move uphill" was essential. With one modest exception, the four NGOs had not really worked or proselytized in hillside areas, just valley bottoms and plains. They had done little crop or system demonstration work, with one exception: The strategy seems to have been to rely on a base of Farm Systems Management, and a "Sondeo". The former is a three-phased process of Project Managed research (PMR) moving results through Farmer Managed Experimentation (FME) and moving those results through the extension services of the NGOs to all the farmers.

3. The Sondeo (Rapid Rural Appraisal) and Consulting the Farmer

The "Sondeo" is a form of Rapid Rural Appraisal (RRA), a technique developed over the last decade or so by a network of rural social scientists

and farm systems analysts. Each area and set of problems naturally requires its own survey questionnaire and sampling procedures. These were developed over the first six months of 1987 by ARD personnel.

The process of developing the Sondeo engendered such an extremely high level of animosity among the different organizations involved that the questionnaires--immensely complicated and over-designed--reportedly had to be tested outside of the project region. Unfortunately, some of the ARD personnel attempting to conduct this sondeo were viewed by the NGOs as rather undesirable people in their own right, domineering and arrogant, and as having no right whatsoever, as outsiders, to direct NGO affairs. The language, the concepts and the analytical processes included in the sondeo were quite outside the typical NGOs experience and frame of reference. Additionally, the NGOs contended that having groups of "blancs" running about the countryside questioning farmers would completely disturb the concerned communities and spell an effective end to the NGOs ability to attract and work with rural people.

Eventually a partial sondeo was concluded on four sites. It was too late, too minimal and too "foreign" to be of serious value for designing strategies. Some farm-level financial date should be available in mid-1990, generated by another contractor (Agricorp). Being contractually two and one half to three years late (mid-1987 to mid-1990) in obtaining the planned data is perhaps not as bad as it seems since the project is "delayed" by nearly that amount of time. Also, farmers to date have had no serious input to project design and implementation. Yet it is a key requirement.

The design could have included the first efforts at technically sound and financially attractive recommendations for farmer inducement. An effort to analyze the reasons for failure of most equivalent rural development projects in Haiti would indicate that a "dirigiste," top-down approach invariably means failure and abandonment. No serious efforts appear to have been made to search for and bring forward either experience elsewhere in Haiti, or from the myriad of technical interventions tendered in earlier TWM project documentation.

The process has illustrated several key features of the project. First, there has been, on the part of ARD, a lack of understanding of the nature of the problems to be solved; of the nature and characteristics of the concerned NGOs and the peasantry; of how to approach and work with such agencies, communities and processes; and of the role and limitations of the "outsider," especially if white, in Haiti. USAID/Haiti and ARD management could have done considerable redirecting before the downhill slide began to accelerate. Other badly managed project elements, e.g., funding processes, technical arguments, etc., were also causing upsets, each disturbance feeding off and exacerbating the others.

Second, the failure to put in train a working PWR-FME process has resulted in the need for ARD to enhance the work of its own trial and demonstration plots. Budgets have had to be reworked, technicians employed, inputs, supplies and root/seed stock generated and imported, land acquired, and the like. Agronomists have come and gone. Early agronomic work appears

to have been undisciplined, concentrating on the quick and the short-term. There is a need for some of this. But not all effort should have been put into the large spending on vegetable seeds which seemed unscientific and unplanned. The usual project adaptation process of getting a better and better approximation of what is best to do has not been well managed; discipline through USAID, or through ARD's home office, as well as through the project office, has been remarkably absent on a sustained basis.

Third, the lack of an adequate PWR-FME process has also resulted in the need and opportunity for the NGOs to establish themselves in work areas of their own choosing. Instead of more rigorous planning and strategy criteria being applied to this selection process--e.g., places where erosion was worst, or was least; places where people were the poorest; places where population was the most dense; places where out-migration had been highest; places where alternative income-earning opportunities were least--the NGOs set up pretty well where they themselves chose, without much guidance and dialogue.

In point of fact, some sites are more correctly rehabilitation sites and not conservation sites. This difference was pointed out quite clearly by the ARD soils scientist early in the project, but there appears to be no design or operational cognizance of the difference. A key area required in a resource stabilization program is " gully-stopping." This is a serious problem in many parts of the project area (even more so in many other areas of Haiti, no doubt). But it seems illogical to deal with a farmer through extension on one of his fields while another field is being gullied at an accelerating rate! A total hillside conservation strategy would thus incorporate an integrated package of complementary strategies, not push ahead with just one.

4. Watershed development

The project has been designed and is being implemented as a partial watershed project. While the thrust of project activity is correctly on the hillside, major benefits and costs are in the lower reaches as well. But so too are some of the solutions. A significant share of the hillside cropping, often in the worst, even abandoned areas, is conducted by the landless (or nearly so) in the valleys and on the plains. Further development there--agricultural, processing, light-assembly and manufacturing, and infrastructure, would relieve pressure on the hillsides. At a minimum, the net rate of increase in population growth could be employed nearer home and off the hills.

Watershed development must be viewed as an integrated development process. A "plains" development strategy would have its own components. But its major benefits include those on, and derived from, a hillside strategy. The two are generally related. No doubt the earliest stages of a "plains" strategy could be conducted rather independently of hillside activity, but never out of the context of total integrated watershed planning. Since the longer-term agricultural health of the plains is heavily a function of groundwater reliability, hillside soil and water stabilization are prerequisites.

Given propitious political and inter-governmental environments, a preliminary assessment of Les Cayes plains development could be devised over the next 12-18 months and based on whatever project coordination structures is established. The present Coordinator office would be satisfactory. An inventory of current activity, of prospects, and of problems could provide a base for GOH/USAID/other donor regional investment planning. Existing donor programs, e.g., private sector development, health, education, etc., could be brought to bear on the region; they become mutually supporting. Land tenure, the absentee larger land-owner, the fiscal and monetary policies which result in the concentration or several crops only--all these could be examined in an integrative dynamic context, among themselves, and "upstream." Settling good hillside farmers on land purchased from larger owners who are not maximizing value added from land, or water, or other infrastructure, would have obvious benefits.

The best farming on hillsides is based on good soil conservation practices. However, watersheds have their own unique sets of constraints and possibilities and many steps are necessary to improve farming. Such steps could include altered price policies (inputs, outputs), marketing developments, tool and implement availability, roads of various kinds, some forms of credit, water services/infrastructure, veterinary services, and the like. Some of these could be permissive; others may be seen as incentives (prime). Together with improved soil conservation practices, farming could become more intensive.

It is incumbent upon the project to examine these constraints as well. This is <u>not</u> a major exercise; key and immediate bottlenecks are usually obvious in most cases, e.g., a modest improvement in an access road, water for seedbed and household use, elementary storage systems for output and seeds (at several levels) and so on. Through an appropriate delivery structure, discussed with, and approved by, the affected families--identification and participation are prerequisites to cooperation and sustainability--the existing GOH and NGO project structure probably can accommodate these modest or evolving supplements to the agricultural programs. Possibly the team of consultants developing the improved financial and economic monitoring base could provide some of these assessments. An extended project could accommodate them, some of them no doubt Title III.

Within this context, it is imperative that a greater, real concentration occur. That is to say, most efforts to date have focused on "signing up" farmer participants, organizing them in various ways, often providing incentives (prime) of various kinds, and concentrating extension work on several key "interventions" (which become "products")--most popular and pursued is the elephant grass live hedgerow. This combination has inevitably led to a situation in which the wider impacted area has farmer participants who are not on contiguous holdings. Moreover, the "intervention of the day" may not be the most important <u>initial</u> intervention for many farmers. Perhaps it is lucaenae strips for one person; hill/mound cultivation for another; or tie-ridging; or lines of vetiverre on the contour harvested alternately; or mulching; or dense tree planting; or whatever.

To date, neither ARD nor USAID has carefully thought out a package of strategies to optimize the quality and pace of watershed development tailored to the farmer participants. As part of that process, which must begin now, much more tailored, or fine-tuned, interventions are essential. Agronomists and soil conservation experts, together, must develop farmer/plot specific farm development plans. The Haitian context in light of the sheer number of programs past and present trading in these subject matters has this expertise. The task is to marshall them into an effective program and to provide them with evaluations and refinements of orientation with appropriate short-term assistance.

5. Utilizing the PVO/NGO structure/model

The project was designed, purposefully, to utilize an institutional structure for, i.e., the PVO/NGO implementation considered successful in other USAID/Haiti projects. The project has two levels of private organization. One is the "umbrella" organization which is directing, managing, and monitoring the project being implemented at the ground level by four other NGOs, several with a strong religious orientation. The umbrella PVO is a US consulting firm and is contracted. The four implementing NGOs are funded by grants and are based and registered in Haiti. Several are historically funded internationally.

The Evaluation Team has also examined numerous other PVOs in USAID/Haiti projects. These include particularly PADF, CARE, and SCF. It is our considered judgement that the discipline, accountability, and on-the-ground performance of virtually all activity areas of these organizations are inadequate in terms of the major goals of the projects: raising farmer income, soil conservation and enhancement and rural productivity. USAID project officers need to intensify their surveillance efforts in this regard. Past reviews, end of project reports and evaluations are more verbose, self-serving, and superficial than they are accurate. In one sense, USAID cannot be blamed for trying to replicate the structure in new projects; their staff and consultants have told USAID management that all is "rosy." A very natural and understandable response is to replicate this management style in new projects. Unfortunately a similar set of results has materialized in the TWM project. The implications are discussed in subsequent sections. Therefore, independent evaluations of smaller entities need to be done on a continuing basis for several sectors.

6. Better farming and soil conservation

The project was designed to promote soil conservation. It was recognized early on that any "interventions", or "intervention modules" had to be financially attractive to the farmer. Project managers disallowed major use of "interventions" or incentives that were not of a soil conservation variety. It has been established around the world that as erosion control, soil conservation, and resource base stabilization processes are improved, agricultural systems become more intensive and more productive. Narrowly targeted hillside development strategies not only fail resoundingly; the failure itself may predispose the rural community to ignore any future advice "from above," and to want payment for improvements on their own land.

With this in mind, however, it should be noted that other improvements in agriculture should not be neglected. Good soil conservation measures are not a substitute for fair price policies, access to markets, availability of imports, etc. The one informs the other. If the "setting" is right for the farmer to make a profit, he will likely be more careful about using good conservation techniques. However, good conservation techniques alone will not make his labors profitable. Extensive documentation in Haiti itself, plus common sense, both suggest that areas differ in the constraints imposed upon this farming system improvement. A sequence of constraint relief in one watershed may be a road upgrading, some sort of water supply development, and a boutique for inputs. In the next watershed, such improvements might have negative consequences. For example, improving access to a region might encourage more intense tree felling and accelerated charcoal production because of the increase in transportation. This, in turn, could exacerbate the process of soil erosion.

7. Hillsides versus plains as sites for action

A watershed project must be designed from the height of land down to where most raindrops end up--with the fish in the sea. A "Targeted Watershed Management Project" should be just that. The designers of this project conceptualized soil conservation work on lands between 10 percent and 40 percent of slope. At one stroke, they thus eliminated very large areas needing rehabilitation at slopes greater than 40 percent, and the valleys and plains where many, if not most of the benefits are designed to occur. To the degree basic data are reasonably correct, the areas (10 percent - 40 percent of slopes) covered by project soil conservation efforts are some 17 percent of the entire watershed area, though the percentage is larger in some of the six individual watersheds, and is smaller in others.

The historical USAID literature on the project makes it abundantly clear that a hillside development strategy is designed to protect other project investments on the plains, particularly in irrigation and other infrastructure. There is absolutely nothing wrong with that objective. But two other elements must be considered. The first relates to project economics; the second concerns part of the solution to the hillside problem. Certainly, there are farmer-level benefits to soil conservation efforts on the hillside themselves, at least if the project develops and propagates financially attractive "interventions" which are permanent and sustaining. Done properly, on a wide enough scale and density, soil conservation and other anti-erosion efforts rèduce flood peaks and their occasional heavy damage, stabilize runoff and groundwater systems, reduce sedimentation and its adverse effects on the plains (siltation and impeded drainage), and reduce the negative impacts on estuarial and foreshore marine life chains, already under heavy harvesting pressure. These well-recognized benefits would be assessed in a benefit/cost analysis. So would the continued and mounting costs of not having erosion control, providing there were suitable data systems measuring the project's physical impacts.

Medium and longer-term development plans for the plains would relieve the watersheds of people, giving them the same place to go as their soil.

Such development plans could also provide employment in processing, light industry, fabrication and assembly; and would stimulate the nascent small service and trading entrepreneur sub-sector. Equally as important, they would provide income opportunities for those landless (or nearly so) who now migrate seasonably to the hillsides to farm almost invariably on the steeper, most degraded plots thus accelerating erosion and rendering the rehabilitation process even more costly and difficult. Such development carries with it the gradual improvement in farm-market roads, in marketing structures and processes, and the enhanced commercialization of inputs and supplies closer to the farmer. Hillside development based on and geared to such a plain and municipal growth strategy becomes independently sustainable. Thus NGOs and the Government of Haiti should be following up on the plains in this respect with other sources of funding so a national total strategy can emerge and be successful.

8. Concentrating effort in smaller zones-design issues

To generate the desired physical impacts--soil and water rationalization and stabilization--the project should have been designed to concentrate efforts in smaller and more compact zones. At present, the NGOs are working at sites which are widely separated from one another. Within each site, participating farmers are themselves greater or lesser distances from one another, and even within any one farmer's land, soil conservation coverage, e.g., hedgerows is rarely complete over the entire necessary surface. The heavily eroded lands (steeper and higher) are not really being addressed at all. Two farmers out of three will not be touched by the project, and that even of those who are, there will still be a large share of the land to which they have some rights which will not be subject to treatment simply because the farmer has a most insecure mode of tenure (e.g., terre "mine" separe, non separe or en division).[3]

One can only wonder how project designers felt about this. If the project were viewed as a first stage--create, test, and disseminate financially attractive "interventions"; build up organizations; train and develop qualified research, extension and monitoring staff--that is one thing. This would then be followed by a full-fledged project purposefully designed for maximum impact, including this concentration component. But we find no such intent in project documentation.

In the absence of the these design features and strategies, it is perhaps somewhat redundant to point out that the first three to four years of the project should have had a designed set of inter-related phases over time. These iterative stages would have led to the successive work plans for institutional, technical, administrative development. A project such as this cannot possibly be conducted on a short four or five year period. The sheer nature of agriculture/livestock systems; of apparent lack of financially

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[3] See particularly Groupe de Recerche pour le Développment, Modes de Tenure en Haiti et "Degrés de Sécurité", Maidan - Salagnac, September, 1979. Such family land could very well be up to half of the watershed; some estimate the share at 75 percent.

attractive interventions; and the nature of history and disposition of implementing NGOs should have meant, in combination, a three-four year "getting ready" period.

9. Physical impact monitoring systems

The project's key objective is soil conservation. Coincidentally, this would entail other physical impacts, e.g., reduced runoff, lower levels of sedimentation and sediment transport, more rainfall percolation and retention, reduction of flood peaks, improvement in groundwater systems and dry season water supplies, and the like. No physical impact monitoring measuring or other evaluation devices or processes are designed into the project. Instead, the project measures the proliferation of interventions, e.g., linear meters of hedgerows established. While these may be measures of NGO performance, they can hardly be construed as gauges of project impact on soil conservation. Once again, however, the apparent lack of concern for such assessments may reflect the short-term focus of the project. We found this lack of performance indicators rather incongruous.

10. Project Administration and implementation

a. Background

The project has been implemented rather badly, certainly in its first two and one half years. Compounded by primitive communications and general conditions, misunderstandings, talking at cross purposes, and truly contradictory world views of the different actors, the inherent faulty design elements and a constant pressure from USAID for "outputs" or "products" all combined to create and then enhance a working environment of distrust, suspicion, and frustration over the period 1986 to early 1990. This aura is now improving (mid-1990).

The medley of ARD staff members was not well chosen. They were unable to work with one another constructively or with many of the NGOs and farmers. In some cases, their qualifications for this specific project were not appropriate. This staffing situation was compounded by ARD management which appeared to seek the "easiest" solutions. In some ways, it is a wonder that the project has survived at all. It has in fact begun to recover, primarily because of the liaison work of the USAID-appointed Coordinator, based in Les Cayes.

b. Umbrella organization: Associates in Rural Development (ARD)

(1) Introduction

The USAID/ARD contract (see Annex 1) details the objectives, how ARD was to implement project activities, and how the work of individual long-term staff members was to integrate into a total work system. In brief, the work encompassed on-farm research, demonstration trials, animations, outreach impacts, organizational development, systematized extension, incentive contracts, market feedback and spread effects, groupement formation, and work plans. The core activity was to develop and test

"integrated technical packages" which are adapted to specific agronomic, ecologic and socio-economic zones.

The means to do this, all in the first year or so, were by (a) establishing 20 experimental demonstration sites throughout the watershed and (b) inducing several thousand farmers to establish on-farm adaptive trials, Those interventions found ecologically sound would then be extended to entire watersheds. The candidate interventions would be fitted into a solid awareness of the several farming systems by the use of a baseline study conducted by the Farming Systems Research Specialist who would also measure "pre-project" income and welfare levels.

The agronomist, livestock specialist, and soils scientist would all participate as relevant, working with the NGOs to establish this technical base and then help to proliferate it. All would help train NGO staff. The administrative specialist would be particularly concerned that the NGOs financial systems were upgraded to accommodate USAID's rather stringent reporting requirements. Much of this work, including the establishment of plots on farmers' fields and the Farming Systems Research survey, plus demonstration plots (called Project Managed Research), plus all basic administrative matters were to have been completed, organized, and working by the end of Year One.

Though funding was approved in late 1986, due to delays caused mainly by Haitian political issues, the first group of long-term staff did not arrive until a year later. ARD's first annual report was for the year 9/87-8/88. A total of ten expatriates have been employed; there was considerable turnover in 1988 and 1989; indeed five of the ten were already working before the "permanent" Chief of Party was on site (4/88). The livestock/forage specialist was among the initial group (9/87) and is still with the ARD team. Serious and continuous disruptions caused by staff failure to work with one another and with others as well, led to the departure of the horticulturalist/agronomist in 6/89, followed shortly by the soils scientist and the sociologist. None of the three finished all their work, though several soil surveys were undertaken for the NGOs, and several reports produced on local market prices. The Evaluation Team did not inquire at any length into the rather rapid turnover of Administrative Specialists. Certainly meeting all USAID's administrative/financial/reporting requirements and working with NGOs to bring them up to the point where they could be funded and audited (under the regulations in their Cooperative Agreements) certainly must have been frustrating. The NGOs report that each of the three Specialists had his own accounting style and training/teaching requirements, which raised the frustration quotient on the NGOs part no doubt.

(2) Conceptualization, design, and strategies

Earlier sections indicate weaknesses in project design and implementation strategies. As the implementing "umbrella" agency, ARD has carried the brunt of the fallout. When flaws became apparent, ARD seemed unable or unwilling to conceptualize or design adaptive and improved strategies, or routes to solutions.

Possibly the most important component in the project is (was) the so-called Farmer Managed Experimentation (FME). From the beginning, several thousand farmers were to be encouraged to try out an "intervention," a change in inputs and/or production systems based on already existing technology. While the schedule for doing this was too accelerated, the idea was (is) a good one. These farmers are perfectly aware of what is needed for higher yields, e.g., pigeon pea planted in the maize hill, some phosphate fertilizer, and the like. The farmer also knows how to plant grass.

The trick is to relieve each farmer of his own particular set of constraints, usually one at a time, but in as rapid a sequence as possible. He knows he should have better storage for his seed to improve germination rates or that he should practice soil conservation techniques. But he needs help to do these things. Improvements must be introduced gradually and should provide the farmer an opportunity to evaluate the benefits, and the costs of a new technology. The farmer has to see for himself that saving the soil is in his interest. Current research, at the Brutus site where furrow/berm conservation structures were installed has yielded some interesting results important to farmers. Trials indicate that considerable soil is saved by installing the furrow/berm/living hedge system at a very low cost. On the Perrin site, living hedgerows have been established on contoured furrow and berms. It is expected that continued observations of the development of different species of leguminous tree crops will provide useful information for the future planting of living hedges under conditions pertaining to the site.

This on-farm work should have started in 1987. Because of personnel problems, this very important basic work has not been accomplished. By early 1989 the strategy should have been re-thought, and work programs re-designed to do the work some other way, preferably with new (fresh) personnel. Instead, the NGOs were provided with hedgerow grass planting material for proliferation and distribution to farmers. The efficacy of this intervention as it is being done is in any case questionable. Not only did ARD/Camp Perrin not re-think this work. Apparently ARD/Burlington did not either. There is no direct reference to its fate in ARD documentation after the first annual report. The NGOs were in any case underfunded and understaffed to join in such a huge crash program, another serious design fault. So the key project activity, the cornerstone of this soil conservation effort, just fell between the stools, and USAID let it. The focus shifted to hedgerows and animal health.

(3) Technological development, leadership and planning

Annex 3 provides documentation and detailed analysis on the technology elements--candidate "interventions"--suggested in pre-project documentation, and on the interventions currently being researched or experimented with by ARD/Camp Perrin staff. The Evaluation Team has devoted a considerable share of its effort, particularly that of both the agronomist and the economist, to assessing the nature of the technologies proposed for on-farm soil conservation. We are not convinced that ARD management as a whole truly understood what was required for on-farm adoption of new technologies in their numerous forms. These "incentive" requirements are discussed elsewhere in this report (see especially Annex 4). In very late 1989, ARD technical

assistance personnel began to develop two demonstration/trial plots near the Camp Perrin office. These were deemed necessary since they had failed to convince four NGOs over the preceding several years to establish their 20 or so equivalent plots. But these plots (as indicated above) are fine-tuning "high-tech", agroforestry systems, and not really aimed at these sorts of local small farming systems.

ARD management also resisted more trials and related work with livestock and livestock feeding for a long time, even though such efforts are clearly one of the main routes to achieving project objectives. Indeed, some of the management and leadership of the key intervention thrusts and related research has been assumed by the NGOs, particularly ORE. It is certainly fair to say that the present team has made considerable progress over the past year in working with the NGOs/ONGs. The research, however, should have been conducted by the NGOs, not ARD. The hedgerow manual is in French, borrowed from others; and in any case, we found no one using it.

The major difficulty the Evaluation Team has with these lists, is in attempting to understand the purpose, or the direction, of these activities. In the early stages of this project, interventions were needed which, above all, attracted the farmers' pocketbook, and which produced results quickly. These experiments and trials are for a sophisticated level of agriculture and agroforestry many light-years away from current general practices. None have been tested for their financial attractiveness or just how they could fit into farming systems. Sondeo Report No. 1 deals in semi-detail with selected systems and posits farming decision-making issues. It was a good start.[4] They are also, in the main, dealing with items which have already been researched an experimented with elsewhere. As indicated clearly in ARD's proposal for this contract, the first steps were to have included, quite rightly, a sequence of on-farm adaptation and sustainability trials. This do not happen. A more rigorous leadership would have made it happen. Planning in the sense of organizing and standardizing workplans, output records, accounting and finance procedures, most at the behest of USAID, has certainly occurred. What has not really occurred is the process of prioritization among the myriad of activities.

Additionally, there appears to have been a tone of "placation" with the NGOs. This is perfectly understandable given the earliest and highly abusive ARD/NGO environment. But it has meant that leadership and direction were rather lost. NGOs, for example, picked the sites for their activity on their own. Leadership should also have entailed continuous questioning of project methods, and adjustments as necessary, especially as it became apparent that a concept of density of impacts was required. ARD is only partly to blame for this type of implementation problem; it is also a basic design fault.

To improve implementation of this project, the ARD function should be phased out and be replaced by a quite different management structure. The

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[4]J. Jaffe, Sondeo Report No. 1 -- Land Use, Soil Degradation, and Farmer Decision-making: Cavalier, Despa, Kols, Saut Mathurine, Camp Perrin, August, 1989 (for ARD/USAID)

existing structure was designed, with all good intentions, for implementing the wrong things with the wrong targets.

(4) Project implementation: monitoring performance

USAID, for its own purposes, has insisted on participating NGOs documentation of their "outputs." Work plans must provide targets, such as the number of linear meters of hedgerow to be planted, number of trees to be distributed, and the like. A great deal of effort at USAID and ARD levels has gone into the devising of rather detailed forms and tabulation sheets for each participating farmer and, in some cases, for each discrete area of land treated. Such efforts have included the not-always-successful attempt to standardize these reporting devices and processes thus facilitating eventual computerization: A good deal of reliance has been placed on the "borrowing" of PADF forms, and on the instructing of moniteur and other field agents dealing with the farmer in completing these forms on a regular basis, and accurately.

This process has led, perforce, to a number of highly undesirable consequences. The NGOs tend to feel that their performance (and thus their continuing income) is being judged by these numbers. Targets are intuitively kept as low as can be got by wit and accomplishments can be exaggerated. The objective is to achieve a final column which shows accomplishments as a percentage of target of over 100 percent! This seems to satisfy everybody.

Unfortunately the qualitative dimension tends to be lost. There is a strong likelihood that a meaningful share of the interventions now being effected will not be in place five to ten years from now because they have been established incorrectly and/or very hurriedly. Animateurs and technicians are themselves not always properly trained, as yet. Nor indeed are the moniteurs themselves. A double and triple counting of accomplishments and people are not uncommon. This exaggerates the data, not intentionally perhaps, but because of a lack of qualified and trained reporters dealing with the farmers. The problems, and the need for benchmark "pre-project" economic data have led to USAID employing Agricorp, a local and experienced socio-economic survey organization, to run checks on these information gathering systems (among other duties). Some NGOs are rather affronted with this, understandably. Agricorp's work has resulted, however, in discoverings of major discrepancies.

This "spying" syndrome must be placed in the context of continuous confrontation with ARD and, at somewhat greater distance, with USAID. Within that context it surely must appear that USAID/ARD project objectives and justifications are the merchandizing of quantities of products, or "interventions" and not really the conserving of the resource base. Not helping either was ARD's decision to employ two agronomists to look at the NGO's (two each) as a form of internal audit, and USAID employing Agricorp to check up on the veracity of intervention (produce/output) reporting (among other things). They all aggravated the question as to who was looking at whom.

c. Specifics of implementation

(1) Research, trials, demonstration processes

(a) PST research

The Project Paper stated that technical packages would be introduced by on-farm "Trial-and-Demonstration Plots" followed up by "On-farm mini-experiments ." There was no clear distinction between replicated research, trials, and demonstrations. We saw no on-farm replicated plots, trials or demonstrations. Replicated research plots were established near the PST headquarters about two years after the project began. Research at ORE was on-going at the time. The "delay" was apparently due to confusion about the Terms of Reference, the ability of early project personnel and the lack of perception about denoting and prioritizing research needs.

The treatments in the plots that were finally established were chosen after reviewing early project observations and farmers' needs. The first research plot (i.e., with several replicated treatments) was established on the Brutus site near the PST headquarters in late 1989. Additional replicated plots were set up on the Brutus and Perrin sites in early 1990 (altitude <500m).

The Brutus site evaluates in two experiments the effect of leguminous species used as green manures on yields of sorghum, chicken corn (at three plant populations), and dry beans. Hedgerows of Elephant grass and Siratro are spaced five meters apart. Clippings will be scattered over the alleys on all but one plot. The treatments are logical extensions of known practices and do not "re-invent the wheel."

We observed phosphorus, zinc, and nitrogen deficiencies on the leaves of young maize, plus uneven stands. Siratro looks like an effective legume cover crop to mix with grass or crops. Suggestions for improvement at the Brutus site include:

- Use a split-plot or split-split plot design in order to analyze the effects of variables more meaningfully;

- Use a statistical analysis of covariance in order to take uneven stands into account if the plants are not over-planted and thinned to desired populations. This technique will also reduce the unacceptably high coefficients of variability;

- Use no decimal points or at most one decimal point when recording yields of grain on dry material. More than that are meaningless; and,

- Count kernels per ear (this is done very quickly by multiplying number of rows of kernels on the ear times average kernels per row) and determine 1000-kernel weight of maize and beans in addition to counting ears of maize per plot. The latter will be a factor to help farmers choose seed for the next crop.

At the Perrin site, there are three experiments:

- o Comparison of corn only, beans only and corn plus beans in association (farmer custom);
- o Evaluation of castor bean and pigeon pea production on very poor soil;
- o Evaluation of several hedgerow species with respect to their ability to build up soil on their uphill side.

The suggestions for improvement on the Brutus site are also applicable here. The plot area is shady, and trees will reduce the force of the rainfall, the extent of erosion and the photosynthetic ability of the crops.

(b) NGO research

We were told by Agr. Magloire at ORE that he is conducting research to compare corn varieties, on bean varieties, and to develop a hybrid corn variety suited to the watershed area. We did not see the field work. Agr. Magloire is well qualified to do such work. No research is being carried out by the other three NGOs.

(c) Trials and demonstration

These words are usually taken to mean the same. However, a distinction has apparently been made by PST and at least one other project (LORD I). A trial is a small plot with at least two treatments replicated once under the care of an agronome. The purpose is to observe and evaluate the treatments in order to determine which one should be set out on a farmer's property as a demonstration. Here, a new practice or input is installed side by side with the farmer's usual treatment in order to demonstrate to the farmer that the introduced practice is superior in terms of production, crop quality, saving of soil and labor, or raising quality of soil. Examples of each of these demonstrations could be:

New/suggested practice	Farmer usual practice
Improved black bean variety	"Usual" variety
Green manure legume (higher protein content of corn)	No green manure legume
Hedgerow	No hedgerow
Phosphorous fertilizer	No fertilizer

Trials should be conducted by PST/NGO personnel on the basis of local, Haitian or world research or sound recommendations by an experienced agriculturist. NGO agronomes and animateurs/TAPs should visit those sites

regularly to make observations and draw conclusions, and should also encourage area farmers to see the trials. Inputs that can result in higher farmer income should be introduced to farmers. Their potential economic benefits must be calculated before taking them to the field in the form of demonstrations or full-scale adoption. We did not see trials or demonstrations in the PST area. However, ORE conducts research and has many trials and on farm demonstrations. IRD has on-farm demonstrations. The NGOs evaluate these from yield-quality-economic attractiveness standpoints but no clear patterns of recommendation have yet emerged.

(2) Influence of organic farming

There are many local documents relating to soil fertility which contain references to the need for addition of organic materials to soil. Such materials include compost, hedgerow clippings, legumes used as green manure, and crop residues. These materials, especially the leguminous ones, will provide a little nitrogen to the following crop, will temporarily increase soil organic matter and water-holding capacity if decomposed adequately by bacteria, and will help reduce the impact of raindrops if left on the surface. With respect to the inorganic plant nutrients, these materials will only recycle them. Deep-rooted plants can bring up very small amounts of mineral elements from deeper sub-surface zones (if roots reach such zones and if those zones have accumulated any mineral nutrients through the years).

On the other hand, mineral nutrients are being carried off the fields with every harvest. Even at the low yield levels existing in Haiti, more plant nutrients are being removed from farms than are being added by any of the methods outlined earlier. Phosphorus and zinc are cases in point. Deficiencies of these elements were observed on corn in every location we visited. Soil accumulated above hedgerows or stone barriers is deficient in phosphorus and zinc because the sub-soil from the tops of the alleys is deficient. Corn looks a little healthier immediately above hedgerows because the accumulated soil is slightly higher in organic matter. Obviously, the soil at the top of the alleys contains less organic matter at the end of a rainy season.

Constructing hedgerows and planting trees will help to save some soil, but those actions in and of themselves will not materially increase yields per hectare. Increased use of commercial fertilizer may be important for some Haitian farmers. This can be done successfully on a small scale in some areas (e.g., the plains) for farmers to net more per hectare. Organic fertilizer alone will not solve the Haitian problem of low production.

(3) Reaching, motivating, and servicing farmers

Farmers can be "reached" successfully by animateurs: farmers or farmers' sons who live in, know, and have respect in a community. Animateurs need training in how to contact farmers, how to maintain a relationship with them, and how to teach them. Some animateurs can be trained as technicians: they can serve contacting, teaching, and technical functions effectively. Training of animateurs should begin with an extensive one- or

two-week course, and continue with periodic short course work as well as with on-the-job training by Haitian agronomes, Haitian or foreign supervisors, and visiting experts from outside Haiti brought in at intervals.

Agronomes need on-the-job orientation. Many agronomes go "by the book": they are taught facts but not the integration of facts into forestry or crop or livestock systems. This training should begin with a short course that includes:

- Agroforestry information on the area;
- A review of tree planting and care;
- A review of livestock care;
- A review of production of crops in the area, including farmer cultural practices, the cropping calendar, crop rotations, relay cropping, integration of crops with livestock and markets, plant diseases and varieties, soil physical characteristics, and fertility; methodology of constructing gully plugs; and
- How to work with technicians, animateurs and farmers;
- How to evaluate results from using soil conservation techniques and crop improvement practices.

Agronomes should also be taught that it's not wrong to say they don't have the answer. It's important for them to say they know where to get an answer and proceed to get it for an animateur or farmer. They should also have periodic in-service training, consisting of two to three days every 6 or 12 months at Damien or another center with lectures and questions/answers by Haitian or foreign specialists. On-the-job training every 6 to 12 months by a foreign specialist who spends a working week in the field with the project agronomist(s) would also be helpful. This training should cover management, extension and technical skills.

In sum, farmers are apparently being reached in physical numbers and meters of hedgerow but motivation is lacking in most. Animateurs are not trained to motivate. They and most agronomes want to help farmers but they go about their tasks mechanically and with one objective: install contour ditches and/or hedgerows. They apparently <u>see</u> little else.

Thus servicing of farmers suffers. The project was designed to increase farm income. Contoured inputs won't do this over short-term and perhaps not even over long-term. Neither will organic inputs.

Farm income must be increased by raising yields/ha at minimal cost -- e.g., by improved varieties of crops, commercial fertilizer, planting seed closer together, changing rotations, etc.

(4) Logistical support to implementing agencies

Although there was almost an adversarial relationship between ARD and the NGOs as the Project began, the umbrella personnel and the agencies gradually began to work together more closely. Part of the reason for this was change in ARD staff. A more significant component, however, was the creation of the Les Cayes coordination office and the personality, technical, human relations and management capability of the man running it. With more cooperation came more logistical support. For instance, the following are available from Camp Perrin on request:

- Clumps of grass species for planting and evaluating in hedgerows;
- Seeds of leguminous trees for planting and evaluating hedgerows;
- A soil sampling and mailing service;
- Services of a veterinary technician;
- Results of area market studies.

How much effective use is made of these services is unclear.

11. Financial and economic impacts

a. Impacts on the farmer/animal owner

With two likely exceptions, there is no serious evidence as yet that the "interventions" are increasing farmers' incomes. The exceptions are (1) the fruit tree grafting program, whose financial impacts are presumed and not yet measured, and largely assumed from the programs popularity; and (2) components of the livestock program being pursued by IRD with the concurrence of ARD. Aside from animal medicine and health activities, which must be considered "incentives," there is the likelihood that the hedgerow/goat relationship, done properly on a sustained basis, and combined with other animal management technologies and systems, could become very fruitful indeed for animal owners. Done properly, and covering the field in a practical way, the hedgerows can conserve soil. Fruit trees do not; nor do other trees positioned as they are in very scattered locations.

It is also a moot point as to how yields will increase behind hedgerows. The accumulated soil is just as infertile as it was higher up the slope. Water percolating and root development could be better, however. But unless other technologies go with the hedgerow, e.g., mounds, tie-ridges, better seed, fertilizer with key missing nutrients (phosphates, boron, zinc), and the like, so that the farmer sees a major increase in yields, he just won't be attracted on a sustained basis. Contour canals could catch as much dirt and cuase as much more water percolation.

b. Impacts on the NGOs

The NGOs have been allocated $4.4 million out of a project total of $14.8 million ($12.5 million excluding contingencies and inflation). However, the amount earmarked has risen to nearly $4.9 million, which is roughly 33 percent of the project total excluding contingencies. The ARD umbrella has $5.0 million committed, very slightly larger. Details of individual NGO funding are at Annex 2 Table 3. Funding is in $H (gourdes) for the most part, though $US are used for some purposes (imports, external training).

ORE has established important research, testing, and laboratory facilities. They have undertaken major fruit tree and training programs as well as extension work in several areas. The other three NGOs (UNICORS, IRD, and DCCH) spend their funds on staff, both administrative and technical/field. The proportions vary between NGOs. ORE has a higher percentage of administrative supervision (a complex data entry and processing system, extension strategy and evaluation meetings in which the entire administrative staff participate) and training expenses devoted to extension activities. Their total expenses for extension are comparable to the nursery and propagation expenses though the latter activities are run with about 30% of the administration required for extension activities. A large percentage of the plant multiplication sites which are staffed by the "plant multiplication" staff constitute the demonstration sites which are the basis for extension outreach activities. Others, e.g., IRD, have some three quarters of their staff costs (and 90 percent of their people) in field work. UNICORS has a large share of its staff in tree nursery work (coffee, fruit, forest trees).

Project funding has allowed NGO training, staff expansion, and thus a growing area of influence. It has stabilized and regularized income, and permitted the development of operating systems (e.g., transport, communications, buildings) not possible heretofore. Several of the NGOs continue work other than that of the TWM Project. USAID accounting systems/audit processes are now regularizing those split financial processes. As well, the project has so bolstered the administrative capability of these organizations that they are now in an improved position to expand capacity for both work and for absorbing funds; they are more credible.

c. Total project benefit/cost relationship

A total project benefit/cost analysis is not possible at this time. Benefit data at the farm, hillside, watershed, or total project level have not been generated or even attempted seriously in many cases. Total costs to USAID, including project development as of mid-1985 (approx.) through the PID and PP and in USAID/H and USAID/W for overhead and administration, could be $5 million. Thus, the total project cost to USAID is perhaps $20 million. It is not possible to estimate farmers' costs (real and cash), or the costs to other individuals involved. This has to be developed and the administrative specialist with ARD is a good place to start and could be one of his tasks for the rest of his stay.

The Team tried to calculate the value of the TWM Project for money spent. To do this, Team members visited work sites of the four NGOs/PVOs and the University of Florida and asked to be taken to sites which would provide a representative sample of their best activities. At these sites the Team Leader always asked one question: If the farmer were to be hired to do the same work as he had carried out on his land on someone else's land, how much would he charge? The answer was requested by categories, e.g., hedgerows, contour canals, etc. This information was used to develop an estimated cost per foot for each type of activity. These estimates were then used to determine the cost of building or installing all the physical and live structures reportedly built/installed in the project area.

Costs for grafted trees and animal services were estimated to be $150,000 on the basis of what Haitian contractors would customarily charge for trees and for service calls, plus the estimated cost for farmer-installed improvements. What it would cost the Haitian farmer to obtain these services if he were not in the program was used as the base figure for calculation. The figure appears to be low because of the following:

$15 million budgeted

- 6 million to ARD
- 3 million to the University of Florida and STABV
- 1 million to general administration
- 5 million to the four NGOs (of which 70 percent is used to pay salaries and fringe benefits for Directors and agronomes)

The achievements of ARD, the University of Florida and STABV are minimal and marginal. The change effected by directors and agronomes on the rural landscape in Haiti is minimal. The actual work is being done by the animateurs. Their stipends and program inputs are only 30 percent of the $5 million allocated to NGOs, or $1.5 million. The project, therefore, is producing a return on investment of 10 percent ($150,000 divided by $1.5 million) and gives the overall expenditure a tangible rate of return of 1 percent ($150,000 divided by $15 million).

G. Recommendations

- Restructure of the Targeted Watershed Management Project and consider the elimination of the ARD component as soon as possible.

  The new project would now be supported by two existing but strengthened institutions--the Conseil of the NGOs and the regional USAID office at Les Cayes. Support should be provided to upgrade these institutions so they can perform the additional functions. The Conseil of the NGOs should become the policy-making and coordinating body for all NGOs operating in the area. The Office at Les Cayes should channel any additional technical assistance which the projects need, serve as the ongoing monitoring arm for project activities and assist the NGOs where necessary to meet USAID requirements. Additionally, more periodic

evaluations should be conducted in each technical specialty (one each quarter) so that needed adjustments can be made on the spot. USAID should contract with a firm to provide this on a continuing basis.

ARD resources should be transferred to the Les Cayes coordinating office. They should be reserved for ultimate use wherever possible and feasible in the target zones. The Haitian technical assistants, for instance, now with ARD can be attached to the Le Cayes coordinators office. So, too, can the research plots if the research being conducted there is of any value. Ultimately, however, one organization should have the responsibility for research. These plots could be converted into trials and demonstrations to the benefit of the program;

In all these upgraded activities and in existing activities, Haitians should be utilized wherever possible and a positive attempt made to indigenize the total exercise;

- Employ one senior external management/rural development/natural resource/tropical agricultural generalist stationed in Les Cayes to help facilitate this transition under contract to USAID.

The management specialist, the Conseil and the Les Cayes office should embark upon an inventory of the strengths of each individual organization and the technical interventions and extension methods and techniques used; existing staff personnel; and a short list of immediate impact items which the program can continue to disseminate;

- Assist NGOs to become more efficient and cost-effective.

This could be accomplished by consolidating most of their staff functions so as to free up their top personnel for line work; providing more training in relevant areas to animateurs in appropriate agricultural practices and extension methodologies so the work of the agronomes and technicians will have a manifold increase in their multiplier effect; and keeping channels of communication open among the NGOs and between themselves and the Government of Haiti. NGOs also need assistance to improve their business skills and acumen, including the development of business plans for the future;

There is need and room in each NGO for only one good director/administrator/manager, supported by two agronomes. One of these agronomes should have three technical assistants, each with a program specialty. They would provide technical support and monitoring for animateurs and would encourage good agricultural practices in crops, livestock and food processing and storage. The second agronome would be in charge of five technicians versed in conservation and reclamation practices. Each technician should manage 10 animateurs, each of whom would be responsible for 10

groupement with about 12 people in each. Thus, one NGO could support approximately 6,000 farm families through its administrative structure;

- Upgrade farming patterns beyond trees and hedgerows.

  This could include agricultural packages for high altitudes (see Kenskoff experience); new, profitable cash crops (flowers, garlic); integration of livestock with hedgerows and other agricultural biomass; and, judicious use of fertilizers to include trace element considerations;

- Reevaluate technical approaches.

  Technology should not go in search of programs but technical bottlenecks should determine what technical programs are introduced. Project reports should be prepared in an accurate and verifiable manner and reflect the actual situation. Strategic selection of discrete mini-watersheds is essential where efforts and impacts can be concentrated. The interventions can then become farm determined rather than program determined. Finally, evaluation standards and sites representative of all work undertaken are needed;

- Develop a plan to integrate agribusiness and small-scale enterprises into the TWM Project.

- Review the larger policy issues to ensure total program success.

  These questions include the relationship of the program to total agricultural development policy; the use of soil conservation with a judicious use of land reclamation so gully erosion does not eliminate gains in the former; the resolution of land tenure questions which presently prevent the start or accomplishment of long term conservation and productivity; the promotion of agribusiness as a part of the Hillside Strategy to increase productivity on the plains and reduce pressure on the hillsides;

- Transfer the University of Florida (Parc Macaya) project.

  The University of Florida project should be attached to the revamped project and become another NGO attached to the Les Cayes Office. The Les Cayes office will then service its consulting and other needs per the consulting arrangements in the first two recommendations above and within the dimensions of its own capacities;

- Make activities in the project more site-specific.

  In business terminology, "pre-investment" studies are needed. These should take into account all questions, including land

tenure, and particular activities need to be identified, which would be most appropriate to a terrain or a crop;

- Promote animateur development.

  Animateur development, the major key to program success should be supported, first, in extension methodology; second, in conservation skills; and third, in special agricultural technologies and intervention packages. A system of quality-based rewards should also be established. This is a major program benefit whose effect is invaluable to long-term program success;

ANNEX 1

Scope of Work: Haiti Hillside Strategy Assessment

Scope of Work

DELIVERY ORDER: Haiti Hillside Strategy Assessment

BACKGROUND. Since USAID reestablished a development program in Haiti in 1971, its strategy for agriculture and rural development has pursued goals related to increasing the incomes of the rural poor majority through increased agricultural productivity while maintaining and enhancing the natural resource base through promotion of sustainable agricultural development strategies. To achieve those goals, the Mission has attempted to resolve constraints within the small farm, multi-crop, peasant agricultural production systems that engage the majority of the rural population.

In 1985, USAID/Haiti outlined its development strategy for the next five years as a systematic attack on the basic causes of Haiti's accelerating economic decline. The strategy in agricultural and rural development defined an orientation to Haiti's hillsides where it was seen that all solutions to natural resource degradation and related decline in agricultural production must start. The "Hillside Strategy" presumed that hillside erosion was holding hostage the most productive areas in Haiti: plains irrigation systems depend on stabilizing hillsides to arrest siltation, prevent flooding, and maintain or restore hillside capacity to catch and hold rainwater. Furthermore, it noted that most of the food in Haiti is produced on small hillside plots. Decreasing food production on hillsides would aggravate already serious food gap problems and inevitably force migration to urban areas such as Port-au-Prince which is already stretched past its carrying capacity. Finally, over two-thirds of the Haitian population live in rural areas. They are dependent largely on agricultural lands, 80% of which are hilly or mountainous, and less than 8% of which are environmentally stable under current land use practices. By means of the Hillside Strategy, then, USAID/Haiti took on the long-term task of assisting this poor majority to improve their livelihood in a sustainable fashion.

The plan for the period 1985-89 was to orient new programs to reforestation, hill cropping systems and soil conservation, specifically targeted to hillside areas. The focus was to address environmental and production problems by watershed. Particular zones having major watersheds were selected for their relatively high production potential: Les Cayes/Cavaillon, Upper Artibonite, Arcahaie and Trois Rivieres. By 2000, hillside production systems would be changed on 290,000 hectares to significantly decrease soil erosion. The Mission would work closely with other donors to promote such an approach by watershed, for example with the Interamerican Development Bank which was designing such a program for the watershed of the Artibonite River. Existing projects were to be reoriented to providing credit, access roads, food for work and agroforestry to hillside populations, while the existing agriculture program would be maintained to protect previous investments in the plains by rehabilitating irrigations systems and establishing water users associations.

ARTICLE I - TITLE Hillside Strategy Assessment, No. 521-0000.1

DELIVERY ORDER Statement of Work

ARTICLE II - OBJECTIVE. To provide a team which shall assess the USAID/Haiti Hillside Strategy and make recommendations to the Mission regarding the advisability of continuing assistance to peasant farmers on Haitian hillsides.

ARTICLE III - STATEMENT OF WORK.

A. Purpose. The purpose of the assessment is to examine the effectiveness of the Mission's ADO portfolio, in light of the hillside strategy, in enhancing small farmer income while promoting soil-conserving farming practices.

In particular, the assessment will:

1. Review the history of the USAID agriculture and rural development program in Haiti since 1971, especially the Hillside Strategy. Analyze the USAID Agriculture and Rural Development portfolio by the resource flow to hillside agriculture, to plains agriculture and to natural resources. Review the functional and geographic efforts of other donors to agriculture in Haiti.

2. Relate the current ADO projects to the Hillside Strategy. Evaluate the Targeted Watershed Management Project and review pertinent aspects of the Local Resources Development I, Local Resources Development II, Agroforestry Outreach and the new Agroforestry II project.* This aspect of the assessment is detailed in item B.2. below.

3. Estimate relations of costs to benefits (inputs compared to: hectares of land stabilized or actually improved; change in vegetative cover resulting from the interventions; change in attitudes as a direct result of the interventions; increase in farmer income; etc.)

4. Review cross linkages between projects as to research, extension, motivational strategies, seed and seedling multiplication, etc. Assess the effectiveness of the accumulated balance between research and extension.

5. Assess suitability and/or modifications to the hillside strategy as a continuing agricultural strategy for USAID for the

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* Targeted Watershed Management (TWM): $15 million, Authorized 9/3/86, PACD 9/30/91. Works in the Les Anglais, Port-a-Piment, L'Acul, Grande Ravine du Sud and Cavaillon watersheds.

Local Resource Development I (LORDI): $1 million, Authorized 7/85, PACD 7/31/90. Addresses the Upper Artibonite watershed around Maissade.

Local Resource Development II (LORDII): $1 million, Authorized 7/2/86; PACD 6/30/90. Works at the summit of the Arcahaie watershed.

Agroforestry Outreach Project (AOP): $27 million, Authorized 1981, PACD 90. Worked nationwide.

Agroforestry II: $30 million, Authorized 1990. Works nationwide.

period 1990-95. Based upon a comparison of the agroclimatic, demographic, cultural and economic factors when the Hillside Strategy was developed with those of today and the next five years, determine whether the stragegy is still valid. Briefly compare from a sociological and economic perspective the comparative advantages and disadvantages of a hillside versus an alternative agriculturalstrategy. Within the parameters of hillside agriculture and funding constraints, assess the range of options for a focus for a continuing hillside strategy.

6. Advise of any further studies that may be needed to adequately compare strategies for hillside agriculture development and plains agriculture.

B. Evaluation/Review of Projects. The indepth evaluation of the Targeted Watershed Management Project and summary or specialized investigations of the LORDI, LORDII, Agroforestry Outreach, Agroforestry II and local currency projects will address:

1. Whether the assumptions, design logic and objectively verifiable indicators of these projects are reasonable and quantifiably measureable.

2. What inputs are required by the actual interventions (technical assistance, labor, capital, vehicles, equipment and supplies, and other material support).

3. Numerical targets of organizations involved in the hillside strategy compared with their actual accomplishments; for example, significant progressive increase in farmer demand for technologies introduced by the projects; soil conservation and enhancement of fertility and moisture.

4. Effectiveness of extension methods, installation and administration of demonstration and experimental sites. Is there an objectively measurable difference in the effectiveness of an individual approach vs. a group approach?

5. Effectiveness of project administrative structures, management, communications and monitoring systems. To what extent has a secondary benefit of the Hillside Strategy been to strengthen rural institutions?

6. Technical, managerial and administrative capacities of the ONGs; sustainability without AID funding or capability to effectively utilize local currency or other AID funds post-project.

7. Input supply structures.

8. Profitability, suitability to the region and adoption of the introduced techniques (including forestry, fuelwood and fruit trees).

9. Soil conservation and fertility augmentation on project sites (clearly stating what are the benefits of soil conservation, based on the types of interventions, their popularity and apparent cost.)

10. Appropriateness and levels of project incentives to farmers.

11. Sustainability of farmer level interventions and ONGs without the projects.

12. Adequacy of data on land tenure, agricultural production and practices, and socio-economic status.

C. Data Collection. Data will be gathered by:

1. Review of relevant documentation (Annex A, attached);

2. Direct observation; and

3. Key informant interviews (beneficiaries, administrators, government officers, community leaders, other donors).

For the projects reviewed in the field, the evaluation team will evaluate data through the agricultural season ending January 1990 and, for the following agricultural season, assess whatever is in the ground in April/May 1990. They will work with USAID/Haiti offices (PPS, ADO, OPE), project managers and coordinators, Save the Children/Haiti, CARE, University of Florida and the Sove Te partners (ARD, DCCH, IRD, ORE and UNICORS), PADF, SECID and IRG.

The team will also collaborate with appropriate MARNDR services, especially the Coordinator of the Secretariat Technique pour l'Amenagement des Bassins-Versants (STABV)in order to put the USAID hillside strategy into the context of similar agriculture/natural resource conservation experience in Haiti, and with the Directorate of Natural Resources (MARNDR/DRN) to review briefly the experience of Projet Amenagement des Bassins-Versants in L'Acul watershed. The team will contact the AID coordinators for local currency projects, and may visit the Bureau de Gestion for the PL480 program to review how local currency has contributed to the Hillside Strategy.

D. Level of Effort. The Hillside Assessment team will consist of: a social scientist (anthropologist or rural sociologist); a resource or agricultural economist; and a tropical agronomist. The team leader candidate will perform the following functions in addition to her/his technical assessment:

1. Manage and provide overall direction to the team while in Haiti. Coordinate all field travel and individual reporting requirements. Supervise secretarial staff and handle all logistics.

2. Serve as the principal liaison between the team, AID, and the projects being evaluated or reviewed.

3. Assure that all of the assessment issues in the Scope of Work are addressed and adequately discussed in the final report.

4. Advise USAID on the drafting responsibilities of each individual team member.

5. Provide bi-weekly progress reports (one page) to the Supervisory Agriculture Development Officer or his designee describing achievements to date, problem areas needing attention, and evaluation issues which cannot be resolved by the team and require intervention by USAID.

6. Submit a final draft Hillside Strategy Assessment which meets USAID's approval.

ARTICLE IV - REPORTS. The suggested format for the report is a synthesis report supported by annexes which evaluate in depth the Targeted Watershed Management Project, and specialized or summary investigations of the other projects. This format is presented as a suggested outline in Annex B. The suggested organization and outline of the report are presented because the Agriculture Development Offices wishes specifically to avoid a report format of a synthesis report supported by annexes corresponding to the technical specialties of the team members.

Specific reports and their deadlines are as follows:

A. The team will confirm the outline of Annex B or submit a draft of its outline for the report by week 6 of the assessment (May 20-26, 1990).

b. Presentation to ADO and Mission of ten copies, in English, of a draft of the assessment report June 8, 1990.

c. Ten copies of final evaluation report, in English, submitted before departure of team leader or July 13, 1990, whichever date is the earlier.

d. Additional forty copies of final evaluation report, in English, submitted to USAID/Haiti and AID/W by July 21, 1990.

ARTICLE V - RELATIONSHIPS AND RESPONSIBILITIES. The team leader for the contractor will be *
The team will work under the technical direction of Mr. Larry W. Harms, Supervisory Agricultural Officer, USAID/Port-au-Prince, or his designee. The team leader will consult regularly with the USAID/Program and Policy Support Evaluation Officer.

ARTICLE VI - PERFORMANCE PERIOD. The period of performance will be April 15 through July 21, 1990. A schedule follows:

DELIVERY ORDER Statement of Work

April 28, 1990	Team arrives in Haiti.
April 29, 1990	First organizational meeting at USAID.
April 29 - May 6, 1990	Background study/interviews in Port-au-Prince and environs.
May 4, 1990	Second briefing at USAID, team presents draft outline.
May 7-16, 1990	Field Trip: Les Cayes and Chardonnieres: TWM, local currency and Agroforestry II.
May 17-22, 1990	Background study and interviews in Port-au-Prince.
May 23-26, 1990	Field Trip: Leger and Bombardopolis-Dosdann: LORDII, Agroforestry II.
May 27 - June 1, 1990	Background study and interviews in Port-au-Prince.
June 2-5, 1990	Field trip: Maissaid: LORDI, Agroforestry II.
June 6-14, 1990	Synthesize. Debrief Mission on June 13. Team members depart on June 14.
June 15-26, 1990	Evaluation team returns to U.S. to work on draft report (team leader, 2 weeks; 1 week each for other two members). Draft report due at Mission by 6/26.
June 26 - July 13, 1990	Mission reviews draft report.
July 13-27, 1990	Contractor representative returns to Haiti to receive comments and prepare final assessment. Final report due at USAID July 27.
July 31, 1990	Delivery of all copies of final evaluation report to USAID/Haiti and AID/W.

ARTICLE VII - WORK DAYS ORDERED. The team will be made up of a social scientist, a resource or agricultural economist and a tropical agronomist. The team leader will be expected to work 64 days, while the other two team members are expected to work from 41 to 46 days each. Two Haiti consultants, conversant with social and ecological issues, will spend two-three days each in Washington, doing orientation and/or reviewing the draft report of the team.

Evaluation Schedule

Amended April 20, 1990

April 28, 1990	Team arrives in Haiti.
April 29, 1990	First organizational meeting at USAID.
April 29 - May 6, 1990	Background study/interviews in Port-au-Prince and environs.
May 4, 1990	Second briefing at USAID, team presents draft outline.
May 7-16, 1990	Field Trip: Les Cayes and Chardonnieres: TWM, local currency and Agroforestry II.
May 17-22, 1990	Background study and interviews in Port-au-Prince.
May 23-26, 1990	Field Trip: Leger and Bombardopolis-Dosdann: LORDII, Agroforestry II.
May 27 - June 1, 1990	Background study and interviews in Port-au-Prince.
June 2-5, 1990	Field trip: Maissaid: LORDI, Agroforestry II.
June 6-14, 1990	Synthesize. Debrief Mission on June 13. Team members depart on June 14.
June 15-26, 1990	Evaluation team returns to U.S. to work on draft report (team leader, 2 weeks; 1 week each for other two members). Draft report due at Mission by 6/26.
June 26 - July 13, 1990	Mission reviews draft report.
July 13-27, 1990	Contractor representative returns to Haiti to receive comments and prepare final assessment. Final report due at USAID July 27.
July 31, 1990	Delivery of all copies of final evaluation report to USAID/Haiti and AID/W.

ANNEX 2

The Nature and the Dynamics Of the Impacted Milieux: Haiti

ANNEX 2

The Nature and the Dynamics of the Impacted Milieux: Haiti

A. The Context

1. Geography: the place[1]

The country of Haiti is located in the mountainous western third of the island of Hispaniola, bordered on the north by the Atlantic Ocean, to the west and south by the Caribbean Sea and to the east by the Dominican Republic. Its closest neighbors are Dominican Republic, Cuba, Jamaica, and the Bahamas. One of the larger of the Caribbean nations, Haiti has 27,000 km^2 of land area including four large offshore islands: La Gonave (680 km^2); La Tortue (180 km^2); Ile á Vache (52 km^2) and Grand Cayemite (45 km^2): as well as numerous smaller islands and cays.

Haiti's position in the tropics and its mountainous terrain have created extreme weather conditions and temperature regimes which vary greatly with altitude. Rainfall patterns range from less than 300 mm in the northwest to more than 3,000 mm in the mountains of the southwest. Tropical storms, hurricanes, droughts, and floods are not infrequent.

Haiti is a mountainous country with only a few plains. Two ranges, the Massif de la Hotte and the Massif de la Selle, run in a west to east direction along the southern part of Haiti. The Massif Central gives rise to the Central Plateau with smaller mountains ("mornes") extending towards the north, south of Cap Haitien and west, along the northwestern peninsula. Approximately 63 percent of all lands have slopes greater than 20 percent, and only 29 percent have slopes of less than 10 percent.

In Haiti exposed rock formations are of igneous, metamorphic, and sedimentary origin. The latter formations are the most abundant (80 percent) and are represented by limestone deposits from the middle and upper Eocene era. Soils occurring near limestone formations are more fertile than those derived from rock of igneous origin which, like the soils found in the northern part of the country, are heavily weathered. Alluvial soils deposited by rivers are the most fertile and are found on the major coastal plains of Haiti and in pockets along mountain valleys. These alluvial soils represent the hope for future agricultural development, with suitable irrigation.

Haiti's rivers are mostly short and swift flowing since they are dissected by numerous mountain ridges and flowing across two relatively narrow peninsulas. The notable exception is the Artibonite River which originates along the border with the Dominican Republic and flows for approximately 290 km. It is not surprising, therefore, to find along

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[1] Information in this section, and much of the narrative, taken from M. Ehrlich et al; Haiti: Country Environmental Profile -- A Field Study, Washington, D.C., n.d. (1984?) (for USAID, Washington)

this river the country's major hydroelectric power generating facility (Peligre) and, on its delta, its major rice producing area. Erosion and reservoir sedimentation now threaten all of Haiti's hydroelectric generation facility, and have done for some years.

Surface water is used for domestic purposes by the great majority of the people in Haiti. It also flows directly into a great number of small and large irrigation systems. In fact, four large irrigated plains constitute the country's most important agricultural areas: the Plaine du Nord, Fort-Liberté area, in the North, the lower Artibonite and Estere valleys in the center, the Cul de Sac plain in the south, and the Les Cayes plain in the southwest. The quantity of these surface waters available for irrigation is decreasing due to the relationship between vegetation cover and river discharge. Baseflows, which represent the water available for irrigation when storage is limited, are diminishing significantly due to continuous deforestation and loss of water retention capacity in the rivers' upper watersheds.

The important source of water is groundwater which already contributes significantly to the irrigation system in the Cul de Sac region. Since limestone substrate underlies nearly 80 percent of the nation, groundwater reserves could become the principal source of fresh water. This future resource has not been mapped, nor is being utilized to complement surface water and increase agriculture production through irrigation.

Both groundwater and usable surface water depend upon the capacity of watershed areas to store water and then to gradually release it into the river system and recharge the water table. The significant development potential of irrigated plains in Haiti calls for immediate action to be taken in an effort to protect and to restore the vegetative cover, and thus, the water retention capacity of the country's major watersheds.

The forests of Haiti have long ago lost their economic significance as renewable resources, and are quickly losing their ecological function as well. The loss of the forest ecosystem has enormous, and potentially irreversible, repercussions which are affecting the livelihood of millions. Historically, Haiti was mostly covered by lush forests. Today, forests cover only 6.7 percent of the total land area (approximately 185,000 ha). Almost 38 percent of the total forested area is represented by pine formations, which have been severely degraded by unmanaged exploitation, repeated forest fires, and overgrazing. The single largest parcel of forest land (26,400 ha) remaining is the pine forest in the southeastern portion of the country. While the highest percent of tree cover is found in this area (Fond Verretes), all its rivers drain into the Dominican Republic.

Of the thirty major watersheds within Haiti, twelve were completely deforested by 1978. Parts of Haiti resemble the Sahel. Thirty-six percent of the remaining forest (66,000 ha) falls within the "dense forest" category (more then 80 percent canopy cover) and sixty-four percent in the "open forest" category of less than 80 percent canopy cover. The high amount of open forest and its very fragmented

distribution suggest that clearing and burning at the fringes of these parcel continues.

In fact, even a 6.7 percent annual reduction will remove half of the remaining forest cover by 1995, and will completely deforest all but five major watersheds in the nation. If the present trend continues, only the pine forest and its corresponding watershed will remain forested by the year 2008. Reforestation programs, past and present, have proven inadequate to reverse the trend in deforestation rates. The forest resources in Haiti will never again be a significant economic resource. Yet more than 70 percent of all energy consumed comes from either firewood or charcoal. Sustained agricultural production of the plains, and continuous hydroelectric output depend upon an adequate forest cover in the upper watersheds. It is evident that remaining forests in Haiti must be protected, restored, and adequately managed in order to perform their historical ecologically critical role. More realistically perhaps, since the best soil conservation includes a more intensive and productive agriculture, reforestation as such must be a component of improved farming systems.

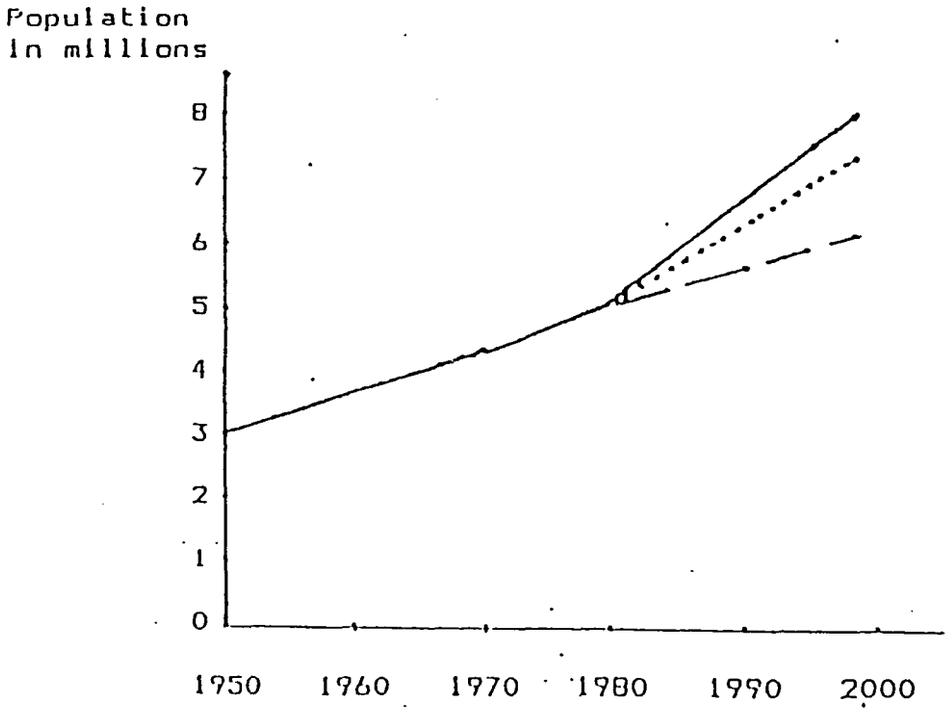
2. Demography: the people

Haiti now has over 6 million people. The difference between birth rates and death rates has increased from 1.6 percent in 1950 to 2.3 percent (or more) in the late 1980s. Population has not been growing at 2.3 percent, however, due to net out-migration, especially to the Dominican Republic and the United States. It is estimated that one million Haitians are in the United States. Figure 1 depicts past and possible future population growth. Birth rates are declining as quickly as death rates, for the customary and well known sets of reasons. The age/sex structure is similar to that of most other poor nations, very wide at the bottom and narrow at the top. This means that, even if fertility levels dropped to replacement levels (2.1 per adult woman) there is already a 50-100 year built-in population explosion. Roughly, each economically active person must carry one other person (very young or very old). The larger dependent population almost guarantees negative growth.

Given the cumulative worsening of the rural resource base, migration to cities and towns has been inexorable, as well as migration to external employment opportunities. Figure 2 provides estimates of recent urbanization trends, with projections to the year 2000. Population pressure itself in the rural areas serves to accelerate the rate of resource degradation, in turn accelerating the outward movement, particularly of women whose job opportunities in factories and service occupations are greater than those of men. Masculinity ratios (more men than women) are over 100 in the rural areas and less than 100 in towns.

It is important to appreciate two key features of this demographic dynamics. First, of the net increment to rural population (who are nonetheless 75% - 80% of all Haitians) do not all move to the towns or cities. As indicated in Figure 2, urban growth so far has been caused more by its own natural increase than by massive in-migration. Haitian rural families are remarkably stable; only some 40 percent of urban

Figure 1: Population Growth in Haiti 1950-2000



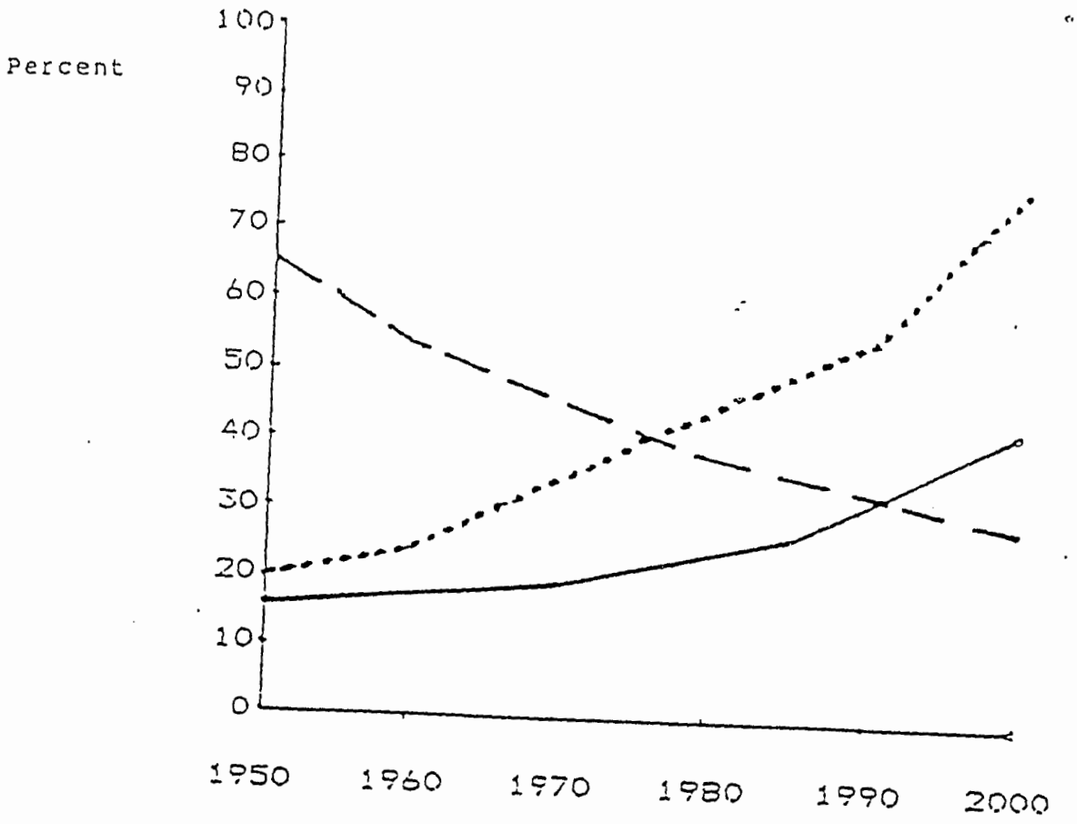
———— Evolution according to 1950, 1971 and 1982 census; projection according to Population Reference Bureau.

— — Medium projection by the Rapid II Project

····· Rapid II projection assuming no change in current parameters.

urces: Haiti, IHSI, Census for 1950, 1971 and 1982.
Population Reference Bureau, Population Data Sheet, 1987.
The Futures Group, Rapid II Project, n.d.
Figure in Renco, op. cit., p. 183

Figure 2: Urbanization in Haiti 1950-2000



——— Percent of population living in cities.

— — Percent of urbanization due to migration.

..... Percent of urbanization due to natural population increase.

Sources: Haiti, IHSI, Census 1950, 1971 and 1982.
Population Reference Bureau, Population Data Sheet.
Calculations by Renco
Figure in Renco, op.cit., p. 191

people are migrants. Given the cumulative nature of rural desiccation, however, that share will rise rapidly over the next 10-20 years, as people are forced to migrate to towns or to starve. Second, the arable land per capita drops markedly--see Table 1. These situations raise the whole issue of rural, agricultural, soil conservation policy and effort. Unemployment increases relatively, but infrastructure requirements increase exponentially. If the only real future for rural Haiti is on the plains--groundwater, infrastructure, processing, etc.--in an intensified agricultural base absorbing people, is there any point in trying to save the bulk of the steeper hillsides? Why not let them go to reach a newer and more stable resource situation? Projects are too little, too late.

3. Economic considerations, the country, and the agricultural sector

Haiti's economy is stagnant. Its failure to perform predated the downfall of the Duvalier regime, though the political uncertainties of the last several years have exacerbated the rate of decline. Growth was slow in the 1950s and 1960s, with some improvement in the 1970s. Table 2 indicates a growth rate of real GDP per capita which has been generally negative for a decade. These trends are brought out sharply in Figure 3. Haiti never really recovered from the world recession in the early 1980s .

The indicators of economic "health" also suggest clearly that the economy has been in serious difficulty over the last decade; some of these measurements are indicated in Figures 4 and 5. Foreign borrowing and grants-in-aid have covered government deficits, and debt-service ratios have risen markedly. External debt service is still at a reasonable level, however. Internal revenue has peaked and taxes on trade have decreased, partly because several were repealed (e.g., on coffee), and partly because trade has decreased. Trade imbalances have worsened perceptibly, putting pressure on the overall balance of payments. Combined with the maintenance of the official exchange rate, this balance of payments pressure has led to the overvaluation of the gourde, the black market rate for which now (June, 1990) approximates 40%-45%.

Haiti relies heavily on external donors to finance development activities. The United States provides more assistance than any other donor. Over 300 non-governmental organizations (NGOs) annually contribute an estimated $65 million in resources and services to Haiti's development, and represent a powerful influence on the economy and the environment. Unfortunately, individual projects are not the end product of a clearly defined set of priorities based on integrated economic and environmental goals.

Moreover, the composition of development activities has changed from an initial concentration on providing economic infrastructure to include social sectors, and, more recently, several major public industrial enterprises. To correct the stagnation and disequilibrium of recent years, it has been suggested that the short-term priority for public policy be financial and economic stabilization, using a variety of

Table 1: Project Effect of Population Growth Upon Haitian Resources

	Base Year Quant.	Base Year Quant.	Year 2000
Fuelwood and charcoal in million cu.m	1967	3.40	5.7
Arable land in ha. per capita	1950	0.38	0.1
Economically active population in millions	1971	2.0	3.3
Annual new job requirements in thousands	1980	46.0	68.0
Primary school age children in millions	1980	1.2	1.9
Population at high health risk in millions	1980	1.9	2.8

Source: The Futures Group, Rapid II Project, nd. (mimeo). Quoted in Renco Consulting Corporation, op. cit., p. 193

Table 2: Gross Domestic Product

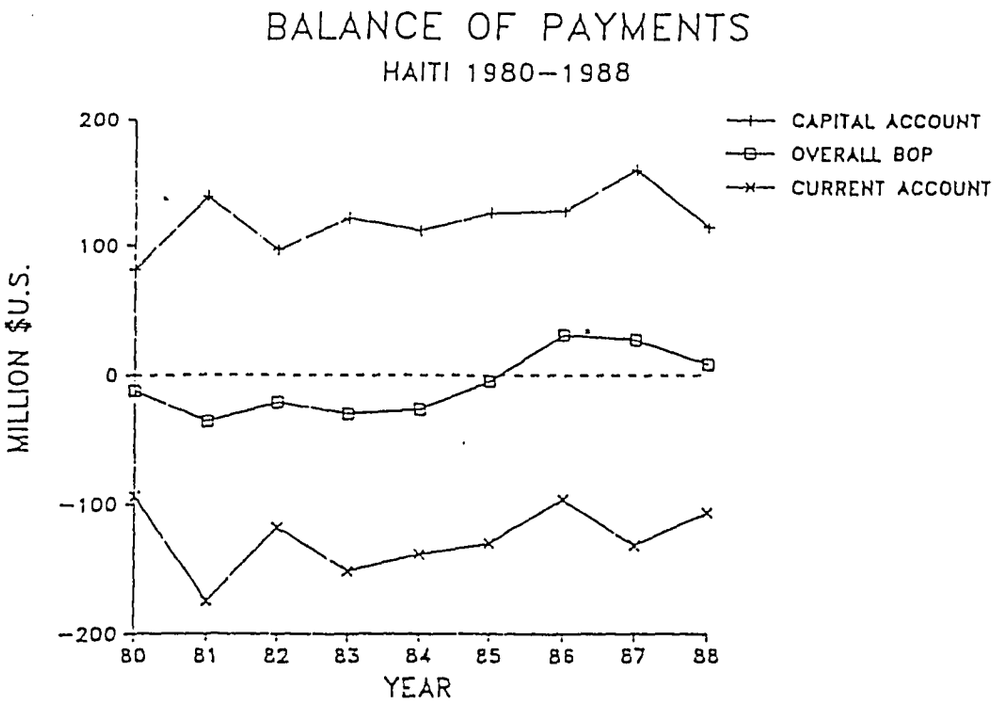
HAITI 1976 - 1988

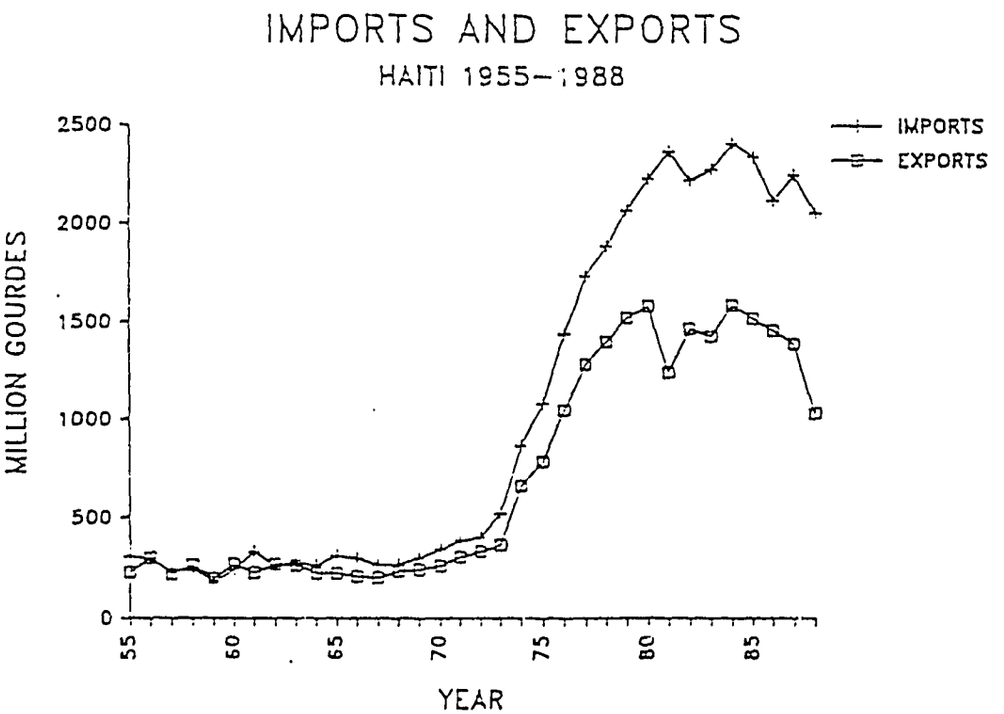
(Million Gourdes)

	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988
NOMINAL GDP	5697	6743	5256	5600	7309	7344	7425	8148	9082	10047	11218	9980	9437
GDP AT CONSTANT '76 PRICES	4210	4262	4437	[illegible]	5108	4961	4652	4656	4673	4620	4646	4707	4776
NOMINAL GDP/CAPITA	1221	1420	1087	1138	1459	1439	1469	1539	1683	1694	1854	1618	1505
REAL GDP/CAPITA ('76 PRICES)	902	897	918	968	1020	972	921	880	866	779	768	764	762
GROWTH RATE OF REAL GDP	7.8	1.2	4.1	7.4	7.2	-2.9	-6.2	0.0	0.4	-1.1	0.5	1.0	-1.8
GROWTH RATE OF REAL GDP/CAP.	5.9	-0.5	2.3	5.5	5.3	-4.7	-5.3	-4.4	-1.6	-10.0	-1.4	-0.4	-3.0
AGRICULTURE'S SHARE OF GDP (%)	39.8	37.0	36.2	36.9	33.7	34.2	35.0	33.5	34.7	36.2	36.0	35.4	34.2

SOURCE: World Bank, IMF, USAID and taken from Whitney and Sahebi - Lafahani, p. 28

Figure 5: Balance of Trade and Balance of Payments Information to 1988





methods. These could include tighter control of public expenditures, new tax objectives and the development of long-term financial institutions and instruments. Figure 6 and Table 3 amplify these comments.

The farmer puts many of the hundreds of projects in resource development on the map. The latter indicates that some $31 million were provided to Haiti in 1986 almost entirely for resource and related development. It is important to note that multilateral agencies provide mainly capital/infrastructure assistance while bilateral organizations and NGOs work mainly in technical assistance. Total assistance to Haiti for all sectors in 1989 was anecdotally reported to be $150 million. Little of this money reaches the "people" level however, given the inverted pyramids of the top-heavy distribution systems.

The agricultural sectors now account for only about one-third of the GDP (see Table 2), and the agricultural sector has been stagnant for 40-50 years. Total production of major cereals (maize, rice, millet) was some 422,000 metric tons in 1950. In 1988, it was 457,000 MT, an increase of only 8 percent in nearly 40 years. A review report is worth quoting at length:

> Figures for the major cash crops also indicate only minimal increases for sugar cane and a decrease in coffee production, Haiti's main agricultural export. Production figures for cocoa and cotton, two relatively minor crops, have shown significant increases over the past three decades. Exports of these crops, however, have remained stagnant in the 1980s.

CASH CROP PRODUCTION TRENDS

HAITI, 1960-1988

Crop	1960	Avg. 1983-88	% Change
Sugar Cane	4,952.0	5,292.0	+ 6.9%
Coffee	39.0	34.6	-11.3%
Cacao	3.9	5.2	+33.3%
Cotton (fiber)	3.5	6.3	+80.0%

As total production has remained relatively constant, per capita production has evidently been more than halved since the 1950s. Agriculture's share of GDP has also fallen from 44 percent in 1950 to its present level of about 28 percent in 1988. Due to the increasing shortfall in domestic agricultural (and more specifically food) production, the volume of cereal imports has grown at an average of 22 percent per year since 1962. The value of total food imports has increased from $17 million in 1970 to $86 million in 1985. The value of agricultural exports, on the other hand, has increased from $25 million in 1970 to $91 million in 1985.

Thus, <u>the current state of the agricultural sector remains basically unchanged from almost half a century ago</u>. Some of the causes

Figure 6: Development Projects as of 1988

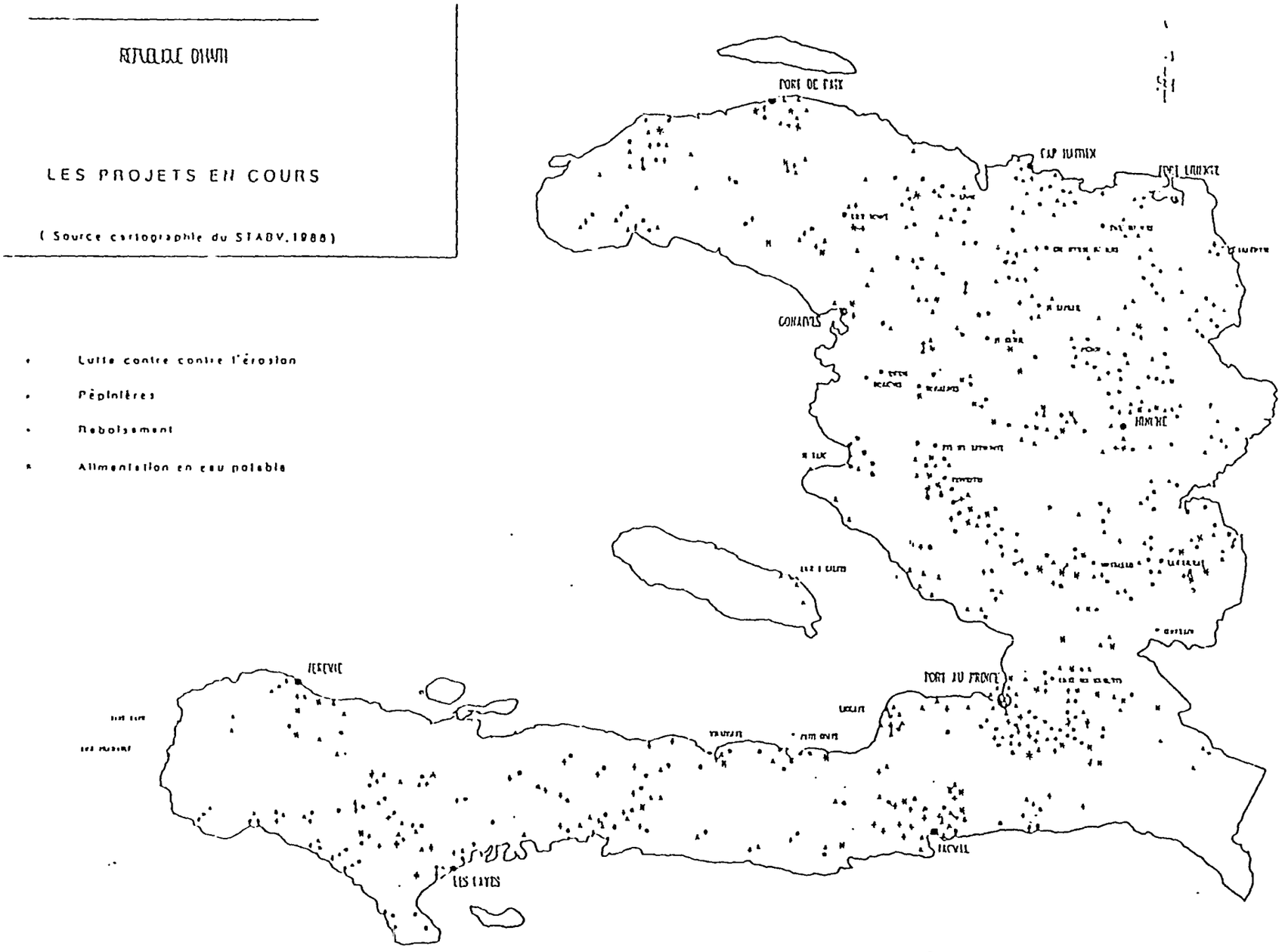


Table 3: External Assistance in Haiti, 1985

RAPPORT SUR L'ASSISTANCE EXTERNE EN HAITI EN 1986
(en 1 000 $)

	RESSOURCES NATURELLES	AGRICULTURE FORESTERIE PECHERIE	CULTURE	TOTAL
Assistance technique				
- bilatérale	1 484	5 805	5	7 294
- multilatérale	80	1 590	221	1 891
- ONG		1 332		1 332
Sous-total	1 564	8 727	226	10 517
Assistance en capital				
- bilatérale	184	7 493		7 677
- multilatérale		12 611		12 611
- ONG		107		107
Sous-total	184	20 211	-	20 395
TOTAL	1 748	28 938	226	30 912

Source: Ministry of Economics and Finance, Gestion des Resources Naturelles en Vue d'un Developpment Durable en Haiti, Port-au-Prince, April 1989 (Associates International de Developpment), p.117

of this failure of the agricultural sector to keep pace with the rest of the economy can be traced to long-term macro-economic policies, involving investment and price incentives, both of which are influenced by trade restrictions, the balance of payments, and fiscal and monetary policies.

The imbalances in the monetary and fiscal positions and in the balance of trade can, and are, having a negative effect on the agricultural sector. Correction or realignment of the underlying policies, some of which have already been undertaken, could improve in the performance of the agricultural sector. With the proper incentives, agriculture could play a more important role in Haiti's economic recovery and help lead to renewed overall economic growth. [2]

Figure 7 also highlights several important features of the dynamics of the sector. Population growth is reducing drastically the value added to exports as well as cereal availability per capita. Food imports are rising and recent attempts at economic reform were disoriented by the pull-out of all major funding agencies in 1987. Manipulation of cereal prices has kept maize and wheat prices well above world prices. There is evidence, however, that even with higher cereal prices (except rice, whose price has fallen) there has been no supply response. The Evaluation Team's view is that the Haitian farmer would respond if he could, but he cannot--he does not have the land, the inputs, etc. [3] Higher land prices have, perforce, reduced nutrition levels, especially in towns; and have raised wage levels, thus impairing the competitiveness of Haiti's manufactured and processed products (e.g., textiles).

In sum, the macro-economic and sectoral environments are inhibiting normal economic growth. Fairly new issues are creating further hindrances. For example, the 50% surrender requirement for exporter's foreign exchange earnings is equivalent to an export tax equal to about half of the differential between the official and parallel market rates (20%-25%). Inflation is rising since fiscal deficits are being partially covered by monetary expansion. Investment budgets continue to ignore agriculture, and in any case tend to concentrate on ill-designed and managed surface irrigation schemes. The malaise afflicting GOH agencies dealing with agricultural, rural, and resource development has led to the assumption of many tasks by PVOs and NGOs. Consequently, development has been piecemeal, unplanned, and uncoordinated.

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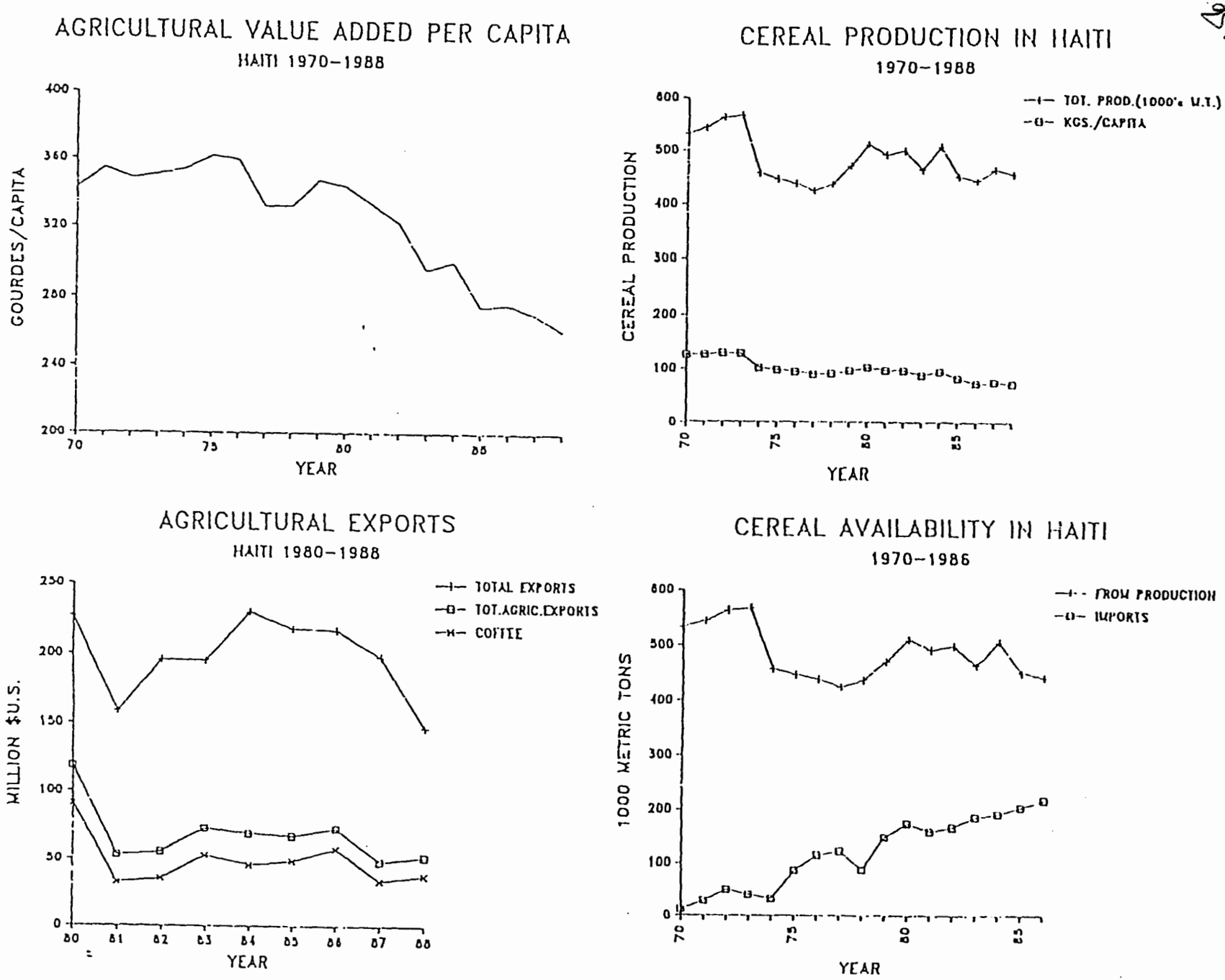
[2] T.R. Whitney and D. Salehi-Isfaheni, A Macroeconomic Analysis of the Agricultural Sector in Haiti; Blacksburg: Virginia Polytechnic Institute and State University, June, 1989 (for USAID/Haiti)

[3] The supply response for coffee is different. Removal of export taxes purportedly gave coffee farmers more profits, but they still do not maintain or harvest their coffee. This does not indicate a lack of price responsiveness. Farmers grew coffee because brokers once provided large cash advances. These advances are no longer provided, and farmers are growing field crops to achieve the same purpose -- cash flow.

Figure 7: Agricultural Value Added and Cereals Production in Haiti



B. The Resource Base, Environmental Degradation and Land Use

1. Introduction

Earlier sections have described the nature of Haiti's agricultural resource base, the dynamics of its cumulatively deteriorating condition, and its progressive inability to support its population. With population growth the per capita worsens quickly. Especially in the last 20 years, these dynamics have meant that Haiti is now the poorest country in the western hemisphere and one of the poorest in the world.

Haiti's Independence in 1804 led to a breakdown of the plantation system and of the irrigation works on which the plantations depend. In the civil wars which followed Independence, two processes became institutionalized which still characterize the Haitian society. First, the parcelization of land and insecurity of tenure resulted as freed slaves occupied land in small, scattered parcels which were further subdivided as the population increased. Second there was a lack of identification of the individual with any greater purpose than personal or family survival and aggrandizement. Out of this evolved a society in which every layer of the society exploits those which are below. These two characteristics of the Haitian society are the underlying causes of rural poverty and of the deterioration of the resource base which threatens the very survival of the society. Thus, it is an almost insurmountable task to bring about a reversal of resources degradation.

2. Agricultural holdings and cultivated areas

Tables 4 and 5 suggest the nature of the people's use of the land. The area cultivated is shrinking since land progressively deteriorates to the point where it must be abandoned. Combined with population growth, densities may now approach 900-1000 person/km^2 cultivated. Given the historical splintering of holding between generations, tiny parcels are the rule; over half the holdings are one hectare or less. Many of the parcels are so small as to be virtually useless. Additionally, an estimated 50% - 75% of the parcels are in the form of undivided family land under claim by lines of inheritance. All serious efforts to come to grips with erosion control, soil conservation and resource stabilization must deal with land tenure issues. As things stand now, only 25% - 50% of the land can be dealt with institutionally.

3. Land tenure

Insecurity of tenure discourages investment in the land. Together with smallholders' needs for short-term income, insecure land tenure also discourages soil conservation practices. Livestock raising is the only technique employed to help restore fertility. Animals are grazed on distant plots (where ownership is less secure) and the residues are returned to plots

Table 4: Summary Statistics on Agricultural Holding, 1971

SUMMARY STATISTICS ON AGRICULTURAL HOLDING (1971)

Land Holdings (by hectare)	No. of Holdings	No. of Parcels per Holding	Total Land (Ha)	Population	Average # of parcels per holding	Average Parcel Size (Ha)	Average # of persons per Holding
1ha. & below	361,985	530,480	184,843	1,498,020	1.46	0.34	4.15
1 to 2ha	141,930	275,510	211,940	666,180	1.94	0.76	4.69
2 to 3 ha	53,600	130,400	137,359	279,990	2.43	1.05	5.22
Cumulative %	91%	84%	62%	88%			
3 to 4ha.	27,370	74,390	96,762	143,800	2.71	1.30	5.25
4 to 5ha.	6,440	39,340	36,790	48,000	3,47	1.32	5.68
Above 5ha.	23,385	78,110	193,822	143,030	3.34	2.48	6.11
Total	616,710	1,118,230	863,516	2,779,020,1.81	0.77	4.50	

Source: George Anglade, Espace Haitien, 1974.

Table 5: Haiti: Total Area, Cultivated Area and Population Density, 1982

Region	Surface Area 1000/Km² Total	Surface Area 1000/Km² Cultivated	Total (1000's) Population	Population Density Persons/Km² Total	Population Density Persons/Km² Cultivated
West	4.649	1.546	1,551.792	334	1004
Southeast	2.215	0.601	367.911	166	612
North	2.045	0.873	564.002	276	646
Northeast	1.752	0.420	189.573	108	451
Artibonite	4.532	1.214	732.932	162	604
Center	3.700	0.820	361.470	98	441
South	2.894	1.158	502.624	174	434
Grande Anse	3.284	0.848	489.95	149	578
Northwest	2.330	0.711	293.530	126	413
Unknown*	0.299				
Total	27.000	8.191	5,053.791	182	617

Note: One square kilometer equals 100 hectares
Note: The population is quoted between 5 and 6 millions
*: To balance Haiti total surface area

Source: Institut Haitien de Statistiques et d'Informatique, Analyse de quelques indicateurs démographiques tire des Recensements de 1950, 1971 et 1982; April 1982, Port-au-Prince, Haiti.

Source : Both tables taken from Ehrlich et al, op cit, p.43

closer to home. Residues are also used for fuel, as fuelwood reserves diminish. [4]

Different degrees of security attend the different types of rights to land. Figure 8 presents these different forms. With pressure on land, the need for legal authorization become strident, "Terres avec Papier."

a. Owner operated

Owner-operated land tenure predominates in the hills, where 60 percent of the land is entirely occupied under customary ownership and less than 5 percent of the population is entirely landless. Farmers who own insufficient land to meet family requirements tend to emigrate to other areas once they can no longer lease or sharecrop sufficient area.

b. Undivided land

It is often not feasible to allocate minuscule plots of land claimed by several lines of inheritance. Such plots therefore remain undivided. They are not always regularly cultivated, they deteriorate rapidly and receive little, if any, investment. Claimants' livestock can graze the land, and cultivate parts of it under group agreements. A new household can sometimes be established by one of the claimants, with "owners" rights to the household plot.

c. Share cropping

A 50:50 share in the harvest between owner and share cropper is most common. This generally is an even split of the net, so that one-third goes to input costs, and one-third each to the user and the owner. In the hills, the owner is usually a local farmer and the share cropper a neighbor with either little land or a desire to complement his cropping activity. On the plains, absentee ownership is common.

d. Leasing

The length of leases and amounts of rent vary widely. A lease arrangement is usually for one or two harvest periods (six months to a year).

e. "Potek" or mortgage

Potek is a type of long-term lease, which covers several years for a fixed and rather low fee paid at the time of sale of produce.

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[4] Material based on IBRD, Haiti: Agricultural Sector Study . . . , op cit, Vol. I, pp. 11-12.

Figure 8: Modes of Land Tenure

		FORTE
TERRES AVEC PAPIER	. Achat "tit" et "honorè". . Achat de "minè" avec titres de propriété, avec prévention. . Achat de "minè" sans titre de propriété, "tè honoré".	
TERRES SANS PAPIER MAIS AVEC ENTENTE	. Terres "minè" séparées, formel, pas d'arpenteur, non séparé, informel, testament oral, séparé-informel-pas de testament mais entente, non séparé pré-héritage, sans papier, parcelle fixe (don).	
TERRES SANS PAPIER, SANS ENTENTE.	. Terres "minè", séparé, informel, pas de testament, pas d'entente. . Terres "minè", non séparé, pré-héritage, sans papier, parcelle indéterminée. . Terres "minè", indivision, emploitation par rotation, . " " " , " collective.	
		faible

Source: Group de Recherche Pour le Devéloppement, Modes de Tenure en Haiti et "Degres de Securite," Madian-Salagnac, Haiti, September, 1979, p.9

f. Government land

Individuals may lease Government land on a long-term basis, and can pass on these leases through inheritance. Lease fees are low and lessees often sublease the land to others or engage in share cropping.

4. The household farm enterprise

A smallholder subsistence farm consists typically of a home occupied by the main wife, and sometimes other complementary homes occupied by concubine wives and their children. These farms employ family labor (including children) to produce food to meet basic needs, and a marketable surplus to cover cash needs (e.g., school fees, clothing, oils, salt). These marketable surpluses are directed to the domestic market, e.g., animal products, fruits and vegetables, or for export, e.g., vetiver, cocoa, and coffee.

Around the main home, the smallholder family cultivates several types of crops in distinct ecosystems. These include, in decreasing order of intensity and fertility:

- Fruit tree plantations: banana, avocado, citrus, coffee, and cocoa, usually grown around the house;
- Annual crops in enclosed gardens: roots, fibers, and vegetables (no fallow), heavily fertilized by animal manure and organic residues;
- Open field cropping: maize, sorghum, and beans, characterized by minimal or no fertilization and by fallow periods during which spontaneous regeneration is razed by animals; fallow periods decreasing rapidly, even on steeper slopes;
- Poor pastures: used for browsing by goats, with no fertilization, tree planting, or control of erosion; and
- Ravines and gullies: usually dry and eroded, although occasionally planted with breadfruit or coffee. Erosion becomes progressively worse.

Although smallholders enjoyed relative prosperity until the early 20th century, cash income from coffee and other food crops has always been limited because the low levels of technology have prevented farmers from producing large marketable surpluses. Much of the equipment used is the same as in the colonial period: hoes, machetes, and pickaxes. The few tools used are imported and there is practically no expertise in rural areas to repair them.

In addition, marketing charges, formal and informal taxes, high interest rates for informal credit and the high cost of surveyors' services have all kept a lid on farmers' discretionary income. With real farm income having declined over the last decade, smallholder agriculture is in a worsening crisis. Unless effective production incentives and other constructive measures are introduced, smallholders are likely to earn progressively less in

real terms because of stagnant technology, further fragmentation of landholdings and less favorable terms of trade.

In order to minimize the risk of poor harvests and the need to sell and buy food, farmers have opted for cropping patterns that have enabled them to harvest food crops throughout the year. They cultivate parcels in several different ecosystems, sometimes by leasing plots from neighbors. The intensity of effort and types of production on different plots are a function of tenure status and distance from the home. Home consumption by smallholders includes roots and tubers (cassava, sweet potatoes), fruits and vegetables (plantains, mangoes, avocados, breadfruits), and dry legumes and cereals. Cash for purchases of cereals and other goods is generated by sales of surplus crops, coffee and vetiver, and animal products (pork, goats, and cattle). Animal protein from domestic livestock has become too expensive for home consumption. Farmers have turned increasingly to dry legumes for both home consumption and for sale to the growing domestic market, putting further pressure on cultivated land, with red and black beans now major cash crops.

The disappearance of the swine population has hurt the rural economy because pigs have been a major source of protein, cash, and manure and have served as a savings mechanism for which farmers have no substitute. High priority has been given to ongoing projects financed by USAID and IDB to rebuild the pig population.

5. Land use potential and land use

Data on land potential are often conflicting and generally overstate the quantities of "good" land. Table 6 indicates use potential as described by the GOH using a classification system adapted from the USDA in the early 1980s. Only 11.3% of the total land area (or 313,010 ha) is in classes I and II, which have few constraints for agricultural use. Much of the 31.7% of the land placed in classes III, IV, and VI consists of steep slopes subject to severe erosion and suitable only for permanent crops or pastures. The Country Environmental Profile (CEP) Team, using more conservative criteria (e.g., arable land with low erosion risk), concluded that the area suitable for crop production with few restrictions is approximately 205,000 ha, or 7.4% of total land area. The Team also concluded that the area under forest cover is greatly overstated by the DATPE figures. Thus, not only is the most arable land already being utilized, but the total area under some form of agricultural production (more than 1,3000,000 ha) is six times greater than the estimated area of "good agricultural land." (See Table 7)

About one third of all lands are either extremely eroded, abandoned for farming, or saline and practically sterile due to inappropriate land use practices. Most of these marginal lands are found on mountain slopes. Every year cultivation of annual food crops forces agricultural activity higher up the mountains, increasing the steepness of lands under cultivation. The result of tree cutting and cultivation in these areas is tremendous soil erosion. Each year the equivalent of 6,000 ha of valuable land is lost to erosion. Over the past forty years, estimates of remaining "good" arable land in Haiti show a consistent decline of as much as 3% per year.

Table 6: Distribution of Land by Use Potential

Potential Use (2)	Land Area (km²) and % Distribution (1)				
Land/Soil Class	North	Transv.	West	South	Total
Ia Good soils with possibilities for irrigation, suitable for mechanization, high productivity potential, topography constraining	785.6 20.2 25.7	1,046.3 10.0 34.3	588.7 8.7 19.3	633.7 11.2 20.7	3,054.5 (3) 11.3 (4) 100 (5)
IIb Good soils, not irrigable, some restriction in type of crop, small localized mechanization and irrigation possible traditional agriculture with soil conservation measures, topography a constraint, most appropriate for tree crops, pasture and forest.	1,040.4 26.7 12.1	3,712.5 34.7 43.3	2,135.0 31 24.9	1,683.9 29.6 19.6	8,571.8 (3) 31.7 (4) 100 (5)
IIIc Mediocre soils, swampy suited for rice subject to adequate water development and management, drainage and irrigation	104.0 2.7 16.2	397.8 3.7 62.5	60 1 9	74.1 1.3 11.6	636 (3) 3.2 (4) 100 (5)
IVd Soils suited especially for forest, localized tree crop agriculture and pastures possible. Topography constraining subject to severe erosion.	1,966.9 50.5 13.3	5,547.4 51.8 37.4	4,014 59 27.1	3,289.8 57.9 22.2	14,818.6 (3) 54.7 (4) 100 (5)

a) includes classes I and II of the USDA system
b) includes classes III, IV and VI of the USDA system
c) includes class V of the USDA system
d) includes classes VII and VIII of the USDA system

1) The country is divided into four regions for resources inventory & planning by DATPE
2) adopted by DATPE from USDA soil capability classification
3) for each region/country the total area
4) for each region/country the percentage of the area corresponding to the respective land soil class
5) contribution of each region to area of the respective classes expressed in percentage.

Source: Ehrlich *et al*, *op cit*, p.36

Table 7: Occupation of Land by Use Categories

Type of Land Use		North	Transversale	West	South	Haiti
Agricultural Domain	Specialized crops	371.1	605.3	318.9	413.4	1,708.7
	Rice	42.8	316.0	46.8	63.6	469.2
	Sugarcane	126.1	NI	144.5	81.7	352.9
	Annual Irrigated	48.4	265.6	28.0	162.4	504.4
	Banana	–	0.9	42.9	12.3	56.1
	Sisal	163.2	22.8	56.1	17.6	249.7
	Vetiver	–	–	–	72.0	72.0
	Coconut	–	–	0.6	3.8	4.4
	Tree crops dominant	413.0	725.9	460.9	396.3	1.996.1
	(Food crops in	(c)267.5	(c)168.4	(c)281.5	(c)183.5	(c)900.9
	association)	145.5	557.5	179.4	212.8	1.095.2
	Tree crops sparce	846.7	1,728.6	1,094.8	861.0	4,531.1
	associated food	553.1	1,462.9	577.9	535.7	3,129.6
	crops dense	(c)293.6	(c)265.7	(c) 516.9	(c)325.3	(c)1,401.5
Agro-pastoral Domain	Food crops dense tree cover open	474.7	1,629.8	962.5	979.8	4,046.8
	Food crops moderately dense in pasture and natural vegetation	438.1	1,663.2	1,437.2	837.3	4,375.8
	Food crops dispersed pasture and natural vegetation	196.8	1,777.8	564.1	319.7	2,258.4
	Extensive pasture herbaceous species dominant	305.1	1,244.9	385.0	27.4	1,962.4
Silvo pastoral Domain	Savana with trees	183.7	998.0	1,053.6	664.1	2,879.4
	Trees localized	44.8	56.1	109.1	124.9	334.9
	Trees dense	3.0	61.3	12.4	41.6	118.3
	Trees sparse	12.7	443.3	316.5	219.1	991.6
	Trees very sparse	123.2	437.3	615.6	258.5	1,434.6
	Broad leaf forest	397.3	253.6	104.1	1,064.8	1.819.8
	Dense	13.3	58.6	31.4	116.1	219.4
	Sparse	265.0	29.9	13.0	312.6	620.5
	Very Sparse	119.0	165.1	59.7	631,1	979.9
	Pine forest	94.6	74.2	252.4	52.6	473.8
	Dense	9.8	27.9	53.8	–	91.5
	Sparse	84.8	46.3	93.5	22.4	247.0
	Very Sparse	–	–	105,1	30.2	135.3
	Mangrove	49.1	43.1	17.7	61.6	171.5
				6.651.2	5,658.0	26.223.8

(1) From maps showing occupation of land established from 1978 aerial photographs. (DATPE/SEP);
NI = Not Indicated
(c) Coffee probably in association

Source: Taken from Ehrlich et al, op cit, p.40

Only 11.3% of the total land area of the country consists of good soils with possibilities for irrigation, mechanized cultivation, and high yield potential. Much of the 31.7% of the land with good soil, but no potential for irrigation is found on steep slopes subject to severe erosion. These lands are best suited for managed pastureland and for permanent tree crops such as coffee. The extensive reduction of forest cover and widespread cultivation of lands unsuited for annual crop production, without even minimal attention to soil conservation practices, has led to the catastrophic state of erosion throughout the country and to the subsequent serious damage to the agricultural potential of the lowlands, both in terms of irrigation and infrastructure.

A high percentage of all cultivated lands are being farmed beyond their carrying capacity, resulting in an escalating and potentially irreversible land degradation process. If maintaining or improving existing land resources, is a high priority, a significant portion of Haiti's cultivated lands should be removed from current land use and returned to forest. In practical terms, however, only the upper watershed areas of the agriculturally and economically most important plains could become the object of such a drastic resource restoration strategy. People must farm to survive; they have no options except moving downhill to the plains and towns.

Consistent reductions in soil fertility, as well as soil loss through erosion, have resulted in greatly reduced average crop yields. The MARNDR has supported a research system for 45 years and more. An improved Research Service and Research Center were developed in the early 1980s with significant bilateral assistance (USAID, CIDA). Both Texas A&M, and CIMMYT developed new crops and cultural practices, using Farming Systems Research to identify key bottlenecks and possibilities. All work, as far as this Evaluation Team can gather, involved irrigation and the use of chemicals, especially fertilizers. In short, even with recent research efforts (e.g., Winrock/University of Arkansas) there is no meaningful technology developed which would improve yields and farming practices. That is why the synthesis of all this work, and its re-establishment as farmer-level research on the TWM project (Les Cayes region) is so critical.

6. The end result: grinding poverty

The crisis in Haitian agriculture stems from the dynamics of farm/population growth on a fragile resource basis. Food supplies have fallen, the exodus continues out of the countryside, unemployment and infrastructure stress are everywhere, trade balances are disturbed, and the agroindustry sub-sector falters. This crisis has resulted in widespread and worsening rural poverty, and a loss of hope by many rural Haitians. The causes of the crisis are declining standards of living, the lack of viable economic opportunities for the rural poor, and the obvious indications that the resource base and infrastructure are breaking down due to overuse.

> "Les causes de cette crise non passagére, non superficielle mais profonde et durable, sont á chercher dans les blocages structurels qui entravent depuis longtemps le développement de ce secteur et qui se sont renforcés au cours de dernières décennies.

L'insecurité accrue où se trouve le paysan, face aux appétits de l'homme de la ville qui le dépossède trop souvent de sa terre, quand il est propriétaire, ou qui la dépouille du fruit de son travail dans le cadre du système injuste de métayage et de fermage, lorsqu'il est paysan sans terre, lui enlève toute incitation á investir et á produire davantage.

D'un autre côte, la déperdition accélérée de la substance même de la terre qui s'en va à la mer ou qui se desséche sous le soleil, faute d'investissements publics dans l'irrigation et la lutte contre l'érosion, la pénurie de routes secondaires pour désenclaver les régions productrices, l'inefficience des autres services tels que le crédit agricole, l'encadrement technique, la vulgarisation, l'éducation et la santé, etc. . . ce sont là autant d'élements d'explication de la crise actuelle de l'agriculture." [5]

It is into this nexus of issues, with the isolated and progressively more desperate farmer at the bottom, that USAID Hillside and other strategies must fit and adapt.

C. The Basis of Chronic Failures in the Haitian Development Programs

Failed development effort can be more depressing than the condition for which solutions are sought. Depending on what one counts, there have been literally hundreds of development efforts in Haiti. Some have been conducted by the private sector--individuals and firms; others by GOH Ministries and agencies, or groups sponsored by such Ministries or agencies. Still other efforts have been supported by multilateral and bilateral donor funding or by sponsoring GOH agencies, or by PVOs and NGOs--private organizations funded and chartered externally, or domestically.

It is difficult to determine why so many different types of projects have failed. How does one distill the realities of these experiences especially when privacy of operations and general non-accountability are so prevalent? The Agricultural Ministry has attempted to rank the major constraints to agricultural development. These are listed at Figure 9. It is worth noting that the procedures for implementing projects by both the GOH and international agencies are viewed as major bottlenecks. And so they are, from the recipient country's point of view. The Evaluation Team identified four main reasons for the lack of success by development projects.

First, projects hardly ever take into account the nature and needs of the farm family, their production system, their constraints, and their capabilities. Projects have been designed almost without the farmer. The developer/agency feels that "x" is the answer, e.g., irrigation of a particular kind, or soil conservation, or coffee trees, or whatever; the project is constructed accordingly. This is "top-down" development, and hardly unique to Haiti. The projects' objectives and processes often match those of the farmer only "by accident." Yet the prime characteristic of successful peasant farmer development projects worldwide is the active

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[5] GOH, Propositions Pour Une Strategie de Développement Agricole, Port-au-Prince, Decembre, 1987 (Commissariat à La Promotion National et à L'Administration Publique), page (a) Executive Summary.

Figure 9: Constraints to Agricultural Development in Haiti: A Tentative Ranking

Type of Constraints	Degre of Importance (a)
Farm-Level Constraints	1
Acess to Productive Resources	
Land and land tenure	2
Capital	2
Labor Supply	3
Technology	1
Natural Constraints	
Natural Disasters	2
Climate, soils, topography, water ressources	2
Insects, diseases, rodents	2
Soil Erosion and Related Man-Made Constraints	1
Support System Constraints	
Supply-Demand Constraints	-
Supply Constraints	1
Demand Constraints	2
Concessional food grain imports	3
Marketing Constraints	
Dispersed production	3
Lack of uniform weights and measures/grades and standards	3
Lack of storage facilities	2
Handling and transport costs	1
Lack of inventory financing	3
Lack of market information	3
Institutional Constraints	
Administrative/managerial/ technical capacities	1
Cooperatives and other farmer organizations	1
Production Credit	2
Input suppliers	2
Research	1
Extension	2
Other services	2
National-Level (Policy) Constraints	
Tax Policy	2
Monetary Policy	3
Price Policy	2
Credit Policy	2
Land Tenure and Land Redistribution Policies	1
Policies Affecting Rural Levels of Living and Income Distribution	2
Employment Policy	3
General Government Support for Agricultural Development	1
Implementation Constraints	
Bilateral and International Agency Procedures	*
GOH Procedures	*

(a) 1 = Major 2 = Moderate 3 = Minor
* Regarded by the DARNDR as significant constraints.

Source: DARNDR, and taken from Ehrlich et al, op cit, p.51

participation of the farmers who are the "target" population. The Appendix to Annex 3 provides further information. Huge investments in soil conservation works, roads, irrigation and extension projects do not survive because they are not of the farmers' making--they belong to the "outsiders."

Second, many complex projects address only one or a few components of what is in fact a production system. Even if the problem or issue addressed were entirely legitimate in its own right, e.g., soil conservation, such narrow orientations are not necessarily linked to the system. Impact, per se, is limited and usually temporary. This "one piece of the elephant" syndrome can stem from ignorance of the farming system itself. There is also a tendency to "put the cart before the horse." Nothing, absolutely nothing, happens on the farm on a sustained basis unless the farmer wants it to. He will even go so far as to accept something out of politeness, e.g., trees, or because he thinks he may need the development agent in the future for something else. But he must want the item. To want it means he must see that it improves his cash flow and/or reduces risk within his constraints, both cash available and labor. Even the simplest "intervention" calls for adjustment in systems. The horse is quick cash. The cart is soil conservation. When asked why she put a ditch across the contour on her land, one lady head-of-household replied "il apparit belle"--it looks nice.

Third, and perhaps most surprisingly in Haiti, there appears to be little or no learning from experience within development agencies, whether domestic or external. The Evaluation Team read a number of reviews of project experience with erosion control, conservation, tree, and related resource projects. They told similar stories, yet the project designs often repeated the same design faults which caused earlier projects to fail. There is little institutionalized memory and "independent" evaluations have a tendency to praise rather than point out faults and corrective processes. Projects continue downhill, and new "look alike" projects are designed.

There also appears to be some absence of accountability in projects, once launched. Regardless of funding and/or implementing agency, Haitian conditions seem to engender "drift." Communications are difficult, as are rural/site living conditions. The buck doesn't stop anywhere. People are not fired when they should be. GOH and funding agencies do not seem to insist on accountability at the ground level, e.g., are the irrigated crops, or hedgerows, or trees, or meters of terrace, or whatever, actually there? Who is actually counting, insisting on performance, checking real results?

Thus, faulty project design seems evident under these Haitian circumstances. Technical people, or people not really understanding farmer processes, tend to dominate design teams. The time period for project implementation is much too short. Miracles are expected overnight. Rural development projects take time. Thus, 10 to 15 year perspectives are in order. Once a good thing gets going, farmers themselves will adopt the new system. But time is needed to lay the proper implementation groundwork--train cadres, get the implementing agencies in shape, and develop appropriate strategies.

Fourth, and finally, there have been difficulties with the use of GOH agencies for project implementation. This is hardly surprising given the recent political, budget and economic circumstances of Haiti. As a result,

PVOs and NGOs have played a major role. While many foreign PVOs/NGOs have made a contribution to development in Haiti, for the long term, it would be best to support the increased participation of GOH and private Haitian agencies in the development process when possible.

D. General Lessons Learned

The general nature of Haiti's basic development processes seem rather clear. Thus, development agencies both domestic and international need to roll with these dynamics, optimizing the good, softening the bad. The Evaluation Team identified some valuable Lessons Learned in reviewing the context and dynamics of development in Haiti, especially related to the "hillside strategy." These are identified in the paragraphs below.

- Population will continue to grow. Movement to towns and cities will continue, particularly from southern Haiti. There is the strong presumption that the rate of migration will increase.

- The continuous desiccation of the watersheds underlies the migration. If they now support 3.5 - 4 million people, they will support perhaps 2 million in 15-20 years' time; half as many. Those remaining will be primarily on the plains, on the rolling lands with lesser degrees of slope (up to 25% - 30%), and in the river valleys on the alluvial soils.

- Development must concentrate on the plains and valleys. Intensive agriculture, manufacturing, processing, and infrastructure development must focus on employment creation and the venting of the Haitians' keen entrepreneurial spirit. Regional development planning is in order, using health, education, agricultural, and institutional development programs to supplement and support one another. Services, boutiques, transport, marketing systems will move automatically to the lower hillsides and valleys. People from the hillsides will have somewhere to go.

- Part of the longer-term solution may be to accelerate the movement of people from the steeper hills, and then plant hills to trees and pasture. That seems harsh but people have left, and will continue to leave. People from the plains and valleys will continue to move up to farm seasonally as long as they have no other suitable means of livelihood. Consideration must be given to not delaying the process. What is needed is a stabilization of the resource base, especially the hydrological regime. With denudation it will stabilize at a lower level of capability than an historical level. In due course, with more hillside rationalization, that groundwater capability will increase.

  Thus, a hillside strategy should not even try to effect conservation or control on lands over 35% - 40% of slope. They are going to be lost any way. Successfully redesigned hillside projects take a long time; each one impacts only a tiny fraction of the problem. Concentrate on the lower lands in the form of agricultural projects--the best soil conservation on the farm is improved farming.

There can be a better future for rural and small town Haitians. although there are no easy solutions. With good planning, vision and good management $150 million of external assistance received annually could pack a massive wallop, properly channeled for Haitians to develop themselves. Haiti's greatest strength is the quality of its people, and developers should make every use of that strength.

E. Implications for Agricultural Development in Haiti

Given the context described above, certain things emerge:

- Many areas of Haiti have or will have a shortage of quality, quantity and depth of soil suitable for agriculture;

- The terrain, the land tenure system and the level of capital available to the principal actors on the soil are not amenable to the "green revolution";

- Site-specific interventions are needed not only to save soil but also to meet the other constraints in Haitian agriculture:

  -- Uplands and intermountain plateaus;
  -- Drought prone areas; and
  -- Saline conditions.

- Haiti is a food deficit nation. To reverse this low output, agriculture must be converted to highly intensive high output practices;

- There are considerable pressures on the land to produce in the short run. While longer term solutions are desirable and necessary, the peasant in his grinding poverty needs food and cash immediately;

- While a peasant cannot eat or sell a soil conservation device, he can sell livestock (animal protein) since Haiti is both protein and calorie deficient. Thus, conservation should be tied to biomass production;

- The peasant has little money and must produce food while his livestock grows. Food production, at least at a subsistence level, has to be a key component in hillside operation;

- Disease resistant and drought tolerant varieties, organic fertilizers containing trace elements, trees whose root systems reach into the subsoil and a judicious application of fertilizer in small quantities are vital to increasing soil fertility and crop production;

- Techniques described above should be combined into site-specific plans. A well trained animator work force will be necessary to provide a sufficiently large multiplier effect here;

- Cash earning possibilities from labor intensive techniques (providing ground cover, e.g., coffee, sirato and velvet bean plus grass hedgerows for animals) should be promoted;

- Regional processing and marketing of cash crops should be encouraged;

- Irrigation is needed to provide a dependable source of water. Dams are needed to help hold soil water and allow water to penetrate the soil;

- Peasant organizations and individual farmers should be consulted in the direction of public spending and donor giving to the rural sector. This assistance should be based on the number of inhabitants and on equity considerations;

- Further research is needed in means to create income generating activities, particularly those in which women and young people can participate (fish culture in ponds, biointensive gardens, and honey production;

- Additional efforts to promote exports of primary products, niche products and products processed in country to give value added are also needed. Investments which have a multiplier effect should be stressed, e.g., the manufacture of insecticide from neem seeds; and

- Implementation mechanisms that work from bottom up must be encouraged.

These then are the major implications of what the Milieux demands. How far USAID has met them or has attempted to meet them is discussed below in the examination of USAID's Hillside Strategy, its portfolio of projects, and the Targeted Watershed Management project.

ANNEX 3

Interventions: History and Critique

ANNEX 3

Interventions: History and Critique

A. Introduction

According to the Webster's dictionary definition, an intervention is:

- An entry or occurrence as an unnecessary condition or characteristic; or
- An appearance or coming between two things; or
- Coming in or between so as to modify or hinder.

An "intervention module" is commonly defined as two or more "interventions" combined for greater effort. An example is a contour ditch with Elephant grass and Siratro planted on the berm. However, there are suggestions in some Haitian reports that a module can be a single item.

The implication is that intervening involves some degree of force, duress or unwelcome interference. For this reason, we prefer to define newly introduced "items" to farmers as PRACTICES or INPUTS. A practice is defined as the act or process of doing something introduced into a system or expended in its operation to attain a result or output, especially "the body of basic resources including materials, equipment, and funds necessary to compete a project."

Therefore these are more appropriate terms to use than "intervention." Use of the word "module" is overkill; we will sometimes use "combination," "group," or "package" when speaking of two or more inputs being introduced at one time.

It is well documented that farmers respond to demonstrated suggestions which:

- Improve immediate cash income;
- Improve immediate real income;
- Improve the value of land;
- Improve collateral (especially livestock);
- Improve medium term income/income prospects; or
- Reduce risk and uncertainty.

Thus, new inputs and/or practices are needed which, first and foremost, the farmer sees as being in his interest. The more prone the

family to risk, the smaller the area of usable land, the more infertile and overworked that land, the more emphasis is placed on improving immediate cash flow and reducing risk.

Second, to meet the goal of resource stabilization and improvement, the innovation or new input must:

- o Retard impact of raindrops;
- o Retard/decelerate velocity of runoff; and
- o Enhance percolation to deeper soil depths.

Third, in doing this the "intervention" package must:

- o Save or hold the soil;
- o Provide better root environment in terms of depth, friability, and structure;
- o Engender enhanced use of water by the crops; and
- o Improve overall fertility on a sustained basis.

Fourth, more production and revenue will result when there is:

- o higher plant density;
- o more yield per plant (kernels, nuts, beans, etc.);
- o higher survival rates through drought and other stresses;
- o longer storage and higher quality out of storage;
- o quality improvement to ensure repeat sales.

B. History

Although "interventions" have not been named as such until recently (1980s), research into better methods of crop production has been carried out sporadically by various groups for many years. The results have rarely been translated into farmer adoption. A few contour structures and some new bean varieties are evidence of some use of new inputs.

Through the years soil has been eroding, steep fields have continued to be farmed and soil fertility has been decreasing. Yet very little has been done to change these trends.

We can conclude that few "interventions" have been researched or tried and even fewer adopted by the majority of farmers.

C. List and definitions of "interventions" (inputs or practices)

Annex Figure 2-1 lists inputs and practices that have been referenced in Haitian project papers and other documents. This list is non-inclusive. Nearly all of the items have been suggested, tried or implemented at one time or another in Haiti. Definitions have not been included for practices that are self-evident.

D. Major "interventions" in or for Haiti and their usefulness

From the list in Annex Figure 2-1, we have selected certain inputs and practices which have been adopted or should be more widely used (Annex Figure 2-2). Certain inputs need more evaluation. Others should be instituted immediately.

For the most part, many of these inputs and services have been evaluated sufficiently elsewhere in the world so that scientists in Haiti can determine quickly the extent to which zone or local testing needs to be done.

Dozens of "interventions" are available. Each farmer, therefore, can have a choice based on his soil, slopes, family needs, markets, cash needs, and flow. It is up to agronomes, animateurs, and consulting scientists to determine together with the farmer, what those inputs should be. It is simply a matter of selecting from a menu the items that will meet needs and do the most good.

Agronomes involved with current projects are expected to try out or test/evaluate in trials a potential new input or practice. This is seldom done because of the required field work with technicians, animateurs, and farmers.

The current project-associated scientists who are qualified to conduct replicated research are at ORE and PST headquarters at Camp Perrin. Their research results are rapidly picked up by farmers because it is practical.

Current research at Camp Perrin on seed/crop improvement, legume green manures, cut-and-carry forage and grass or grass-legume hedgerows is extremely important. As soon as valid conclusions are drawn and farmers are told about and shown their potential benefits, those inputs will be utilized.

Current methods of soil conservation plus the new ones just listed will help significantly to keep soil in place while major production-related research continues or begins. We must re-emphasize here that good, efficient, high-yield crop production is one of the best methods of soil conservation.

Large root systems hold soil. Many soils are clay or silty clay in texture: roots penetrate them with difficulty, especially when the soil is dry. Organic matter loosens soil and increases water-holding capacity. Crop residues and hedgerow clippings add organic matter. An adequate nutrient supply helps to create large root systems. It can thus be seen that crop production and soil conservation are linked

Annex Figure 3-1: Inputs and Practices Referenced in Haitian Project Papers and Other Documents

Type	Specific Input or Practice	Definition
Field Crop Management (fields or alleys)	CROPS	
	Eliminate burning	
	New varieties	
	Single crop	
	Intercrop	Two or more crops in the same area
	Relay crop	Crop seeded into growing crop
	Cover crop	Crop planted to keep soil covered
	Alley cropping	Emphasis placed on crops between hedgerows
	Change planting time	
	Change planting rates	
	Change harvest time	
	Rhizobium inoculation	Treat legume seed with appropriate nodule bacteria culture
	Nematode control	
	Corn borer control	
	Bean disease control	
	Economics of production	
	Storage	
	Marketing	

Annex Figure 3-1: Inputs and Practices Referenced in Haitian Project Papers and Other Documents (continued)

Type	Specific Input or Practice	Definition
Garden vegetables	Varieties	
	New varieties	
	Introduction of seed	
	Culture	Includes planting rate and depth, use of fertilizer, compost
	HILLSIDES	
Contour canal		30-60 deep trench to trap soil and trap and diffuse rainfall
	No plantings on ridges made with soil from canal	
	Crop on ridge ("billon")	Beans, corn, pumpkin, etc. planted on ridge of soil
	Hedgerow or grass on ridge	Grass or hedgerow trees planted on ridge
	Tied	Earth barriers every few meters in the canals
	Earth ridges ("Billonage")	Built on contour between canals to enhance root development and reduce rill erosion

Annex Figure 3-1: Inputs and Practices Referenced in Haitian Project Papers and Other Documents (continued)

Type	Specific Input or Practice	Definition
Contour hedgerows		Planted on contour lines 3-8 meters apart, depending on slope
	Grass	
	Grass plus legume	
	Leguminous trees	Manufacture most of their own nitrogen
	Non-leguminous trees	
	Trees plus grass	
	Under 500 MASL	Altitude differentiates some species
	Over 500 MASL	Need different legume trees
Contour Perennial	Associated with canals	
Herbaceous Legumes	Not associated with canals	
Contour Rampe Paille	Sticks, branches Crop residues Sticks plus residues	Interwoven along contours, anchored with pegs
	Uncovered	Usually no soil is thrown on it
	Covered	Soil thrown on barrier to reduce rodent infestation
Contour	Loose stones	
Stone walls	Dry masonry with stones	

Annex Figure 3-1: Inputs and Practices Referenced in Haitian Project Papers and Other Documents (continued)

Type	Specific Input or Practice	Definition
Gully plugs	Stones with or without masonry	Barriers made in gullies to reduce speed of water flow and prevent soil movement down hill
	Plant material	Large pegs driven into ground hold branches and sticks in place to reduce water speed
Pastures	Grass Grass plus legume	Hillside conservation measure plus animal feed
	LIVESTOCK	
Breeding	Introduce new breeds Introduce new blood lines	
Feeding	Type of forage	Can be grass, legume or mixed
	Time of cutting forage	
	Feed supplements	
	Cut and carry forage	
	Cut and store forage	
Preventive medicine	Vaccination	
Medicine	Treatment of illnesses	
Management	Teaching	

Annex Figure 3-1: Inputs and Practices Referenced in Haitian Project Papers and Other Documents (continued)

Type	Specific Input or Practice	Definition
	SOILS	
Tillage	Seedbed preparation	
	No-till/zero-till	Previous crop's residues not burned or removed; left on surface to reduce raindrop impact and soil erosion
	Fallow	Soil left undisturbed between crops, usually for at least a year
Residues	Leguminous green manures	Crops planted specifically to be cut and residues left on surface or scratched into soil to provide nitrogen
Organic nutrients	Straws Compost	Layers of plant material, garbage, manure, soil, and nitrogen fertilizer (if available); mixed or not; add to soil to increase organic matter and plant-available nitrogen
	Manure Green manures Straws	See above (residues)
Commercial fertilizer		Granular manufactured materials containing one or more of the 12 essential plant nutrients

Annex Figure 3-1: Inputs and Practices Referenced in Haitian Project Papers and Other Documents (continued)

Type	Specific Input or Practice	Definition
	Analysis	Imported materials can be blended to any analysis to fit needs of soils and crops
	Amount	Application geared to soil, crop and available in dollars
	Time of application/ placement	Can be placed with or near seed, below seed, on soil surface before planting or beside plants; depends on many factors
	TEACHING (TRAINING EXTENSION	
	Administration	Accounting Care of equipment Management Purchasing Statistics/Records
	Field personnel	Farmers Animateurs Technicians/monitors Agronomes*
	Families (wives)	Health Diet Babycare

*An agronome is a university graduate in agriculture. His speciality may be animal science, plant pathology, agronomy, etc.

Annex Figure 3-1: Inputs and Practices Referenced in Haitian Project Papers and Other Documents (continued)

Type	Specific Input or Practice	Definition
	TREES	
	Fruit trees	Variety introduction Nursery management Transplanting Grafting techniques
	Coffee	Variety introduction Pruning Underplanting with green manure crop Harvest
	Pole/lumber trees	Variety introduction Nursery management Transplanting Management "Forest" planting
	WATER	
	People	Spring caps Cisterns Wells
	Crops	Irrigation

Annex Figure 3-2: Recommended Inputs and Practices

Intervention	Haiti Tried	Haiti Tested	Haiti Used	Current Projects Tried	Current Projects Tested	Current Projects Used	Usefulness/Comments
New varieties	* (1)	*	*	*	*	*	Beans very important; coffee a "must"
Alley cropping	*	- (2)	-	*	*	*	Hedgerows research on-going; more crop research needed
Change planting time	-	-	-	*	*	-	Plant beans before maize to get higher yields
Change planting rates	* (2)	*	-	(3)			Need research after soil fertility increased
Inoculate legume seed	*	*	-	*			Inoculation of legume seed helps maximize module bacteria which manufacture nitrogen; future manufacturing in Haiti will help
Control yam nematodes	-	-	-	•	ORE	*	Mini-sett method has other advantages
Fertilize for maize	*	*	-				Probably the most limiting corp input
Storage for seed	*	*	*		*	pst lord II ORE	Maintains higher germination percentage
Compost for vegetables	*	*	-	•	lord II FLA	-	Useful medium in low quality soil used near Kenscoff; should be used elsewhere
Fertilizer for vegetables	*						
Contour canals	*		*	*		*	Common in certain areas with least stoniness
Tied contour canals	*			*		-	Some currently made
Contour legume hedgerows	*		*	*	*	*	Leucaena common at low altitudes; Calliandra above 500
Contour grass hedgerow	-	-	-	*	*	*	Satisfactory if close enough and farmer has livestock
Contour rampe paille	*	*	*			*	Some projects recommend it more strongly
Contour stone walls	*	*	*			*	Used in extremely stony fields
Gully Plugs	*		*			*	Should be in every watershed gully
Cut & carry storage	-	-	-	*	*		Farmers haven't picked up yet
Vaccination	*	*	*			*	Common; effective
No-till planting	-	-	-	*	*		Reduces erosion, but farmers used to little or no residue
Legume green manures	-	-	-	*	*		Another step that farmers can utilize
Training in accounting	-	-	-			Pst Lord I	Minor but important
Training of animateurs	-	-	-		*		Some done, but not enough; necessary
of fruit trees	-	-	-	*	*	*	Very popular in PST area
Management of tree nurseries			*			*	Local nursery mgt. taught by agronomes
Spring capping	*		*	*		*	Very necessary still in many areas
"Forest" planting	-	-	-	-		- Agrofor.	Groves few & far between; farmers & landowners reluctant to dedicate a sizable area for this

(1) Unlikely event
(2) Highly likely or actual event
(3) A blank square indicates no need for trying or testing, or not used by farmers

systems. On-farm inputs, for greatest effect, must therefore be recommended, instituted, and monitored as packages.

There is a significant need for research and trials relating to commercial fertilizer. The major reason why crop yields are dismally low is low soil quality, i.e., lack of nutrients and organic matter.

Another reason is low plant population, especially of maize and sorghum. But, the number of plants per hectare cannot be raised until the nutrient supply is increased. Farmers are already aware of this: the number of corn plants per hectare decreases with higher altitude, as does the fertility.

The immediate priority for research, trials and demonstrations should be:

- Research on plant nutrients including phosphorus, zinc, nitrogen, sulfur, boron, manganese, potassium. In many instances, research is not required as a first step, but could begin later as fine-tuning becomes more important. The plants show the needs, trials and demonstrations will show responses;

- Research on fertilizer placement. Optimal placement depends on the amount of fertilizer, the type of seed, the soil moisture and the fertilizer ingredients and analysis. Ideally, most fertilizers should be placed 2-3 cm below and 2-3 cm beside seeds;

- Research on plant population. As fertility increases, it should be feasible to increase the number of seeds per hectare. With higher quality/higher germination seed, the number of maize or sorghum seeds planted in each "hill" or "hole" can be decreased;

- Research on plant configuration. This should included planting in rows across the slopes, with closer distances (i.e., less than 1 m) between plants; and

- Research on cash crop culture. As food crop yields increase, fewer hectares will be needed to grow them. Cash crops, with appropriate improved inputs and cultural practices, can then be substituted.

Research and demonstrations that have been done, plus work currently under way in the Targeted Watershed area, has been practical. Part of the reason for this is that farmers have asked for it. It is easy to show when a new input or practice coming from research, trials and demonstrations is successful. Farmers quickly accept and use it. Part of the reason for success in this regard is extension: capable "teachers" in the form of agronomes or animateurs who can explain how to utilize the new and how it will be attractive in monetary terms.

With further realignment of research priorities, new and better inputs and practices can soon be available to progressive farmers.

ANNEX 4

Incentive Analysis and Farmer-Level Decision Trees

ANNEX 4

INCENTIVE ANALYSIS AND FARMER-LEVEL DECISION TREES

A. Introduction

This brief annex supports the two related points that first, innovations and recommended "interventions", whether physical and service inputs or alterations in farming systems, must be evaluated through the farmer's point of view. The second and companion item is that farmer-managed research and experimentation has never been conducted in these projects. Both these points are made throughout the main report, particularly in the separate project analyses (see Chapter IV on TWM) and in the discussion of farmer motivation in Chapter V, Section B and Chapter I, Section B.

The failure to take farmers' constraints and viewpoints into account has hampered project effectiveness. Some interventions and new technologies have been provided to farmers through the project system without adequate testing or preparation. The problems of soil conservation and overall resource stabilization are often designed by outsiders and are not necessarily priorities as viewed by the farm family faced with layers of intertwined constraints. The farmer may seem to accept an intervention because it is circumspect to do so, but he may retain a fundamentally different view of what his real problems and needs are.

B. What is Needed for Farmer Acceptability and Adoption

It is well-documented that farmers under similar circumstances respond to interventions which have demonstrated the ability to:

- Improve immediate cash income;
- Improve immediate real income;
- Improve value of land;
- Improve collateral and assets (esp. livestock);
- Improve medium-term income/income prospects; and
- Reduce risk and uncertainty;

First, projects must offer interventions which the farmer sees as being in his financial interest by minimizing risk and increasing his immediate cash flow. This tendency is most pronounced for farmers with the smallest margin for error, for example, those with small areas of arable land or with severely overworked land. Most farm families in Haiti, especially on the hillsides, are in this position. Indeed, meeting cash flow demands often causes disinvestment, as families are forced to sell at low prices.

Second, to meet the end of resource stabilization and improvement, the innovation must:

- o Retard the negative impact of rain drops;
- o Slow the velocity of runoff, diffusing it as much as possible;
- o Enhance water percolation to deeper soil depths; and
- o Reduce leaching.

Third, in doing this the intervention must:

- o Protect the soil (or, more accurately, delay its disappearance from the farm);
- o Provide a better root environment (depth, friability, structure);
- o Engender enhanced use of water by the crops; and
- o Improve soil fertility on a sustained basis.

Fourth, the intervention must simultaneously generate more production and revenue on a sustained basis through, for example:

- o Increased plant-density/area;
- o More yield/plant (cobs, kernels, nuts, beans, etc.);
- o Higher survival rates in the face of drought, stress, excessive rain;
- o Improved storability for food and seed;
- o Quality improvement for sales and seed; and
- o A more diversified, less vulnerable, cropping and livestock base.

C. <u>What is the Nature of Haitian Farmer Income and Income Options</u>

The Haitian farm family has numerous sources of real and cash income, the relative importance of each of which varies by season and from year to year. Cash is always needed for salt, basic clothing, school fees, ceremonies and celebrations, and inputs such as seed, livestock medicine, and tools. These are recurrent needs, involving daily expenditures for food and larger periodic spending for school fees and seed, and the farm family is continuously making critical decisions with little margin for error.

The families' sources of real income (some of which may be sold for cash) include the following;

- Food grown and consumed by the family;
- Services provided to outsiders such as farm labor;
- Barter in food, fuel and other products such as those collected from the wild;
- Fuel gathered;
- Water; and
- Produce from someone else sharecropping the farmers "away" fields and consumed at home (the landowner generally receives half of the net returns after sharecropper deducts costs, or about 1/3 of gross production).

Cash income is also obtained from several sources which fluctuate greatly in timing, amounts, and predictability. As with real (non-cash) income flows, some may substitute for others. These include:

- Sale of field and tree crops and products derived from them. This often includes seed needed for next season;
- Sale of livestock or livestock products;
- Wage labor, especially in nearby valleys and plains in areas such as sugar or rice harvesting;
- Sale of services;
- Sale of land;
- Rental of land for cash (rare);
- Produce sold received from sharecropping returns;
- Sale of trees, wood, charcoal, fuel wood, timber (either grown or more likely from the common or government land; and
- Borrowing against assets (livestock, land, trees) usually to meet large, lump-sum expenses such as ceremonies or school fees.

The above description cannot encapsulate the family's continual struggle to make ends meet. Survival for today and for this season dominates the lives of all but a few. Many Haitian farmers cannot increase their output because they ate their seed or sold it at very low harvest-time prices and do not have the cash at planting time to buy seed at prices 3 and 4 time as high. They continuously disinvest, selling products, assets and labor at low prices since they are desperate for cash. Coffee growing is a case in point. Historically, agents/brokers advanced the grower cash, which the grower repaid in kind at harvest. The system changed several years ago and such advances are no longer available, so few small farmers now harvest coffee. Indeed, many farmers have sold the coffee trees as wood and use the land for

maize and beans, the real cash crops. New coffee project developers appear to have designed new projects in ignorance of this reality.

D. Income Needs and Technical Interventions

To be financially attractive to the typical farm, any proposed intervention or improvement package must satisfy two sets of constraints. One set of constraints is defined by the financial/income environment described above. Second, the intervention must be consistent with the constraints on the farmer's system. The typical farmer does not have access to unlimited labor supplies, or to cash by buy inputs or planting material. He does not have unlimited land, and of those areas where he has some rights only a small share may carry with it sufficient right to permit livestock or tree planting. One must also consider the length of time between planting a crop or tree and its harvest or sale time. The desperate need for cash puts a premium on quick turn-around. Seasonal crops (maize, beans, etc.) generally are dominant, with goats a close second, followed by fruit trees, pole trees and lumber trees then follow along on a preference curve.

Thus, the analysis of the suitability of a proposed process or intervention must be as follows:

Technically viable intervention/package?

Yes No------>reject
|
v

Is the intervention within the farmer's land, labor and cash requirement and other constraints, which are dynamic?

Yes No------>reject
|
v

Does it meet the farmer's priority income needs in a timely manner better than current resource uses now in place?

Yes No------>reject
|
v

Propagate after sufficient testing.

The ARD proposal for the TWM project contained a more sophisticated version of this analytical searching process (see Figure 3.1). Unfortunately, the system was never implemented, and potential technical interventions were never garnered from other projects in Haiti, the Caribbean, or elsewhere. The constraints matrix, while an excellent concept, appears to not have been applied, nor were the constraints defined. The Evaluation Team is troubled that projects worth tens of millions of dollars were launched in the absence of project design incorporating these core financial/economic tenets. As far as we can tell, this basic analysis of what makes the farmer tick and how the developer can move into the system productively was not conducted by experienced professionals in any of the projects. The above analysis and description were done by analogy from Team familiarity with

equivalent societies and production economies, not from detailed examination of Haitian families over the 6 weeks the Team was in Haiti. These visits, however, confirmed the similarities of the Haitian small farming system to systems found in other regions.

As a partial first step in approaching these analyses, we provide two "first cut" decision-trees (Annex Figures 3-1 and 3-2). Figure 3-1 tracks the decision system and alternatives for farmers on land on steeper slopes (30%-50%) with and without soil conservation, with and without livestock, and finally with annual and perennial crops. Figure 3-2 depicts the same process for more gently sloping regions (10%-30%). While there is nothing definitive about this, it does depict the nature of the process farmers implicitly work through; project agronomists and extension agents should use a similar analyses.

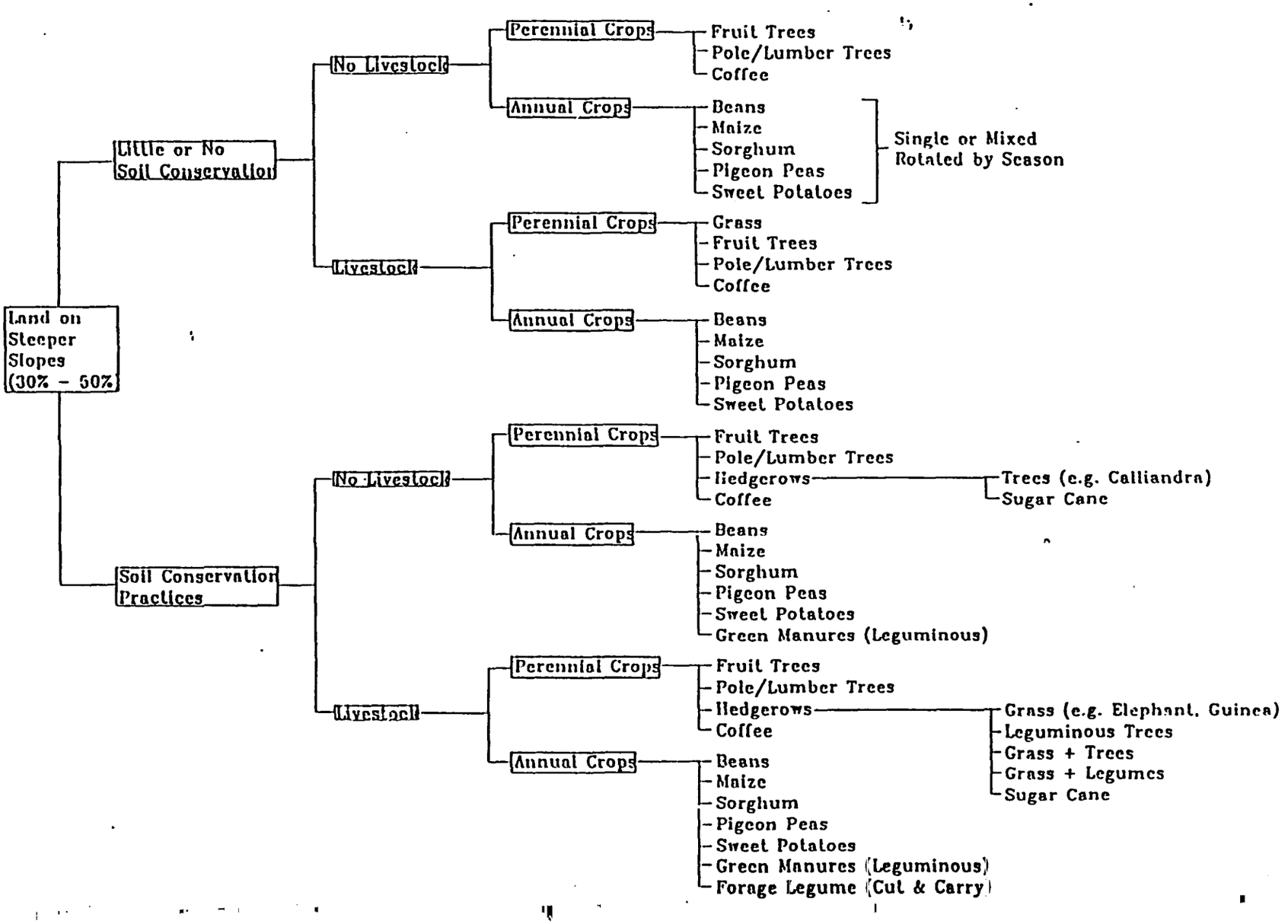
E. Concluding Observations

The Evaluation Team is not surprised that the Hillside Strategy projects in the current and recent portfolio have not been very successful. Indeed, what modest success they have had has been rather fortuitous resulting from the class, patronage, and "always say yes" processes of Haitian society. That is certainly generally true in agroforestry and the LORDs. The TWM project still has possibilities with its hedgerow/livestock activity.

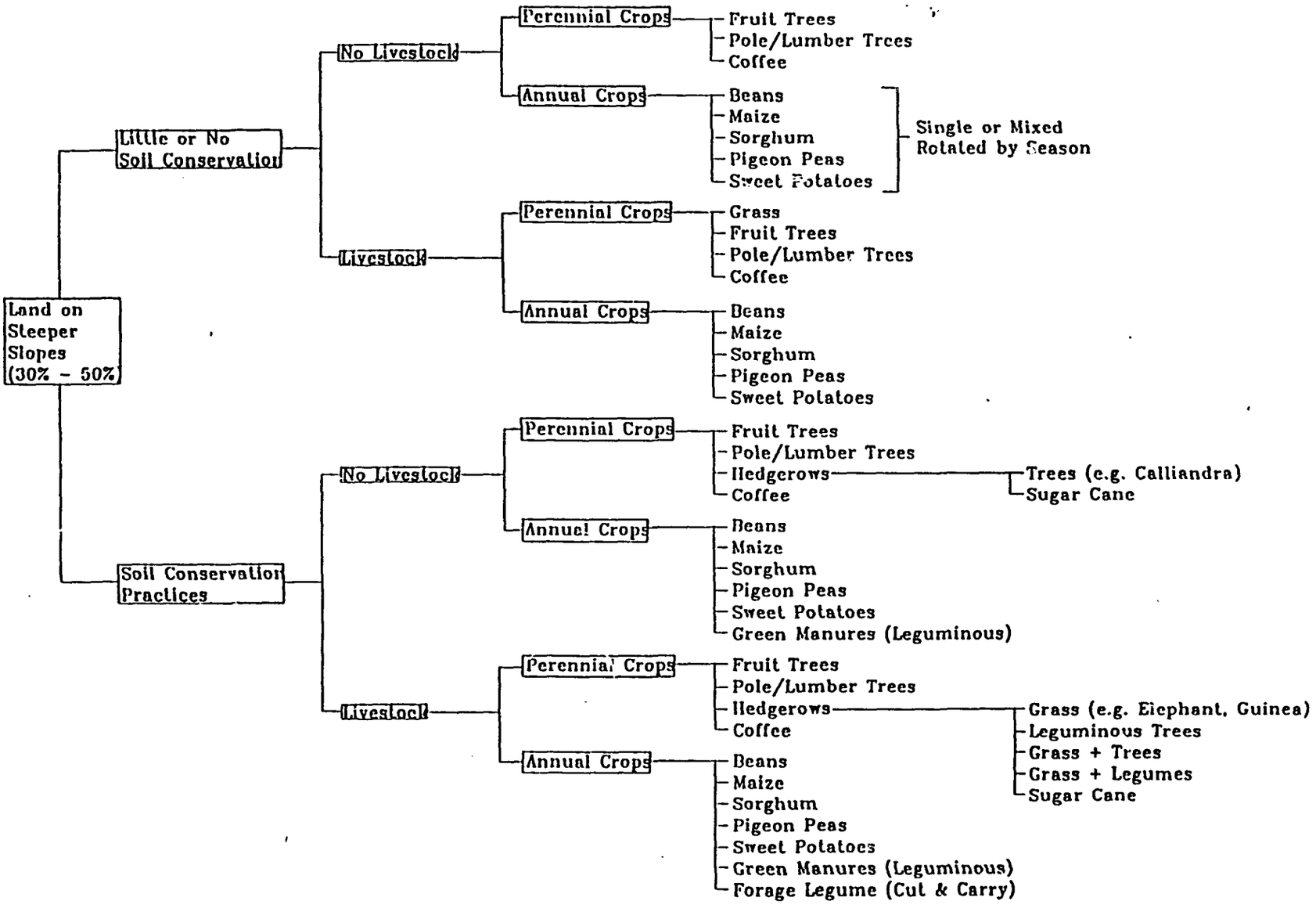
Indeed, two elements can be built into these projects. One is a "kick-start"; the other is the application of existing and successful practices (in Haiti) -- root crops, curcubits, grains, all mounded over with trash and silage. Fancier research is not necessary. Technical research conducted to date has not addressed farmer decision systems.

The Appendix to this Annex provides a short synthesis on how and why interventions have worked or failed elsewhere.

Annex Figure 4-1: Decision Tree: Land on Gentle Slopes



Annex Figure 4-2: Decision Tree: Land on Steeper Slopes



APPENDIX TO ANNEX 4

Synthesis of Soil Conservation Findings; Results of Experience among Small Farmer Communities

Years of research and development programs in watershed management and soil conservation have yielded a number of useful insights about rural resource management in general:

- Watershed management requires a watershed manager or management unit that is compatible with local practice and organizational structure. Planning for the coherent use of a watershed unit cannot be based on the cumulative results of individual decisions taken at farm scale. A manager (or management unit) must be directly accountable to members and to downstream users for the maintenance of whole watershed functions and services. These include water supply, water storage, water regulation and delivery, drainage, maintenance of slope stability and conservation of soil. The latter helps to sustain upland production as well as to prevent sedimentation downstream;

- Long-term conservation strategies should be nested within practices that yield short-term (livelihood) benefits for resident participants, unless local motivation or subsidies are high enough to offset both local investments and opportunity costs;

- Patchwork, incomplete, and/or inappropriate treatment may be worse than no treatment at all. Well intentioned soil conservation measures, when carried out half-way, or on the wrong site, or incorrectly designed and constructed, can cause gullies, landslips, accelerated sheet erosion, or loss of soil moisture. Trees or agroforestry systems planted for soil and water conservation purposes can be equally destructive if layout is not properly planned and trees are not planted correctly;

- Widespread adoption of alternative "less effective" treatments may be far more effective than isolated "model farm" adoption of model technologies. For example, 500 hectares of contour planting and vegetation strips on sloping cropland is more desirable than one hectare of perfectly terraced cropland and 499 hectares plowed and planted up and down the slope. The first alternative may be acceptable to farmers, while terracing is not. Technical purism and inflexibility may simply result in a wasted demonstration and extension effort; and

- Relative value attributed (locally) to soil, water, labor and different land uses may determine the range of technology and management options to be considered. Labor intensive conservation practices, for example, may not transfer easily to areas where small farmers can earn high wages off farm. On the other hand, in cases where water is scarce, people may be willing to invest more labor and capital in soil conservation structures that also conserve or store water.

Some of the best positive examples for implementation and models of local participation come from action research programs in rural primary health care, adult literacy and alternative local employment opportunities. As reflected in the points listed below, the process, rather than the content, is of special interest for development of participatory research and action methodologies for agroforestry.

- Local experts, both traditional and "emergent" can often adapt new methods, to local conditions better than outsiders. it can be disruptive, as well as costly, to circumvent such people in favor of direct introduction of outside expertise and technology designs. In both Mexico and Kenya local mid-wives and herbalists have played a key role in adapting and disseminating new health care information and practices in rural areas. Stovemaker artisans from the "informal sector" have contributed substantially to the design and "packaging" of improved cookstoves in Kenya;

- Local control of change may matter more than rapid transformation. The process is as important as the initial result if change is to be sustainable. People may need time and a series of small successful changes in order to develop the will and the capability for further change;

- It is usually preferable to build upon and branch from existing technologies, rather than to introduce entirely new technologies. New technologies should be "graftable" onto existing knowledge and practice through a variety of local information and action networks;

- Joint participation between outsiders and rural communities implies dialogue to establish trust and shared goals and to translate and pool knowledge. Facile compromises to meet conflicting or unrelated objectives may simply result in two jobs poorly done, the outcome of a "double lie";

- Dialogue must take place within communities as well as between the community and outside "catalysts." In some cases, people's responses to outsiders' questions and their decisions on community and individual action will change considerably after separate discussion among themselves;

- External constraints that block local initiative may be subject to removal or change, with dramatic results at the local level. A change in pricing policy, a marketing co-op, improved access to water, or legal protection of local trees from removal by outsiders, all could open up new opportunities and enable people to take initiatives previously not feasible; and

- Strategies for survival and for positive change can be elicited from "successful" members of disadvantaged groups, or from representative members of the client population. Some researchers have engaged rural people in group "think-tank"

meetings to improve design and delivery of health care products, while others have used similar approaches to inform technology and project design in agriculture and agroforestry.

Source: D.E. Rocheleau M., op.cit., pp. 3-4

ANNEX 5

Methodologies for Comparing USAID Projects Under Field Review

ANNEX 5

METHODOLOGIES FOR COMPARING USAID PROJECTS UNDER FIELD REVIEW

A. Introduction

The evaluation team's field trip program called for visits to numerous project sites and locations. The individual projectsin the evaluation had from one to six implementing PVOs/NGOs and any specific implementing agency could have been working, or was still working at numerous sites, sometimes through yet another layer of local organizations and groups.

The team was interested, essentially, in two sets of elements, recognizing that each can be divided into many sub-components. These are: (a) the project's impact on the individual farmers involved (conservation, yields, income); and (b) the efficacy of the development systems established by the implementing agency concerned (nature of extension, management, reporting, etc.)

Two sets of forms were developed for all "official" visits; more informal observation and visitings, including to Title III and other areas such as Les Cayes plains were not so assessed. The original list of candidate sites was as follows:

Assessment Form No. 1 for following projects/organizations

1.0 Targeted Watershed Management
- 1.1 ARD
- 1.2 DCCH
- 1.3 UNICORS
- 1.4 ORE
- 1.5 IRD
- 1.6 UNIVERSITY OF FLORIDA

2.0 Agroforestry Outreach (AFI) and Agroforestry II
- 2.1 PADF (one to be in Les Cayes area)
- 2.1.1 Site 1
- 2.1.2 Site 2
- 2.1.3 Site 3
- 2.2 CARE - N.W.
- 2.2.1 Site 1
- 2.2.2 Site 2

3.0 LORD I (SCF)

4.0 LORD II (CARE)

B. The Assessment Forms

Assessment Form No. 1 (Annex Figure 5-1) is directed at the farm level; No. 2 (Annex Figure 5-2) is an effort to encapsulate impressions at the site/location level. Since we wanted at least 2 team members to

Annex Figure: 5-1 Assessment Form No.1

FOR EACH PROJECT/PVO/NGO EXAMINED

Project Activity Impact on Farmers Involved	Score[a] (0,1-5)	Discussion[b]
1. Physical soil conservation		
2. Soil quality		
3. Crop yields: annual		
4. " " : trees		
4.1 - fruit		
4.2 - other products		
5. Short-term farm income (annuals)		
6. Medium-term farm income (fruit, livestock, wood products)		
7. Longer-term farm income (sustained yield improvement)		
Total:		

(a) Score 1 to 5, 5 being best, 1 being worse. Where no impact at all, put 0.

(b) Justification of score; general applicability, give a range if necessary, e.g. 80% farmers: 4; 20% farmers: 0.

Annex Figure: 5-2 Assessment Form No.2

Project Level Impacts Ranking	Ranking[a] (0,1-5)	Discussion[b]
1. Reliability of reported outputs (are the trees, hedges, etc. really there?)		
2. Voluntary nature of groupmen (being polite, conscientious, arm twisting, patronage/loyalties)		
3. Estimated share of farmers actually amending their production systems (as against stated or desired population)		
4. Quality of agronomes and effectiveness		
5. Quality of animateurs and effectiveness		
6. Management capability of system on the ground (nature of incentives and results, spending wisely, etc. and reporting and supervision processes)		
Total:		

(a) Give 0 if not applicable or if no project level impact. Give 5 if best; give 1 if marginal, or in-between zero.

(b) Discuss justification for rank given; evidence used.

visit each site, this was anticipated up to several dozen, even thirty, assessment forms of each kind. In the event another process was found more efficacious, as discussed below.

Form No. 1 attempts to distil project impacts at the household level. Its construction is based upon the premise that soil conservation efforts will protect the soil, raise yields and overall farm productivity (crops, trees, livestock), increase net income and improve cash flow, and reduce or spread-out risk. To one degree or another these desired outputs are built into all the Hillside Strategy projects under review. The team also realized that some of the projects, especially TWM, were so relatively new that many medium term impacts, and all long term impacts, could only be inferred, not observed.

Form No. 2 addresses the institutional environment surrounding the farmer and carrying the project's activity to him. Management systems, quality of personnel at different levels, share of farmers impacted, and quality of reporting systems are all desired evaluations.

The ranking systems on both forms is simple; higher scores indicate better performance. The subjectivity inherent in such evaluations precludes more sophisticated levels of ranking. It was anticipated that biases and proclivities of team members would tend to even out over the total assessment process. Total scores could be compared between projects, assuming the same number of evaluations on each. The total score on any form, however, assumes that each of the 6 items being scored is of equal importance, of weight. The team economist has devised more sophisticated weighted ranking devices where the quantity, total volume, of farmers and organizational structures is very much greater. The team decided, however, that the small size of the universe did not justify such a sophisticated approach. In any case, such weightings open yet another door to dispute, as it is difficult or impossible to establish whether the quality of the animateurs/technicians (line 4 in Form No. 2) is of greater weight than, say, the quality of the reporting/monitoring system (line 1)

C. Results

1. Process

In practice, the team found it more expedient to adopt a slightly different process. Each team (usually 2 people) would provide a completed set of forms, not each person; the ranking would be designed to reflect a mutual assessment. This was then carried further; the forms became the agenda for total team discussion. Such synthesis, in the event, resulted in few adjustments. Some forms were not used in the synthesis as they were incomplete or as judged on too small a sample and thus non-representative.

2. Form No.1

Annex Table 5-1 records results as at the farm level. As expected, the projects' impact on annual crop yields is extremely low. Certainly some farmers are benefitting. But the tree programs, as implemented over 10 years, cannot be expected to provide higher crop

Annex Table 5-1: Assessment Form No.1 Synthesis of Results

	Project activity, impact on farmers involved	Score (0,1-5) Total	No forms*	Avg**	Notes
1	Physical soil conservation	12.0	7.0	1.7	5 missing forms reflect avg.
2	Soil Quality	9.0	7.0	1.3	5 forms not reliable or inconclusive
3	Corp yields (annual)	4.5	7.0	0.6	3 forms inconclusive, 2 incomplete
4	Corp yields trees	5.0	7.0	0.7	Missing forms not applicable
	4.1 Fruit				
	4.2 Other products	9.5	7.0	1.4	Not applicable in some cases
5	Short term farm income (annuals)	6.5	7.0	0.9	Too early, no records, none seen
6	Medium term farm income (fruit,livestock,wood products)	6.0	7.0	0.9	Ditto
7	Longer term farm income (sustained yield improvement)	3.0	7.0	0.4	Too early, no base visible or deductible
8	Total / Average	55.5	56.0	1.0	
9	Possible	280.0	56.0	5.0	

* Not always the same seven forms
** Best possible is 5

yields except as they fix nitrogen and protect the soil from physical impacts of rainfall and erosion. Improved rainfall percation could also improve yields. Thus, short and medium-term incomes, perforce, have not been affected seriously. Yet, increase is short and medium-term incomes are supposed to be the incentives!

At the other end of the spectrum, physical soil conservation impacts scored relatively better overall, though still poorly. The average was raised by the presence of gully plug work and other physical works (rock walls) in the LORD projects, where already faulty hedgerow establishment is leading to gullies and erosion. Additionally, the 4 NGOs in the TWM hedgerow project (particularly UNICORS) are beginning to have some success with grass hedgerows on the steeper slopes. But farm fields are not fully protected, hedgerow longevity is often suspect and its maintenance and use seldom efficacious. The hedgerow has yet to be proven as an attractive device (financially and technically).

A perfect score for an NGO would be 40 (8 items time 5 points). The highest scores on these farm-level impact analysis were CARE's agroforestry in the N.W. (districts 3 and 4) with their pole program (14); and LORD I (11) with modest success now building up in tree programs and soil conservation. The other project ONGs tend to fall in the 8-9 point range. The University of Florida received only 5 points, and then only because their score was increased through the use of fertilizer on crops.

Since many of these projects are new, yet some are older on the ground, it is just not possible to carry these comparative analyses too far. They provide a range of results more as a check on overall impressions derived in other ways, and have been so used.

3. Form No. 2

Annex Table 5-2 presents synthesized results for higher level impacts similar to those of Evaluation Form No. 1. Once again the emphasis is on comparison, not absolute measures. The highest scores concern the quality of the animateurs (line 5, 16 points), and the nature of the groupmen, voluntary organizations of participating farmers (line 2, 14 points). The two LORD's scored highest here (3s). The balance of the organizations tended to be about the same (2s) in the ranking of both animateurs and groupmen. Among the NGO's, UNICOR's animateurs (TAPS) scored highest. The difference seems to be length of time established, and the amount of training.

At the other end of the spectrum, two evaluation measures more or less share the bottom. Line 3 (total of 8 1/2 points) attempts to deal with the popularity of the programs, and the size of the influence network as a share of the total possible impact population. Data on membership are really at 2 levels. One is the recorded number of farmers contacted as documented on lists of names (nurseries, groupmen, individuals). These lists generally range from "somewhat" to "very much" greater than the number actively participating -- the actual share would need to be judgmental -- because a farmer takes trees does not mean that he plants them and looks after them.

Annex Table 5-2: Assessment Form No.2 Synthesis of Results

	Project Level Impacts Ranking	Score (0 1-5) Total	Avg*
1	Reliability of reported outputs (are the trees, hedges, etc really there ?)	8.0	1.1
2	Voluntary nature of groupmen (being polite, concencus, arm-twisting, patronage/ loyalties)	14.0	2.0
3	Estimated share of farmers actually amending their production systems (as against stated or desired population)	8.5	1.2
4	Quality of agronomes + effectiveness	12.5	1.8
5	Quality of animateur + effectiveness	16.0	2.3
6	Management capability of system on the ground (nature of incentives & results, spending wisely, etc. & reporting + supervision processes)	12.0	1.7
7	Total / Average	71.0	1.7
8	Possible	210.0	5.0

* Average of 7 forms in analysis, not always the same 7. Best possible score is 5.

Secondly, the share of total candidate farmer population is difficult to define. It might include all the watershed; a given sub-watershed' hillside only a hillside plus a valley bottom and so on similarly it is difficult to define where a political "sphere of influence" ends and another one begins. Overlaps abound. For example, PADF may have X number of farmers in the Les Cayes region; Y percentage of those may also be registered participants with one of TWM Projects NGOs. PVOs and NGOs have targets to achieve, which historically have been expressed as numbers of "signed up" farmers, whether through groupmens or individually. But just finding members does not in itself contribute towards the prevention of soil erosion. Indeed, in any given area, 100% of the farmers must be covered, and covered properly -- not doing it right is generally worse resource management over a 5-10 year period than doing nothing at all.

Yet the persistent pressure for bigger and better numbers of "outputs" and "verifiable performance indicators" has turned the process into a numbers game. The LORDs were spread a too thinly; they may achieve 5-10%. The other PVOs and NGOs tend to fall in the same range. Realism is permeating the work plans of the TWM project NGOs; they are beginning to realize that concentration in smaller areas is more efficacious -- UNICORS and ORE are targeting 50-100% of smaller areas in 5 years or so, This is not only more cost-effective. It also stands a better chance of having some impact on soil conservation.

Line 1's result reflects the problem of "is it really there"? The problem comes in several forms. With trees and hedgerow planting material, the main records show volumes of tree leaving nurseries or plots developing planting material. Three serious gaps exist what share of this is planted? Second, what share survives? Third gap -- will these interventions influence soil conservation? For trees which are planted (25% of those issued/sold?), and which survive to perform their economic role -- poles, charcoal, etc, 25% of the 25%?) do they assist soil conservation? Generally, they do not though some will if planted (and surviving) around farm boundaries and with hedgerows on the contour. Using those ratios and a total of 30,000,000 trees issued/sold in all reviewed projects, this would give 1,875,000 fulfilling their function. Since, say, half of these would already have been harvested, this means nearly one million taxes are or should be in place, now. Extrapolating from what the team actually saw (very, very, few, and those mainly fruit trees), even a one million figure could be high. The point is, the records show some 28 million seedlings out in agroforestry, and up to 2 million in the other projects combined. These numbers excluded fruit tree graftings; those data seem imminently reasonable.

Hedgerow reported data -- elephant grass, etc, are considerably more reliable than tree data. But even with those numbers, so many farmers are planting them on family land, where they will not survive; or are not trained properly in their management (and the animateur generally not either); or are not of a density or spacing which actually protect the land -- a "threshold of arrest" is needed; or they vent (end up) in a spot likely to become a gully quickly.

As with the trees, the system alone is asking the farmer to do something. To keep the peace, to give the system what it wants, farmers go through the motions of acquiescence. Anyway, he may need the NGO/PVO at some point; it would be rather foolish to run against the system. And certainly the monitor/animateur, his neighbor and possibly a relative, is not going to disjoint the system by "spilling the beans", as it were.

Thus, the evaluation team is highly disappointed with the quality of the reporting systems; the numbers do not reflect reality. We also realize, however, that most of the highly touted tree operations, as conducted, are not really going to impact soil conservation. Thus, faulty reporting systems are not the root problem if the tree projects are not really efficacious, or very cost-effective. What is important, however, is that USAID has not itself monitored properly, checked the figures on the ground (or in the ground) and enforced PVO/NGO accountability. The other actors -- PVOs, NGOs, farmers, local leaders, animateurs, and moniten -- are all doing what the system is either allowing or encouraging. USAID grant monies, in any case, are less stringently disciplined.

Management systems (line 6) vary considerably. The system must be judged against what it is trying to do. The PVOs generally are top-heavy (CARE and PDAF particularly) in agroforestry operations. CARE has 100 people in its Gonaives office for 3 projects. Both LORDs were somewhat better, however, with shorter chains of command. Staff overhead costs are relatively high, particularly where expatriates (and often many Haitians) are receiving high salaries. Both PVOs and NGOs were in business before USAID financial support was available. Generally, they have not been particularly accountable -- they were rarely asked to price-tag performance indicators or become more cost-effective. Senior managers are clergy, photographers, academics, or well-intentioned generalists. It would be unrealistic, if not naive, to expect first class, cost-effective management systems overnight. But help is needed towards that end. Several of the NGOs in the TWM Project do remarkably well even though management is spread very thinly indeed over the expanding work loads emanating from the Project.

ANNEX 6

Targeted Watershed Management Project Logical Framework: A Critique

ANNEX 6

Targeted Watershed Management Logical Framework: A Critique

A. Introduction

The "logframe" (LF) for this project (page B-1 of pp--521-0191 of 6.18.86) (Annex Figure 7-1) was rather optimistic and ambitious. The purpose of this section is to critique that presentation, indicating strengths and weaknesses. Discussion will be restricted to the material in the LF's final column which spells out "Important Assumptions."

B. Program or Sector Goal

"To arrest the process of environmental degradation in Haiti's watershed areas." Important assumptions made included:

- Watersheds are degrading: That is correct, parts/sections are;

- Watersheds are recuperable: That is partially correct. The project aims at those hillsides which are between 10 percent and 40 percent of slope (some documents say 10% - 50% of slope). These areas are some 17% - 20% of the total Les Cayes/Pic Macaya zone. The balance, in roughly equal proportions, is either plains and river valleys, or land of slopes greater than 40% - 50%. The farmers are not really degrading in the soil conservation sense, although flooding and sedimentation, and (in places) disjointed groundwater systems all have resulted from hillside erosion. The steeper slopes generally are not recuperable for peasant farming. They are recuperable for tree/forest cover and/or grass cover/pasture. Perhaps the LF should have read some "hillsides are recuperable." Additionally, the recovery requires a three-pronged effort. The project aimed at one effort only; dealing with farmers, on farm, to effect soil conservation in farming systems. Gully stopping is also essential and many hillsides need reconstruction and rehabilitation with physical works (terraces, walls, bunds, etc.);

- Increases in production are compatible with soil protection: That is correct under certain specific conditions. It depends on how one generates the increased production. It could be, and has been, by cultivating more land, which would not be compatible with soil protection. Perhaps the author meant "increases in yields." Protected soil e.g., piled up and caught behind barriers of grass hedgerows, or grass plus trees, is not necessarily more fertile -- it is as unfertile there as it was further up the slope. It does permit better water penetration and root development and if the farmer plants crops which fix nitrogen e.g., Congo beans, yields will also increase.
  But if the farmer pulls such crops up by the roots (e.g., vetiver, Congo beans), or lets the goats eat the hedegerow, the damage is worse than pre-conservation effort. Since many

Annex Figure: 6-1 Targeted Watershed Management Log Frame

Project Title & Number: Targetted Watershed Management (521-0191)

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To arrest the process of environmental degradation in Haiti's watershed areas.	Measures of Goal Achievement: Improved agricultural land, soil conservation measures installed. Technical packages accepted. Farmers adopt packages. PVO technical & administrative capacity upgraded. Accurate and timely data are gathered and analyzed. Credit program revolving fund working. Land tenure situation changes, and there is a shift from annual to perennial crops.	Project studies; reports from CCH, OPRODEX, and others; aerial photographs results from Agroforestry Outreach Project and fruit tree projects; other baseline studies and monitoring programs	Assumptions for achieving goal targets: Watersheds are degrading; watersheds are recuperable; increases in production are compatible with soil protection; population will remain on the hillside; increased income from agriculture is possible; GOH commitment to agricultural development; national agricultural policies encourage agriculture.
Project Purpose: To extend soil-conserving and fertility-augmenting land management practices in the target area and to apply lessons learned from this field effort to national-level hillside management planning.	Conditions that will indicate purpose has been achieved: End of project status. Increase food crop production. Increase yields. Increase export crop production. Decrease or reverse erosion rates. Increase vegetative cover on hillsides. Increase livestock holdings per family.	Aerial photographs; baseline studies and monitoring reports; project evaluations and reports; credit reports credit records; land tenure study.	Assumptions for achieving purpose: Farmers will innovate and invest; is an effective national coordinator; GOH agricultural policies encourage production; national agricultural research capacity develops; national policy encourages perennial crops; no food for work or salaries paid for work done on a farmer's own land.
Outputs: MARNDR Coordinating Secretariat established. Watershed surface area transformed and farmers' productivity and income raised. Erosion rates diminished. Baseline studies completed and kept up to date. Input supply logistics effective. Improved animal health and production and increased pasture available. Staff trained in appropriate institutions in Haiti and overseas. PVO management and technical capacity upgraded.	Magnitude of Outputs: 30,000 hectares improved; 150,000 gardens improved; 20,000 families helped; three baseline studies completed; monitoring effective; seed production system adequate; input supply logistics adequate; 2M linear meters of hedgerows; doubling of food crop production; 50% increase in export crop production; 1,000 Ha of improved pasture; 50 extensionists and site managers trained.	PVO and project reports and evaluations; aerial photographs; baseline studies; reports produced; updated studies; personnel records; evaluations; national agricultural policy statements project information.	Assumptions for achieving outputs: Local PVO management ability; technical capacity; GOH and PVOs cooperate; GOH land use policy is positive; input program is manageable; there is public support for conservationist agriculture.
Inputs: Previous watershed studies by AID and others. Resources to purchase, transport, store and distribute inputs, including seeds and fertilizer. Training of host country and PVO counterparts. Periodic evaluations, regular monitoring and long and short term technical assistance. PVO staff, facilities and contacts, and AID policy and management support.	Implementation Target (Type and Quantity): Project implementation plans; project implementation contract (including TA), subgrants with PVOs; project reports; project evaluations	Project and PVO reports; project management records; project evaluations AID records.	Assumptions for providing inputs: Umbrella organization is efficient; TA team is effective; timely short term TA; is effective; AID policy pressure is effective.

hedgerows are not established properly in the first instance, gullying and more rapid erosion can be expected, with consequent losses in production (yields and total output);

- Population will remain on the hillside: Given increase in yields and production, farm families will certainly stay where they are. The options are far less desirable e.g., unemployed in a town or city. The only possibilities in this project for income increases in the foreseeable future are the goat, linked to grass hedgerows; and fruit trees -- grafted or planted. These can hardly be called soil conservation instruments in any strict sense. We see only modest increases in farm income from cropping interventions -- this should be an agricultural project, providing farmers what they need to improve and stimulate production and income e.g., better roads, seed storage, fertilizer, etc.
  The Evaluation Team has great difficulty in seeing just where increases in income will come from, on a sustained basis, and sufficient to improve living standards. Additionally, even if hedgerows, alley cropping, etc. double net income, can they do it in time? In 10 more years, most of the land in the targeted zones (10% - 40% of slope) will be gone in any case, or nearly so. And so will be the people. Project effort is too scattered for any meaningful impact on resource stabilization;

- Increased income from agriculture is possible: That is correct. But this is not an agricultural project. The best soil conservation is an improved and more intensive agriculture. The project was designed to focus on those interventions which induce, or bring about, or cause the conservation of soil -- conservation comes first; farming second. That is the wrong way around. Conservation will accompany an improved agriculture. The road to conservation involves the sequential releasing of the constraints to improved farming;

- The GOH is committed to agricultural development: This assumption is valid. There is a commitment. But there are no effective resources to put into agriculture; and

- National agricultural policies encourage agriculture: This assumption has not been met in large part in spite of the Government's commitment. A series of trade, monetary, fiscal, price, and institutional reforms begun in the early and mid-1980s was truncated severely with the political development of 1987 et seq. A national agricultural development strategy was promulgated in that year.[1] The key hurdles to sector growth are institutional; irrigation and processing are tied to large and (mainly) absentee land owners -- small farm production;

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[1] GOH, Propositions Pour Une Strategie de Développement Agricole, Port-au-Prince: Commissariat a la Promotion Nationale ETA, L'Administration Publique, Decembre, 1987 (D.G.P./Doc. 87-1)

especially of coffee, has been ill-served by the socio-economic structure.

C. Project Paper

Conserve soil, augment fertility, apply lessons learned to national-level hillside management planning. Assumptions include:

- Farmers will innovate and invest: Correct, but only if they can see quick returns, and if they can actually afford the item within their land and labor constraints;

- There is an effective national coordinator: There should have been one -- STABV -- but it has been rather moribund, and rather afraid to indulge in policy analyses;

- GOH agricultural policies encourage production: Not correct;

- National agriculture research capacity develops: Not correct;

- National policy encourages perennial crops: Not correct; and

- No food for work or salaries paid for work done on a farmer's own land: That has been the normal case in Title III conservation projects, but these were not part of the TWM Project, as such.

D. Outputs

STABV established; watershed surface area transformed and farmers productivity and income raised. Erosion rates diminished. Baseline studies completed and kept up to date. Input supply logistics effective. Improved animal health and production and increased pasture available. Staff trained in appropriate institutions in Haiti and overseas. PVO management and technical capacity upgraded.

Assumptions included:

- Local PVO management ability: Definite improvement for NGOs;

- Technical capacity: Definite improvement but still needs major upgrading;

- GOH and PVOs cooperate: No, but varies between PVOs. Differences in philosophy and politics;

- Input program is manageable: Barely, but improving; and

- There is public support for conservationist agriculture: Not per se. Conservation is coming down from outside and above -- not farmers' priority at all.

E. Inputs

Previous watershed studies by A.I.D. and others. Resources to purchase, transport, store, and distribute inputs, including seeds and fertilizer. Training of host country and PVO counterparts. Periodic evaluations, regular monitoring and long and short term technical assistance. PVO staff, facilities and contacts, and A.I.D. policy and management support.

Assumptions included:

- Umbrella organization is efficient: Not in earliest period -- very ineffective and key work tasks not accomplished. More effective in last year with existing personnel. Problem stems as much from incorrectly designed project and ineffective USAID management and direction in earlier periods;

- TA team is effective: Three current members are, particularly in livestock and administrative/financial support (to NGOs) areas. But 1987 to late 1989 highly ineffective in general with soils scientist as exception;

- Timely short-term TA: Financial consultant help to NGOs very effective; and

- A.I.D. policy pressure is effective: Unsure of what "policy" pressure is; heavy pressure for "outputs" and "quantifiable, verifiable indicators" of performance. Negative results as wanted far too much far too fast, given the situation. Pressures to perform have induced a "quantity" syndrome, not a "quality outlook. Budgets are tied to numbers showing actuals compared to targets.

ANNEX 7

Definitions of Basic Terms

ANNEX 7

Definitions of Basic Terms

A. Watershed Management

The process by which a discrete watershed is managed. Normally implies a development effort to control the watershed resources base in some way either to prevent further deterioration; or to enhance its capability. Assumes some sort of development authority empowered to make management policy decisions. Encompasses entire watershed from hillside to estuary.

B. Natural Stabilization and Enhancement

Typically in the context of attempting to repair a resource base which has been abused; the original capability of the resource base of the resource package (soils, hydrological system, flora and fauna) has been reduce due (usually) to mans' over use to the resource. Stabilization normally implies a regained capacity which is of a lower level than the original.

C. Soil Degradation

This is the gradual process of soil decreasing in quality (i.e., ability to support plant growth) and depth (quantity, density). Major factors that result in increased soil degradation are:

- Erosion due to rainfall, wind, etc.;
- Annual crops grown on steep slopes utilizing soil fertility factors and contributing to downward migrations; and
- Lack of soil cover (crop plants or residues).

D. Soil conservation

This is the process of utilizing sound cultural practices and physical barriers in order to reduce or stop the flow of water and soil down slopes in the forms of sheet and/or rill erosion. Major factors that result in decreased soil conservation are the same as the factors that result in degradation. Good crop production is good soil conservation.

E. Soil Productivity

This is the ability of the soil to produce rather specific yields of crops, fruit or trees. Degraded soils have lower productivity. Plains soils have the highest productivity because they contain nutrients and organic matter that have washed down from hills and mountains over centuries.

Soil productivity can be increased by returning crop residues or manures, by adding commercial fertilizer, and by reducing the time when there is no vegetation or residue on soil surfaces.

Productivity can be quantified. For instance, the present average productivity of Haitian soils is equivalent to about 800 kg/ha of corn. With certain inputs, average productivity can be doubled.

However, productivity of steep slopes will always be lower because soil depth is less than on gradual slopes or level terrain, and soils generally overworked without sufficient recuperative fallow.

F. Rural Development

Normally the process by which a rural/agriculturally based community or region is improved in terms of its levels or security of welfare. In addition to increased farm productivity, usually encompasses improvements in medical/health, education, water supply and other basic infrastructure improvements. In some parts of Haiti, efforts at such broadly-based development have not been common. There are instances where a series of NGOs, separately and individually, have provided ingredients of rural development e.g., water, health, education simultaneously in the same general region. The aim of rural development is to provide using indigenous resources, or by trading them in such a fashion that the human needs of that area's population are met at an acceptable level. Our examination of the project sites tried to elucidate how far project activities are being geared to meet these human orientations.

G. Agricultural Strategy

A set of objectives, policies, and procedures by which, it is hoped, agricultural activity can be induced to be more productive. Thus, it normally encompassed cropping, livestock, and tree systems. May also embody the use of water for irrigated cropping. Generally a strategy will also try to maximize the use of the most plentiful resource and simultaneously restrict to a minimum the need for the scarcest resources. In Haiti, the scarce resources include especially good agricultural land on the hillsides; and labor at critical times, given the cropping cycle under a bi-modal rainfall regime.

A strategy must also provide:

- food needs for local consumption;
- cash crops for domestic sale or export;

- crop insurance, through a variety of ways, to meet 1 and 2 above;
- agribusiness to process and handle surpluses; and
- protection of the national patrimony

H. Agroforestry Strategy

An integrated set of policies and procedures by which the objectives of an agroforestry program (or project) may be met. As with an agricultural strategy, it must address and answer the questions of who, what, where, when, and how much. Typically concerned in the first instance (in Haiti) with issuing trees which have value (pole, lumber, charcoal, fruit), a strategy would (should) move to the integration of forestry/trees into the agricultural system -- scattered tree plantings have little or no soil conservation effect otherwise.

I. Farming Systems Strategy

Peasant or small-holder farming systems in the tropics are complex, and dynamic. They have evolved in response to particular agro-climatic, ecological and socio-economic conditions. Small-farmers (often called peasants) have not been rejecting technologies out of ignorance, tradition or laziness. The Haitian farmers are rational decision-makers. They pursue goals and employ criteria for evaluating technologies or inputs that are distinct from those used by agricultural scientists. The former strive to meet both consumption and production goals under marginal conditions, making complex decisions as they formulate management strategies.

Farming systems strategy must take these factors into account. The strategy must also recognize that optimum management of inputs (old and new) is rarely feasible. Because soil quality and quantity, the agro-climatic zone and socio-economic factors must be taken into account, some adaptive research plus on-farm demonstrations are necessary.

It is important to remember that decisions about developing farming systems strategy should be based in large measure on what farmers say they want and need as adaptations to existing, on-going production systems.

J. Watershed Development Strategy

Watershed development strategy encompasses policies and procedures by which a watershed may be managed to achieve the objectives desired for it. In Haiti, the key objective is to raise the levels of income available to the farm family in the watershed by conserving his soil and improving the productivity of his farming/livestock operations. Watershed development strategy encompasses, in an integrated manner, the entire watershed area from the height of land "downhill" as it were to the final water destination. The "enemy" is the raindrop. A watershed development strategy controls the raindrop to advantage--make it

percolate to the benefit of plant and groundwater systems, slows down its surface movement, take the peak off flood levels, etc.

K. Hillside Strategy

Typically, a watershed has three distinct zones, certainly in Haiti. The two most obvious are the hillsides themselves, sloped land ranging in steepness and altitude but generally steep enough so the agricultural and grazing activity under traditional systems and forest use, engender erosion and gullying. Secondly, there is the downhill, the flat land which usually forms an alluvial plain before the water course itself reached the ocean. The seaward edge may or may not feature a configuration of brackish water areas, swamps, lagoons, and other transition type zones, particularly (as in Haiti) when sedimentation has been heavy over an extended period. The third zone is the river valley itself, above the plains. Typically narrow, and subject to flooding, the alluvial soils (eroded from contiguous hills) generally can support fairly dense settlement.

A hillside strategy generally addresses or should address the development policies and activities of the hillsides and their constituent river valleys. It also has the following ingredients:

- The future of the hillsides cannot be considered in isolation; it is directly linked to the development of the lowland and urban areas of Haiti.

- Stabilization of the hillsides to ensure Haiti's future water supply and to control erosion is absolutely necessary for the sound development of the nation as a whole.

- This stabilization requires conversion of most steep areas to permanent crops, including pasture, and improved soil conservation practices on those areas suited to annual cropping. Many areas now devoted to annual cropping cannot be stabilized economically unless they are converted to mixed crop systems, based on perennials and agroforestry.

- If the hillside farmers are to adopt environmentally sound, sustainable systems of agriculture and are to make the necessary long-term investments in their land, these systems must offer them an attractive return, provide an income sufficient to their needs, and fit within their capacity to supply labor and other inputs.

- These systems must be served by reliable input supply services, profitable markets for produce, sound technical information on production practices and land management, and security of tenure.

- Historical and current trends promote the intensification and diversification of lowland agriculture, based on increasing production of food and export crops. The modern technologies, applied to the better soils under irrigation on the lowlands,

imply that annual crops on the hillsides will not be competitive with lowland produce.

- The hillsides will continue to play a major role in Haitian society, as a place of work, as a major contributor to agricultural production for export and domestic consumption, and as a place of residence for a large portion of the population.

L. Plains Development Strategy

Developers in Haiti have normally and historically concentrated their main efforts on the flat alluvial plains created by the rivers after they leave the hills. Such plains can be extensive, particularly where rivers are immediately adjacent. There are a half dozen major plains areas in Haiti, originally developed very highly be the French colonists who (reportedly) had up to 200,000 hectares of irrigated cropping.

A plains development strategy thus normally differs from a hillside strategy because it includes or should include, an irrigated agricultural sub-sector. To date, most of the irrigation has been by surface flow, and thus, subject to the vagaries of flooding and sedimentation. It is anticipated that future development will depend more on the groundwater resources. A plains development strategy is essential to assist in solving the problems of the hillsides, especially in the form of income earning opportunities. Thus, while a plains development strategy would have its own components, its major benefits include those on and derived from a hillside strategy. The two are generally related. No doubt the earliest stages of a "plains" strategy could be conducted rather independently of hillside activity, but never out of the context of total integrated watershed planning. Since the longer-term agricultural health of the plains in haiti is heavily a function of groundwater reliability, hillside soil and water stabilization are prerequisites.

ANNEX 8

Bibliography

ANNEX 8

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ANNEX 9

Calculations of Tree Survival Rates

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Calculation of Tree Survival Rates[1]

A. Method For Calculating Tree Survival Rates--CARE

The CARE tree-planting program is a very simple one. One person (Peter Welle) had some ideas about tree planting and what needed to be done. He tried a few innovations, e.g. local grow mix stump planting, root trainers, community nurseries, etc., but by himself he was unable to accomplish very much.

CARE operates in the North West of Haiti and at Leger in the West Center of Haiti. Leger was one of the last sites visited by the Evaluation Team. Since it had become clear that there was a "numbers" problem with trees reportedly produced and planted, the Team Leader asked the Team's Soil Scientist/Agronomist and the CARE District Director to make an exhaustive search for trees. After two days of searching for the 50,000 trees allegedly planted they could only find 500 trees which could be clearly ascribed to the program and the possibility of about 500 more which could conceivably be tangentially related.

The trip to the North West was carried out over a four day period. CARE was told that of the 4,000,000 trees allegedly planted in the last two growing seasons that the Evaluation Team wished to see some 4000 as a representative sample of their work and the Team would be satisfied. The Team saw no more than 400 which could be ascribed to the program and several of these were trees which had been there for several years.

On the second morning of the visit the Team Leader, in an early morning walk, engaged a peasant in conversation. The subject revolved around what the Team Leader, a stranger, was doing in the remote North West of Haiti. The Team Leader indicated that he had a large task ahead--to count trees planted by the CARE program. The peasant had three observations:

1. Did the Team Leader say he was to be there for three more days - yes.

2. Could the Team Leader count as many as 100 in a day - yes.

3. Then not to worry; the task will be finished with time to spare.

The peasant's observations were prophetic.

When trees were found in such small numbers the Team Leader asked to be taken to a spot where he could see about 100 trees. He was taken to

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[1]This Annex was prepared by the Team Leader, Dr. Joseph Rajbansee, in response to USAID/Haiti's request for additional information on tree survival rates.

a spot where there were some 65 trees (85 if the twenty trees harvested are included). These were about seven years old. Subsequently the Team learned from a USAID staff member that CARE had only been working in that area planting trees for no more than four years. The Team was also shown a town park at Bassin Bleu with about 200 trees. These were six to seven years old.

The Evaluation Team's visits took place in CARE Regions 3 and 4. The Team understood that in Region 1, around Bombardopolis, that there were indeed some trees very visible which were planted under the influence of CARE but a different administrative and motivational base were utilized than the one in the present program structure. The new CARE leadership offered to take the Team there but since that tree planting mode (with more peasant incentives) had already been discarded, the Team Leader did not see the utility of such a visit.

CARE has always reported 75% to 85% tree survival rates. When the Team questioned the new leadership as to real survival rates they had now borrowed the PADF survival rate of 50%. Unfortunately the Team could see survival rates of only 1% and 2% on hillsides and at best, overall, about 10%.

This is not news to USAID management. USAID's own staff member, Richard Pelleck, had made several queries and comments as to the voracity of the CARE reports. Nowhere did the Team find CARE's response to these queries. Memos exist in Pelleck's files showing CARE contradicted itself on the same pages of its own reports. CARE, as the Team Leader was told, never felt a need to answer these questions. For anyone now to come and say that the findings on CARE are controversial or that they were not aware of the numbers is simply to be shedding "crocodile tears." Pelleck has since been transferred out of Haiti.

Much of the blame for CARE's poor performance can be placed on the existing CARE leadership. People like Peter Welle and the few whom he motivated were caught in a debilitating web. CARE's upper level supporting staff is extremely naive and include too many recent US university graduates, primarily female, with little appropriate field experience. They were also condescending. Many of the Haitian workers openly hinted at racist elements in their hierarchy. These themes permeated the CARE structure and set the tone for low production. The fact that very little was being accomplished in reality did not seem to be the concern of anyone. Peter Welle fell ill between the Team's visits. With his demise USAID needs to seriously consider the continuation of CARE in the program. It is the Team Leader's best professional judgement that the acting leadership replacing Mr. Welle has insufficient experience and wisdom to achieve the project goals.

B. <u>Method for Calculating Tree Survival Rates--PADF</u>

The Team's first contact with PADF came from their own published materials. They were active in 80% of Haiti and in the last two growing seasons had planted over 7,000,000 trees. Peasants who were planting trees were keeping them for poles and planks (about 5 years or more). However as the Team traveled around Haiti not only were they not seeing

any/many of the 7,000,000 trees of which half supposedly survived but they also found it difficult to believe that of the millions of trees planted by peasants who were holding on to them, they were only able to see a few around the borders of their property and on rare instances about 15 or 20 around their homes.

The Team inquired discreetly as to where the millions of trees were, and were met by responses of discreet snickers. When they quoted the program document creating Agro Forestry II which claims that there was $35,000,000 in value and $12,000,000 in additional value somewhere in the country the snickers turned to laughter. While the Team was visiting TWM sites in the south they asked to see three PADF sites. The Team was there two weeks. PADF could not arrange visits despite the intervention of the USAID program manager and the regional coordinator. The Team Leader then made a formal request to PADF via USAID to see sites which would be representative of PADF's work.

The Team Leader spent 10 days of his return to Haiti in July looking at PADF work all over Haiti. He found that peasants had received as many as 300 - 750 trees depending on the region they were in during the life of the program. The pattern emerging was as follows:

- The number of trees around property varied with the size of the property. However an optimistic estimate of the area of rural landscape so covered is somewhere between 5 to 10%; and

- Trees in small woodlots near houses numbered about 15 to 30. About one in every 3000 farmers had these. The Team drove long distances between tree planters to see the same phenomena--at best there were trees around the property and an average of 25 trees next to homes.

In ten days of travel with PADF staff and members of their directorate the best the Team could find was one farmer with about 250 trees in the Plateau Central, one church with about 400 trees in the North East, and one farmer with about 150. This last farmer was asked how many he got. He said 750. But these exceptions were in the most favored growing areas.

Little or no PADF work was seen on true hillsides except for a couple of sites in the south. Some 350 organizations were planting trees in Haiti. How much of what the Team saw could be ascribed to other organizations was unclear, the results were minimal.

Relative to the farmers who had <u>no</u> trees, relative to the numbers allegedly handed out and relative to the numbers the Team actually saw, the 2%, 15%, and 25% are very optimistic estimates.

The Team Leader asked to see the best sites and there is no reason to believe that he was not shown the best sites. These however resulted in the percentages as advanced. The PADF Director in Haiti claims that 2 percent is a good survival rate when compared to Africa.

The fact is that PADF staff have been recently claiming 50% survival

rates for some 7,000,000 trees allegedly produced and planted. The Team could not find any corroborating evidence in the field to say "yes," as a result of PADF activity in the last two growing seasons, 3.5 million trees now survive in Haiti. Eighty percent of the trees the Team saw were over five years old. In those days PADF claimed higher survival rates. Assuming the 30 trees the Team saw came from 300 allegedly produced and handed out (and this is the most favored situation the Team personally saw) a survival rate of 10% is the best that the program is doing. PADF has no sizeable amount of work executed on hillsides. As such, the Team Leader cannot say with any degree of voracity that PADF is a significant actor in the Hillside Strategy.

If Marc Erlich's comments are to be believed (and he is most knowledgeable about Haiti) USAID and program administrators have been aware of these numbers for some time. USAID's own Haitian office staff are aware of these shortcomings--none of the ladies canvassed could say where in their travels in their own homeland they had seen any significant tree planting effort which could meet the criteria used in the program document to justify the outlay.

The problem does not lie with the Haitian field workers. All those whom the Team saw were highly motivated. For the 10% of program inputs getting to their level through the "trickle-down" approach they were performing extremely well. It was not clear what the heavy, expatriate super-structure was contributing to the efforts for the 80 percent of the resources they were absorbing.

There is no real controversy as to the actual accomplishments of the tree planting program and TWM. The plain, painful fact is that the accomplishments have been both minimal and marginal and program administrators are unwilling, or unable, to see that. The Team Leader believes that this "ostrich with its head in the sand" phenomena comes from the following:

- Expatriate project managers socialize in a small, well-knit group. It is not in the interest of the group to admit to a lack of success. As a matter of fact they mutually reinforce each other as to how difficult it is to achieve results in the Haitian context;

- Evaluators have also taken the information generated in self-serving reports to say "all is well" thus adding a blinkers perspective to program managers;

- Local managers are well paid by US standards. The fringe benefits are enormous. The fact that they can obtain a 50% increase in their salary by exchanging same in the parallel market creates a new privileged class who look out for each other;

- Many program managers/leaders are the same people participating in Haitian development over the past fifteen years. The names of their programs and guises under which they have obtained US funds may have changed but the personalities and their low

level of program outputs have continued;

- US personnel are unable to see realities because they are insulated by several layers who "filter" to them what they would like to hear. Their deficit in Haitian creole, their limited French, their very visible whiteness, their lack of training in program management and evaluation and their willingness to use a Theory Y for management and motivation in a Theory X situation are partially responsible for the dismal attainments;

- Between USAID/Haiti and the rural people are several layers of consultants who make a living and need to keep doing so. These include expatriate operating agencies (CARE, PADF, ARD) and a number of "localized" foreigners serving as "culture brokers." These elements are well versed in protecting their own self-interest. Thus, largely compliant messages and numbers often emerge.

Many of these problems could be resolved by the increased involvement of Haitians, both in the USAID/ADO and in the NGOs/PVOs. Many of the appropriate technologies exist; what is missing is the material incentive to apply these technologies.