HAITI PRODUCTIVE LAND USE SYSTEMS PROJECT

SOUTH-EAST CONSORTIUM FOR INTERNATIONAL DEVELOPMENT

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FARMER NEEDS ASSESSMENT EXPLORATORY SURVEYS

EXECUTIVE SUMMARY AND RECOMMENDATIONS

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FORWARD

This report contains the summary and syntheses of five surveys conducted by a multi-disciplinary team led by Anthropologist, Dr. Richard A. Swanson, of the University of Arkansas, Fayetteville, Arkansas. Additional members of the team included Agronomist Yves Jean, Agricultural Economists, George Condé and Roosevelt Saint-Dic and Animal Production Specialist, William Gustave, assisted by Agronomist and SECID Team Leader, Dr. Frank E. Brockman and SECID Agricultural Economist, Dr. J.D. (Zach) Lea. The team was assisted and supplemented on-site by PADF and CARE staff members.

These surveys were part of the on-going effort by SECID/Auburn University and its partners in PLUS, PADF and CARE, to implement a Monitoring and Evaluation System which orients the project towards activities which will bring about sustainable increases in farmer income and crop production, while conserving natural resources. As part of this effort, these surveys provided baseline information on farming systems in three watersheds in each of five regions in Haiti and identified constraints to production and opportunities for PLUS to achieve sustainable increases in production and farm income. The surveys also provided information on technologies promoted by PLUS, as they are presently implemented in the survey areas.

These surveys represent an invaluable contribution to PLUS and our understanding of farming systems in various parts of Haiti and how they relate to interventions available to PLUS. They provide new insight into the dynamic relationships between soil conservation, crop and livestock production, trees, farmer income, organization of labor, land tenure and other factors of the farming system. They raise important issues to be addressed in our implementation program and point out possible new areas of opportunity to achieve sustainable increases in farmer income. As we wrestle with the issues raised, and adapt our extension message and methodology and our research agenda to reflect new insights, PLUS will become more effective in serving Haitian farmers.

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EXECUTIVE SUMMARY OF RECOMMENDATIONS & PROGRAM OPPORTUNITIES IN HAITI

0. Introduction

The privilege of traveling as a multi-disciplinary team to 15 watershed areas in five regions of Haiti and discussing with many small farmers about their farming system constraints and aspirations, their observations about current and past project interventions, particularly in soil conservation, has given insights into opportunities for increased, and perhaps more effective, development assistance in these regions. The team has prepared a report of its findings for each of the five regions visited[1] (SECID/Auburn Report Numbers 9-13). Recommendations specific to each of these regions should be sought in these documents. This executive summary highlights a number of the common themes and findings of the team, findings which reflect our perceptions of the needs and socio-economic reality as expressed by farmers.

Besides visiting PADF and CARE implementation areas, the team made quick side visits on their own time to a number of other nearby sites where soil conservation efforts of past programs had been concentrated[2]. This was done in order to understand the successes and failures of these programs in light of what the PLUS project is attempting to do. These visits have given added depth for our observations and recommendations. The team hopes the following observations will stimulate PLUS and other future projects towards ever more effective program activities for Haitian hillside farmers.

While the discussion below concentrates on areas for improvement, new opportunities, perceived farmer needs, etc., we do not want to fail to point out that the PLUS project, through PADF and CARE, provide very significant services and assistance to farmers with whom they are working. Bio-intensive gardening, work with fruit tree grafting, new crop varieties, field rock terraces and ravine rock walls are all very valuable and activities that are much appreciated by farmers.

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[1] The five regions: PADF Cap Haitian Region 4 (Plaisance, Grande-Rivière, and Dondon areas); CARE Northwest Region (Lafond, Barbe Pagnole, and Passe Catabois areas); PADF Jacmel Region 2 (Palmiste Avin, Berry, and Tilier/MonDésir/Marigot areas); PADF Mirebalais Region 3 (Seau d'Eau, Wanni, Lonsi/Lascahobas areas); and PADF Les Cayes Region 1 (Gaita/Vachon, Picot, and Banatte areas).

[2] These include: USAID financed ADS-II project in Haut Cap Rouge/Jacmel and Fonds-des Frères/Les Cayes area, USAID financed Projet Sauvé Terre in Les Cayes region, European funded Developpement Communautaire Chrétien Haitien -DCCH) near Camp Perrin/St. Hélène, ORB/USAID around Seau Mathurine, Ministry of Agriculture/CARE food for work activities in the Northwest, other Ministry of Agriculture works in Marigot area, European funded PRISTENE and INTERAID programs in Jacmel, FAO's long term soil conservation efforts in Limbé region.

1. Hillside Farming Systems

It remains true that soil/water loss on Haiti's hill and mountain sides continues to pose serious problems, and that many areas continue to be deforested. It is also true, based on what we have observed and learned from farmers, that past hillside soil/water conservation programs activities, in general, have not had the results hoped for. Farmers have not, in most cases, adopted the "messages" extended. What, for a short time[3], may appear like "success", turns out not to be sustainable - reflecting underlying problems not dealt with. For many very good reasons, most often not technical, farmers have not been able to adopt these messages. The socio-economic environment, as well the program approach itself sometimes condemns it to ultimate failure.

However, many hillside cropping systems remain productive, particularly in the Cap Haitien, Jacmel, and Mirebalais regions visited. They have potential for increased productivity, given the right combination of incentives, market opportunities, and approaches to farmers. We were impressed by the depth of good soils on cultivated fields of steep slopes in many regions (30%-70%, and in some places more!). These fields in most cases still do not have adequate soil conservation measures in place and are therefore at risk. We believe that continued focus on improving appropriate production systems, including conservation measures for these and other regions, is justified. Benefits of such action would include not only preservation of the productivity which still exists in many such areas, but an increase in productivity.

The key to doing this will be a holistic/systems approach to specific target areas. Projects are often too narrowly focused (eg. agroforestry, soil conservation or livestock). Too many important associated/complementary issues are ignored, or cannot be dealt with ("we don't do that"). Soil conservation and sustainability will only be achieved if the farming/cropping system on the concerned hillside fields are understood and adapted to, if a whole range of inter-linked issues are dealt with effectively together (government policies and their implementation, commercialization, agro-industry, improved varieties, credit, etc.).[4] Furthermore, programs intending to have long-term

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[3] During life of project.

[4] We are not suggesting the old "integrated rural development" approach here. What we are saying is that if soil conservation on hillside fields in a particular region is important, then all those related elements which tie in directly or indirectly to the success of soil conservation measures being worked with must be considered (eg. not livestock development as such, but those specific aspects of livestock management in a particular region which strongly influence the long term sustainability of mountain resources [not necessarily hedgerows], for example). For example, some argue that cattle raising in Haiti, as in many other similarly mountainous parts of the world, is the only viable means of sustainable productivity with pastures - but that the prices farmers can realize for milk products must reflect true production costs + reasonable profit. To use an analogy, an eroded hillside field may be like a patient needing major surgery to save his life. The health service has the operating table all ready, but the patient has no way to get to the hospital, or once there, no-one to care for his meals (the hospital won't), or once operated on, nowhere to go to recover and no one to

sustainable impact must also have long term commitments to the areas of concern. Four or five year time horizons for such efforts are not realistic. There are no quick fixes when complex and lasting behavioral changes are sought.

Production systems on Haiti's hillside fields are dynamic, ever changing, influenced by the sometimes conflicting goals of different farmers and the realities of their lives (poverty, land tenure, livestock). Perhaps the most important of these may be poverty, in that farmers often are forced to take the short term options, which may be the least productive and most destructive to their natural environment, because they have no other option. These realities must be realistically faced by a project (and government ministries concerned) and dealt with in some way. Otherwise program efforts will be no more than short term injections of aid which quickly disappear.

Different strategies must be developed for different situations - no one technique will work in all areas, for all farmers in one area, for all the fields of one farmer, or even the entire surface of one field. A field extension program such PADF or CARE's might encourage its field technicians/agronomists to be flexible, creative, imaginative, and observant of what farmers are doing, listening to what they are saying. From the field point of view, both PADF and CARE have been fairly rigid institutions, top-down in nature. A program must build on what farmers already possess or do - which **can possibly be modified in some way to achieve both traditional goals of the farmer and new goals of soil conservation.**[5] The PLUS project objectives of being **client/farmer demand driven** represent a significant initial development for reorienting program activities in this direction.

2. Hedgerows As Soil Conservation Measures

Generally speaking, program experience with hedgerows in Haiti has been disappointing - highly visible during the life of a project, but, with the exception of scattered fields, largely

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pay the costs of the services provided - so he has to sell his only cow to meet expenses. Our extension activities are often like providing the operation services, but not giving thought to all those other issues which led to, and lead from, that operation - activities which may in the end determine whether or not the patient actually is helped or not.

5 One such system is the farmer practice of creating contour ridges for planting manioc and sweet potato. This technique, expanded to all crops (as in Palmiste Avin) would greatly reduce soil erosion. Programs should further build upon this system, towards establishing productive vegetative barriers. Vegetative barriers could then be established using vegetative material farmers already consider important, and whose spatial rearrangement upon fields may provide additional economic benefits to the farmer.

disappearing soon after a project departs from the area.[6] One frequently encounters the perception among development workers that, once the structures have been "put in", the job is done, the land saved, now it is "up to the farmers" to maintain and manage them as they have been shown". Years later, new projects come along, find little left from previous programs, and do essentially the same thing all over once again.

Farmer observations and actions concerning the benefits of hedgerows[7] as being extended by PADF/CARE on hillside fields[8]:

(1) Their animals like to eat it.
(2) Animals are permitted to graze directly on hedgerows during fallow and pasture periods.
(3) Hedgerows increase soil fertility (some Les Cayes farmers).
(4) Hedgerows, specifically leucaena, hold soil.[9]

Farmer statements on problems of hedgerows:

(1) Hedgerows reduce area for cultivation of food crops.
(2) Leucaena tends to "take over" their fields, while it is in fallow, making subsequent land preparation more difficult.
(3) Leucaena resembles "delain", a weed which farmers already have problems getting rid of in their fields (Mirebalais region).
(4) Hedgerows (leucaena/gliricidia/grasses) are not of

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[6] We define hedgerows as a single row of plant material, usually established by planting a row of seed (leucaena, gliricidia, trees seeds) or other material (pineapple, manioc), to form a thin hedge along a contour. A hedgerow does not widen over time (i.e. spread out over surface of ground). By vegetative barriers we mean using plant material which expressly will spread out, once established. Plant material such as plantain, banana, sugarcane, grasses, will produce new off-shoots from the parent roots. One planted plantain can, in time, have created a clump of as many as ten or more stalks of different sizes, spread out over a diameter of about 2 meters. Vegetative barriers of this kind, along a contour, will trap plant debris (or dead vegetative matter can be purposely placed against its up-hill side), which will filter water/soil to create small terraces.

[7] In most cases, the material used in hedgerows across Haiti have been leucaena, gliricidia, and more recently pineapple.

[8] Statements true for all regions, unless specified otherwise.

[9] It was not evident that we were being told a fact or whether farmers were simply repeating what they had been told by extensionists to be a benefit of leucaena. In fields with standing hedgerows of leucaena, it is true that the soil upon which the leucaena is found is "higher" than the ground about a foot below (down-slope) the hedgerow. This, however, can be explained by the cultivation techniques used by farmers, where in field preparation the soil is "dug down" the slope. Not digging out the hedgerow would leave this row "higher up". We did not see evidence that leucaena hedgerows were building up a terrace on the up-hill side. However, by leaving this hedgerow in place, farmers are in effect creating a sort of terrace. Another benefit we observed in the USAID funded ADS-II region of Fond-des-Frères/Cayes, were that some of the leucaena hedgerows planted on the 70% - 90% slopes in 1987 had become small forests. When we asked about this, the farmers said that the soils were no longer any good (for cultivation) and so the land had been abandoned to the leucaena. They were using the almost tree-like growth for charcoal and animal feed. The hedgerows were not able to save soils.

economic importance to farmers (except where there is urgent need for forage - Northwest, some Les Cayes).

(5) Hedgerows, are rarely, even when present, cut and incorporated into soils as a green manure.

Hedgerows will never succeed in Haiti as soil conservation structures unless farmers can realize significant and observable economic benefits from having these on their hillside fields; and unfortunately, this usually means short-term benefits. It is principally in the Northwest and in the Les Cayes area where one can find farmers already specifically growing/leaving clumps of grasses in some of their cultivated fields for animal forage. It is therefore reasonable to think that it may be principally in these regions where there exists the potential that farmers will accept rearrangement of such plant material, and adding others like leucaena, gliricidia, etc. to create soil conservation hedgerows and vegetative barriers. Only in the Les Cayes area, which has benefitted from many years of program efforts, did the survey team encounter some farmers who appeared interested enough in their leucaena hedgerows to possibly maintain them.[10] In the other regions of high rainfall visited, farmers appear to have enough other vegetative matter for their grazing animals, so as not to specifically require animal forage in their food crop cultivated areas.[11]

Leucaena, as a hedgerow strip has probably been greatly overplayed, in some regions, as the principal component for soil conservation where rock walls can not be built. It is certainly the vegetative material "of choice" encountered most often (followed by gliricidia) for hedgerows throughout the regions visited (for both current and past projects). That seed is fairly easy to obtain, and it is not difficult for projects to convince hillside farmers to "allow" this to be planted on their fields as a hedgerow is no indication that farmers necessarily either want

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[10] Such farmers have yet to pass the test of keeping the barriers after the departure of program efforts, however. The team also met many farmers in the area who had either directly removed their hedgerows from past projects or had permitted grazing animals to completely destroy or break down the hedges.

[11] In these areas, the survey team met many farmers who did not want the leucaena planted by project extensionists in their fields (though they 'permitted' it to be planted). We saw many fields where farmers had already weeded out such hedgerows, some planted less than 4 months earlier, some planted earlier in the AF-II period). We saw fields which had been burned to clear them of un-wanted vegetative material (including leucaena and delain) (Mirebalais). Almost everywhere, we saw farmers permitting direct grazing of their cattle, sheep, goats, horses on field crop residue - including leucaena (as they always do after harvests) - with the result that much of the hedgerow (if young) had been eaten up and destroyed.

An exception to this statement was seen in Palmiste Avin, which, though receiving high rainfall, is under intense cultivation pressure on even the steepest slopes by its growing population - who also want to raise animals needing forage. Where to find forage is a major problem - and animals are placed on the worst, most eroded lands, further complicating the problem.

this or will (be able to) maintain it[12]. Nor does it necessarily follow that the reported success of leucaena in some other country means that socio-economic constraints in Haiti will also permit adoption.

Within the regions of Haiti visited by the Farmer Needs Assessment Survey Team, hedgerows (of leucaena, gliricidia, etc.) would seem to have the greatest likelihood of success under the following conditions:[13]

(1) field is owned by farmer exploiting the land;
(2) field is located near the farmer's homestead;
(3) hedgerow is established on field at the beginning of at least a 9 month cropping cycle;
(4) hedgerow is not planted at beginning of a short term cropping cycle (eg. corn/beans), after which there might be a possibility the field will be left briefly as a pasture.
(5) hedgerow is not planted in fallow or pastured fields.
(6) lower rainfall areas
(7) poorest soils

The following scale seems appropriate, according to our discussions with farmers. The farther to the right one goes, the less leucaena or some other <u>non-food crop</u> vegetative material seems appropriate for either hedgerows or vegetative barriers, partly because of availability of other forage for animals. The farther to the left one goes, the more importance such vegetation may have because of the lack of other sources of forage, and smaller animals require less resources of feed to raise them.[14]

need for more forage	greater wild vegetation
more small animals like sheep, goats	more large animals, eg. cattle, donkeys
lower rainfall	higher rainfall
poor, shallow soils	better soils

But it is complicated when these factors are present:

higher pop. pressure on farm land	lower population pressure
cultivated land hard to find, rent	cultivated land easy to find, rent
less share-cropping	more share-cropping
more land owners	less land ownership

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[12] While the technician, in his mind's eye, sees a hillside field covered with beautiful rows of leucaena, creating over time small terraces, the farmer is probably (in many cases) seeing a project that will help him create (at little or no cost) rows of vegetative strips upon which he will be able to pasture his animals, when his crops come off the field, for a short time. He may hope, that by "doing what the technicians want", he may gain some other economic advantage.

[13] The same conditions would apply for establishment of vegetative barriers as well.

[14] One reason frequently heard from farmers for prefering smaller "rustic pigs" over other "improved" varieties is that the former require less feed per animal unit to maintain.

There is a vast difference between using hedgerows for soil conservation and rock terraces for this purpose. Obviously for the latter, one must have the rock material on hand in the field. However, more importantly, the use of vegetative material for soil conservation purposes presents completely different problems/issues within the farming system. While the often dramatic, increased crop production resulting from rock walls in ravines and many hillside slopes can be realized within one or two years (eg. Grande Rivière, Seau d'Eau), this is not the case for hedgerows - such as leucaena. While it is true that hedgerows can be producing significant forage in less than a year, their effects as a green manure are rarely, if ever, perceived by farmers. The primary issue here is the length of time it takes for farmers to realize some kind of benefits - and most small farmers require quick returns.

There has not been any effective, long term, applied research and demonstration program, in Haiti, on farmer fields, concerning the long term effectiveness of hedgerows - under farmer management. The use of hedgerows as soil conservation structures is fairly recent in Haiti, dating from the early to mid-80s. What one finds, in fact, is widespread extension of a message (eg. leucaena or napier grass as a effective hedgerow), without the real basis for this. There has been, historically, very little researcher managed experimentation of hedgerows on slopes in Haiti, though what has been done elsewhere has shown promising results.[15] This is the important first step in identifying themes appropriate for eventual extension and is the principal reason why the SECID/PLUS team has developed its agroforestry researcher managed trail program, currently underway in several locations of the country, on hillside fields. Farmer management tests, under the conditions of the real farming system, with natural crop rotations, periods of fallow and pasture have also been lacking in Haiti to show their effectiveness or acceptance by farmers.

In most, if not all cases, hedgerows are seen and extended as a vegetative strip or row. That is, for instance, leucaena or gliricidia seed is planted along a furrow in the ground (perhaps on side of a shallow contour ditch prepared for this purpose) - creating a hedgerow.

Greater attention should be placed on the possibility of using vegetative material and crop management techniques already used by farmers, on hillside fields, as material and methods for creating

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[15] Showing theoretical benefits when used as a green manure over a period of many years, or showing benefits when regularly cut and carried to animals, or showing amounts of soil retained by dense root systems and closely spaced plants. Such results are only "promising" because, until they have been successfully adopted and maintained over time in real farmer's fields, without outside input or continued encouragement, there remains a question of the appropriateness of this practice within the farming systems concerned. Farmers may or may not accept the new cultivation system. Promising results of new crop variety research are often rejected by farmers for reasons unanticipated by researchers.

such barriers. One wants to look for crops with long term cycles which have major economic and consumption roles for these farmers.

Based on discussions with farmers, and observations of their farming systems on hillside fields, there is mounting evidence to suggest that what may be needed is not a row but a vegetative band or barrier. And more importantly, this vegetative band must be composed largely of crops of very **high economic importance to the farmer (what the farmer really wants)**, both for household consumption and for commercialization. This barrier must fit into the cropping system of the farmer, with its periods of fallow, pasturing, planting of specific crops at specific times of the year. Farmers will only invest their time and resources in what really adds income regularly to their enterprise.

3. Rock terraces

Farmer observed benefits of PADF/CARE rock terraces on hillside fields and rock walls in ravines were:

(1) very significant barriers against soil loss,
(2) creation of important new areas (on up-hill portion of field) for production of crops which farmers value most (plantain, banana, taro, sugarcane, and corn).[16]
(3) possibility, in some areas, of growing high value crops (taro, plantain) which could not be previously cultivated here.
(4) Farmers claim **significant production increases** from these structures, sometimes doubling yield of corn and beans, but always increasing yield 30% - 50%.

Rock terraces, because of their relative permanence, should be the option of choice on a farmer's field, if the material is available. The key problem with rock terraces is the motivation necessary to create such structures - which take so much more effort. Even in areas where leucaena hedgerows have largely disappeared (eg. Jacmel/Haut Cap Rouge, Jacmel/Marigot, Ministry of Agriculture Mirebalais, Lake Péligre watershed work, FAO/Limbé), one will still find rock terraces filled to their tops, with often significant vegetation behind them. Though many rock terraces break down over time (from movement of large grazing animals over their surface), and are not repaired, many are also repaired because the rocks themselves hinder cultivation and are rearranged if for no other reason than to make space for crops. Farmers do clearly see and appreciate the economic advantages of rock terraces, even if they do not (can not?) reproduce them themselves on their own land.

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[16] We saw this proven in all regions visited. Areas where only corn/beans were cultivated, now growing rice behind rock walls; areas where only sorghum and some peanuts could be grown, now growing corn as well (or much better corn, if corn was already grown); areas where nothing was any longer grown, now growing beans, sorghum, and corn. And in almost all cases, behind rock walls, high value plantain, banana, and taro are also associated. It is difficult to quantify the impact of such structures on a household, yet their importance in increasing farmer productivity can not be denied.

Rock terraces, in themselves, however are not the only answer for long term sustainability. On some kinds of soils (eg. Grande-Rivière, Lonsi, Les Cayes), such terraces may be undercut by water flowing through and (in time) over them, eventually collapsing. Cases were also observed in the Northwest where farmers removed rocks from perfectly good terraces in order to make some quick money (used for road building and house construction material).[17] Here too, the appropriate (to farmer) productive vegetative barriers need to be created along rock terraces - not only to take advantage of the accumulating soils for increased productivity, but for long term soil conservation purposes and as further incentive to maintain and repair rock walls.

4. Animals and Soil Conservation

Animals are extremely important to all regions of Haiti, with particular animals having more importance than others in specific areas. Farmers greatly value pigs in many areas and their presence and increase can probably be positively correlated to farmer motivation to increasing the number of fruit trees on their land (or not cutting down ones they have for charcoal). Vegetative material on the contour of hillside fields should be monitored for their value and use in animal production, through the entire cropping cycle - including possible fallow.[18]

It is unlikely that non-food crop vegetative material (such as leucaena, gliricidia, grasses) will provide the economic benefits farmers will need to be motivated to keep such material in hedgerows or vegetative barriers **unless they can be cycled through an animal.**

It is also unlikely that such material will be considered appropriate for hedgerows or vegetative barriers in those regions where farmers already consider there to be significant "wild" vegetative growth for their animals throughout the year (eg. Mirebalais, Dondon, Tilier/MonDésir). Where forage is lacking during critical months of the dry periods (Northwest, Les Cayes), farmers were found to be interested. Special attention needs to be given to the importance of the short fallows and pastures of field rotation systems - a period when animal manures enrich the soils.

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[17] Their short term need for cash was greater than their long term need to protect their land - which they might not even own in the first place.

[18] In the low mountains surrounding Les Cayes, for instance, intense cropping and livestock practices have reduced the hills to bare domes, in most cases. To protect a future fallow area from grazing, farmers will leave pigeon pea in a field (as part of rotation). To protect leucaena hedgerows from overgrazing, it may also be necessary to associate it with some high value crop during parts of the cropping season. The best way to establish leucaena hedgerows is to plant it at the beginning of the corn/bean/pigeon pea cropping cycle. The field will be protected for at least 9 months from grazing (because sorghum will be relay-cropped into this field). However the problem for the leucaena comes when this field stands fallow and direct grazing will be permitted.

In an area such as the Northwest (also Les Cayes/Vachon, Banatte, and St. Hélène), where vegetative material is limited and where livestock, particularly sheep, have relatively greater importance in the overall farming system, programs must clearly make this association. In fact, whatever kind of vegetative matter is used for such barriers, it is important to link animal production to it (in all areas where PADF and CARE work).

The last few years have seen a major decapitalization for Haitian small farmers. There are less animals in farmers possession. Farmers sell their animals and find they can't repurchase them when they wish to - due to major rising of costs. Farmers, however, will continue to place their financial resources, as they get them, into animals. Improved crop production, more revenue from bio-intensive gardens, clearly means more animals. How and where these animals are fed must be considered. Government policies which favor production of milk and its products, and which guarantee that farmers receive significant economic benefits from this, might influence a shift in land use from cropping to pasturing the land. Overgrazing of pastures, however, can also lead to serious erosion problems as witnessed in Palmiste Avin, where well-managed crop production resulted in less erosion.

5. Commercial Outlets

Projects, including PLUS, must very seriously assist in helping to develop the commercial outlets of those key products which will help increase the value of long term crops[19] on hillsides or in maintaining vegetative barriers created with these crops. This may sometimes mean looking at appropriate agro-industry measures to increase efficiency, making products more competitive, or identifying new crops for commercial exploitation. The PLUS project itself may not be able to implement some of the recommendations which follow below. The project should, however, be instrumental in seeking partners to work in activities which are complementary and mutually supportive. For instance:

(a) Plantain/Banana

Plantain is already one of the most valuable food crops grown, as well as one with important commercial outlets. There are commercial interests in Haiti to produce a flour out of plantain which can be used for all kinds of food processes (eg. banan-nioc - combination of plantain and manioc flour). This may mean PLUS program help in identifying the best varieties for this purpose. Plantain can become an important element of vegetative barriers/bands on many hillside fields (PADF Cap Haitien,

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[19] If vegetative barriers are to remain in place long enough for them to have an impact on soil conservation, they must be long cycle in nature - not harvested every 3-9 months, like corn, sorghum or beans.

Mirebalais, and Marigot/Jacmel regions in particular).

Taro (malanga) is an even more valuable crop to many farmers in the Mirebalais and other high rainfall regions. Its cultivation has been the specific reason for the creation of rock terraces on many steep slopes and in ravines by local work groups (seen in Mirebalais region), without any project intervention. With taro, in such locations, is always cultivated plantain/banana and outstanding corn crops, sometimes rice.

(b) Sugarcane

Sugarcane is another important crop for establishing vegetative barriers in regions where plantain is widely grown. There are many opportunities to increase the motivation of small farmers to plant sugarcane on these hillsides. Not only can small sugar mills be greatly improved, but there could be an important place for some kind of small, hand driven, sugarcane crushing apparatus[20].

(c) Fruit and other Trees

There are more trees on the Haitian hillsides of many regions - thanks to past agroforestry projects, efforts of AOP, AF-II and others. These trees are today 6-7 years old and are beginning to make their presence evident. This is very encouraging. What is unfortunate is that more of these trees were not strategically placed on farmer fields to serve more than one purpose (firewood, or lumber). They could be serving as semi-permanent "stakes" in vegetative barriers, holding traditional "rempe paille" in place, and building terraces.

Various fruit trees (mango, banana, cashew, guava, pineapple, etc.) could be better exploited. Many of these could become integrated as components of permanent vegetative barriers on hillside field, if approached this way. The PLUS project could promote such efforts. While grafting will help improve the presence of improved, marketable varieties of some fruit trees, marketing outlets for the fruit or some means of transforming fruit into higher value products must be available locally. Jam/jelly making could be greatly expanded if locally appropriate small processing technologies could be introduced and market channels established. Cashew production, already present in many areas, could be expanded and this high value crop better processed and marketed, both locally and internationally. Cashew also makes an

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[20] The only sugarcane many hillside small farmers grow is what they can eat (canne ananas), or the little they can sell for consumption. Much of this is grown on the field around the household. Some households have a traditional way of crushing a little cane for household juice (for sweetening beverages, etc.). They can not produce enough cane to afford the rental fees charged by the small local sugar mills, or for renting the bulls which turn the cane crusher.

Les Ateliers-Ecoles, a private workshop in Camp-Perrin with Belgium technical assistance make all kinds of good quality farm implements. It has plans for creating both a manual as well as motor/animal driven sugarcane mill, something they too believe is greatly needed in the country. Their efforts should be supported.

extremely sought after jam and jelly.

Other tree species, such as coconut, royal palm and latanier palm could also form components of vegetative barriers. Seedlings and seed could be supplied for this purpose through PLUS project nursery programs. Castor bean is another potential high cash value crop for hillside vegetative barriers. It is already used in some cases, but success will depend on developing an effective agri-business for processing large quantities of this seed regionally.[21]

(d) Manioc

Manioc is a very important cultivated crop in many mountainous regions of the country, and particularly in the PADF Les Cayes/ Camp Perrin region. Manioc cultivation, associated with sweet potato, and pigeon pea, motivates farmers to create labor intensive contour ridges - important for soil conservation and moisture retention. Farmers plant manioc along these contour rows, and most of the form of these mounds last for the entire 12-18 months[22] these are in the ground. Manioc cultivation should be encouraged and expanded for this reason.[23] However, farmers do not obtain anywhere near the value of this crop - selling it at low cost to those who will process it into a higher value product: cassava bread.

Farming systems which rotate manioc/sweet potato crops strategically on hillside fields could also control soil erosion throughout the year, and also 'protect' leucaena hedgerows from direct animal predation!

(e) Product Transformation and Processing

Helping to establish more privately run, small processing centers in mountain areas[24], such as that seen in Jacmel's Palmiste Avin (manioc, sweet potato, jams) or the several manioc transformation centers encountered in the Camp Perrin area, could very significantly promote product transformation while

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[21] The Ateliers-Ecole workshop in Camp-Perrin already has the appropriate press to extract the oil. It is expensive, however, and substantial amounts of seed must be collected to enable production to be profitable for a small, private local operator. Realistic prices must be given to farmers for their seed to encourage such production. Castor bean oil has good potential as an export crop from Haiti.

[22] Sometimes as long as three and four years! Farmers in Jacmel's Palmiste Avin create such contour ridges for <u>all</u> their cultivated crops.

[23] Harvesting manioc after only one year will not produce the soil conservation benefits needed. Farmers realize that they would earn more money by leaving the crop for another year but do not do so because they need the money represented by the crop for other household needs. Some form of revolving credit scheme could be useful in permitting long cycle manioc - thus protecting the hillsides from over-cultivation.

[24] To grind the manioc into pulp, and to then press the water from it. Farmers themselves can scrape the 'skin' from the tubers, and once pressed, can themselves pound the pressed pulp and bake the round cassava bread. A major constraint here is finding appropriate round metal sheets for baking. Also more fuel efficient stoves need to be developed to reduce wood consumption.

significantly raising farmer incomes.[25] Innovative efforts should be made for small-scale rural processing and transformation centers for fruit tree products and castor bean oil. Such efforts would also encourage farmers to raise such crops in their fields, perhaps as part of vegetative barriers. These crops would provide increased long term vegetative cover to Haiti's mountain and hill sides.

Product transformations of jams, jellies or fruit pulp[26], for instance, may need to be done on an itinerant, seasonal basis - using dismountable processing equipment which can move from region to region, as fruit ripen. Large (stationary) processing centers, such as the AKRA fruit processing center in Cap Haitien, frequently experience problems finding enough produce locally to keep in operation year-round - thus adding to the costs of equipment and personnel maintenance. Smaller, mobile, units would be more realistic in the Haitian context - where fruit come into season at different times of the year in different regions. A study needs to be done on the regional availability of different kinds of fruit, and the quantities and locations involved (Francisque mango, citrus, avocado, cashew, guava, etc.). While the PLUS project would not be directly involved in such an operation, it is clear that such activities support and complement creation of permanent and sustainable vegetative cover for soil conservation. This in turn can lead to greater economic productivity on these hillside - something which PLUS <u>is</u> concerned about.

6. Seed & Grain Banks/Loans/Credit

Price fluctuations of basic crops pose a serious problem in all parts of the country, with farmers selling much of their produce at a time when prices are lowest, only to have to repurchase seed from the market, for planting or consumption[27], when prices are highest. Farmers are often unable to grow the crops they would like (especially beans) for lack of money to purchase seed at planting time. Programs which help farmers organize to avoid early sales of their produce and to obtain credit (if necessary) to purchase seed should be encouraged wherever possible.[28] An example is the establishment of grain and seed

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[25] The Ateliers-Ecole workshop in Camp-Perrin create the appropriate mills needed for manioc processing.

[26] With fruit pulp, only initial processing is completed in-country. Final processing of shipped products take place overseas (fruit as an ingredient to yogurt, for example).

[27] They sell what they have, in the first place, because cash for various household needs could not be raised in any other manner.

[28] This would, of course, not be highly appreciated by the Madam Sara who make their living from this price variability. Therefore, these merchants should be involved as part of the solution. One way to do this would be to help them overcome some of the high losses they experience when marketing products, part of the reason for the wide price fluctuations.

banks. PADF/CARE might consider such efforts in all their watershed areas.

Programs with bio-intensive gardens (BIGs) are very valuable. It is essential that, from the very beginning, programs not themselves be involved in seed distribution. They must identify local merchants (Madam Sara) who can obtain the needed seed. Farmers will come to them to purchase directly the seed needed. The survey team encountered past programs with BIG activities (eg. DCCH in the Camp-Perrin region) which failed when project ended[29] because the project was active in furnishing the needed seed. No local entity was developed to fill this role. PADF is back in the same area, with the same farmers, showing them how to construct a somewhat different kind of BIG garden, but still helping to provide seed.[30] PADF/CARE, or some other organization, may need to provide individual loans to put someone 'into business' selling seed.[31] The same principal is true for many of the services needed in rural communities (fertilizer supplies, simple livestock vaccines, etc.).

7. Seed Multiplication Programs

Improved varieties, as well as locally sought for varieties which are disappearing, could be promoted by using small farmers as seed growers. Good yam varieties are disappearing in some regions (eg. Berry/Sud Est) due to maroka larvae and soil fertility problems. Varieties of pigeon pea in CARE's Northwest region which are very important for household consumption have almost disappeared in some areas. This is because people eat these varieties green, with little making it to mature seed stages. High yielding, disease resistant bean varieties, such as Tamazulapa, should be made available to farmers. Disease resistant varieties of sugarcane (against charbon) or plantain (against maroca larvae) should also be made available and monitored (through research /demonstration fields). PLUS is beginning to have a much appreciated role doing just this in its areas of operation.

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[29] September, 1991, because of political problems - a time when many bilateral and private foreign aid programs were terminated.

[30] We met farmers in Banatte (Les Cayes) who had gardens of tomatoes last year. Technicians and extensionists were busy upon our arrival (August), in creating BIGs near the household residences of group members. People did not know where or when they would have the seed - even though one member of group had been taken by the project to Les Cayes Agro-Supply last year when the seed had been purchased. Technicians told us that nurseries would be established in September for transplanting in October. Farmers are "waiting to see" if PADF will again buy them the seed. If PADF does not do so, many of the already prepared BIGS probably will not be planted.

[31] Our impression is that going the individual route may be more promising than trying to promote this as an activity of the groups - which may not have enough common interests to hold together after the departure of the project.

8. Roads

The team, when traveling all over the country, often over terrible roads, could not help but feel the impact of this constraint - and also give it some thought. One of the most visible effects of the deterioration of Haiti's economic infrastructure are her roads. Pavement has disappeared in many areas. Or pavement is broken up, with potholes everywhere - greatly increasing the cost of transportation (time, harm to vehicles and produce). Foreign donors are poised to inject considerable AID into Haiti should normalization take place and reconstruction begin. This will mean that there will be a great deal of money spent on roads.

Developers should seriously consider using this money to provide more than a quick-fix for Haiti - that is, using imported petroleum products, at very great cost[32], to repave many roads. One might consider labor intensive means of channeling all of this money to remain in the country by creating, perhaps initially more costly, but more long lasting, roads. A country which has made a political commitment of this kind is Cape Verde, which has used local labor and talent to pave the roads of the country with locally available stone. Such flat stones exist in Haiti and could be used (eg. on road to Cap Haitian there is an exposed mountain of this being mined for house construction material). Or even cement based 'bricks' could be used for this purpose, in some areas (like those used on the Canapé Vert road in Port-au-Prince). Use of this kind of technology could result in the development of a whole new economic sector in the country - with many long-term spin-off benefits.

PADF will be involved in improvement of rural roads during the next few years, and CARE has done so in the past in the Northwest. We therefore would recommend that consideration be given to using procedures and materials which will handle the challenge in its wider context: not simply as a problem (roads) which needs to be fixed but an opportunity to have a greater impact on the Haitian economy as a whole.

9. Vegetable Production

The Northwest has potential for increased vegetable production, for both the local and regional economy. CARE activities in "areas of opportunity", through bio-intensive gardens for instance, are a very important beginning in this direction. Much greater attention needs to be given to developing this sector in a region where other options are more limited. This would

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[32] Large amounts of the money end up in Saudi Arabia or Kuwait, not circulating through the Haitian economy.

include looking at new varieties of produce for export, as well as considering how the transportation and road systems can be improved to support such an opportunity. This would also require initiatives in creating cisterns (below ground type for run-off water) for small holders (BIGs and livestock use), and other irrigation possibilities.

PADF regions with similar potential include Berry (Marigot area), Palmiste Avin on the paved road to Jacmel, and Bedoret/Plaisance on the paved road to Cap Haitien. High value vegetable crops such as these can completely change farmer motivation towards intensive contour ridging and use of fertilizers on these mountain slopes. Vegetable growing on the steep slopes around Fermathe, in the mountains above Port-au-Prince, is a good example of what can happen if a market can be attained.

10. Labor and Organized Work Groups

There is a general problem of approach to farmers within the PLUS project. Not enough effort is given to learning how farmers actually accomplish field work. Such work, if not done by the farmer himself, or his immediate family, is done through a number of forms of locally organized, traditional, work groups (combite, associée, esquad, rampaneau, 'job', korvé, mera). The most effective of these appears to be the small group (4-8 people) of friends/neighbors who organize to work today in my field, tomorrow in yours, the next day in his, and so on (no pay). Members of such groups may "sell" their day to raise some money; or the group may even organize to sell their labor to others, with each member getting the day's money (paid for all members) in rotation. Sometimes this money is saved by the group for a New Year Eve's Feast.

Daily labor rates are surprisingly similar across the entire country visited, ranging between 5-7 gourdes for about 6 hours of work, plus usually 2 meals. Where rates are higher, the reasons are usually clear because of the kind of work being performed (i.e. creating contour ridges in Palmiste Avin: 10-12 gdes/day). Women in some areas (Northwest, Mirebalais, Marigot area) also organize themselves in this way to perform collective work (usually weeding), even selling their "day" too for 3-4 gourdes for about 5 hours work, about half that received by their menfolk.

The Farmer Needs Assessment Team believe it is essential that PADF/CARE also work with these <u>already existing</u> groups, whose very existence, in all mountain communities throughout Haiti, is based

on performing field labor (usually).[33] Soil conservation activities need to become part of the regular activities of these groups, if they are to ever become part of the farming systems of the communities concerned. Working through PVOs to reach farmers, as PADF does, or other special purpose community groups/cooperatives, etc. can sometimes be a hindrance - as artificial groups are created to interface with the project and disappear when the project is gone.[34] PADF has had some success in the Les Cayes (Gaita) and Mirebalais (Lonsi) areas in working with work groups - though not using traditional structures. This is a constructive development in these areas which, if combined with contacts with traditional work groups as well, should prove effective in extending technical information into the communities.

11. Land Tenure and Policy Reform

A great many of the problems concerning a farmer's ability to adopt various soil conservation measures can be directly related to a farmer's rights to specific pieces of land. Only direct ownership of land provides the right motivation for long term sustainability. Such ownership comes about through either direct land purchase or when land is actually divided up among the survivors of a deceased land owner (man or woman). Share-cropping arrangements are the very worst in terms of soil conservation management - and land renting only somewhat better. Almost as bad are situations where inherited land rests "undivided", and everyone has equal "rights" to use the land. Once a crop is out of a field,

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[33] Members of these work squads may or may not be members of the formal "groupements" with which PADF/CARE work - and in some cases was responsible for creating. We have found that, more often than not, they are not. At some risk of over-generalization, members of such squads are characterized as: (1) living in the mountains; (2) being poor; (3) having very little land of their own; (4) share-cropping much of their cultivated land; (5) having little or no land in the valley bottoms and plains; (6) working for the 'better off' landowners of the valley/plains; or (7) 'selling their day's labor and being the sharecropper to members of the groupements, that PADF, in particular, work with. While there are, of course exceptions to this pattern, yet it is true enough to be at the root of a lot of the problems of adoption of hillside conservation measures. It is actually these farmers, represented by these traditional work groups, who are probably among the most important to reach and help in terms of soil conservation measures - as they are the ones most likely to destroy such structures for short term gain.

Squad members have told us that "they didn't know they could work 'directly' with PADF" or "they thought that they would have to dissolve their squad into the 'formal groupement'; or "they thought they would have to pay a fee to become a member of the formal groupement"; or "they though they would have to 'change their name' - to that of the larger groupement.

The PADF PVO groups are large groups, often with at least 20 members. In Les Cayes (Banatte for example), PADF has been instrumental in: (1) encouraging farmers to form into groups in two communities - with 6 groups forming, and then (2) organizing these 6 groups into an association (Organisasyon Plante Banatte Fogé - OPBAF) - with which, and through which, PADF channels its efforts. Leaders of these groups are often the influential people of the valley/area, live along or near the road (where project first met them). These groups work in each other's fields, for soils conservation purposes, or will even sell their "days" like a traditional work group, but will put this money into a "caisse" to be used for some common group enterprise - maybe grain banks. This would be great if they really can do this and sustain this beyond the presence of the project.

[34] Many so-called PVO groups or community groups only exist, in reality, when a project shows up. A project ends, many groups for practical purposes also end. A new project shows up, and asks "Are there any 'local groups' in this area", and right away the old group comes to life again. This is not to discount the importance of the many legitimate PVO and local groups which do exist and function locally.

any family member has rights to pasture his/her animals on the land. No family member will take his brother to court because his leucaena was eaten by his brother's donkey.

Should the government of Haiti become seriously involved in confronting land tenure issues in this country, with the purpose of some kind of reform, USAID should provide every support possible. Effort might be made to give secure titles to the thousands of farmers who cultivate state lands - and have not paid rents since the departure of Duvalier. This could be done subject to their establishment of vegetative contour barriers on their land for a certain number of years.

12. On-Farm, Farmer Managed Research/Demonstration Trials

There are currently no projects in Haiti supporting increased productivity through sustained applied research and demonstration activities, with support to valid commercialization issues in different regions of the country. Both PADF and CARE are more orientated to extension/implementation activities. In some cases, the "message" being implemented is either not appropriate, or long term sustainability of efforts are not being considered carefully enough. Successful implementation can not proceed without the support of on-farm applied research and demonstration activities. It is important that SECID initiate on-farm, farmer managed trial activities in all five regions of the PLUS project. Implementation should be based on sound and successful outcome of such work. If this were done, it follows that those involved in such applied on-farm research must be directly involved in developing the training and extension messages which would then be extended to farmers.

For example, in some regions plantain and sugarcane, planted alone or in combination along a contour, will in time grow together, eventually creating a 1-2 meter wide barrier of plants against which up-slope field debris will accumulate, forming terraces over time. This would require significant changes in how farmers organize their crops on their fields, how they conceptually view their land, how they manage such vegetative barriers - in other words, a <u>modification to their farming system</u>. Yet, to our knowledge, no one in Haiti has ever tried this on hillside field-scale research/demonstration trials under farmer management. Before widespread 'promotion' of an idea like this, field testing and demonstration is essential to work out unforeseen problems of sustainability within particular regions. The same rule applies to extending hedgerows of leucaena or gliricidia (for example), as well. SECID researchers should be encouraged to collaborate with CARE/PADF in giving major priority to such activity.

13. Program Unifying Themes

PADF/CARE, together with SECID, should identify one or more unifying themes in each of its project regions around which to organize their activities in order to have the greatest impact. This should provide the basis for an on-farm, farmer managed trial program (at least 20 repetitions per region). Unifying themes proposed by the Farmer Needs Assessment Team should be considered for implementation during the remaining 15 months of the project, and hopefully into the time beyond. To be unifying, the theme must combine the efforts of the entire PLUS team in the area: PADF or CARE and SECID researchers, looking at the farming system **AS A SYSTEM** and not as a number of unrelated parts. To have an impact on soil conservation, key elements of the production system must be identified which will permit the economic justification for sustainable soil conservation practices. The Farmer Needs Assessment Team is convinced that, in many cases, animals **MUST** be considered in a total systems approach. Commercialization issues **MUST** be addressed carefully and thoughtfully, and real help provided to see appropriate mechanisms put into place. Project M/E activities should be particularly concerned with components of the unifying themes; activities for socio-economic data collection should be focused around these themes; project indicators for success should be primarily focused on the measured success of the components of these themes.

Activities related to these proposed applied research themes will extend beyond the current life of the PLUS project. However, even within the next fifteen months, important information will be gained which will provide the support necessary to perhaps justify continuation.

14. Other Specific Recommendations

(1) Farmer Payments

The PLUS project should continue its policy of not "paying" farmers, whether in cash or in kind (food for work) for creating soil conservation structures on their fields. When major tasks are involved, like rock terraces or digging contour ditches, motivating farmers will take longer. Use of small existing traditional work groups should accelerate this process.

There may, however, be one appropriate way of creating greater motivation among farmers faced with major tasks like rock terraces, rock walls, and contour ditches. Farmers traditionally provide a meal to any labor group working on their land, sometimes one or two meals - depending on length of workday. A program could consider giving to the farmer on whose field will be worked a <u>contribution</u> towards the cost of this meal (4-5 gourdes/person). In this case, people working do not consider themselves as "being paid" for their work - they don't take home either any money or any food. If this

were adopted, a program would probably have to do same thing for those creating hedgerows as well.

(2) **Start-up of Applied Trials**

Begin to initiate immediately (September) implementation of on-farm applied research and demonstration trials, based on the unifying themes developed in the Farmer Needs Assessment Survey.

(3) **Livestock Technical Assistance (Haitian)**

Include someone on SECID staff with livestock production experience to help team in monitoring the impact of conservation measures on livestock forage issues, increase in livestock, and other specific issues. These activities should center around the 20 research/demonstration farmers selected in each program area for on-farm applied research/demonstration trials.

(4) **Team Division of Labor**

SECID team might consider splitting up 5 PLUS regions, giving one person principal responsibility for leading **team's** effort in establishing the unifying theme trials with PADF or CARE field staff assistance. This will help the group to depend on each other's skills in developing the overall program, to focus their overall efforts towards one common goal.

(5) **Livestock & Seed Bank Issues**

If PLUS program is seriously interested in activities being "farmer needs driven", it will have to take serious consideration of farmer grain storage/seed bank and livestock issues. This should be done in the context of the unifying themes recommended.

(6) **Changing Behavior & Shifting Priorities**

The basic issues to which PLUS will have to be directed are cultural in nature - changing <u>behavior</u>, to achieve sustainability. This will take time. Unlike counting the number of latrines dug, number of linear meters of rock terraces constructed, number of tree seedlings grown, what happens afterwards is what is important. We recommend that counting the number of linear meters of <u>hedgerows</u> established by the project is counter-productive - and sending the wrong message to both project technicians and extensionists and to farmers. We recommend that time (and financial resources implied[35]) used for this monitoring indicator be shifted to efforts in establishing and close monitoring of the on-farm trials and related themes proposed. This will provide a basis upon which evaluation of behavioral changes can be made, and provide a means for fine-tuning extension themes in each region.

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[35] We do not believe the implementation of the proposed "unifying applied research trial themes", including their monitoring, should involve <u>new</u> project financial resources. There should be a re-distribution of existing human and financial resources to more important activities. Some PADF watershed areas visited employed as many as 24 extensionists; 8 of the best of these would be sufficient to handle field implementation.

(7) **Trees as Components of Vegetative Barriers**

Agroforestry activities of the programs should concentrate on support to the specific unifying themes being developed for each area. One of the most enduring and successful aspects of past programs has been the extent to which they have included trees onto hillside fields, and most specifically as part of contour vegetative strips (eg. Fonds-des-Frères). Farmers in Les Cayes noted the importance of bois blanc (straight, little shading) trees for such structures - but PADF is not using them as an element in establishing contour vegetative barriers. Nurseries established should have this as one of their specific targets (not just trees for the farmer to plant, but to plant specifically in these vegetative barriers). Other species such as latanier and royal palm tree, bamboo, coconut trees, and fruit trees should also be included in these nurseries. PADF's use of locally made, plantain fiber containers for seedlings, replacing the need for plastic bags, is highly innovative and should be widely extended to other regions.

(8) **Inter-regional Visitation**

PADF and CARE alike should provide key cooperating farmers (not just extensionists) who are involved in the research/ demonstration on-farm trials the opportunity to visit other areas of the country where what they may be doing can be better visualized. One would think of Kenscoff vegetable gardening for demonstrating new management techniques, contour ditches and ridging in Palmiste Avin, manioc/cassava processing and transformation in Les Cayes, etc.

(9) **Training**

Farmer training should not be left to project "extensionists", who themselves have only a few days of formal training. Training should be on-going and participatory in nature, helping farmers think through their own issues and seeking ways to solve them together. There must be more direct and continuing agronomist contact with farmers, not depending only on scheduled "training" workshops to achieve this. Program technicians and agronomists may not always have the answers. These sometimes must come from the community and individuals themselves. Extensionists and field technicians basically do exactly what they are told to do by project "higher-ups" - who sometimes do not have a good understanding of the specific field realities being faced.

(10) **Breeding**

There is often a problem of the availability of males for reproduction purposes (whether of cattle, goats, sheep, pigs, horses, rabbits). An opportunity exists to improve the animals in a region by providing breeding stock through some kind of program. Mules are one of the most important beasts of burden, extremely expensive and hard to come by. A program of artificial insemination would be valuable in those areas which need them most (Mirebalais, Palmiste Avin, Northwest). An animal production

technician within the PLUS program could target these issues.

15. Conclusions

Where does the PLUS project go from here? The reports prepared during the mission of the Farmer Needs Assessment Survey Team have been provided as a means of helping program leaders see their field activities from a perhaps different perspective: that of the farmers. The recommendations and summary provided here will help, we hope, to draw PLUS project attention to areas of particular strength in the program, which should be further built upon, and to areas of possible weakness which can be improved. We especially believe it is essential that far greater attention be given to the establishment of a program of on-farm, farmer managed trials around the issues presented as "unifying themes" in our discussion. Too much extension (and monitoring and measuring of this) is taking place of yet unproven or untested good ideas.

THEME # 1: A Unifying Theme for PADF Watersheds in Jacmel Region 2, Mirebalais Region 3, Cap Haitien Region 4

UNIFYING THEME: Plantain/Sugarcane as Principal Components of Vegetative Barrier

UNIFYING THEME	COMPONENT	CONSTRAINTS RESOLVED BY ACTIONS	PROJECT ACTIONS TO BE TAKEN
Hillside Cropping Associations: Corn/Sorghum/Bean Pigeon Pea/Manioc with Vegetative Bands of: Plantain Banana Sugarcane Pineapple Some Castor Bean Some Yam Some Fruit Trees Some Gliricidia Some Coconut Trees Some Other Trees	1. Household Food Consumption	Need for increased crop production. Increased production for most important food crops from both vegetative barriers and space between them.	Establish at least 20 on-farm, farmer managed, research/ demonstration trials with this unifying theme. Assist other farmers in area to establish these, if interested.
	2. Soil Conservation	Soil loss and reduced productivity. Therefore need for increased vegetative cover of hillside fields, reduced soil erosion, increased water infiltration, increased productivity of hillside fields.	Establish "rempe paille" along contour, using living stakes of preferably Gliricidia, limited leucaena, creating small soil ridges. Establish vegetative barriers along these ridges, using plantain, banana, sugarcane, pineapple, sorghum.
	3. Agroforestry	Loss of hillside vegetative cover. Increased vegetative cover and long term productivity of hill-side fields.	Encourage farmers to select a number of both (grafted) fruit, coconut tree seedlings (project supplied), castor bean, and other tree species to include scattered along the vegetative barriers. Create a wind break of fast growing trees along at least one side of field.
	4. Animal Production and Forage	Need for forage material for increased animal production, higher quality feed for animals.	Forage material coming from the vegetative strips can become an important new source of feed, using cut-and-carry. No direct field pasturing.
	5. Marketing	Low productivity of hillside fields will be modified with high value crops like plantain, banana, fruit trees, improved corn and bean production.	Establish full range of crops during the 1993 season with at least 20 participating farmers in region. Provide assistance, where needed, in marketing key crops, seed banks, etc.
	6. Agro-Industry	Farmers are not realizing what they might from the production of key crops. Incomes remain low and motivation to increase production thus limited.	Search for means of product transformation of key crops grown in vegetative barriers. Consider assistance to sugarcane processing mills and new manual means of extracting juice; consider improved means of processing castor beans; consider associating hillside plantain crops with varieties for flour processing; consider assistance in establishing cassava processing cooperatives.
	7. Project Information Needs for Monitoring and Evaluation	Lack of objective data on soil conservation measures which will significantly both raise hillside farming productivity and result in soil conservation and farmer sustainability.	Obtain detailed data on the 20 participating farmer fields concerning all activities undertaken, timing, costs, and production. Use of forage for animals. Value of animals benefiting.

THEME # 2: A Unifying Theme for CARE Northwest Watersheds, and PADF Les Cayes Region 1
UNIFYING PRINCIPAL THEME: BIO-INTENSIVE GARDENS (BIGS)

UNIFYING THEME	COMPONENT	CONSTRAINTS TO BE RESOLVED	PROJECT ACTIONS TO BE TAKEN
BIO-INTENSIVE GARDENS (BIGS)	1. Household Food Consumption	Lack of food, especially between major crop harvest periods.	Promote wide-spread adoption
	2. Seeds: Commercialization	Lack of Seed; Greater diversity of seed available; Seed source stabilized and Employment Generated; Area not dependent on project source of seed.	Set up several small enterprises (women) merchants to sell seed; Possible provide loan to start-up; Help develop contacts with outside seed sources; Help BIG households learn how to preserve their own seed.
Spinach Cabbage Lettuce Tomatoes Eggplant Carrots Lima Bean (Pois Souche) Cantaloupe Melons Watermelon	3. BIG Production: Commercialization (Key Constraint)	Reduce Risk of Over-supply in Local Markets; Diversify locations where produce may be sold.	Obtain wide range of vegetable varieties and dates of maturing; Help BIG farmers
	4. Basket Making: Commercialization	Poor Quality of Produce arriving at distant market (papaya, Francisque mango, melons, etc.)	Help develop cottage industry in making appropriate containers from latannier leaves for long distance transport.
	5. Water: (Key Constraint)	BIGs often located at considerable distance from water, which is transported by children or a donkey; Few farmers have close access to streams; Insufficient water given to BIGs; Water a problem for livestock too.	Promote construction of very simple, below ground cisterns (low cost - without cement) to catch run-off from household yard; Train in more efficient means of BIG water use (evening watering; soil cover).
	6. Manure	Low soil fertility resulting in lower yields.	Demonstrating, through trials, importance of using animal manures; Advise BIG farmers on animal enclosures and staking for gathering manure; Improve manure quality through means of protection from sun/rain.
	7. Forage Crops	Farmers have critical need for animal forage for sheep and cattle; Money from BIGs will be used to purchase additional sheep = greater need for forage.	Farmers with BIGs should create vegetative barriers on hillside fields using guinea grass, leucaena, latanier palm, & herbaceous legumes (siratro, glycine, teramnus) on contours on at least ONE of their major OWNED fields (with project help). Farmer will take measures to protect forage strips when fields are not in use.
	8. Pest Management	Extensive insect larval damage to vegetables; Reduced quality of product resulting in lower prices.	Instruct in methods to use neem kernel extract as an insecticide on BIGs; Collect neem seeds in area, if available, with BIG farmers; Encourage BIG farmers to plant neem trees on contour vegetative barriers.

BIO-INTENSIVE GARDENS (CONTINUED)	9. Agroforestry	Lack of hillside long-term vegetative cover, resulting in serious erosion; need for cover crops; forage for livestock; increased water infiltration; increased food for consumption.	Availability of neem, guinea grass, latanier palm trees for contour strips on hillside fields of BIG farmers. Establish nurseries with latanier palm seedlings, bois blanc, neem to include as components of vegetative barriers on hillside fields.
BIO-INTENSIVE GARDENS (CONTINUED)	10. Project Information Needs for Monitoring and Evaluation	Data Collection on the 10 components of the BIG unifying theme for M/E purposes; objective to quantify benefits of system.	Data on BIG farmer use of time, water, and amount of produce sold and consumed; Data on costs of constructing simple cistern; Simple manual on preparation of neem kernel extract for application to BIGs and method of application; If small business set up for sale of BIG seeds, then collect data on numbers of farmers requesting seed, where they are from (extension), periods sought, varieties requested and purchased, and economics of business; Data on timing and quantity of forage obtained from BIG farmer fields, and monitor BIG livestock, destination of all manures; Select 10 Cooperating BIG Farmers per Micro-Watershed for this M/E Data Collection.

THEME # 3: A Unifying Theme for PADF Watersheds in Les Cayes, Region 1, and CARE Northwest Region Watersheds

UNIFYING THEME: Leucaena/Napier Grass, Combined with Trees, as Principal Components of Vegetative Barrier With Long Term Manioc/Sweet Potato Ridges as Formal Component of Association

UNIFYING THEME	COMPONENT	CONSTRAINTS RESOLVED BY ACTIONS	PROJECT ACTIONS TO BE TAKEN
Hillside Cropping Associations: Crop Rotations Between: (1) Corn/Sorghum/Bean Pigeon Pea; (2) Short Fallow; (3) Manioc/Sweet Potato with Vegetative Bands of: Leucaena and Napier Grass (close parallel rows) with Bois blanc tree seedlings (every 2 meters) and Some Castor Bean Some Gliricidia Some Coconut Trees Some Other Trees	1. Household Food Consumption	Need for increased productivity of most important food grain crops. Produce these from area between vegetative barriers reserved for such crops.	Establish at least 20 on-farm, farmer managed, research/ demonstration trials with this unifying theme. Assist other farmers in area to establish these, if interested.
	2. Soil Conservation	Need for increased vegetative cover of hillside fields, reduced soil erosion, increased water infiltration, increased productivity of hillside fields.	Establish shallow contour ditches along contour, creating small soil ridges, into which are planted both one row of leucaena and one row of napier (on up-hill side).
	3. Agroforestry	Need for increased vegetative cover and long term productivity of hill-side fields.	Encourage farmers to select a number of both fast growing trees (bois blanc, bois capable), coconut tree seedlings (project supplied), castor bean, and other tree species to include scattered along the vegetative barriers. In furrow, plant every 2 meters tree seedling. Include castor beans (plant seed every 2 meters. Initially supply farmers of 20 trials the seed/plant material; initiate seedling development in nurseries for extended adoption.
	4. Animal Production and Forage	Need for forage material for increased animal production, higher quality feed for animals is particularly high in these regions; space is limited for animal pasturing	Forage material coming from the vegetative strips can become an important new source of feed, using cut-and-carry. No direct field pasturing.
	5. Marketing	Low productivity of hillside fields will be modified with higher production from protected soils; vegetative barriers will produce new crops (castor bean, lumber, fire-wood); increased manioc cultivation will generate new revenues.	Establish alternating crop production zones between the vegetative barriers; Band One with corn/bean/sorghum/pigeon pea; Band Two with sweet potato/manioc on contour ridges; every other band should always be in a field of manioc/sweet potato - providing long term vegetative cover and some protection from direct grazing by animals on part of each vegetative barrier. Provide assistance, where needed, in marketing key crops, seed banks, improved varieties, etc.

6. Agro-Industry	Farmers are not realizing what they might from the production of key crops. Incomes remain low and motivation to increase production thus limited.	Search for means of product transformation of key crops grown in vegetative barriers. consider improved means of processing castor beans; consider assistance in establishing cassava processing cooperatives.
7. Project Information Needs for Monitoring and Evaluation	Lack of objective data on soil conservation measures which will significantly both raise hillside farming productivity and result in soil conservation and farmer sustainability.	Obtain detailed data on the 20 participating farmer fields concerning all activities undertaken, timing, costs, and production. Use of forage for animals. Value of animals benefiting.

PADF - PLUS

MAP OF REGIONS AND OFFICE LOCATIONS