ARD - RAISE

Haitian Hillside Agriculture Assessment

Strategic Review and Performance Indicators Development

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PREFACE

This report is written to compliment to a report prepared by SECID entitled: *Assessment of Haitian Hillside Agriculture Interventions Report: March 5, 1999.*

The three principal components of the scope of work were

1) to help to establish a strategic vision to link USAID's natural resource and agriculture activities to other components of its strategic priorities,
2) to evaluate USAID's current hillside produce marketing strategy, and
3) to develop a monitoring and evaluation strategy for measuring the impact USAID hillside activities on its sustainable growth strategy.

The complete scope of work is attached in Annex A. A summary of findings and recommendations on each of these issues comprises the first section. The remainder of the report is organized in three sections responding to each of these issues in turn.

The report is based upon a three week mission to Haiti, which took place between July 19 and August 8th 1999. The team visited various hillside project sites near Camp Perrin, Belle Fontaine, Gros Morne and Cape Haitian, as well as numerous institutions, businesses and individuals in Port au Prince. Important contacts made during the trip are listed in Annex B.

The team wishes to express its gratitude to the USAID Haiti mission for its guidance, advice and support and to all those it met with for their frank and open responses to its inquiries.

I. Summary of Findings and Recommendations

A. Hillside Agricultural Strategies

1. Findings regarding the current context and strategies to develop hillside agriculture

The macro-economic and sectoral policy environment for investment in hillside agriculture has improved but still faces several issues:

- The Gourde is becoming overvalued.
- Accession to CARICOM may give undue protection to staple import substitutes.
- Commercial input markets for agriculture are hampered by ad hoc subsidy policies.
- Indirect taxation of transport is high.

Haiti's comparative advantage is in producing higher valued exportable crops in hillside agriculture

- The economic prospects for rebuilding traditional agricultural exports are strong.
- Higher-valued, perishable food crops have limited local market potential due to only moderate projected demand growth in the national market.
- Hillside staple crop production is being sustained beyond optimal levels because of protection and isolation from markets.

Farmers are benefiting from soil conservation interventions, but not always for the reasons for which they were promulgated.

- Increased yields on land with soil and water conservation infrastructure are due to better water management, rather than "soil conservation".
- There are serendipitous indirect benefits from some soil and water conservation infrastructure, which may be more important than the direct impact of the infrastructure on yields.

Existing efforts in soil conservation have not demonstrated their sustainability nor spread effects.

- The Monitoring and Evaluation evidence is not available.
- The use of incentives to undertake soil conservation biases conclusions

Technical solutions to improve fertility and productivity are not being emphasized sufficiently.

- CARE has promoted "deep digging" incorporation of crop residuals and use of compost on bio-intensive gardens, but the first may be too labor intensive and the second too small in scope.

- PADF and CARE promoted Leucaena hedgerow in part as a means of improving soil fertility, but results appear marginal and unevenly distributed because of farmers' management of hedgerows for fodder production.

- More attention should be given the use of leguminous cover crops/green manures in crop rotation on fallowed land to recycle nutrients, improve nutrient status, increase organic matter content/build soil, and increase water holding capacity .

- The potential of leguminous in-situ mulches have not been fully explored to build soils on installed soil and water conservation infrastructure, to rehabilitate/rebuild degraded parcels, and as a labor saving alternative to soil and water conservation infrastructure on unimproved land devoted to staple crops.

Community based organizations (CBOs) have been used as effective instruments for reaching large numbers of people and organizing communal responses.

The long run viability of community based organizations is:

- High if focused on marketing and processing or other profit making ventures.

- Low as mechanisms for promoting soil conservation interventions on farm fields.

- Sometimes feasible for addressing critical communally shared resources, depending on the larger policy context of the resource.

A more holistic approach to farming system needs to be taken in defining project activities.

- Environmental and financial benefits from soil and water conservation practices have been demonstrated, but because of the narrow focus, potential increments from other elements of the cropping system are not realized.

- Livestock are an essential part of the farming system equation, but as yet have been largely ignored.

- Access to water is a primary concern of hillside farmer to free up family labor, and for domestic and farm uses.

Support both staple crops and export crops to necessary increase and secure farm family income.

- Farmers already producing for export market are still dependent on staple crops for food security.

- Increasing cash crop marketing from hillsides has synergistic effects on intensification of staple crop production.

- Increasing staple crop yields will permit farmers to devote a larger proportion of holdings to export/cash crops.

- Increasing production and improved quality of export crops must be undertaken in conjunction with efforts to secure markets and improve price incentives.

2. New Strategies Orientations for Hillside Agriculture

Increase incomes generated by hillside agriculture by

- Responding to farmer priorities in farm interventions.
- Emphasizing an export market orientation for agricultural production.
- Creating communal institutions to address communal problems.
- Creating a conducive policy environment to invest in hillside agriculture.
- Reducing pressure on hillside resources.

Shift emphasis in hillside interventions to respond to farmer priorities. These include:

- Improving fertility of soils and raising crop yields.
- Increasing access to water, both for small scale irrigation and domestic use.
- Improving the productivity of farm livestock
- Improving market access.

Create a conducive policy environment for hillside agriculture by

- changing relative prices to reflect economic values;
- improving the policy context for local control of hillside resources;
- assure efficient market s for inputs and outputs of agriculture.

Develop institutions to internalize externalities of resource use

- promote community solutions to community problems
- develop policy strategies to link up and down stream watershed users.

Reduce pressure on hillside agriculture by reducing natural population growth and providing productive alternatives to hillside populations

- Target family planning, nutrition, and maternal and child care interventions to hillsides
- Target primary education to hillside communities to increase livelihood opportunities and capacity to address problems on a local level
- Encourage labor intensive manufacturing in high productivity zones.
- Develop temporary emigration programs to the western countries for unskilled labor.

B. Agricultural Marketing Strategies

1. Findings regarding Agricultural Marketing

Hillside markets for staple crops are highly competitive and compete with imports on a seasonal basis.

- Reducing transport and storage costs will reduce price fluctuations in hillside communities.
- Processes to reduce perishability and increase ease in preparation will expand staple crop markets.

A wide range of non-traditional exports have potential for export to the US produce market.

- These commodities are typically relatively non perishable, reach moderate standards of appearance and uniformity and are generally destined for niche market Caribbean consumers.
- Haitian exporters are eager to cooperate in exporting these commodities but do not have the capacity to organize producers to provide sufficient supply, in the necessary time intervals, of sufficient quality.
- SECID has greatly improved the efficiency of commercial marketing from small producers by using marketing cooperatives to assemble produce to meet exporter requirements.
- The impact on producer income of SECID activities has been strongly positive.

Poorly performing markets for traditional export crops have contributed to declining traditional exports.

- Collusive behavior by exporters has reduced the export price share received by farmers.
- Traditional exporters provide no price incentive to improve quality.
- Publicly managed systems for controlling quality have collapsed.

USAID sponsored marketing cooperatives alternatives to traditional exporters have simulated competition and raised quality in these markets.

- Servicoop's interventions in cocoa, coffee and mango markets have raised returns to farmers, improved quality and strengthened farmer marketing cooperatives.
- The Haitian Blue Coffee federation has successfully exported limited quantities of coffee, raising farm revenues and
- Both of these institutions remain financially vulnerable and institutionally weak.

2. Recommendations regarding Marketing strategies

Create and sustain a competitive export market environment.

- Continue to support marketing alternatives to increase competition in constrained markets.
- Continue to provide organizational services between exporters, cooperatives and farmers in competitive but atomized markets.
- Support independent monitoring and evaluation of the performance of markets and the impact of public policy on markets.

Develop new/non-traditional export crop markets with Haitian exporters

- Identify opportunities with existing exporters
- Organize production trials and market assembly with local farmer marketing groups/cooperatives.
- Provide technical assistance for problems in production, processing and marketing to farmer groups/cooperatives and businesses.
- Support efforts to certify Haitian product with international organizations that provide marketing advantages for organic, small farmer/farm cooperative, and bio-friendly criteria.
- Recruit. international agribusiness to provide technical assistance and financing to local producer and marketing cooperatives and businesses.

Provide direct support to investing in public goods required for efficient markets

- Support community mobilization to build and maintain rural roads.
- Support the dissemination of daily market information via radio.
- Support public policy analysis and debate on agricultural sector policy to promote efficient markets and trade.

C. Monitoring and Evaluation of investments in hillside agriculture

1. Findings regarding current M&E approaches

Current methods of evaluating hillside investments are inadequate to determine the magnitude of impacts on income and the environment, and conditions under which they occur.

- Measures of income effects of the PLUS Project based on farmer perceptions of change reveal substantial positive effects of interventions. However, annual repetition of this appreciation is of little additional benefit.
- Evidence is not available to ascertain the sustainability of current interventions nor the evolution of their effects on farm systems.

- Evidence of spread effects of project interventions is not available but a study of secondary adopters could provide this information.

- Current analyses focus on parcel level effects but do not permit an appreciation of the impact of hillside agricultural interventions on the whole farm system.

Indicators used by USAID to measure performance of its hillside investments are too mechanistically defined and reported.

- Measures of income and environmental effects are narrowly focused on one-time parcel level effects and do not capture indications of sustainability and the spread of impact.

- Contractors appear to have tailored their activities to meet these indicators rather than to meet the objectives that the indicators seek to capture.

- Methods of measuring these indicators are suspect and should be revised to use diverse approaches to capture effects.

Internal procedures for monitoring project outputs are in place and appear to provide the data necessary for tracking project inputs and outputs.

- Verification of the accuracy of these internal monitoring data should be undertaken periodically.

- These data are not exploited fully for management decisions and in evaluating impact.

2. Recommendations

The PLUS project should seek to undertake the following evaluations of their activities before the end of the project.

- The rate of spread of techniques that are being introduced

- Sustainability and long-term impact of interventions

- Incorporation of practices in the farming system

Measures of income effects should be built on carefully controlled measurements of intervention effects.

- Past measures of these effects should be used where they are consistent with other measures of impact.

- Additional measures should be undertaken by independent assessors using controls in farmer fields where additional information is needed.

A modeling approach aggregating from carefully measured effects should be used assess whole farm effects. The analysis should:

- build up net income effects from carefully measured effects of particular interventions based upon comparisons of farmer yields with and without interventions.

- weight effects according to their contribution to household income.

- model impacts on other farm and household activities such as livestock, and cash needs.

Other indicators of impact should be incorporated into the evaluation methods for hillside agriculture:

- Measures of biophysical change in the project area.
- Measures of wellbeing of project participants and the general population in the project

Evaluations of the impact of marketing interventions should be reinforced to:

- monitor changes in absolute and relative prices of staple and export crops in hillside producing zones.
- track changes in market and trade policy and their impact on incentives to farmers.

II. A Strategic Vision for Hillside Agriculture

Assessments of agricultural production, the status of soil and water resources, and indicators of income and wellbeing of hillside populations in Haiti all suggest that the hillside agricultural economy has been deteriorating over the past two decades. The litany of reasons given for this decline includes high population growth rates, a fragile resource base, insecure land tenure, the absence of public order, and grossly inadequate investments in human capital and economic infrastructure.

Given the very limited investigation undertaken by this team, this report makes no attempt to review the evidence of decline in hillside agriculture; the fundamental reality of these trends are taken as a given. Rather the approach taken here is to scrutinize the current strategies to address these problems to identify where they appear either unproductive or inadequate, and to provide suggestions for enhancing or redirecting efforts to meet USAID's objectives of raising incomes and arresting environmental degradation in Haiti's hillside agriculture.

The first component of this section summarizes the current economic and political environment which faces investments in agriculture. A second subsection then summarizes results of previous research concerning the economic basis for investing in hillside agriculture. The analysis then examines the experience of USAID investments to date in hillside agriculture. Finally , based on these findings recommendations for current and new strategies are then examined.

A. The current economic/political environment of hillside agriculture [1]

Many fundamentals in Haiti's economy have improved since the return to civilian rule in 1994. Both fiscal and monetary discipline have permitted the government to reduce its annual deficit, while holding inflation in check and stabilizing the nominal exchange rate. Much of this discipline has been based on a law prohibiting the treasury from increasing its debt to the Central Bank. Ironically, the state of political paralysis that has persisted since 1997 as the country has sought to establish a new government may have contributed to this discipline. Ironically, the approach of new parliamentary elections may undermine the governments new-found fiscal discipline in the near future.

A second, and related factor that could undermine the macro-economic environment is the exchange rate. This risk is suggested by the relative stability of the Gourde's nominal value despite rapid rates of domestic inflation in comparison to Haiti's trade partners. If not arrested, overvaluation of the Gourde will erode the competitiveness of Haitian agricultural sector. The team has not investigated the foreign exchange market but suggests that this issue be flagged for further investigation.

The sectoral policy context for investment in agriculture has improved dramatically from a past in which taxation of exports, protection of import substitutes and public interference in markets crippled its development. Since the early 1990s the government began reforms which have removed all export taxes, reduced protection on import substitutes, and withdrawn from direct interference in markets.

[1] Most of this discussion is derived from analysis presented in more detail in Metzel, 1999.

However, crop specific analyses of nominal and effective protection suggest that staple import substitutes (rice, maize, sorghum, beans, pigeon peas, sugar) still benefit from substantial official protection due both to border tariffs, and indirect taxation of transport. although the presence of large -scale staple food smuggling into secondary ports, may have eroded the real impact of these policies.[2] Nontraded and export crops do not benefit from the same protective policies as import substitute crops. Inputs to agriculture face low net taxation, due principally to transport taxes in marketing.

Under the "Projet de Loi" which Haiti has negotiated with the World Bank and IMF, protection levels are scheduled to fall further for most staple crops, but rise slightly for rice and sugar. These policies move Haiti towards a more consistent and attractive environment for investment in agriculture. However, the GOH is also currently in discussions to join CARICOM under a common tariff regime that will eliminate protection from imports originating within CARICOM but raise them substantially for imports originating outside of it. With CARICOM, protection - and therefore prices - of rice, sugar, pigeon peas and livestock products are expected to rise. The lack of clarity as to the future of tariff policy has created uncertainty and therefore stymied investments by investors in agriculture agro-industry.

These findings suggest the need for Haiti to reconsider the trade benefits that CARICOM will provide in the larger context of its impact on food prices and therefore real incomes of its population. This reconsideration might lead either to negotiation of exemptions on the external tariffs that CARICOM entails, or another regional trading arrangement that does not divert trade from least cost sources.

With respect to agricultural input markets, Government programs to subsidize fertilizer and improved seed have increased their use, but have also created a highly uncertain atmosphere for the private sector in these activities. Fertilizer subsidies are not sufficiently funded to cover all of demand, nor is the subsidy mechanism managed either to maintain a consistent subsidy or to provide a buffering mechanism. Evidence suggests that it has crowded out private actors in both importing and distribution, reducing spatial access and the selection of fertilizers, although a strong world price drop in fertilizers has permitted some private imports in the last few months. The program has also been plagued by supply ruptures that have aggravated price variability. Finally, it has probably had negative distributional effects because access to it has favored relatively wealthier producers in more intensive agricultural production systems.

Staple seed subsidies promoted by several large donor funded projects have had similar effects, with subsidy rates that have exceeded 50% of seed costs. A further problem has been the suspect value of the much of the seed being promoted as improved. Finally, many of these programs have apparently sold improved seed at or even below commercial grain prices, opening the possibility that it has been consumed directly rather than purchased for seed. In most cases, cooperative input stores established to distribute inputs do not appear to be autonomous, nor to be located in areas that are unserved by private suppliers.

Countering these direct subsidy programs, high taxation levels on imported vehicles and fuel result in substantial indirect taxation of all marketed commodities, and thus are particularly taxing on exported commodities and crops that use marketed inputs.

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[2] Based on analyse in Metzel, 1999. Meaures of nominal and effective protection are presented in Annex 3. Tables 2 and 3.

These critiques of current input policy partly reflect developmental difficulties in establishing a coherent input policy, and constraints on public resources. However, if not addressed they are likely to continue to stifle private sector activity in agricultural input markets, with negative consequences for any investments in agricultural intensification.

Elimination of transport taxation is unlikely given its importance in public revenue generation. This may argue for sustaining offsetting subsidy policies on inputs. However, to reduce their negative consequences, a revision of current subsidy programs might be considered to provide complete market coverage and mechanisms that channel all subsidies through viable private actors. However, to elaborate a coherent input policy, a better understanding of current input market behavior is needed.

B. Economic prospects for income generation through intensification of hillside agriculture.

Analyses of economic comparative advantage suggests that under current techniques, most staple crops produced in hillside agriculture, including maize, sorghum, and beans, are not economically competitive in the national markets in competition against imports, but are being sustained by protective measures against competing imports.[3] Moreover, because hillside soils are poorer, and because hillside communities are more isolated, investment in hillside agriculture provides lower returns for investment than alternative investments in agriculture in lowland areas in Haiti.

On the other hand, the choice of hillsides as a priority for investment in agriculture can be justified on efficiency and distributional grounds. First, known technologies for intensifying staple crops suggest that these crops have positive economic value for sale in local rural markets under rain-fed conditions.[4] This local comparative advantage is created in large part by the natural protection due to high transport costs in bringing in imported staple alternatives.

In addition, some hillside investments can provide important externalities to the rest of Haitian agriculture. Most importantly, reduced soil erosion and increased water control can greatly improve the prospects for investment in downstream systems. Secondly, targeting hillsides naturally targets the poorest geographic subgroup of Haitians. Investments in hillside agriculture have therefore proven to be a cost-effective means of having a direct effect on their welfare. Finally, literature on economic growth patterns has found that the multiplier effects of direct investment in agriculture in general are higher than in other sectors of the economy because of the strong linkages between agricultural communities and the rest of the economy.

Among hillside crops, higher valued but typically more perishable fruits and vegetables show much more attractive financial and economic returns than staple foods but only moderate demand growth in the national market even assuming rapid recovery of the economy. Thus

[3] See Metzel 1999 for detailed analysis. Annex C. Tables 4 and 5 present summary results of analyses of comparative advantage.
[4] Ibid..

measures to raise production will not have a large scope if targeted only to supply this market.

The potential to export these commodities to large regional markets exists by reducing production costs through available commercial agricultural intensification techniques and by addressing a number of constraints in marketing. These opportunities appear both technically feasible and achievable, given both past successes and the current interest expressed in this strategy by private exporters.

The economic prospects for rebuilding traditional exports are also strong. Haiti still has a strong comparative advantage in production of cocoa and coffee based upon appropriate natural conditions and relatively inexpensive labor. However, production has been stifled by numerous factors that have served to stifle markets, neglect investment in production. Regeneration of these sectors will require relatively large investments in new tree plantations and rural processing and market infrastructure for both coffee and cocoa. A prerequisite for this investment is to increase producer prices. To do so will require restructuring export markets to lower export margins. A strategy to achieve this is to reintroduce a competitive market by supporting newcomers to the market, and fostering direct contractual relationships between producer groups and international buyers. The second section of this report examines the recent experience with export marketing and strategies to promote it in more detail.

C. Assessment of Current USAID Project Interventions in Hillside Agriculture

USAID has undertaken projects to promote Haitian agriculture for about thirty years. Since the mid seventies it began to focus on hillsides through initiatives that concentrated primarily on agro-forestry and soil conservation interventions to address environmental deterioration of the hillsides. After the lifting of the embargo in Haiti in 1994, the revised PLUS project design called for replicable interventions which would have an immediate positive impact on crop yields for hillside farmers. Soil and water conservation infrastructure was still deemed to be the necessary first step; other complimentary practices were introduced, but the major emphasis was still on infrastructure with the expectation that increased fertility and yields would follow.

PLUS interventions on hillsides have concentrated on soil conservation measures, including hedgerows, rock walls, check dams (gully plugs), contour infiltration bunds/crop strips (bann manje), and trash lines. It has also undertaken some attempts to improve soil fertility through techniques such as cover crops, bio-intensive gardens, and deep tillage. Other measures have targeted increasing crop productivity directly through the distribution of improved seeds and planting material, timber and fruit tree planting, fruit tree grafting, and integrated pest management. With the beginning of the Asset project in 1997, a number of additional interventions have been introduced in the watersheds in which it is working. These include the construction of impluviums and assistance in constructing secondary rural roads.

All of these practices, either alone or in association with others, have been demonstrated to be capable of making a positive impact on farm family income and on the environment. M. Douglas in Annex 5 of the 1995 Romanoff report thoroughly discusses their application, with the exception of "impluviums", which have been introduced under ASSET. The team

did not see in the field all of the practices employed, or interview sufficient farmers in the different project areas to attempt-a detailed technical evaluation of the efficacy of the individual practices promoted by PLUS. Findings made by the team are noted below for interventions it did observe.

~~3.~~ *Soil conservation measures*

Hedgerows appeared to be found more often on steeper and more degraded slopes. Although some farmers reported that they did grow annual crops on land treated with hedgerows, not many were observed. Farmers may have placed hedgerows on plots which they considered too degraded for annual crop production, as a means of qualifying for project benefits. The market for poles and firewood have made established hedgerows a source of income for some farmers, and according to PADF personnel, there is now sufficient incentive to install new hedgerows without project intervention. If independent expansion of hedgerows for this purpose is confirmed, PADF should promote them as a cash crop.

Information from PLUS personnel and reports indicated that even hedgerows used for annual crop production were not likely to be managed in the recommended way. Farmers used pruned branches for livestock fodder, rather than as a green manure/mulch and they therefore had a minimal impact on soil fertility.

According to the PLUS 1995 Impact Survey, **rock walls** were more often installed on more secure parcels with less steep slopes and better soils than were hedgerows. Interviews with farmers and reports suggest that the positive impact of rock walls on crop yields can be much more significant than the 17% used in the annual reports. Some farmers interviewed by the team stated that rock walls made the difference between corn yields of 300kg/ha without and 1200 kg/ha with rock walls. Another farmer reported the same yield "in a normal year" saying that he would not have even planted the parcel without the rock wall. However, everyone is not getting these yields and some parcels with rock walls appeared to have no crops on them at all.

Gully plugs profit from the absence of effective soil and water conservation measures on surrounding slopes. Because they concentrate and hold soil and water in ravines from more extensive catchment slopes, not just the area between hedgerows or rock walls, gully plugs have significant impact on production, albeit for a reduced area. They are apparently popular, and farmers reportedly will expand them on their own, though farmer to farmer diffusion is considered ineffective and even inadvisable by experienced technicians, since farmers "copying" the practice without technical direction are "apt to do more damage than good". Although there is a "lag time" before benefits are enjoyed, the utility of gully plugs does appear~~s~~ to be appreciated by hillside farmers who have installed them, and is recognized by organized work groups which give them a high priority;~~,~~ this is illustrated by the decision of several Belle Fontaine groups-to do gully plugs as the next activity after impluviums/nurseries. Check dams can also have important "downstream" benefits, at all levels within the watershed by stopping loss of adjacent fields to growing ravines, and by reducing "storm surges" in the rivers they feed.

"Bann Manje" contour infiltration bunds with crop strips planted in manioc, pineapple, etc, are more effective on gentler slopes. It could be called an improved production practice which simultaneously conserves soil and water. Although PLUS has heavily subsidized the vegetative materials for these *bann*, according to PLUS staff, farmers have abided by their contractual obligation to PLUS to give in turn what they received to another farmer, thus cutting per meter cost of the intervention in half. In Camp Perrin important serendipitous indirect benefits where noted because the perennial and semi-annual species used in the *bann manje* dissuade farmers from burning fields in land preparation and lead to better community control of free ranging livestock on crop residuals during the off season. This in turn improves survivability of fruit tree and high value timber crop seedlings, and reduces maintenance requirements for infrastructure. Similarly, Gros Morne farmers who are planting mango seedlings on sloped land currently used for staple crop production said that they no longer let livestock range freely in the off season, and do not burn their fields.

The use of **trash lines** is a useful practice when done on the contour, but impermanent and initially for water management, though when farmers incorporate crop residuals and weeds they also improve soil fertility, structure and water holding capacity. According to CARE and PADF annual reports, the use of trash lines is a fairly popular practice; the fact that farmers plant into old "ramps" of buried trash lines suggests that they do have a noticeable impact on yields. It also requires the least labor of any practice, with the possible exception of direct seeded leucaena hedgerow.

4. Soil fertility measures

Cover/green manure crops have been tried on a small scale in the past by PLUS, but apparently never extensively used. Their utility for protection of the soil and to improve fertility, organic matter content and water holding capacity is undisputed, but their integration into the hillside farmer's farming system must interfere with relay cropping and will require a change in livestock management practices. They are not discussed in annual reports or work plans, but CARE, PADF and ASSET advisors all mentioned that they are doing trials with velvet bean. The team encourages this investigation.

Bio-intensive gardens were not observed by the team. They are also popular interventions and appear to have had an important impact on food security and family income in the northwest. They seem to be a modification of the "Lakou" garden, incorporating compost of household plant and animal refuse in vegetable gardens. Planting material is subsidized, though farmers also buy seed. They are a small scale intervention, and related to soil conservation when they are established on land with soil and water conservation infrastructure.

Deep tillage is the incorporation of crop residuals, weeds and in some cases, green manure crops; it is a relatively insignificant part of the hillside agriculture "package", practicable only where soils are deep and on gentle slopes. Although it could be expected to have a dramatic impact on yields where practiced, it is labor intensive and "requires a lot of water", and is thought not likely to be widely adopted.

5. Crop intensification activities

Comparisons of current productivity of agriculture in Haiti, either to other countries with similar agroecologies, or to available improved technologies for crops in Haiti show a large technical potential to intensify staple crops further.[5] USAID sponsored efforts to improving productivity in hillside agriculture have focused simply on introducing new and better plant material. Distribution of **improved seeds and planting material** has been used as an incentive to get farmers to adopt soil and water conservation practices. In order to extend the impact of this material, revolving "seed banks" have been established in which farmer receive material for free but is then required to payback vegetative material to a third party.

In the case of basic grains seed, it appears however that rather than save selected harvested seed from the distributed improved varieties to reimburse the system, many farmers use whatever they can find in the market to reimburse the seed banks. This is not surprising since PADF found that more than 90% of farmers bought grain in the market for use as seed. The seed bank approach has helped to keep the cost down but , it is not a "sustainable" intervention because of the rapid deterioration of the seed quality.

In the long run projects need to rely on market mechanisms to distribute seed if a sustainable commercial seed industry is to emerge. Moreover, to increase the impact of these distributions. Distribution of improved seed should be complemented by field demonstration of the advantages of improved seed. Farmer training in seed selection and appropriate storage technology would also be a low cost means of raising the quality of seed stock.

A large share of the “crop improvement” effort has been simply to encourage timber and fruit tree planting. **Timber and fruit tree planting** is important economic activities, but unless they are planted in stands, trees do not protect soil from erosion. They have however, changed the way land is used, and given greater utility to soil and water conservation infrastructure over a much greater area than if they had been planted in stands. As has been demonstrated by PLUS and its predecessors, farmers will plant trees if they are made available, and the average survival rate after one year is fairly high. Nursery costs were high in the past, but have been coming down with the introduction of "root trainers" and the increasing reliance on groups and CBO's to maintain their own tree nurseries. Demand for fruit, coffee and cacao seedlings is increasing. Ways need to be found to reduce production costs further. More will be said on this subject later.

Fruit tree grafting is a popular intervention with the potential for a significant economic impact. Grafting specialists evaluated by ORE are well trained, demonstrated by a 99% success rate. Demand is high for the services of grafters, within and outside project areas. Top-grafting converts older mango and avocado trees of less marketable varieties to export crops, making it less likely they will be cut for charcoal. This program has a positive environmental impact, increases farm income, and has created a well trained cadre of rural residents who can sell their services. A PADF trained grafter interviewed at Camp Perrin

[5] Kerr and Bellande,, 1999.

stated that if the project were to end tomorrow he would be able to make a living grafting. Nor was it "just a job"; he believed in the benefits of the product to have planted 50 mango and avocado trees on his own land, from which he calculated that he could earn as much as HD$400/tree.

IPM is a relatively new intervention of CARE. It was not observed in the field nor is sufficient experience available to demonstrate its value. However, given the exorbitant cost of commercial treatments for pests, and the potential added incentive of reaching higher paying "organic" markets for many of Haiti's exportable crops, the intervention appears well conceived.

Most of the gains in yield for food grains under PLUS appear to be attributable to the mechanical interruption of water flow down slope and the consequent increased availability of water to crop plants and/or protection of plants from washing. Marginal increases in soil fertility may also have been achieved with leucaena hedgerows, but because farmers tend to use pruned branches for fodder and fuel rather than as mulch, additions of organic matter and improved nutrient status of soils appear to be insignificant.

6. Water harvesting and management

Surveys from CARE, ASSET and PADF zones each found that water for both domestic use and irrigation is one of the highest priorities for hillside communities. Water for both domestic and crop use was repeatedly reported as a high priority for hillside farmers. Interviewed farmers stated that crop yields were frequently affected by water deficits, even in areas with high (mm?)annual rainfall. The intensity and irregularity of rainfall, poor permeability and low water holding capacity of eroded soils with truncated profiles, and inappropriate cultural practices are all factors. This priority is not difficult to understand given that in many communities, water must be taken from ravines, and water carrying can occupy women and children for as much as three hours a day.

The Asset project has recently begun to support construction of impluviums in response to the priority of access to water expressed by the Belle Fontaine community. These collect water from concrete aprons and store it in masonry reservoirs. The water from these impluviums is currently targeted to produce the seedlings of those cash crop tree and vegetable species chosen by the groups for use in expanded *lakous*, gully plugs and existing rock wall terraces. Demand for water for domestic use is already an important secondary use. These have become a successful focus for the organization and mobilization of groups. However, as designed they appear to be expensive to construct and do not seem to be a "replicable" intervention without external (project) assistance.

Other components of the PLUS project are not working with water; extending project activities to include water could be an important organizational tool for projects and would also have a wide ranging impact on health, productivity, food security and cash crop production.

In semi-arid areas such as Gros Moran and parts of the Belle Fontaine watershed, supplementary irrigation schemes could also assure yields of staple crops even in drought years when there would otherwise be no harvest. Small scale irrigation systems can also

enable farmers to grow cash crops, even on a few square meters, which will provide an additional source of income to the farm family economy.

ASSET is responding to this priority, though efforts have so far centered around providing water for cash crop perennial and vegetable nurseries. A wide range of possibilities was discussed in the 1995 Rapid Assessment document and the team agrees with all of the water harvesting strategies put forward. There are other strategies, however, which would also be worth considering, and the conditionality of assistance with water projects also needs to be explored.

a) Institutional strategies

Community based organizations (CBOs) have been used as effective instruments of change in the PLUS project. In particular, the PADF has successfully mobilized local populations for soil conservation activities through CBOs. These organizations provide a relatively cost effective means of reaching and organizing many people. Moreover they provide a mechanism for resolving internal disputes, and for recruiting collective participation. However, despite their extensive use, the long run viability of community based organizations has not been demonstrated as mechanisms for promoting soil conservation interventions. In nearly all cases the PADF CBOs have required sustained technical assistance to maintain activities in soil conservation. Moreover, the interventions undertaken by these organizations have virtually all contained a subsidy element, in addition to the technical assistance provided.

Some PADF CBOs do appear to have evolved into sustainable institutions in cases where they have undertaken activities which generate profits. These typically involve processing and marketing activities.

The Asset project has been successful in using existing organizations to mobilize farmer groups for community level economic initiatives such as building roads and impluviums. These existing organizations have been more sophisticated to the extent that they already had structures, and also where connected into their region's political structure. Their collaboration with these existing organizations has allowed them to take a more demand driven approach in which they have asked these organizations to set their own priorities. Asset has then negotiated with them its contribution to their proposed initiatives. The results have been dramatic in terms of their being able to mobilize large numbers and percentages of the communities with which they work for the activities they are undertaking.

These experiences suggest that while CBOs may be effective mechanisms for reaching large numbers of people, they are not likely to sustainable institutions unless they either focus on profit making ventures which allow them to become autonomous businesses, or they are effective in addressing critical communal needs that provide incentive for people to continue cooperation. This critique is not meant to imply abandoning CBOs that are not focused around marketing or communal issues, but only to suggest that strategies that are centered on implementation by CBOs that do not possess these characteristics, such as those used to spread soil conservation , must be expected to require continual external support for as long as they are expected to be functional.

7. Evidence of Impact

Nearly all of the technical interventions discussed above have the potential for a positive impact on natural resource conservation and on crop production, either individually, or in conjunction with other interventions. Case studies undertaken by the PLUS project attempted to measure the direct effects of these interventions based upon comparisons of interventions and controls. These measurements suggested high returns to many investments. However, these measurements where compromised and therefore discontinued because of the difficulty of maintaining control plots in the trials conducted. Moreover, indicators of impact, such as the rate of spread to participants' other fields, the rate of adoption of these interventions by non-participants, and the permanence of the introduced interventions over time have not been assessed.

The CARE and PADF 1998 Extensive Surveys report that a fairly high percentage of soil and water conservation infrastructure is in "good" condition six months to one year after installation. However, evidence for sustained adoption of PLUS introduced soil conservation practices is inconclusive. The team is unaware of the existence of an adoption study which demonstrates that cooperating farmers have maintained soil and water conservation infrastructure such as gully plugs, hedgerows and rock walls for a sufficiently lengthy period after the termination of direct project interventions in a particular area to suggest that practices have been permanently incorporated into the farming system.

Evidence of secondary adoption of introduced technologies is also weak. Farmers interviewed by the team who had collaborated with PADF, ASSET, and the SECID marketing program variously stated that soil conservation infrastructure conserves soil, permits the productive use of sloped land, and increases yields, but only a few considered some or all of these benefits to be of sufficient magnitude to independently expand these structures or employ them on other parcels without project support. Tenancy status, the degree of degradation of the parcel and the potential return on the labor investment were additional factors which influenced these decisions.

A recently conducted secondary adopters survey demonstrates that some farmers are installing soil and water conservation infrastructure without the incentive of other project benefits. It identifies farmers' reasons for adoption and non-adoption, sources of information, and shows that PLUS was an important influence on independent adopters, but it was not designed to ascertain the proportion of the rural population which has independently taken up technologies through farmer to farmer diffusion.

Farmer motivation for adoption is also difficult to ascertain because of the liberal use of incentives by projects. Although farmers are not directly compensated by PLUS for installing soil conservation infrastructure, adoption of some practices does entitle farmers to receive other project benefits. CARE's approach gives farmers a wider selection of activities to choose from and may give a more accurate estimation of the farmers' evaluation of the worth of soil and water conservation practices, as illustrated by the dramatically different adoption rates from community to community in the same region. However, PADF farmers have a better one-year maintenance record.

In this context of uncertain sustainability, undemonstrated secondary adoption, and the dubious role of inducements to undertake, many interventions, the success of the soil and water conservation measures that have been promoted by USAID in hillside agriculture can

not be said to be demonstrated yet. Section IV of this paper addresses monitoring and evaluation approaches to get at these issues.

Even assuming that these techniques are proven successful, a further question is whether the concentration of PLUS should continue to be on extending these techniques. One recent survey indicated that 98% of interviewed farmers in the project area who where **not** project participants were familiar with the soil and water conservation technologies being promoted by the project.[6] This may suggest that these technologies have been adequately demonstrated to that population. This should be evaluated, but if found to be true, PLUS should shift its strategy to concentrate on introducing elements to the farming system which will have a positive economic impact utilizing the existing soil conservation infrastructure.

A final and related critique of past PLUS activities is that they have been too narrowly focused on soil conservation because project activities were driven by numerical indicators of success that emphasized soil conservation measures. While these interventions may have been beneficial, they may not have been successful because complementary measures where not introduced to allow farmers to raise returns to the crops protected by these interventions. Only 25% of respondents of the "Secondary Adoption of Soil Management Practices in Haiti" survey identified "good yields obtained", "soil productivity increased" and "better crop growth" as advantages experienced by practitioners of soil conservation technologies. Their perception of the utility of soil and water infrastructure is notable, since they have presumably not been instructed as to the benefits by extension agents. This suggests that infrastructure is probably not widely perceived amongst the general public as having a significant impact on soil productivity/crop yields.

8. A holistic approach to hillside agriculture

The analysis of USAID initiatives in hillside agriculture has suggested that one reason that these initiatives have not been more successful is that they have concentrated too narrowly on a few technical solutions. While these solutions may have demonstrated impressive positive effects in isolation, their impact has been muted by the myriad of farm and household constraints which ultimately constrain the success of any individual intervention.

Among the priorities for broadening the approach is the need to introduce new elements to the farming system which will build on the soil conservation and other measures that have already been introduced. A number of technical approaches that warrant greater attention included a greater focus on soil fertility measures such as mulching, water management investments, and low-cost seed improvement strategies.

[6] Preliminary resputs reported by Curtis Jolly for the 1998 Secondary Adopers Survey.

Enhanced soil productivity may be promoted by the inclusion of in-situ legume mulches such as velvet bean in the cropping system on existing soil conservation infrastructure.[7] Over the last 50 years, the use of velvet bean has spontaneously spread amongst peasant farmers on the north coast of Honduras, in the Toledo district of Belize and in the Guatemalan Peten under climatic and soil conditions similar to those found in Haiti. Dramatic yield effects (as much as 400% increase for maize). Use of leguminous cover crops and mulches also protects soil from raindrop impact and pore sealing, slows runoff and increase the OM content/water holding capacity of soils. Farmers can thus use it as a fertility enhancing treatment on degraded or fallowed land. Although velvet bean seed is expensive, as demand increases, it can become a cash crop.

Another important aspect of the mucuna system is that it is a multi-purpose innovation in the sense that the introduction of one single "technology" (the mucuna fallow) provides answers to many simultaneous constraints, from soil conservation to weed control, nutrient input or labor use. On degraded soils mucuna can actually build soil and improve nutrient status over the long-term, even as it is used for crop production, although it could be slow to get established on very poor calcareous soils.

Main benefits are:[8]

1. It requires little labor both for its initial establishment in the field and for its maintenance, because of the ability of mucuna to reseed itself spontaneously.

2. It allows farmers to take advantage of the best cropping season for maize.

3. The mucuna and maize residues are never burned, and the soil is protected year-round from direct exposure to rainfall.

4. Upon decomposition the mucuna mulch provides large quantities of nitrogen and other nutrients to a succeeding maize crop. The mulch helps conserve water in the soil profile, which provides a buffering capacity against drought stress, especially in dry years.

5. The mulch and the mucuna fallow help control weeds.

6. Maize yield levels are doubled compared to fields without mucuna. Furthermore, yields start increasing in the first year after mucuna has been introduced (no delay in response, as in the case in many agro-forestry systems or terracing works).

7. The mucuna system allows continuous cultivation of the same field year after year, without a need for fallow periods.

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[7] Velvet bean has already been tried in Haiti, but with inconclusive results. Eliassaint Malgoire of ORE reported that he briefly worked with velvet bean during the Targeted Watershed Management Project and that "farmers had liked it", but that it had not regenerated, and that when the project was prematurely terminated because of the coup its use ceased. The 1995 Romanoff report states that some Plus farmers had rejected the technology as "a cover crop" because velvet bean competed too vigorously with their corn, beans and sorghum. However, it does not appear to have been tried as an in-situ mulch. In this practice, it must be cut back when the food crop is planted. Velvet bean should not require more labor to curtail competition than ordinary weed control. ASSET has distributed some velvet bean to farmers in Belle Fontaine this year, though it is not clear if it is intended to produce fodder for live stock or as a live mulch.

[8] Triomphe, B, in "Seasonal Nitrogen Dynamics and Long-Term Changes in Soil Properties Under the Mucuna/Maize cropping System on the Hillsides of Northern Honduras", Cornell U., 1996

Small holders may be reluctant to displace relay cropped staples with one corn crop planted into velvet bean mulch, however, many hillside areas of Haiti appear to include fallow periods that would be ideal opportunities to introduce mulching crops. In Belle Fontaine, for example, many fields were observed to be in fallow. [9] Interviewed farmers said that poor soils on steep slopes were fallowed for two years, intermediately better fields for one, and the best soils were cropped continuously, except for the "dry" season from January to April. In those areas where farmers fallow entire parcels because of poor fertility, the use of velvet bean as an in-situ mulch should be attractive to farmers, to intensify land use, increase yields and as a labor saving alternative to physical soil conservation structures.

Access to improved seed can have an immediate and significant impact on crop yields. ORE estimates that without changing any other practice, the use of improved corn seed can increase yields by as much as 40%. Soil and water conservation infrastructure makes an investment in seed less risky and more likely to give good results. In association with practices which increase fertility, the use of improved seed can give dramatic results and make soils protected by infrastructure much more productive.

The distribution of improved seed has so far been done through projects, as an incentive for collaboration on soil and water conservation treatments. These seeds are not widely available through the market. A more sustainable way to effect distribution of improved seed might be to direct subsidies through private suppliers. PADF found that more than 90% (?) of farmers bought grain in the market for use as seed. Distribution of improved seed should be complemented by field demonstration of the advantages of improved seed and farmer training in seed selection and appropriate storage technology.

Another issue is the need to **integrate livestock interventions** into hillside projects when they appear attractive. The importance of livestock as a means of exploiting byproducts, as "savings", for transport to markets, is amply and well discussed in "The Upper Watersheds of the Rivieres Grise & Blanche" Rapid Assessment. The team agrees with the Rapid Assessment analysis regarding livestock and the recommendations therein.

Opportunities to **produce exportable tree crops** appear to be among the most remunerative These can increase farm family income and eventually, can be expected to promote substitution of less erosive cash crop perennials for the production of subsistence food grains on slopes. However, a holistic approach also means recognizing that even if the greatest economic benefits are in tree cash crops., a strategy of intensifying staple crops may be the most effective approach to release scarce farm resources to produce these cash crops. In particular small marginal farmers will need to increase yields of food grains before they will be willing to reduce the area devoted to their production and substitute more environmentally friendly cash/export crops.

As has already been noted, **access to water** is a priority issue with farmers, and yet few techniques have been introduced to address this critical constraint. Some water harvesting techniques which could be introduced include:

[9] According to one estimate, one third of crop land was in fallow each year in the Belle Fontaine watershed.

- diversion dams on dry ravines to redirect run off during and following rainstorms using use unlined ditches to one or more unlined dirt tanks from which small parcels can be irrigated by bucket or hose siphon;

- as an alternative where dirt tanks are not possible because of shallow soil depth, water can also be applied directly to fields below the ditch, in conjunction with water conservation techniques (infrastructure, mulches) designed to hold water on field;

- unimproved water catchment ditches below steep slopes, or rock faces to conduct water to dirt tanks, or to directly irrigate field in association with other water conservation practices,;

- exploitation of springs for both domestic and small scale irrigation by oversizing delivery systems so that water in excess of domestic needs for community can be used for small garden plots;

- ram pumps to get water up from lower springs to reservoirs for domestic use and possibly for irrigable garden plots as well;

- sub-surface concrete water catchment box with rock and gravel filter above in dry ravine with pipe to reservoir or dirt tank; could be for several families, and might provide sufficient water for small gardens, as well domestic consumption;

- in larger catchments, sub-surface diversion dams extending down to impermeable strata could provide water for extended periods after rain fall; such systems can be used for direct irrigation or to similarly fill dirt tanks;

- also in larger catchments, infiltration galleries built in bed of dry rivers to catch sub-surface flow can be used to irrigate more extensive areas.

These technologies typically require technical direction and tools, cement, reinforcing rod, in varying quantities according to the sophistication of the infrastructure. Farmers in Belle Fontaine have already demonstrated their willingness to contribute an impressive amount of labor to impluvium structures which will benefit their groups.

In exchange for assistance with water projects farmers , should similarly supply the labor required, but can also be asked to do things in the catchment area above some of these water harvesting installations which will protect the infrastructure and increase the supply of water.

Tree planting, soil and water conservation infrastructure, control of fire, restricting livestock access, can all be contractually agreed upon. Groups (where none exist) would have to organize themselves and agree to the above conditions in a petition to the project before the water infrastructure would be considered. PLUS (or its successor) engineers would prioritize such proposals from communities according to feasibility, the degree of organization of the group and its commitment.

From the team's perspective there is no "silver bullet" that can resolve the multiple problems of hillside communities. Technical solutions can have major impacts, but their success is almost always localized to the particular agro-ecological, and socioeconomic environment into which they are introduced. To maintain relevant and effective strategies, future hillside projects need to continuously reassess the impact of the technical activities

they support with the view of improving the efficacy of these efforts in responding to ever-changing circumstances. (Section IV examines evaluation tools in detail.)

D. New Approaches to addressing hillside problems and linkages to other AID activities

The preceding discussion has argued that USAID strategies to address hillside agriculture in Haiti over the past two decades have focused primarily on objectives of stabilizing the natural resource base through soil conservation measures. However, problems that have arisen in this process have illustrated that without dealing with the larger context within which hillside agriculture is deteriorating , these investments are not likely to be successful. This suggests not only that a more holistic to hillside agriculture is required but that the approach must also be coordinated with changes in areas beyond agriculture. Examination of the underlying causes of the downward spiral of hillside conditions suggests additional components of a strategy to reverse the process of decline. These are identified below and specific recommendations for developing a new hillside strategy are made with particular reference to other activities that USAID is already undertaking in Haiti.

1. Reversing the "Malthusian" process

One of the most fundamental causes of deterioration of hillside agriculture is attributed to overpopulation.[10] According to this "neo-Malthusian" argument, growing rural populations are increasingly taxing the resource base. In many areas it is argued that the pressure on soils has reached a point that people are mining soil fertility because falloffs have shortened to a point that soils are unable to recover their fertility.

To the extent that population pressure is the driving a process behind the deterioration of hillside agriculture, the implication is that more needs to be done to reduce the burden of population on hillside resources. This can be accomplished either by slowing the natural growth rate, increasing out-migration or reducing the dependence of hillside populations poifnd Tw planthat,e tmahatut-m of h,lowing the n5 0 -13.5 85 0.0194hillm038rs s /cthed he to e rrtegy inmns

wellbeing and food security in rural areas.[11] This dynamic works through a wide variety of effects of female education on improving family planning practices and nutrition of families, and in empowerment women as decision makers and income earners. In effect primary education makes the target population more knowledgeable and productive in their own surroundings and increases their qualifications to seek alternative employment to agriculture for their livelihood. Again USAID already commits important resources to education in Haiti. Hillside communities should be made one of the focuses of these resources.

Other strategies to increase non-agricultural sources of livelihood include, first, efforts to stimulate employment growth in secondary urban cities of Haiti. This issue is being addressed indirectly by USAID's the new focus on secondary urban centers. Activities envisioned under these interventions are expected to create a more conducive environment for attracting investment to these centers, thus increasing employment opportunities.

This dynamic has been documented in Bangladesh and Madagascar, for example, where the growth of a garment industry resulted in a large influx of labor from rural areas. This same industry established a strong foothold in Haiti in the late 1980s, but was squashed by the embargo in 1991. Currently, US legislation prevents USAID from direct involvement in this sector. Nonetheless a wide array of activities can be identified that could dramatically improve the prospects for attracting labor intensive industry back to Haiti. These range from investing in basic public infrastructure (water, sewage, road, port, electricity, telecommunications) to support industrial activities, and reforming labor, investment, and business legislation to facilitate the establishment and operation of labor intensive businesses.

Another strategy which has the potential of a much more immediate means of providing alternative employment for productive labor and of injecting income into the region would be to establish a program with the United States for the seasonal use of migrant agricultural labor in the United States. Similar programs have been created with other Latin American and Caribbean countries. These programs permit participants to earn several times their annual earning in the United States. The program would also address an urgent need for unskilled labor in the American farm industry.

b) Arresting the "Tragedy of the Commons"

A second reason often given for the deterioration of the natural resource base in Haitian hillsides is a "tragedy of the commons" process. The argument goes that rights to agricultural land are insecure and inadequate to justify individual investments to protect resources and improve productivity. Therefore, it is not in the interest of individuals to protect shared resources, or to forgo using them to his advantage even if this contributes to their overall degradation. Thus resources that are not individually manages are being degraded because in the absence of effective communal control of communal resources.

Some have questioned the "tragedy of the commons" argument , given evidence that state or communal land holdings represent a very low fraction of the land in most hillside communities. Moreover, the role of land tenure in inhibiting investment decisions has been

[11] Cf. Stryker and Metzel, 1998. IFPRI, Brown and >> 1998.

challenged by microeconomic data which finds almost no evidence of differences in behavior across different formal categories of land tenure in Haiti.

On the other hand there is also evidence that formal tenure status may not appear significant not because security of tenure doesn't make a difference but because officially recognized tenure classifications provide no indication of true tenure conditions. Moreover, government efforts to clarify tenure may only increase insecurity. This, for example, has been the experience with recent moves of the official land reform agency , INARA (Institute National de Reforme Agraire) which only increased the level of insecurity by seizing properties for which customary claims of tenure where questioned.

Related land issues raised to the team are the problems of "indivision" and "landowner absenteeism" by landowners. "Indivision" is the case where land is owned by family but no individuals within the family have clear rights to manage its use. Landowner absenteeism is blamed for inadequate oversight of land management, and low incentives to invest in land improving interventions. Both problems permit inappropriate and non-sustainable uses of the land.

Another type of "tragedy of the commons" problem concerns the negative externalities of hillside agriculture on downstream farmers. These costs are especially high in Haiti's irrigated lowlands where irrigation schemes have become unproductive due to rapid siltation from upstream soil erosion. Unprotected watersheds have also greatly increased flooding and reduced the duration of water flows, further limiting the potential for irrigation.

All of these problems suggest that other approaches to the management of hillside land need to be found to permit land users greater security in making long run investments. Given mistrust in governmental authority, these mechanism may need to rely more on local community institutions to control communal resource issues.

One interesting experiment found by the team illustrates the possibilities of communal approaches. A farmer's group working with the PADF project has developed a contracting scheme with absent landowners from their village to manage their land for them. The group served as to assure that sharecroppers and tenants of the land lord practice certain soil conservation techniques and tree planting. The tenant farmers involved in the scheme received a greater share of both staple and tree crop harvests than traditional sharecroppers as an incentive to plant and maintain a tree crop on the land for the land owner. This mechanism provided a means for the landowner to manage and improve his property, while giving sharecroppers a greater return, and the community is able to protect its common watershed. As a result, steep hills that had been under continuously sharecropped maize and beans, now have permanent tree crops intercrossed with maize and manioc.

Another approach that might permit the negative effects of upstream watershed degradation to be "internalized" could build on existing irrigation water-user associations to funnel some funds from irrigation farmers who would benefit most from watershed protection to the communities which must undertake this protection. In several large irrigation schemes, these water user groups already tax water use in irrigation to pay for maintenance of their systems. Allocation changes might be made to allow some of these fees to pay for upstream protection.

For such an approach to occur, however, downstream users must be convinced of the efficacy of their investments arresting the costly effects of degradation on their agricultural

systems. Unfortunately to date, evidence of the efficacy of investments in upstream soil conservation and watershed protection measures on downstream impacts is not available. As noted in Section III, evaluating this type of impact must be a priority of future USAID monitoring and evaluation of hillside interventions.

c) Changing incentives in favor of sustainable, high value exportable crops

A third cause of decline in hillside agriculture may be attributed to economic policies that undermined the incentives to produce crops that where most adapted to hillside agriculture. This policy bias has been created due to excessive protection of staple food crops, and negative protection of exportable crops such as coffee and cocoa. As noted in the discussion of the policy environment for agriculture, until recently Haiti heavily taxed exports as a means of raising public revenues, and heavily protected staple production, to favor certain large farmers and in the interest of "self-sufficiency: Although many of these policies have been reformed in the last decade, over the same period, the emergence of collusive export markets have continued to undermined prices for exports at the producer level. (See next section.) As a result hillside crops such as coffee, and cocoa for which Haiti has a strong economic comparative advantage have been replaced by staple food crops whose production represents low or even negative net economic value to the country.

It has also been suggested that in misguided efforts to redress the collapse of the agricultural sector, donors have sought to sustain rural populations through overly subsidized delivery of agricultural inputs and seed. These efforts have been insufficient to adequately meet demand for inputs, and have undermined commercial markets for agricultural inputs.

An important component of any USAID hillside agricultural policy must be to establish and sustain a coherent macroeconomic and agricultural sector environment that will encourage production of products that are in Haiti's greatest comparative advantage, inclusive of economic valuation of their environmental effects. In this regard, USAID should work with other donors and with the Haitian government to assure that the climate for agricultural production is carefully monitored. This activity is all the more important in light of important current issues mentioned in the discussion above that could cause this climate to change dramatically. These include the potential of overvaluation of the Gourde, changes in trade policy if Haiti joins CARICOM, and ad hoc agricultural input policies applied to fertilizers and staple seeds.

III. MARKETING STRATEGIES FOR HILLSIDE AGRICULTURAL COMMODITIES

The analysis of the previous section has emphasized the importance of cash crops in the future of Haitian hillside agriculture because these crops show the strongest comparative advantage, are likely to be the most sustainable crops, and are central to raising incomes of hillside farmers. However, to stimulate productive investments in these commodities a greater emphasis must be placed on marketing hillside agricultural commodities in Haiti.

In order to assess agricultural markets in Haiti, it is convenient to categorize its important hillside agricultural crops according to characteristics which affect market structure and conduct. These characteristics include the crop's importance in local diet, its contribution to income (whether primarily a food staple or a higher valued cash crop), its perishability, and the type of market in which it competes to determine its price. Table ?? below provides a rough classification of crops with respect to these characteristics for the purposes of the discussion which follows.

Table 0-1 Categorization of Commodity Marketing Prospects

Tradability ***Value and Characteristics***	***Importable***	***Nontradable (except on Hispaniola)***	***Niche market or seasonal exportable***	***Large exportable markets***
Low valued staple foods	Maize, rice, beans	Manioc Manioc flour		
Higher valued perishable foods		Cabbage, tomatoes, potatoes, onions	Yams, pigeon peas, plantains, citrus, breadfruit, Spanish Gourd etc.	Mango, avocado
High valued non-perishable cash crops				Coffee, cocoa, ginger, other spices

A. Domestic food markets

1. Market characteristics

Local markets for food staples appear to operate competitively in Haiti. At the local level, food markets are typically held weekly on specified market days. In many areas of Haiti, particularly in mountainous regions, produce is still transported by head loads or by mule to these markets. Market women, known as "Madam Sara", serve as intermediaries for collection storage and transport of produce to larger urban centers. These intermediaries typically do not own their own transport but travel by pickup and 10-ton trucks between markets. Some transporters cover relatively consistent circuits and schedules so that most areas with passable roads have predictable transport service to market centers. Analysis of profit margins in local markets suggest that marketing margins for locally marketed crops (bananas, maize rice, and peas) are roughly of the same order of magnitude and appear reasonable, considering high losses, high risks in marketing and the high opportunity cost of capital. [12]

[12] See Metzel, 1999.

Characteristics of higher valued perishable commodities such as cabbage, carrots, potatoes, onions, tomatoes produce certain particularities that distinguish them from staple food markets. First of all, because they are more perishable, market channels are much shorter. Thus market flows are typically from rural areas to regional urban centers in close proximity to them. Secondly, because they are perishable, most are nontradable, so that prices are set largely by domestic supply and demand conditions. Thirdly, because of their relatively high value, they are a minor component of poorer Haitian diets and so market volumes are limited. Finally, higher value also means however, that these crops can support commercial inputs more easily. Thus they are produced using more input intensive technologies than staple crops.

At certain points in the year, these products may compete with imports from the Dominican Republic, and occasional surpluses may be exported to the DR or to other islands in the Caribbean. For example bananas and other tropical fruits and vegetables are exported from northern Haiti to the Bahamas.. This trade appears to occur largely due to localized factors of transport advantage, particularly for producing areas near the border with the Dominican Republic (D.R.) and due to seasonal differences in supply.. This is the case, for example with potato and onion exports from Thiotte to D.R.

Most staple foods (maize, rice, beans, and sorghum) must compete with imports because these foods are produced locally using relatively unproductive traditional technologies, in competition with much more productive world suppliers. Imports of staple foods have grown steadily in recent years because of weak performance of the agricultural sector. Cereals represent the single largest category of imports of the country by value, of which rice is the most important import, followed by wheat flour, poultry and beans.[13] Maize is also imported but in far smaller quantities, although cereal brands, and blends are imported in substantial quantity as well.

Staple imports include both commercial imports (primarily of rice and beans), and food aid imports. Food blends represent in large part, food aid commodities due in part to the logic that these semi-processed commodities will compete less directly with locally grown food staples.[14]

With relatively free trade, producer prices for import substitutes are set by world prices inclusive of applied tariffs in urban areas. Because of this, staple prices are not strongly seasonal in these areas.[15] Rather they fluctuate as a function of world prices, exchange rates, and factors affecting trade (embargoes, transport costs, tariffs). On the other hand, prices in remote rural hillside communities isolated from world markets do fluctuate with production cycles. As would be expected, prices for perishables are much more variable because the local market is limited, storage and preservation capacity is nearly nonexistent, and export markets are not developed.

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[13] This structure has existed, however, only for the last decade, before which, wheat flour and wheat imports far exceeded rice imports. Reasons for this reversal are unclear to the author.

[14] At least two other unrelated reasons are also given for this focus. First, these commodities are said to promote better diets, and finally, use of semi-processed foods, generates greater support for these programs for the agro-processing industries in the donor countries.

[15] C.f. Metzel 1999. The exception is for maize which shows higher variability, in large part because imports represent only a sporadic and small share of the market..

2. *Market Prospects and constraints for food crops*

Demand for import substitutes and nontradables commodities is limited to local demand, with the exception of localized trade in these commodities with the Dominican Republic. An analysis reported in Table ?? below attempts to estimate potential growth rate of demand for Haiti's importable and nontradable agricultural products.[16] Table ?? presents rough estimates of current production, and consumption. It also presents the annual rate of supply increase from 1996 levels necessary to saturate local demand in 10 years given three scenarios of capita income growth per annum (low, 0%; medium, 2%; and high, 4%).

Table ?? Production Growth Necessary to Saturate Domestic Demand

	Production 1996	***Baseline Consumption Projection 2010 (a)***	***Production growth rate necessary to saturate local consumption at different levels of per capital income growth***		
Income growth scenario/capita---->			***0%***	***1%***	***3%***
Cassava	350000	481201	2.3%	2.6%	3.4%
Maize	204058	335546	3.6%	4.0%	5.0%
Plantains	270000	371213	2.3%	2.7%	3.7%
Potatoes	7000	9624	2.3%	2.9%	4.3%
Rice (Milled Equivalent)	63945	347965	12.9%	13.6%	15.0%
Sorghum	88140	121180	2.3%	2.7%	3.7%
Starchy Roots	770300	1059056	2.3%	2.6%	3.4%
Sugar, Raw Equivalent	32500	247710	15.6%	16.3%	17.8%
Vegetable Oils	1676	124323	36.0%	37.1%	39.4%
Vegetables	211325	295458	2.4%	3.3%	5.0%
Yams	190000	261224	2.3%	2.7%	3.7%

Note: (a) Consumption estimates assuming 0% income growth per capita. All consumption estimates include waste. Rate of waste assumed constant over time in projection
Source: Metzel, 1999.

The analysis suggests that there is little risk of saturating domestic demand for rice, sugar, and vegetable oils because double digit annual production growth would be required to do so. This is principally because production must displace large volumes of imports in addition to overtaking demand growth in order to saturate the local market. Coarse grains, maize and sorghum, currently marginal imports, shows much lower production growth rates needed to reach saturation (3-5%). However, these estimates are probably low because they ignore intermediate demand for coarse grains, which is likely to rise rapidly if incomes grow, to meet feed needs of pig and poultry producers.

The other commodities in the table are generally higher in valued commodities, with smaller local markets. They are all currently nontraded, meaning that production already satisfies demand, and therefore production can only expand at the pace of population growth plus

[16] For the analysis, estimates of consumption per capita were derived from FAO 1996 food balance data. No distinctions are drawn between rural and urban populations or by economic strata. Population driven demand growth for staples is estimated at about 2.3% annually. Changes in demand due to changes in per-capita income are evaluated using generic estimates of income elasticities assuming that for these commodities elasticities are likely to be positive but less than unity and decreasing as incomes rise.

any projected increases due income growth per capita. This suggests that agricultural intensification strategies for these commodities should focus on those with prospects for reaching export markets. (See discussion of exports below.)

Opportunities to improve domestic marketing performance exist for food crops in a number of areas which can increase efficiency in marketing, reduce marketing losses, or add value in processing. Market efficiency can be promoted, first, by improving transport infrastructure in remote areas. Though costly, roads reduce transport costs, increasing competition, and facilitate information flows. Making market information more readily available to intermediaries, particularly in isolated areas is another less expensive means of improving market efficiency. A variety of techniques for improving storage and processing of staple foods exist but must be tested in local markets to assess their feasibility and acceptability to local consumers. Ideas for doing this are addressed below under??.

B. Export crop markets

1. Market Characteristics

Currently, Haiti's most important agricultural exports are coffee, cocoa, and mangos although data on their importance are contradictory.[17] The recent experience of coffee, which has seen a long decline in production and exports, provides one case study of the constraints and potential for traditional commodities. Declines in coffee production and exports have been attributed in part to the extreme shocks to the Haitian economy in recent years, requiring farmers to concentrate on food crops to survive. Farmers are reported to have begun to "mine" their plantations, rather replanting them. Other causes of decline include disease, and the loss of government support to the sector, both in terms of oversight of quality controls, and support to producers for extension, disease control and subsidization of seedlings for new planting . Recent declines in exports through traditional exporters in Port au Prince may also reflect an increase in exports to the DR from areas along the borders.

At the level of market intermediaries and exporters, there also appears to have been a loss of interest in the sector, with a number of processors and exporters going out of business, and others consolidating their activities . This decline was in part caused by the sever shocks to the sector due to the embargo. However, the continuation of insecurity is also raised as an important cost that has made operations untenable. For example, one large exporter shut a processing facility and curtailed coffee collection activities after a collection truck was robbed, a collector was killed and processing facility was sacked.

Finally, declining trends at the production level are attributed the lack of price incentives to farmers. This loss of incentives is generally attributed to the oligopsonistic structure of the export market which has allowed collusion among exporters to hold producer prices down to marginal cost levels. The evidence of oligopsonistic cartel behavior in these markets is strong. Aside from donor supported projects and cooperatives, there are currently three large exporters operated in the cocoa export market and seven in the coffee market. The three

[17] According to the FAO, the global value of coffee exports ranked first ($12 million dollars) in 1997, with mangoes ($5.2 million) and cocoa ($2.9 million). However US Dept. Commerce data shows that imports of mangoes to the United States alone where greater than $7 million in the same year. Moreover, to the US mangos ranked first followed by coffee and cocoa. See Annex Tables on trade.

actors in the coffee sector are also among the seven actors in coffee. Moreover, a number of these actors in coffee and cocoa are reputed to be linked by family ties. Each group is reported to have divided up the country into areas of operation in which one or at most two actors operate. Interviews with producers and producing cooperatives, confirm the presence of only one "king" in their regions, to whom all market intermediaries sell. Moreover, accounts of strong-arm tactics to control areas of operation suggest efforts to sustain these zones of control. The cartels are reported to meet on a regular basis to collude in determining prices to be offered to farmers. Each group is reported to have strengthened in the early 1990s during the period after the coup d'etat.

Mangoes, currently the second agricultural major export of Haiti after coffee, show some similarities to the coffee and cocoa markets, although not the same degree of concentration. Currently mango demand in the United States has been growing steadily. Haiti is blessed not only with a substantial surplus of Mangos, but with a variety of mangoes, the *Francisque*, which is particularly appreciated. Mango exports began growing before the embargo, where stopped, but have rebounded rapidly since then.

Mango exports are handled by about a dozen major exporters. All exporters provide credit to buyers to purchase produce for them from producing areas. Some exporters appear to have their own trucks for collecting mangos, but many rely primarily on buyers to arrange their own transport. Most buyers have specific buying regions in which they purchase mangos. Buyers typically employ teams of local collectors to assemble mangos for export. A common practice is for collectors to purchase the mango harvest of particular trees from farmers well in advance of the harvest. It is then the responsibility of the collector to come and pick the trees he has purchased. Prices paid for mangoes through these contracts are much lower than at harvest.[18] In 1996/97, an assessment of margins between producer and export price also found that prices received by producers where very low in comparison to prices paid by the exporters for the mangos in Port au Prince, suggesting that noncompetitive rents existed in mango markets.

In general, high margins in domestic marketing for all these export crops appear to be in part because of the high percentages of unexportable product quality. These losses mean that margins between producer and export price must be adjusted by levels of losses due to receipt of unexportable quality. In addition the practice of selling these crops before harvest suggests that a credit component is built into the market margin..

In addition to these adjustments, however, various structural characteristics of these markets suggest the capacity for exporters to exercise limited cartel behavior in these markets. First, public sector corruption permits unscrupulous exporters to manipulate the market, second poor roads and low market traffic volumes in isolated limit farmer access to markets and alternative buyers. Third, low volumes mean that it is often not worth a new competitor entering a market because splitting the volumes would make the activity unattractive to both buyers. Fourthly, credit needs of farmers and intermediaries create a strong dependency on buyers who extend credit.

[18] A phenomenon which makes evaluation of prices and margins difficult is the habit of buyers to increase the count "per dozen" to as high as 14 or 15 mangos. The increase may reflect discounts for size or quality, or simply a unit price adjustment.

Finally, lack of market information gives buyers a strong negotiating advantage. In isolated areas, farmers simply aren't aware of the extraordinary gap in prices between producers and exporters. Moreover, they lacked information pertained quality requirements, better product storage and packing techniques, alternative buyers, and the ultimate consumer of their product.

2. Expanding markets for existing exports

A number of opportunities exist to expand markets for Haiti's traditional export crops. First of all, unit prices received by Haiti for most of it's coffee and cocoa exports are lower than world market standards because of poor quality. In the case of coffee, exporters complain that much of the coffee is now almost unsellable. Some of the reasons for poor quality include premature harvesting by farmers to avoid theft and to obtain cash sooner, on the other hand, some coffee also deteriorates because it is being held too long by farmers as a store of value, finally a high percentages of foreign matter is present in the coffee. This is due both to poor handling practices, and apparently to efforts to cheat the buyer. By raising the weight. Cocoa quality also has deteriorated due both to high infestation rates by pest and mold and high humidity. Servicoop has been successful in raising quality for cocoa by providing a premium for beans which meet certain standards, and by giving technical assistance to cooperatives on how to manage these problems.

The deterioration in quality appears to be both because of a lack of incentive to farmers to provide high quality and due to a withdrawal of traditional exporters from much of the quality control functions that they have traditionally performed in the circuit. Reasons given by exporters for their inability to sustain quality have included the inadequacy of government regulation and organization of the sector , the lack of public effort to control pest and disease problems, marketing security concerns, and the loss of markets for quality product during the embargo.

Other means of expanding markets for these crops include seeking certification as organic crops and subscribing to organizations which give a higher price to products of small farmers in developing countries. Both of these strategies are being pursued by various exporters for coffee, cocoa and mangos.

3. New export opportunities and constraints

A wide range of "non-traditional" exports also has potential for export to the US produce market. Given the costs of collecting them, these commodities must be relatively non perishable, reach moderate standards of appearance and uniformity and are generally destined for niche market Caribbean consumers.

Haitian exporters are eager to cooperate in exporting these commodities but do not have the capacity to organize producers to provide sufficient supply, in the necessary time intervals, of sufficient quality. In discussions with exporters, they point to a variety of commodities that benefit from these advantages. Most importantly tropical commodities which are not produced industrially and for which niche markets exist in the United States, particularly among Caribbean communities. These include pigeon peas, yams, hot peppers, tropical vegetables igname, Spanish gourd, pummelo, guava , papaya, melons and breadfruit.

Exporters claim that they can easily sell these in Miami or New York markets at attractive prices.

a) Supply constraints

For traditional and non-traditional commodities, however, the greatest constraints are of obtaining sufficient quantities on a reliable basis to warrant exporting, and assuring that the product is of sufficient quality. Because most Haitian farmers have very small farms and these farmers are only willing to risk a small portion of their time and resources to cash crops, particularly to new crops for which they have no certainty of success, any effort to organize sufficient quantities to export must involve the collection of production form many small farmers. Moreover, to undertake new ventures, small farmers must be given instruction on how to grow and handle the produce. Exporters do not have the organizational capacity, nor technical resources to undertake this type of high overhead activity.

b) Commercial credit and risks

Another set of constraints noted by export entrepreneurs who are interested in diversifying their export base concerns risks entailed in mounting new exporting operations. To generate sufficient volumes of new production, entrepreneurs are required to extend relatively large volumes of credit to local producers and buyers. However, in the existing legal and business climate there is no way to secure credit nor to insure its reimbursement. The alternative of producing themselves, also is fraught with difficulties in locating and leasing land sufficient land and finding competent managers willing to work in agriculture. Assessments of risk in all new investments are heightened by a sense of unpredictability in public policy and in the outcome of any legal or regulatory decisions. These underline the need for clarity and consistency in policies affecting agricultural investments.

c) Phytosanitary controls

Strict phytosanitary controls on agricultural imports to US and European markets require crop by crop attention to specific risks posed by pests and disease to which each crop is susceptible. Despite strict requirements, a wide range of potential crop exports do **not** face specific health risks that might exempt them from importation to the United States. Among crops commonly grown in Haiti, and mentioned in this report, no particular treatment protocols are necessary for avocado, bread fruit, beans, cacao beans cassava, citrus (including lemon, lime,, grapefruit, kumquat, orange, pummelo and ugli fruit), eggplant, ginger, jackfruit, papaya, pigeon peas, tomatoes.[19]

Where a crop is restricted, a treatment protocol can be developed with USDA but this process can take many years to develop, and typically requires a critical volume of exports to justify.

An example of an effective program to address this type of constraint is the mango inspection program that the USDA/ APHIS has established in Port au Prince. The office inspects hot water treatment of mangoes which permits their certification for export to the

[19] Untitled listing provided by APHIS office, Port-au-Prince. December, 1998.

United States. Because of expected growth of demand for these facilities, particularly from the region of Gonaives, there is discussion of the prospects of opening inspection of additional facilities in Gonaives. This program currently faces problems with mango exporters over their arrangement to reimburse USDA for the costs of this program. It is expected that the exporters will soon form an association to handle this process and thereby make the process more transparent and accountable.

d) High transaction costs

Finally, costs of transacting trade are high in Haiti because of the lack of basic road, telecommunications and port infrastructure. Roads are critical to market access for hillside farmers. Currently most marketed produce comes on headloads or donkeys out of hills. The high unit costs of these methods rapidly undermine the economic comparative advantage of any agricultural commodity trying to reach urban or export markets. A rough estimate provided by hillside farmers suggests an additional cost of 1 gourd per kilogram per ten kilometers. This would reduce the producer's price of coffee by 5% for each ten kilometers distance from a road.

The of Asset project experience in Belle Fontaine where the local community mobilized 50,000 person days of volunteer labor to build a rural road clearly illustrates the value of these roads to local communities both for bringing goods in and for evacuating product.

Port costs for exporting are also high in Haiti, although they have fallen substantially in the last year. For example refrigerated 40 foot containers shipped by sea to Miami cost $4500/container in 1997, but have fallen to $2800 in 1999. This improvement has dramatically improved the returns on exports to US markets. Rates are similar and sometimes cheaper to Europe. Freight to New York still continues to use the DR in most cases however, because of much more frequent service and cheaper port charges. .

Dedicated storage structures for crops are almost nonexistent in rural areas. Most farmers store crops in their homes or by hanging them in trees. Keeping crops dry and away from pests and livestock are among the most immediate problems. Security is also a problem in less isolated areas.

C. Impact of USAID activities in Agricultural Marketing

Through the PLUS project, USAID has supported a number of marketing initiatives that have had remarkable success in improving market performance, and raising incomes to farmers. These activities are examined below under three major strategies which have been used – promoting competitors in uncompetitive markets, organizing marketable surplus through farm marketing groups and linking actors to new opportunities.

1. Promoting market competition

Through its sponsorship Servicoop, a cooperative marketing associations, USAID has begun to increase competitiveness in cocoa and coffee markets. This has occurred because Servicoop has provided alternative marketing options for cocoa and coffee producers in their areas of operation. This competition has served to bid up the price of both products in regions that Servicoop has been serving, and so have raised farmer incomes from these crops. Moreover, by insisting on quality standards in its purchases and providing a price

differential for better quality coffee, it has introduced a new dynamic into the market that is raising producer quality.

A USAID sponsored IICA project initially had similar success in working with cooperatives of coffee producers to process and export coffee themselves in the region of Jacmel. By cutting out the middlemen and dealing directly with foreign buyers, this experience was able to raise incentives to producers, increase quality and therefore prices of its products. Management problems of the project have recently reduced its effectiveness, suggesting that the project needs to be restructured to put it on a stronger business footing.

2. Using market cooperatives to increase market efficiency

A second successful strategy that the PLUS Project has used to improve the efficiency of commercial marketing from small producers has been to work with community based organizations (often set up by the PADF component of PLUS) and cooperatives to assemble and prepare produce for marketing. Servicoop's presence is also strengthening marketing cooperatives because Servicoop only purchases from cooperatives, thus forcing the market to work through these cooperatives. Many of these cooperatives have been established by previous projects but had become moribund as production has fallen over time. The entry of Servicoop has rejuvenated these cooperatives, while capitalizing on past investments in cooperative infrastructure and training to make rapid progress in developing these markets.

In the last two years, the PLUS project has also undertaken activities to improve conditions in mango markets. These efforts have centered around efforts to organize farmer groups to negotiate their selling prices for mangoes. These efforts have demonstrably increased prices to producers and have also resulted in a streamlining of market structure such that farmer groups are now beginning to negotiate directly with exporters, bypassing the traditional intermediaries. By working with farmer groups to improve handling, storage and packing methods, exporters have also been able to dramatically lower their reject rate.

Although market development usually resulted from collaboration between CARE, PADF and SECID, the SECID marketing team is also working with farmer groups which are not in the PLUS project areas and do not receive technical assistance. PADF and CARE should have the flexibility to intervene in areas where farmers are working with the SECID marketing program promoting soil and water conservation technologies and improved staple crop production practices. Farmers might be more receptive because of their desire to expand the area in cash crops. This could be as simple as farmer to farmer cross visits, or might mean opening new areas with a mobile team of technicians who would conduct training courses for coop members, establish demonstration plots, and regularly visit.

Through periodic external consultancies SECID is currently providing technical training to cacao producers and PLUS extension agents in those areas where marketing activities and PLUS farm initiatives coincide.

A number of market developmental effects are evident in these experiences. First the development of marketing activities with farmer groups has provided these groups them

with a profit center that provides resources to make the groups more sustainable; this also seems to force them to become more organized and to begin to work on business principles.

Viable cooperatives, in turn provide an institutional mechanism through which to channel technical assistance to farmers. Twenty members of the Port Margot cacao marketing cooperative, were given advanced training in cacao production by MEDA and advise their far on methods to improve production volume and quality.

For the exporter this approach overcomes their biggest difficulties in dealing with small farmers: by assembling sufficient product to make it worth their while to send a truck to get it. It also provides an efficient structure through which to pass information and technical advice on how to improve production, storage and handling of product to increase the volume and quality of the product.

One constraint to expanding market cooperatives, however, is that currently cooperatives are unable to obtain credit from banks because protections against seizure of cooperative property prohibit their use as collateral in obtaining loans. These policies have evolved to protect cooperative members from exposure to bad debt that might be incurred by corrupt leadership. On the other hand, they severely curtail the capacity of cooperative to raise capital. The FINNET project should examine criteria and procedures by which credit applications of sound cooperatives with strong track records could be guaranteed.

3. Exposing the market to new opportunities

A third important contribution of the PLUS project marketing component has been to introduce a number of new commodities into the domestic and export markets. This activity has been most successful with mango exporters to date, perhaps in large part because these exporters are plugged into the tropical produce markets in the USA and Canada. These markets are the most obvious targets for other tropical commodities that Haiti can produce. In addition to mangos however, PLUS is undertaking export marketing trials for yams, pigeon peas, Jamaican pumpkins, and bitter oranges. It has also developed a new domestic market for manioc flour which has become the commercial focus of a number of cooperatives and farm groups. This product is especially attractive because it creates a means of preserving harvested manioc, which is otherwise highly perishable. The impact on producer income of all of these activities has been strongly positive for producers. The introduction of competition into the markets for cocoa, coffee, and mangos has already substantially improved both the share of the export price and the absolute price paid to farmers. Farmers have also initiated strategies to raise immediate supply response, but investments in production expansion are only beginning.

4. Problems with USAID's current marketing approaches

Several potential problems in these approaches should be noted however. First the strategy of promoting a champion in a noncompetitive market to make it more competitive must avoid the risk of undermining the same markets it seeks to strengthen. This could occur, for example, if Servicoop begins to crowd out its competitors on the basis of the subsidy

component of its financing. At the extreme, Servicoop could simply replace them in controlling the market.

On the other hand in trying to break into an established and colluding market, the more immediate danger is that the competitors will act to undermine the newcomer. In this regard, Servicoop is already facing "hardball" tactics from its competitors in competing for the market in both coffee and cocoa. These tactics have included a price war, and underhanded efforts to stop its shipments.

A third risk is of bankruptcy of marketing cooperatives due to the difficulties of startup in a business that requires heavy initial investments, is exposed to high price risk, and must rely on low margins on high volumes to survive. In this regard, Servicoop is not yet a financially viable institution. It has benefited from more than $450000 in grants for capital and startup costs, and has also benefited from free technical assistance from the PLUS project. To date however, it has not showed a net profit for any 12 month period. The substantial losses it incurred over the past year occurred in the context of a declining world price for cocoa. One problem was that Servicoop's sale volume was lower than expected because its competitors launched a price war to close it down. Secondly, it lost money due to negative price movements in intervals after it had pledged buying prices to its cooperatives.[20] In addition, Servicoop incurred expenses in the midst of this depressed market to begin exporting coffee and to expand cocoa operations in the south. These two decisions appear now to have been strategic investments that could substantially raise returns in the near future. Finally, until December 1998, Servicoop continued to pass back 80% of profits on any particular sales to its producer cooperatives despite it incurring losses overall. This policy was only recently suspended.

As a startup company, these results are not alarming.. Nonetheless, Servicoop is currently heavily reliant on two bank loans to cover its operating expenses. It has not yet begun to accrue capital to cover the replacement costs of its vehicles, nor to cover its exposure to adverse price movements during its purchasing and sales campaigns.

Creating sustainable cooperative institutions represents another difficulty of promoting cooperatives as marketing solutions. For example, the internal operating procedures of Servicoop are also still in a state of development. Like any new business it still needs to develop internal procedures and policies with respect to employees, benefits, taxes etc. Most importantly, policies for the allocation of profits between debt, reinvestment, employees, and its farmer cooperative partners are still unclear. The current guideline is to distribute 20% of profits to its employees and to keep 80% to build up its capital. However, it was not clear to the team that this policy has been adopted officially, nor that it has examined all contingencies.

Another issue with respect to Servicoop is the status and sustainability of its governing board. Currently the board is composed of selected persons which serve for staggered 3 year terms. These persons serve without remuneration but are in principal part owners of the assets of the business. The perception of a conflict of interest regarding the PLUS personnel participation on the board of Servicoop could become a liability to PLUS and individuals involved if not clarified.

[20] Servicoop must announce its buying price to its cooperatives between a week and two weeks before it obtains its selling price.

The claim of a potential conflict of interest rests on the dual roles of these advisors in determining marketing strategies and partnerships of PLUS marketing activities, and at the same time promoting marketing ventures of Servicoop as one actor in these markets. In addition, while Servicoop does not remunerate its board members, they could potentially benefit from distributions of assets should Servicoop ever be liquidated.

Despite these potential conflicts of interest, the current arrangement has also been an extremely effective method of providing technical assistance to Servicoop. In particular, the SECID economist serving on the board has been extremely valuable in helping to create Servicoop and in directing its activities into areas with a very large positive economic impact. Servicoop has defended this arrangement to USAID based upon precedent arrangements. A response has not yet been received from USAID.

D. Recommendations regarding Marketing strategies

The review of marketing opportunities suggests that an export market orientation should be a central component of any strategy to promote income growth in hillside agriculture. A strategy which focuses on intensification of potentially exportable crops holds a number of advantages. First, by targeting export markets, the stability of demand and therefore the security of producing these crops are increased. Second, establishing more export links will create more conduits for the inflow of new information, technologies, and financial resources to promote growth of the sector. Third, many crops are attractive exports because they meet demands for tropical specialty commodities are particular to the natural environment that Haiti possesses. This not only allows Haiti to respond to niche markets in the US, Canada and Europe for these products, but may increase the chances that these crops can be intensified in ways that are not destructive to Haiti's natural resource base. The high potential returns that intensification of these crops can generate creates an effective mechanism for raising incomes of Haiti's poorest citizens, who cultivate them.
Finally, it should be noted that an emphasis on export crops should not be construed to imply ignoring staple crop production or marketing. Rather this focus recognizes strong positive synergies for the intensification of food crops that can occur as farmers increase cash crop income. Most importantly they are then able to invest in producing staple crops more intensively. Moreover, many market initiatives such as to reduce transport and storage costs, improve access to market information, and organize market cooperative groups are equally beneficial to staple crops.

The review of market opportunities suggests that there is substantial opportunity to reinvigorate traditional exports such as coffee and cocoa by improving production incentives. Promoting competitors, and organizing farmer cooperatives to increase efficiency in these markets are two successful models that can simultaneously improve producer incentives, and increase market efficiency. The analysis also suggests that there are opportunities for a much wider range of Haitian agricultural commodities to be exported. Haiti's comparative advantage in these crops exists in agriculture because of naturally favorable production conditions, low production costs, relatively easy access to US markets, potential seasonal advantages, of production, , and the presence of niche market demand for certain tropical crops.

1. General strategic orientations

The analysis has demonstrated the success of USAID's current strategies to promote agricultural product marketing. These strategies should be continued. In particular, where strong collusive behavior is found, USAID should seek to reverse policies that sustain them and where necessary support competitors to assure that markets remain competitive. The strategy of supporting Servicoop as champion to breakdown the current cartels has been successful. USAID should continue this model of subsidizing startup capital to private market actors interested in developing new markets for agricultural products in Haiti. This could also involve support to marketing agents to provide marketing services in areas in which competitive markets currently do not exist. However, this support should be structured to require investment and risk sharing by the market actor and based on a strong incentive for the actor to perform.

USAID strategy should also continue to support organizational services between exporters, cooperatives and farmers in competitive but atomized markets Finally, USAID strategy should continue to assist in the process of identifying and promoting new opportunities with local and internationally oriented businesses.

In addition to current strategies however, the analysis suggests the need for USAID to consider expanding the scope of its interventions to provide direct support to public goods required for efficient markets to operate. In Haiti, three of the most notable constraints in this regard are road and market infrastructure, market information, and public policy analysis.

a) rural roads and market infrastructure

The Asset project has recently demonstrated the feasibility of working with motivated rural communities to build tertiary rural roads to open up isolated hillside communities. The capacity of community groups to pull together to put in rural roads will be a function of solidarity of rural communities. Models to undertake rural infrastructure should be contingent on community demonstration of their interest and commitment to maintain these investments. Rural

b) market information

Various studies suggest that rural communities are remarkably unaware of market conditions outside their communities. Providing rural cooperatives with current information on the markets into which they are selling provides them with bargaining power in dealing with intermediaries. One cost effective strategy to reach rural communities with this type of information is simply to pass subcontracts with local radio stations to report daily market prices for regionally important commodities on the radio. In rural areas not served by radio, startup grants to establish radio stations should also be considered.

c) Market and trade policy analysis.

Currently, Haiti has a relatively open trade policy for most commodities and in particular, exports are exempt from any trade taxes. However, several issues threaten to undermine this policy environment. First, the lack of change in the exchange rate despite substantially higher domestic inflation than among Haiti's trade partners suggests that the currency is becoming overvalued. If not corrected, this distortion will rapidly erode the competitiveness of Haitian agriculture both for export and in competition with imported products.

Another potential threat to trade concerns potential adverse changes to Haiti's trade policy. Haiti is currently in the process of negotiating its entry into CARICOM. This is expected to result in increased trade taxes for some food and agricultural input imports to Haiti. These changes could have adverse effects on the relative pries of cash and food crops, and encourage inefficient food crop production at the expense of economically profitable export crops.

In addition, export licenses are required for all exports and permits are required for all exporters. These currently do not pose important restrictions on exports. However, their presence offers occasion for reimposition of restrictions on exports and for illegal manipulation of the regulations to impede competitors from trade. Pressures to take these measures are likely to increase as USAID sponsored efforts to increase competitiveness in traditional exports markets begin to be felt by entrenched interests.

These points illustrate the need for careful monitoring of Haiti's trade policy. Given the apparent proclivity of export markets to take on collusive behavior patterns, it is suggested that USAID continue to support marketing alternatives to increase competition in constrained markets. This implies supporting a market monitoring unit to track these markets. Specific types of analysis that should be tracked by this unit. should include absolute and relative margin levels for intermediaries in export markets, relative price comparisons between staple and cash crops in producing zones and rates of effective protection for important import substitute and export crops.

In cases where these assessments indicate substantial erosion of competitiveness in internal markets, loss of FOB price share to producers, substantial long term erosion in relative prices for important export crops, negative effective protection for exportables, or excessively high effective protection of import substitutes, USAID should commission policy analyses to raise these issues to the attention of Haitian policy makers.

2. Immediate Recommendations

Several issues where raised to the team concerning the current marketing activities of the USAID PLUS project. Recommendations in this regard follow.

USAID should continue to support Servicoop's activities in coffee and cocoa marketing as a strategy for increasing the competitiveness in these markets and raising producer income and expanding opportunities to produce these commodities. However, additional funding to Servicoop or other institutions should independently assess the merits of funding to such institutions based upon the potential impact on the competitiveness of markets into which the actor is intervening, the potential impact on the financial and institutional soundness of the organization.

Servicoop should be required to develop a business plan that will increase its financial security and assure that it is able to capitalize its future operations. This business plan should be allowed to include proposals for grant funding to USAID or other donors for expansions of its activities.

USAID should give final legal guidance to the PLUS project regarding the potential conflict of interest involved in PLUS project staff serving on the Servicoop board of directors. Although unqualified to address the legal issue, from a perspective of the efficacy and

impact, the team would encourage USAID to seek a formula that would allow contractors hired by USAID to provide direct technical assistance to marketing cooperatives supported by USAID through their governing boards. This may require clarification of their position on the governing boards to exclude these positions from ownership of cooperative assets.

SECID should broaden its dialogue with exporters in Haiti to work with existing coffee and cocoa exporters. Because SECID has been integral in the establishment of Servicoop as a competitor in the coffee and cocoa industry, it has antagonized existing exporters of the commodities. However, SECID should seek to revive a relationship with these exporters to improve their services to farmers.

IV. MONITORING AND EVALUATION OF HILLSIDE ACTIVITES

A. Role of Monitoring and Evaluation

Monitoring and evaluation (M&E) systems need to provide information for a number of purposes. At the highest level, they should give evidence of the impact of the interventions of a project on the project objectives and provide the necessary analysis to validate or reject the approach taken by the project. This understanding is useful, first, as a public good, to better understand how to accomplish the objectives of the project. It is also essential to the other purposes of the M&E system.

A second more practical purpose of this information is to give the project sponsorer sufficient information to monitor the project's progress and evaluate the success of the project in fulfilling its mandate. In USAID parlance the M&E system must generate the performance indicators established for the project. It should also provide sufficient detail to interpret these indicators with respect to the project purpose.

At the internal project level, M&E should provide information necessary to manage project activities on a continuous basis, and periodically to assess and reorient project strategies and resources to maximize project impact. This entails a process of information collection and use in management decisions but also a process of reviewing project outputs with project clients, such as hillside farmers, to understand their perspective on the project's impact.

The assessment which follows dwells primarily on examining the current M&E system of the PLUS project components with respect to the first M&E objective noted above. This level of analysis is fundamental to the second and third M&E objectives as well. Observations concerning more immediate issues of providing accurate indicators of performance for USAID's purposes are then examined . Finally a few findings for future internal project M& E are provided.

B. Analysis of project impact

Current information generated by the M&E systems of the PLUS and ASSET project components is not sufficient to understand the impact which interventions of these project components are having on hillside agriculture in Haiti. Efforts have been made to measure the effects of particular interventions (e.g. hedgerows, rock walls, gully plugs etc.) in isolation at the parcel level. However, there is no clear understanding of the change in impact of these interventions over time, the spread effects of these interventions both

within the farm and to other farmers, and the broader effects of these interventions on the whole farm system. The first section below briefly reviews the information that is available for current M&E efforts. Each of these unanswered questions is then addressed.

1. Current methods of evaluating income effects of hillside interventions

Measures of yield change for agricultural crops were made by the PLUS project in the early years of the project using intervention specific case studies. These studies where conducted for a sample of parcels in which interventions where undertaken, and comparing them to control parcels. Resultant changes in yield were used to assess the income effects of project interventions. This approach was abandoned, however, because the project was unable to maintain the control plots because of the tendency of farmers to apply the project interventions to these plots.

In the past two years, the PLUS Project has used an annual extensive survey questionnaire to measure gross income. The survey measures income by simply asking farmers to estimate the current yield from their parcels in which particular interventions are present. It then asks them to estimate the yield that would have been obtained in the same field without the intervention. The ratio of these two responses is interpreted to measure the increase in farmer yield and income due to the project intervention.

Although the initial extensive survey was valuable in measuring the farmer's appreciation of the effects of interventions, repetition of the approach is of declining value for several reasons. First, it is unlikely that the farmers' perceptions of the degree of impact will change substantially for the same intervention even if absolute yields change. The very similar results in the second year of the survey have confirmed this expectation. Moreover, as the years since the sampled farmer had practiced traditional techniques on any field increases, the accuracy of his perception is likely to decline. Finally, the question is prone to bias because it may be easily construed to be an evaluation of the project. As such, farmers may begin to respond based upon their feelings about the project rather than based on an objective assessment of the impact of any particular intervention.

Estimates of the income effects of market interventions of the project are also conducted. These rely on a straight forward calculation of net revenues generated by marketing activities for participant farmers. Where project interventions have improved prices for farmers (e.g. by creating greater competition among buyers for farmer produce), the project estimates the wider impact of the project on other farmers, assuming a simple five to one ration, non-participant to participant farmers receiving the better price. While the general approach to evaluating project impact seems appropriate, it could be improved in two respects. First a more careful analysis should be conducted to isolate changes in price margins due to project effects from independent price movements. A second improvement would be to improve the estimate of the broader market affected by project activities. A better estimate of both of these effects could be obtained by conducting a survey of price changes for commodities with which the project is working in markets around the zone of intervention of the project marketing activities. This survey should attempt to detect differences in the percent margins obtained by intermediaries in these markets, to verify the improvement offered by the project. The survey should also examine the extent to which the effect has been transferred to other markets.

2. Sustainability of project interventions

As has been noted in the section on soil conservation, there little evidence that interventions introduced by the PLUS project are being sustained in many areas. The PLUS Project does monitor the state of introduced interventions such as rock walls, gully plugs and hedgerows through a site inspection six to nine months after the intervention was introduced. However, it has not undertaken a longer retrospective assessment to examine evidence the longevity of the investments that have been made under these projects. Fortunately, the extensive parcel survey conducted in the past two years has noted the age of interventions in parcels of sampled participant farmers. The same survey also records a measure of the condition of the intervention and other characteristics of the parcel against which sustainability should be assessed.

This data should be analyzed to examine the change in condition of the intervention, its utility in the parcel, and its impact on soils and yields over time. These changes should then be correlated to characteristics of the parcel (e.g. elevation, slope, orientation, and soils) and the farmer characteristics to increase understanding of the conditions under which these interventions work. If the current data is insufficient an additional surveys could be designed to collect the information on the status and use of project interventions drawing on the existing farmer monitoring "fiche" as a basis for sampling.

3. Spread effects of project interventions

A survey to examine secondary and non-adopters has been conducted, and preliminary results are available. This survey provides descriptive information on these two groups and gives some evidence concerning the judgement and receptivity of these two audiences to the interventions of PLUS. (See discussion of impact of soil conservation above.) However, to date, the survey analysis provides no clear evidence of the spread effects of the PLUS project to the communities they are in and to surrounding areas. The lack of such evidence is in part due to difficulty in defining "secondary" adopters since the projects appear to have rapidly expanded participation in their zones of intervention. In the survey, secondary adopters where defined as those "not directly involved in the project, but they demonstrate the interest, ability and intuition to learn the techniques of soil conservation from others who were directly involved in the PADF/PLUS project". This definition is unclear because it does not imply adoption of anything. The statistics reported indicate that in fact 99% of this group did adopt project interventions, however, suggesting that the sample did, with a few exceptions adopt project techniques.

More troubling still is the definition of nonadopters which where categorized as those "who claimed that they neither participated in the activities of the project, nor did they adopt any of the principals or techniques taught to participants". The survey found however, that substantial portions of them did practice techniques promoted by the project. For example some 42% had soil conservation structures on their farm.

The principal flaw in these definitions appears to be in that they rely on the perception of the interviewee as to their classification as adopter or nonadopter, and for the classification of secondary vs. primary adopter rather than on some objective measure. A second flaw in the survey analysis in its current draft is that it provides no basis from which to extrapolate from the samples to the general effect of the project on the target population. Fortunately, discussion with the PADF staff which undertook the data analysis suggests that this exercise can be done with the data in the survey.

4. Farm systems modeling

Currently, the analyses of the projects do not provide any analysis of the net effects of project interventions on farm family incomes and welfare; it only examines changes in revenue at the parcel level. The need for a broader and more integrated assessment of impact on the farm system is needed to understand how interventions are being used in the farm and why they are or are not being adopted. Particular issues that clearly affect the success or failure of these interventions include interaction between farm animals and crop production (byproduct and residue uses as feed, manure use in fields), the role of cash crops and animals in providing cash to finance farm activities, changes in labor availability and use in farm activities as a result of interventions, changes in tenure arrangements depending upon the types of activities undertaken in farm fields.

C. Provision of indicators for USAID evaluation

In this regard, USAID's objectives for current hillside agricultural program are to respond to two strategic objectives of the Mission: SO1) Sustainable Increased Incomes for the Poor, and SO2) Environmental Degradation Slowed. Currently the principal indicator for monitoring each is:

SO1. Percent increase in real income in project targeted areas.

SO2. Number of hectares of land under improved natural resource management practices in the target regions.

The Monitoring and Evaluation (M&E) systems in place in the PLUS and Asset projects have been oriented to respond to these criteria, but with less regard for the other purposes of M&E. Indeed, as is noted in the discussion of intervention choices, the concentration on soil conservation measures appears to have been driven in large part by the desire to meet objective indicator targets, rather than by any assessment that these interventions where most likely to meet the objectives themselves. Thus alternative strategies to raise incomes where not stressed in project interventions.

This bias is perpetuated by the reliance on only one type of measure of the SO performance indicators. The projects do not currently attempt to measure other indicators of income or environmental impact of the project. Thus at the broadest level, the scope of evaluations is too narrow to permit a full picture of the impact of investments by USAID in hillside agriculture.

As noted in the previous section, there is also a lack of analysis to understand the longer term impact of the interventions that are been sponsored. For example there is not

sufficient evidence on the sustainability and spread of soil conservation measures to determine their long term effects.

D. Internal project management

With respect to internal procedures for monitoring project inputs and outputs, these appear to be in place and appear to provide the data necessary for tracking project inputs and outputs. PLUS /PADF hillside interventions are monitored through "fiche" maintained by extension agents on each farmer with which they work. All interventions undertaken with the farmer are recorded on these fiche. A return visit to each farmer is made six to nine months after undertaking each intervention to evaluate the state of the intervention and to discuss any problems. These procedures appear to be well maintained. Extension agents and technicians also report regularly on their activity progress. In these reports, interventions are aggregated from these fiche for each project area to determine outputs of the project. Summary aggregation of these outputs is passed on to the contractor responsible for monitoring and evaluation.

Periodic checks on the accuracy of these data are apparently undertaken by the implementing contractors. However apparently no analysis of this has been done to determine the bias and reliability of these data.. As noted above, the data of these monitoring devices also appears to be underutilized in questions concerning sustainability, spread and impact of project interventions.

E. Recommendations for M/E of Hillside Agriculture

1. General recommendations

In future projects, a greater and more consistent emphasis on evaluation of the impacts of projects is needed to justify their continuation and to provide guidance for improving their performance. Greater emphasis should be placed in M&E on evaluating the sustainability and spread of project interventions and on then modeling the impact of these effects on the larger issue of impact on income and wellbeing. In this regard, the findings of the exhaustive report entitled *Further Assessment and Refinement of the PLUS M&E System* by Steven Romanoff et al (April 27, 1995, SECID/Auburn PLUS Report No. 25) should be returned to as a guide for restructuring monitoring and evaluation of hillside activities.

Farm models which incorporate all important agriculturally based contributions to the farmer's income should be developed for the most important characteristic types of farms in a project area. (These might be defined based upon agroecological zone, farm size/socioeconomic status, etc.) These models should seek to evaluate fundamental characteristics of the farm system, how interventions promoted by the project impinge on this system.

Periodic in-depth surveys should be undertaken to assess sustainability, spread and impact of project interventions on the local economy. These surveys need not be large given the availability of the area sampling framework. They should sample areas that include both participants and nonparticipants. Thus they might include both the project area and an adjacent area with similar agricultural characteristics to the project area.

Other indicators of impact should be incorporated into the evaluation methods for hillside agriculture. They should include measures of change in the biophysical environment and in the wellbeing of populations in the project area. Possible indicators for each are listed below.

Measures of biophysical change

the duration of water flow in stream beds after rainfalls as a function of rainfall.

sediment levels in stream flows.

tree cover,

depths and recharge rates in wells.

Water levels in bodies of water.

Measures of wellbeing

nutritional surveys centered on children,

percent of children in school

measures of asset accumulation such as numbers of livestock,

new building construction

ownership of status assets such as radios

As part of its future program for monitoring Haitian economy USAID should consider use of the area sampling frame that it has already developed to independently attempt to measure differences in income, farm systems , and environmental status of regions in which PLUS projects have been most intensive. The area of survey should attempt to select a sample of sufficient size to capture a representative sample of project and nonproject participants in the same region and in adjacent regions with similar natural and market access conditions.

2. Immediate recommendations

In the short run, prior to the end of the PLUS project in 2000, a careful assessment of the following aspects of their interventions should be undertaken.

1) An analysis of the sustainability of each major intervention promulgated by the PLUS project. This study should undertake a retrospective survey of a random sample of each type of intervention put in place by the project since its inception. The study should evaluate the age of the intervention, in what context it was undertaken (PLUS project, another project, own initiative etc.) the current state of the intervention and its current uses/impacts on the parcel and the farm system.[21] As noted above, in principal the data to undertake this analysis already exists in the extensive surveys undertaken in 1998 and 1999.

2) Complete the analysis of secondary adoption of each major intervention promulgated by the PLUS project. The principal issue is to determine the degree to which these interventions have

[21] See Romanoff et al. for detailed suggestions of evaluation criteria for condition of soil conservation interventions.

spread beyond the project participants and then to evaluate characteristics of these adopters and of their fields which might help to explain the conditions under which each intervention is likely to succeed or fail.

3) The current extensive survey approach to measuring yield and income effects of PLUS should be discontinued and replaced with an approach that builds up income effects from carefully measured observations of the impacts of particular interventions on farmer yields. These measured effects should be evaluated based upon data from on-farm trials of interventions conducted by farmers, with control plots maintained in comparable plots by the same farmer. In large part, this data exists already. A review of this data should be undertaken to determine the extent to which measured income effects conform with the results of the analyses of spread and sustainability (see above).

4) Where results are inconsistent, new trials should be conducted in the next phase of USAID hillside interventions to reassess the value of these interventions. This assessment should be conducted independently of implementing agencies and their extension agents to assure objectivity and to avoid the problem of having control plots absorbed into project interventions. If necessary, the trails should be conducted on rented land to assure that the evaluators are able to maintain controls.

5) A farm-based modeling approach should be used to evaluate farm income. The farm models should draw primarily on existing data concerning farm size, activities and composition. To the extent possible, the model should draw on existing studies of these issues. Where necessary rapid reconnaissance and intensive farm interviews with a sample of farmers should be used to complete these models. In particular, additional data may need to be gathered on farm system issues that are not currently a focus of the PLUS project. These issues include:

crop practices on fields that do not include project interventions,

the use of labor in farm production

the role and cost of water management in farm households

the role of animals in the farm, and the synergies between animal husbandry practices and crop production, including animal use of crops and crop byproducts and the use of animal manure on crop fields.

The role of trees in farms for on-farm consumption and commercial sale of fruit, wood, charcoal etc.

6) The resultant farm model analysis should also address several other issues. First, it should provide a more complete assessment of the impact of the project on the income of farm families. This can be accomplished by a careful weighting of impacted parcels within all farm income, and farm income within total household income of the family. Secondly, explicit accounting for changes in production costs on impacted parcels should be incorporated in the model based upon evidence of changes in factor and input use in impacted parcels. In practical terms, most hillside agriculture uses almost no inputs. The most important cost change is likely to be in labor use. These changes can be captured by intensive interviews with farmers who are currently farming comparable parcels with and without interventions to discuss differences in labor use on each.

7) An evaluation of the accuracy of project monitoring data should be undertaken by each project component. This would entail taking a random selection of data reported through the internal monitoring process and verifying its accuracy. For each kind of data collected in this fashion, a measure of bias should be calculated and adjustments made to project outputs and impact on this basis.

DOUCMENTS CONSULTED

To be completed

John Kerr and Alex Bellande , January 1999, Agricultural Production Systems in Haiti: Overview and possible opportunities for sustainable intensification. World Bank Pre-Appraisal report.

Metzel, Jeffrey, January 1999. The Economic Context For Investment In Agricultural Intensification In Haiti. World Bank Pre-Appraisal report..

Annex A: Scope Of Work

1. Establishing a clear strategic vision and specific management steps to help link, more effectively and clearly, the Mission's natural resource management and hillside agriculture activities with key over-arching strategic priorities in Mission's "high productivity zones" geographic targeting concept;

2. Evaluating the current hillside products marketing strategy, notably the performance of ServiCoop, the export marketing cooperative established by SECID under the Productive Land Use Systems (PLUS) Project's marketing component; as well as examining the effectiveness and potential exhibited by the Mission's other agricultural marketing initiative, including other PLUS marketing strategies and those of the Coffee Project, Agriculturally Sustainable Systems for Economic Transformation (ASSET) Project; and the proposed PADF/ORE tree crop project;

3. Develop, in consultation with Mission staff and external partners, a limited number of key indicators and a data collection approach to assure adequate measurement of the accomplishments and impact of the hillside elements of the Mission's sustainable growth strategy.

Annex B: Contacts Of The Team

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Annex C: Supporting Data And Analysis Tables

Table 1. Comparison of mean crop yields in Haiti and some neighboring countries (t/ha)

	Country				
Crop	Haiti	Dominican Republic	Mexico	El Salvador	Cuba
Maize	0.8	1.8	1.7	2.1	1.2
Sorghum	0.7	2.5	2.9	1.3	1.1
Beans	0.7[1]	0.9	0.6	0.7	0.8
Rice	1.5	4.0	2.7	4.1	3.6
Manioc	4.0	6.3	17.5	12.2	4.2
Tubers	4.4	6.8	13.0	12.5	5.7
Sugarcane	35	51	89	75	54

Source: FAO, undated., drawn from Kerr, 1999.
(1) Other sources suggest that mean yield of beans in Haiti is only about 0.4 t/ha.

Table2 Staple Crop Policy Analysis Summary

Land type	*Technology*	*Nominal protection rate on product*	*Nominal protection rate on inputs*	*Effective Protection rate*	*Subsidy rate on domestic resources*
Maize					
Rainfed	*Trad. seeds / No inputs*	35%	0%	36%	3%
	Imp. seeds / No inputs	35%	6%	36%	4%
Irrigated	*Trad. seeds / No inputs*	35%	0%	35%	5%
	Trad. seeds / With inputs	35%	11%	48%	5%
	Imp. seeds / With inputs	35%	11%	42%	4%
Sorghum					
Rainfed	*Trad. seeds / No inputs*	35%	0%	35%	4%
	Imp. seeds / No inputs	35%	6%	36%	4%
Irrigated	*Trad. seeds / No inputs*	35%	0%	35%	6%
	Trad. seeds / With inputs	35%	12%	45%	5%
	Imp. seeds / With inputs	35%	12%	42%	5%
Beans:					
Rainfed	*Trad. seeds / No inputs*	19%	0%	23%	2%
	Imp. seeds / No inputs	19%	6%	21%	3%
Irrigated	*Trad. Seeds / No inputs*	19%	0%	21%	3%
	Trad. Seeds / With inputs	19%	9%	22%	3%
	Imp. Seeds / With inputs	19%	10%	21%	3%
Rice:					
Irrigated	*Trad. Seeds / No inputs*	22%	0%	23%	3%
	Imp. Seeds / With inputs	22%	9%	24%	2%

Note: All analyses assume official policy distortions.
Source: Metzel (1999).

Table 3 High Valued Crop Policy Analysis Summary

Land type	*Technology*	*Nominal protection rate on product*	*Nominal protection rate on inputs*	*Effective Protection rate*	*Subsidy rate on domestic resources*
Banana:	***nt***				
Irrigated	***Trad. material / No inputs***	0%	0%	0%	2%
	Imp. material / With inputs	0%	9%	-1%	3%
Tomato:	***nt***				
Irrigated	***Commercial seeds / No inputs***	0%	0%	0%	2%
	Commercial seeds / With inputs	0%	14%	-1%	1%
Eggplant:	***nt***				
Irrigated	***Trad. seeds / No inputs***	0%	0%	0%	2%
	Commercial seeds / With inputs	0%	12%	-1%	2%
Onion:	***nt***				
Irrigated	***Commercial seeds / No inputs***	0%	3%	0%	2%
	Commercial seeds / With inputs	0%	9%	-1%	3%
Shallots:	***nt***				
Irrigated	***Commercial seeds / No inputs***	0%	0%	0%	1%
	Commercial seeds / With inputs	0%	8%	-1%	11%
Hot pepper: ex					
Irrigated	***Trad. seeds / No inputs***	0%	0%	0%	2%
	Imp. seeds / With inputs	0%	10%	-1%	1%
Sweet Potato: nt					
Rainfed	***Trad. material / No inputs***	0%	0%	0%	2%
	Imp. material / No inputs	0%	4%	0%	2%

Note: nt = nontradable; ex = exportable. All analysis assumes official policy distortions.
Source: Metzel 1999.

Table 4 Economic Value of Staple Crops
(Gourdes / Hectare, 1998)

Land type	*Market: Technology*	Local / Regional		Port au Prince	
		Net Revenu	*Domestic Resource Cost Ratio*	*Net Revenu*	*Domestic Resource Cost Ratio*
Maize					
Rainfed	*Trad. seeds / No inputs*	692	0.81	-5116	3.17
	Imp. seeds / No inputs	2,049	0.59	-3859	2.67
Irrigated	*Trad. seeds / No inputs*	1,614	0.73	-4656	2.95
	Trad. seeds / With inputs	3,468	0.58	-4288	4.64
	Imp. seeds / With inputs	7,640	0.44	-3387	3.14
Sorghum					
Rainfed	*Trad. seeds / No inputs*	427	0.86	-5415	3.25
	Imp. seeds / No inputs	1,708	0.62	-3992	2.70
Irrigated	*Trad. seeds / No inputs*	1,815	0.70	-4455	2.84
	Trad. seeds / With inputs	2,673	0.64	-4488	4.44
	Imp. seeds / With inputs	5,114	0.50	-3713	3.37
Beans:					
Rainfed	*Trad. seeds / No inputs*	-2,459	1.87	-15133	3.93
	Imp. seeds / No inputs	-1,217	1.27	-9641	2.73
Irrigated	*Trad. seeds / No inputs*	-2,795	1.52	-12527	2.93
	Trad. seeds / With inputs	-2,637	1.42	-10454	3.49
	Imp. seeds / With inputs	-86	1.01	-7024	2.41
Rice:					
Irrigated	*Trad. seeds / No inputs*	1,975	0.81	-4988	2.42
	Imp. seeds / With inputs	7,966	0.58	-3650	2.27

Source: Metzel, 1999.

Table 5 Economic Value of High Yield Crops

(Gourdes / hectare, 1998)

MARKET:		Local / Regional		Export	
Land type	*Technology*	*Net Revenu*	*Domestic Resource Cost Ratio*	*Net Revenu*	*Domestic Resource Cost Ratio*
EXPORTABLE/HIGH REVENU CROPS					
Banana:					
Irrigated	*Trad. material / No inputs*	*30,351*	0.30	-85	1.03
	Imp. material / With inputs	*56,205*	0.17	290	0.91
Tomato:					
Irrigated	*Commercial seeds / No inputs*	*13,286*	0.44	3009	0.53
	Commercial seeds / With inputs	*25,204*	0.40	3028	0.51
Eggplant:					
Irrigated	*Trad. seeds / No inputs*	*14,215*	0.41	320	0.91
	Commercial seeds / With inputs	*21,520*	0.34	336	0.90
Onion:					
Irrigated	*Commercial seeds / No inputs*	*17,282*	0.43	-4183	2.36
	Commercial seeds / With inputs	*35,312*	0.23	-2268	1.95
Shallots:					
Irrigated	*Commercial seeds / No inputs*	*13,497*	0.58	-4914	2.47
	Commercial seeds / With inputs	*43,493*	0.13	252	0.93
Hot pepper:					
Irrigated	*Trad. seeds / No inputs*	*43,217*	0.25	44515	0.12
	Imp. seeds / With inputs	*61,118*	0.21	44390	0.11
Sweet Potato:					
Rainfed	*Trad. material / No inputs*	*4,932*	0.54	-2006	1.83
	Imp. material / No inputs	*9,922*	0.38	-1333	1.56

Source: Metzel, 1999.