

Date: 2 July 1986

Mr. Andrew H. Derke
Partnership for Productivity/International
2001 S Street, NW, Suite 610
Washington, DC 20009

Dear Mr. Derke:

Subject: Cooperative Agreement No. 521-0192-A-00-6116-00

Pursuant to the authority contained in Section 103 of the Foreign Assistance Act of 1961, as amended, the Agency for International Development (hereinafter referred to as "AID" or "Grantor") hereby provides to Partnership for Productivity International (hereinafter referred to as "PPI" or "Recipient") the sum of Four Hundred Twenty-Five Thousand United States Dollars (US\$425,000) to provide financial assistance for the purpose of undertaking a program of local resource development in the area of the Chaine des Matheux, Haiti, as more fully described in Attachment 2, entitled "Program Description".

This Cooperative Agreement is effective and obligation is made as of the date of this letter and shall apply to commitments made by the Recipient in furtherance of program objectives through the estimated completion date of June 30, 1989.

This Agreement is made to the Recipient on condition that the funds will be administered in accordance with the terms and conditions as set forth in Attachment 1, Schedule; Attachment 2, Program Description; Attachment 3A, Mandatory Standard Provisions; 3B, Optional Standard Provisions; Attachment 4, Assurance of Compliance; and Attachment 5, Procedures to Obtain Disbursements, which have been agreed to by your organization.

Please sign the original and seven (7) copies of this letter to acknowledge your acceptance of this Cooperative Agreement, and return the original and six (6) copies to this office.

Sincerely Yours,



Richard Webber
Agreement Officer
USAID/Haiti

ACKNOWLEDGED:

by:



Jean B. Brisson
PARTNERSHIP FOR PRODUCTIVITY/
INTERNATIONAL

DATE:

July 2 - 1986

Attachments:

1. Schedule
2. Program Description
 - Annex 1 Illustrative Detailed Budget
 - Annex 2 Map of Project Area
- 3A. Mandatory Standard Provisions
- 3B. Optional Standard Provisions
4. Assurance of Compliance
5. Procedures to Obtain Disbursements

Fiscal Data:

Project number: 521-0192
Appropriation: 72-1161021.3
Allowance: LDAA-86-25521-AG13
Total Grant Amount: \$878,580
Amount Obligated: \$425,000
PID/T Number: 521-0192-3-60065
Funds Available: *228*
Date: *8/17/86*

ATTACHMENT 1

SCHEDULE

A. PURPOSE OF AGREEMENT

The purpose of this Cooperative Agreement (CA) is to provide funding for the Local Resource Development II project, to be implemented by Partnership for Productivity/International (hereinafter referred to as "PfP" or "Recipient"), in the Chaine des Matheux, Haiti. The project is more fully described in Attachment 2, entitled "Program Description".

B. PERIOD OF AGREEMENT

1. The effective date of this CA is the signature date by the Agreement Officer as shown on the cover letter, and the estimated completion date is May 31, 1989.
2. Funds obligated hereunder are available for program expenditures for the estimated period of July 1, 1986 to June 30, 1989, as shown in the Financial Plan below.

C. AMOUNT OF AGREEMENT AND PAYMENT

1. AID hereby obligates the amount of \$425,000 for the purposes of this Agreement.
2. Payment will be made to the Recipient in accordance with the procedures set forth in Attachment 3A Optional Standard Provisions, item 1 entitled "Payment - Periodic Advances".

D. FINANCIAL PLAN

1. On the following page is the Financial Plan for this Agreement. Revisions to this Plan shall be made in accordance with the Standard Provision entitled "Revision of Grant Budget".

GRANT BUDGET

Cost Element	Year 1		Year 2		Year 3		Total	Total	Combined Total
	Gourdes	Dollars	Gourdes	Dollars	Gourdes	Dollars	Gourdes	Dollars	
Personnel	73,000	12,000	85,580	12,600	89,850	13,230	248,430	37,830	286,260
Travel and Transport	3,280	10,950	1,470	7,710	880	5,900	5,630	24,560	30,190
Supplies and Equipment	56,500	27,500	34,600	1,000	43,320	1,000	134,420	29,500	163,920
Other Direct Costs	56,000	0	16,280	0	15,650	0	87,930	0	87,930
SUBTOTAL	188,780	50,450	137,930	21,310	149,700	20,130	476,410	91,890	568,300
Overhead	0	64,590	0	42,990	0	45,860	0	153,440	153,440
Contractual Services	31,800	8,080	28,840	4,160	27,500	1,460	88,140	13,700	101,840
Evaluation and Audit	0	0	0	55,000	0	0	0	55,000	55,000
TOTAL USAID FUNDING	220,580	123,120	166,770	123,460	177,200	67,450	564,550	314,030	878,580

BEST AVAILABLE COPY

2. The Recipient may not exceed the obligated amount set forth therein, nor adjust the costs for any individual line item by more than 15% of such line item, unless prior written approval is accorded by AID Agreement Officer.
3. An illustrative detailed budget is provided in Annex 1.
4. The authorized source/origin code for commodity procurement is 941 (selected free world) plus Haiti.

E. CONDITIONS PRECEDENT TO DISBURSEMENT AND COVENANTS

1. *Condition Precedent.* Except as AID may otherwise agree in writing, prior to any disbursement of funds, or the issuance by AID of any commitment document, the Recipient shall submit, for AID's review, a detailed scope of work and qualifications for the project's Program Manager.
2. *Condition Precedent.* Except as AID may otherwise agree in writing, prior to any disbursement of funds for the Program Manager, or the issuance by AID of any commitment document therefor, the Recipient shall select, with AID's concurrence, a Program Manager.
3. *Covenants.* The Recipient agrees that, for the duration of the Agreement, and except as AID shall otherwise agree in writing, the following covenants shall be adhered to:
 - (a) Project implementation will be guided by detailed annual work plans. The first annual work plan will be submitted within three months of the effective date of this Agreement, and thereafter within two weeks of the completion of a calendar year of project activities. This work plan will be organized according to the specific objectives and activities as described in this Agreement, and include both sufficient narrative to explain critical elements and an implementation calendar.
 - (b) Prior to finalizing the first Annual Work Plan, the Recipient will host a meeting and invite representatives of as many pertinent on-going projects as possible to explain the overall objectives of the project and seek input and cooperation from these other projects. The site of this meeting should be close to the project area to permit a field visit by interested participants.
 - (c) Monthly implementation meetings will be held to discuss and document project progress and to make necessary adjustments to the work plan. These meetings will be attended by, at a minimum, the Recipient's Program Manager or Field Office Director, and the AID Project Officer or Project Coordinator or his designee; Responsibility for recording and preparing the official minutes of these meetings will alternate between the two Parties, unless otherwise mutually agreed to in writing.
 - (d) All contracts for long term project personnel and management and for key short-term technical assistance assignments will be subject to review and approval by AID. All Grant-funded international travel is also subject to prior approval by AID.

- (e) Prior to the expenditure of funds for construction materials to be used for housing and/or other office or storage type facilities, or track improvement, or physical soil conservation and/or water control/storage structures, the Recipient will submit for AID's review and approval an appropriate design document which includes a plan, specifications, cost schedule, and a summary description of other options considered. In the case of housing and other building construction intended for habitation, information about water availability and sanitation procedures must also be included. In the case of soil and water conservation structures, it is envisioned that the designs will be generalized for application to multiple sites.
- (f) The Recipient will continue to pursue credit from various sources for onlending to project farmers. \$30,000.00 will be solicited from the Bureau de Credit Agricole and \$250,000.00 from the Inter-American Development Bank. In the event that these credit funds are not secured, the funds provided in the illustrative budget for the Management and Productivity Center (MPC), totalling \$13,930.00, will be reprogrammed to other project activities.
- (g) Prior to the introduction of any new specialty cash crops or the promotion of any indigeneous or recently introduced crop which is not currently grown within the existing farming system of the project area and is intended to become a significant crop replacing traditional cash and/or subsistence crops, the Recipient will submit for AID's review and approval a prospectus for the production and commercialization of the proposed crop. The contents of these prospectus are described under "Reporting and Evaluation", item number 3. This requirement does not apply to initial test plot(s) designed to ascertain the basic suitability of the proposed crop, so long as they do not exceed a total of one hectare for all specialty crop trials, nor place any peasant farmer(s) at financial risk.
- (h) To the extent that local labor is available and willing to work, all job positions in labor brigades will be reserved for residents of the project area.
- (i) The revised December 1985 version of the Project Proposal and the revised chapter 4 entitled "Outputs of the Project and Economic Analysis" prepared in March 1986 are hereby included in this Cooperative Agreement as reference documents intended to clarify the goals and intent of this project. In any and all matters contradictory between the above cited reference documents and this Cooperative Agreement, the Cooperative Agreement will serve as the governing document.

F. REPORTING AND EVALUATION

1. The Recipient shall prepare and submit the following reports in English:

- (a) *Quarterly Progress Reports.* The Recipient shall submit Quarterly Progress Reports within two weeks of the completion of each quarter.

to the Rural Development Office, USAID/Haiti. Quarterly Progress reports shall contain a narrative of Recipient activities undertaken with respect to the Agreement, quantitative and qualitative assessments of progress toward Agreement objectives, and a discussion of implementation issues and problems that have arisen during the course of the quarter, which will include recommendations to resolve these issues and problems. The minutes of the monthly implementation meetings, as described in the Covenants, can be used as attachments to the quarterly reports. Four copies will be submitted.

- (b) *Working Document Series.* In order to facilitate the transfer and review of the information derived from this project which is likely to be directly applicable to other hillside conservation farming programs in Haiti, the Recipient will initiate a consecutive series of Working Documents. These documents shall include typed, draft copies of individual consultant reports, results of field trials, bibliographies, designs of physical erosion control structures, baseline and monitoring data collected to meet the objectives of the project, cost accountings of specific activities, and other data compiled during the course of attaining the specific objectives and outputs of the project. Minor editorial changes and corrections can be noted on an errata sheet. A minimum of five copies will be prepared, and three will be submitted to AID.
- (c) Complete, draft reports will be submitted by all consultants prior to reimbursement by AID.
- (d) Copies of original field data and reports will be regularly transferred from the field office associated with the project area to the PFP Port-au-Prince Office or USAID/Haiti for safekeeping.
- (e) The final project report will be prepared as described below under item 2 (a), *Internal Evaluations*. In addition to addressing each specific objective of the project and the status of the project outputs, this report will present a detailed description of the most appropriate, complete hillside conservation farming technical packages developed for the various biophysical land management units within the project area. This report will also include a detailed discussion of the extension techniques developed and used to transfer these technical packages and motivate the peasant farmers.

2. The following evaluations will be conducted during the course of this project as specified below:

- (a) *Internal Evaluations.* The Recipient will conduct three internal evaluations, the results of which will be submitted to the Rural Development Office, USAID/Haiti within two weeks of the completion of each calendar year of project operation under this Agreement. The third annual internal evaluation will include a detailed substantive assessment of all project activities and accomplishments, and will constitute an end-of-project Final Report. The first and second internal evaluations should accompany the second and third Annual Work Plans. AID will be invited to participate in the internal evaluation. Scopes of work will be prepared by AID and PFP jointly, and team members will be selected jointly.
- (b) *External Evaluation.* A midterm evaluation of the project will be

organized and conducted by AID, using the funds set aside in the budget for this purpose. The team, to be mutually agreed upon, will include representatives of AID, the Recipient and outside parties. The Recipient agrees to provide the necessary logistical contacts and backstopping in the U.S., and AID will coordinate the evaluation within Haiti. Project facilities, vehicles, equipment and documentation will be made available to the evaluation team.

3. Prior to the introduction of any exotic specialty crops into the farming systems of the project area, except as noted in Covenant (g), the Recipient will submit to AID for review and approval a prospectus of the proposed crop, which includes the following information:
- (a) A brief description of the current use of the crop or derivative product; anticipated expansion in the demand for this product and substantiating reasons; and the species' present distribution and availability.
 - (b) The technical and economic rationale for the crop within the project area considering temperature and rainfall, soil types, elevation and other biophysical attributes of the zone. The yield of a high quality product and not simply the survival and growth of the plant itself must be taken into account in this suitability assessment.
 - (c) Identification of the labor, equipment and other agricultural inputs required for successful horticulture, including critical seasonal labor needs, specialized equipment and fertilizer. Known susceptibilities to insect depredations and other economically important plant diseases must also be identified, together with known preventative and remedial treatments.
 - (d) Brief description of harvesting and required primary processing requirements, such as sorting, washing and drying. This section of the prospectus should also include a description of other preparation and processing stages necessary for commercialization, with the goal of identifying additional aspects of product production which might be suitable for accomplishing at the peasant cooperative or industrial level, in Haiti! The cost and availability of necessary equipment should be included, as well as selling price differentials at various stages of preparation.
 - (e) All factors which are known to cause deterioration of the harvested product, such as, but not limited to, fragility, susceptibility to mold and insect damage, tendency to turn rancid, temperature limitations, and requirements for special containers should be identified and appropriate remedial measures summarized.
 - (f) A brief description of the offshore transportation linkages, export/import controls, if any, processing requirements and facilities, and marketing potential of the final product including price trends for the commodity. The number and name of the companies involved in the processing/marketing of the lesser known specialty crop products should be included, with a notation pertaining to either the monopolistic or competitive nature of

the product.

- (g) The minimum amounts and other special requirements (e.g., moisture content) for a marketable product must be specified.
- (h) Any necessary research and development activities, including the analysis of product quality (if a chemical derivative constitutes the desired product) beyond basic trial plots, and the types of technical assistance and facilities to support these activities should be identified.
- (i) Particularly with respect to research and development activities identified in (h) above, but also pertaining to secondary processing and marketing activities, any costs and inputs which can be expected to be contributed from the companies or organizations interested in developing this new source of raw materials, should be identified (i.e., the potential availability of non-AID funding).
- (j) In addition to the possible subsidies identified above, which can be expected in the development of the proposed specialty crop enterprise, the possibility and willingness of the identified purchaser or purchasers of the raw or semi-processed product to enter into bonafide contract growing arrangements as guaranteed payment for peasant farming efforts should be specified, including price ranges and possible duration of such agreements. This expression will not be construed to be binding at this prospectus stage, but is subject to negotiation and agreement prior to the authorization of AID to develop the proposed specialty crop.
- (k) An economic analysis, primarily directed at the peasant level, for the initial crop development and marketing effort, and the anticipated expansion for at least five years should be provided. The estimated time to maturity and anticipated yield under Haitian farming conditions should be clearly specified.

The purpose of this prospectus is intended to protect to the extent possible the targeted peasants from undue risk and speculation, and intentional or unintentional misguidance and/or exploitation.

G. TITLE TO PROPERTY

The recipient is fully responsible for all equipment, purchases and facilities acquired under the terms of this agreement. This responsibility includes maintaining and up to date inventory and maintaining equipment in suitable condition, including routine and preventative maintenance. Six months prior to the Project Assistance Completion Date (PACD) specified in the cover letter to this Cooperative Agreement, USAID/Haiti, in consultation with the Recipient, will make a determination concerning the title and disposition of property acquired with project funds, and notify the Recipient in writing to implement this decision by the PACD.

H. ALTERATIONS AND ADDITIONS TO THE STANDARD PROVISIONS

1. The applicable Optional Standard Provisions to this Cooperative Agreement are indicated on page one of Attachment 3B. Those provisions which are not indicated by a checkmark are hereby deleted from this Agreement.

2. In case of conflict between item 2 «Payment - Periodic Advance» as presented in the Optional Standard Provisions (Attachment 3B) and Attachment 5, Procedures to Obtain Disbursements, the latter will prevail.

ATTACHMENT 2

PROGRAM DESCRIPTION

I. PURPOSE

The purpose of this project is to reverse the degradation of the Courejolles river watershed in the Matheux mountain chain and, if practicable, of the adjacent uppermost segment of the watershed of the Matheux river. The project will improve the environment through reforestation, introduction of new plant forms (shrubs, grasses, etc.) and structures which improve the soil and increase the water retention capacity of the area.

The project will improve the traditional systems of farming and other rural gainful activities in a manner which will increase productivity and give the small hillside farmers in the area an economic interest in the maintenance of the improved environment, rather than in destructive exploitation of the area's resources. This will be supplemented through the development of a simple marketing and credit structure which will allow the small farmers of the area to benefit from their improved agricultural production potential.

II. GENERAL DESCRIPTION

This project will constitute the second systematic effort under the Mission's Local Resource Development Program, which is directed towards the establishment of operational and sustainable hillside farming systems at the watershed management level. The project area encompasses approximately 6500 hectares, which is depicted by the map in Annex 2. Although it is designed for only three years, the project will rapidly develop and disseminate appropriate hillside farming system packages initially based on the experiences and recommendations of such ongoing AID projects as Agroforestry Outreach, Agricultural Development Support II, Interim Swine Repopulation and National Goat Improvement. The project will also develop and test other aspects of a comprehensive hillside farming and soil and water conservation program through the use of field trial-demonstration plots.

This project will extend proven and ecologically sound agricultural practices for Haiti's hillsides. The major emphasis will be on practices designed to be attractive and affordable to the peasant farmer, albeit sometimes with credit assistance. Key components of this comprehensive conservation farming program will include:

- use of improved seed varieties for increased food yields and the removal of some lands from intensive annual crop cultivation;

- promotion of contour planting patterns and minimum tillage techniques which maintain a protective vegetative cover on the soil surface;

- introduction of perennial contour vegetation strips and alley cropping techniques using coppiced leguminous trees and shrubs and adapted herbaceous species (both grasses and legumes) to replace contour infiltration ditches in inappropriate settings, retard surface water runoff, promote soil nitrification and provide organic matter for composting, and provide a more regular and nutritious supply of livestock forage;

use of microcatchments, dry wall terraces, minimum size contour infiltration ditches and other physical soil and water movement control structures where appropriate;

mitigation of poor soil fertility through the development of appropriate composting and mulching techniques and the introduction of green manure crops;

continued expansion of improved agroforestry systems to complement crop farming and enhance fuelwood supplies, wider distribution of improved fruit tree varieties, and longer term income increase from hardwood lumber trees; and

the introduction of significant improvements in animal husbandry by primarily focusing on improved feeding regimentation to take full advantage of the forage produced in the contour vegetation strips as well as better utilization of crop residues, and the introduction of a basic animal health care system.

One feature of the project is its approach to ecologically sound farming systems on steep, degraded hillsides at the watershed management level.

The method which will be used to accomplish the dissemination, understanding and eventual implementation of the conservation farming package will be participatory extension. A network of agronomes, agricultural agents, animators and local farmers (especially those who have already gained renown for innovative practices) will facilitate the rapid establishment of dialogues, visitations, technical extension services and demonstration plots widely scattered throughout the project area. The demonstration plots will serve two important purposes:

permit site-specific trials of different plant species in order to ascertain which are best adapted to the local microhabitats (information which can then be extrapolated to other similar sites); and

to demonstrate to the peasant prior to his commitment the benefits and costs of the combined package of plant varieties, physical structures, planting techniques, and management.

Other aspects of the program include:

water resources development, employing techniques such as spring development, construction of check dams in steep eroding ravines, and the design and promotion of simple, inexpensive and innovative water catchment and storage systems;

to the extent that sufficient credit funds are available, the design and promotion of improved facilities for the post-harvest storage of food crops, seeds, and livestock forage;

identification of land tenure issues as they relate to land and agricultural improvements; and

access to markets and advantageous methods of marketing.

In order to demonstrate the advantage of organized commercialization while at the same time attempting to develop additional income generating farm crops, the project will encourage production of fresh produce for the Port-au-Prince

market, conduct introductory trials of adapted and marketable speciality cash crops, and promote the organization of peasant associations. Using the fresh produce and specialty crops, and providing production credit as focal points, the project will seek to adapt the major attributes of the groupement approach to peasant organization. The goal is to more rapidly establish cooperative working groups so that peasants can take advantage of economic opportunities normally beyond the scope of individuals acting alone.

Thus, the overall goals of the project are to provide the local population with a non-destructive technical capability to develop and exploit their environment for increased production and income; to improve the existing environment; and to valorize both the exploitative techniques and the environment itself through credit and marketing.

III. DESCRIPTION OF ACTIVITIES

A. Specific Objectives

The following are the specific objectives of the project:

1. To collect and analyze baseline data for a socio-institutional-environmental profile of the project area. Geographic information will be presented on a map base having an approximate scale of 1:10,000. One aspect of this objective will be to identify appropriate benchmark indicators and to design a sampling system to allow an unbiased comparison between project area conditions before and after project implementation. Examples of these benchmark indicators include farm family income, yields of selected agricultural crops, soil depth and structures, spring flows, height of flood stage water flow, and similar measurable parameters. This survey will cover the following points:

Location: physical and administrative units, towns and villages, habitations; total land area within the watershed perimeter;

Physiography: geology, slopes, soils, land capability-classification; climate, estimated rainfall and temperatures; hydrography, the impact of recent deforestation; degree of deforestation, erosion, soil loss; soil conservation structures and reforestation achieved to date.

Present non-cultivated plant cover;

Species which are especially favorable to conservation because of their root systems, ecological tenacity or growth vigor;

Interviews with local residents regarding valuable species which have disappeared.

Charcoal production: for local use; for shipments outside the perimeter.

Farming and agro-forestry systems: field crops, yield estimates; tree crops, yield estimates; livestock, pack animals, fishponds; tools and equipment; man-woman division of labor; market channels, and principal flows to markets within and outside the perimeter.

Land use and tenure: size distribution of farms; ownership, tenure, forms of tenancy, title security, squatters, etc; and government land.

Roads and other infrastructure.

Irrigation, existing and potential.

Demography, health services, schools.

Incomes: agricultural and non-agricultural.

Institutions and organizations in the area: government; non-government: local (various levels) and national; formal, informal; international, foreign FVOs, and others.

2. To review existing reports and data, and inspect all relevant on-going programs in Haiti to determine the most ecologically sound and financially feasible methods for sustainable hillside agriculture for the peasant farmer. This review will consider appropriate crops (including trees and forage plants) and multi-cropping practices; techniques to augment soil fertility; surface erosion control and water conservation structures; and the suitability of livestock in these mixed farming systems. As an addition to the data base, the Recipient will assemble a basic reference collection of important articles, monographs and other documentation relevant to the project site.
3. To discuss the following with local small farmer participants: (a) the results of the baseline survey; (b) the participants' own priorities for improvements; (c) the trade-offs between short-term income needs and the longer term benefits of soil and water conservation; (d) the project as a way to reconcile the apparent conflict between short and long-term requirements, and as a way to augment incomes; and (e) the overall strategy of the project.
4. Based on this review, and discussions with local participants, the project will develop technical mixed farming and erosion control packages suitable for trial demonstrations and direct extension to the peasant farmer.
5. To develop appropriate extension methodologies for the transfer of these technical farming/erosion control packages to both individual and organized peasant farmers.
6. To obtain and provide improved seeds and transplant stock for crops, forage species and trees, and to explore the physical and economic feasibility of establishing multiplication plots to supply the needs of project area farmers for improved varieties.
7. To explore the physical and economic feasibility of operating at least a partially self-sustaining nursery for trees by providing high quality, locally adapted and locally desired tree types at a minimal charge. The nursery will also produce seeds and transplant stock for herbaceous plants to be used for soil stabilization and livestock forage outplanting.

It should be noted that agroforestry nurseries in Haiti are subsidized in order to maximize the number of trees available for outplanting. Although not perhaps feasible to develop a completely self-sustaining nursery during the term of this project, efforts will be directed towards determining to what extent nursery costs can be recovered and the motivations required for peasants to be willing to pay for trees. These aspects of the project will be coordinated with the AID-funded Agroforestry Outreach Project.

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8. To initiate and develop an operational credit union for the farmers and other residents of the project area. This legal entity will assist these people in accessing the credit necessary to put in place certain aspects of the technical mixed farming/erosion control packages, and other income generating activities considered within the scope of this project.

It should be noted that AID funds will not be used for credit in this project. Credit funds will be secured from other institutions.

9. To organize associations of peasant farmers for the sale of products and the purchase of necessary inputs collectively, for more coordinated use of technical assistance, and for better access to credit during the initial stages of the project. As these associations develop and gain experience, and the benefits of group commercialization are realized, the project will promote more advanced cooperative ventures towards income generating activities currently beyond the scope of the majority of individual peasant farmers. Examples include the construction of local facilities such as grain storage, irrigation development, and entering into supply contracts with third parties.
10. To design, test and evaluate the agronomic and economic feasibility of producing less perishable specialty cash crops for local or export markets. Examples include annatto seed (for dyes), *Chrysanthemum cinerariaefolium* (for the natural insecticide pyrethrine) and essential oil of marigold, but the scope of alternative crops include any such species that meet the criteria of growing in the project area, producing a minimally perishable product, and being marketable.
11. To augment the available water supply by developing existing springs and by appropriate and innovative water capture and storage systems such as roof and ground catchment aprons, tapping seasonal waters trapped in drainageway sediment loads and other similar technologies.
12. To identify specific animal husbandry activities which can be developed in place. Examples of the scope of this effort include the establishment of swine repopulation centers and the preparation for, and monitoring of, the distribution of swine to peasant families within the project area; the management of both indigenous and improved ruminant livestock; the possibility of producing rabbits for protein; and the treatment of Newcastle's Disease to augment the survival of poultry breeds. Other aspects to be addressed include the development of a rudimentary rural veterinary service, and investigations and trials of improved feeding practices using both crop residues and the harvesting of forage from the trees and herbaceous plants used to stabilize hillside soils. Part of the improved feeding investigations will include the trial and evaluation of appropriate techniques for storing and conserving feedstuffs (e.g., hay, haylage, and silage).

IV. END-OF-PROJECT STATUS AND OUTPUTS

The specific, measurable outputs to emerge from the implementation of this project include:

1. 750 thousand tree seedlings, or their equivalent in herbaceous soil conservation/livestock forage plants, will be planted. Of these, a minimum of 375,000 will survive.

2. If determined feasible, the project will create a financially self-sustaining nursery, through charging a nominal cost per seedling to the farmer.
3. The project will design, test, evaluate and extend improved farming systems, for a hillside conservation farming system. These packages will be developed for each of the biophysical land management units and will include the following:
 - (a) improved varieties of locally adapted agricultural plants and new specialty crops;
 - (b) different multicropping combinations, and the introduction of new or enhanced agricultural practices and inputs, including fertilizer, minimum till techniques, and bulk composting; and
 - (c) Better animal husbandry practices, emphasizing nutrition and basic animal health and the introduction and improved use of forage plants.
4. 1,000 hectares of small farmer holdings, or 15% of the project area, will be introduced to these new packages, resulting in an increase in farmer income of \$300,000 attained after the 5th year within the project area.
5. Physical soil and water conservation structures will be established on a minimum of 500 hectares, but the benefits will extend beyond the parcel actually worked resulting in enhancements to at least 25% of the Project Area.
6. A minimum of 20 checkdams will be constructed.
7. Access roads and tracks within the project area will be improved.
8. Seasonally available water supplies will be augmented via check dams and other water catchment/storage systems.
9. A commercialization program both to facilitate the marketing of products from the project zone and to reduce the cost to the farmer of agricultural inputs. Assuming feasibility can be demonstrated, approximately 50 hectares will be set aside for the production of specialty crops to be marketed under this component, and technical and marketing packages will be developed for these crops, which are expected to provide an additional \$500,000 per hectare annually after 7 years.
10. An operational credit union will be established for the targeted populace to facilitate their accessing credit loans from other institutions.
11. The eight (8) professional project staff and at least 100 local farmers will have the background necessary to continue implementation work in hillside agriculture and conservation.

- 12 The empirical data derived from the field trials and demonstrations, special consultant reports, and the prospectus reports for suitable specialty crop introductions, as well as the experience gained from widescale implementation and extension of the conservation farming packages, will provide a significant contribution to AID's Targetted Watershed Management Program in Haiti.
- 13 "Cost-Accounting" data will be available for the actual costs of selected key activities (e.g., checkdam construction, labor required for composting, and other similar discrete portions of the conservation farming technical package) so that the true cost-benefits can be determined and to provide a mechanism for major improvements in costing future expansions and projects.
- 14 Appropriate benchmark indicators will be established and monitored to provide specific and unbiased data concerning before and after project conditions.

V. CONTRIBUTION OF RECIPIENT TO THE PROJECT

The Recipient agrees to make the following contributions to the project:

Work in the U.S.A and Haiti to identify specialty crops and search for buyers.
Inputs above those charged to the project: \$8,000 per year, \$24,000 LOP.

Working capital for the commercialization of specialty crops (in association with a private company): \$30,000.

Investment in a small on-project nursery: \$5,000.

PFM will contribute 1/3 of the originally proposed salaried inputs of PFM/I and PFM/H: \$31,525.

In addition, PFM will absorb the cost of one project visit each year:
\$3,089.00

The total value of this contribution is thus \$93,614.

Support by PFP/International. PFP/I will provide the the following services to the project:

1. Periodic review with, and advice to, the Program Manager and, on his initiative, other staff members.
2. Evaluation of the performance of the Program Manager, of the Assistants and the Attache for Community Relations and relevant decisions concerning their continuing employment.
3. Analysis of the progress of the project and, if advisable, decisions on major changes in the project's orientation.
4. Preparation, together with the Program Manager and senior staff, of Implementation Plans, monitoring of their execution and, when advisable, readjusting them.
5. Determination of needs for, and selection of, expatriate consultants.
6. Contacts with expatriate consultants and organizing their logistics.
7. Maintaining continuous contact with organizations and individuals who provide technological information and advice, such as Fragile Lands Advisory Group (e.g., AID/S&T, Smithsonian, National Academy of Science, ATI, and VITA). Making the obtained information available to the project.
8. Contacts with international organizations, such as IDB, aiming at additional resources for the project area.
9. Further work on specialty crop development in the area: specific technical advice, logistics of trials and production, marketing.
10. General backstopping of the project for its various needs that require handling in the U.S.A.

Support by PFP/Haiti. PFP/Haiti will provide the following services:

1. Money-handling and accounting;
 - (a) Relations with the Controller's office at USAID (requests for advances, disbursements, voucher reports, settlements);
 - (b) Local payments outside of the project area, including such expenditure items as nursery stock, seeds, chemicals, etc., as well as payments to local consultants;
 - (c) Establishing in cooperation with the Program Manager a plan of accounts, procedures for expenditures and validation of vouchers;
 - (d) Keeping the books of the project;
 - (e) Establishing a cost accounting system adapted to measuring the progress of the project and specific costs involved;
 - (f) performing a quarterly internal audit;
2. Assistance to the Program Manager in the procurement of locally bought materials, and custom clearance of imported items.

. Procedural contacts with GOH agencies in Port-au-Prince.

. Help in scheduling and organizing visits of local and expatriate consultants and in logistic arrangements for expatriate consultants.

. Facilitating communications between the project and PFP/I, as well as other external agencies.

. Secretarial services.

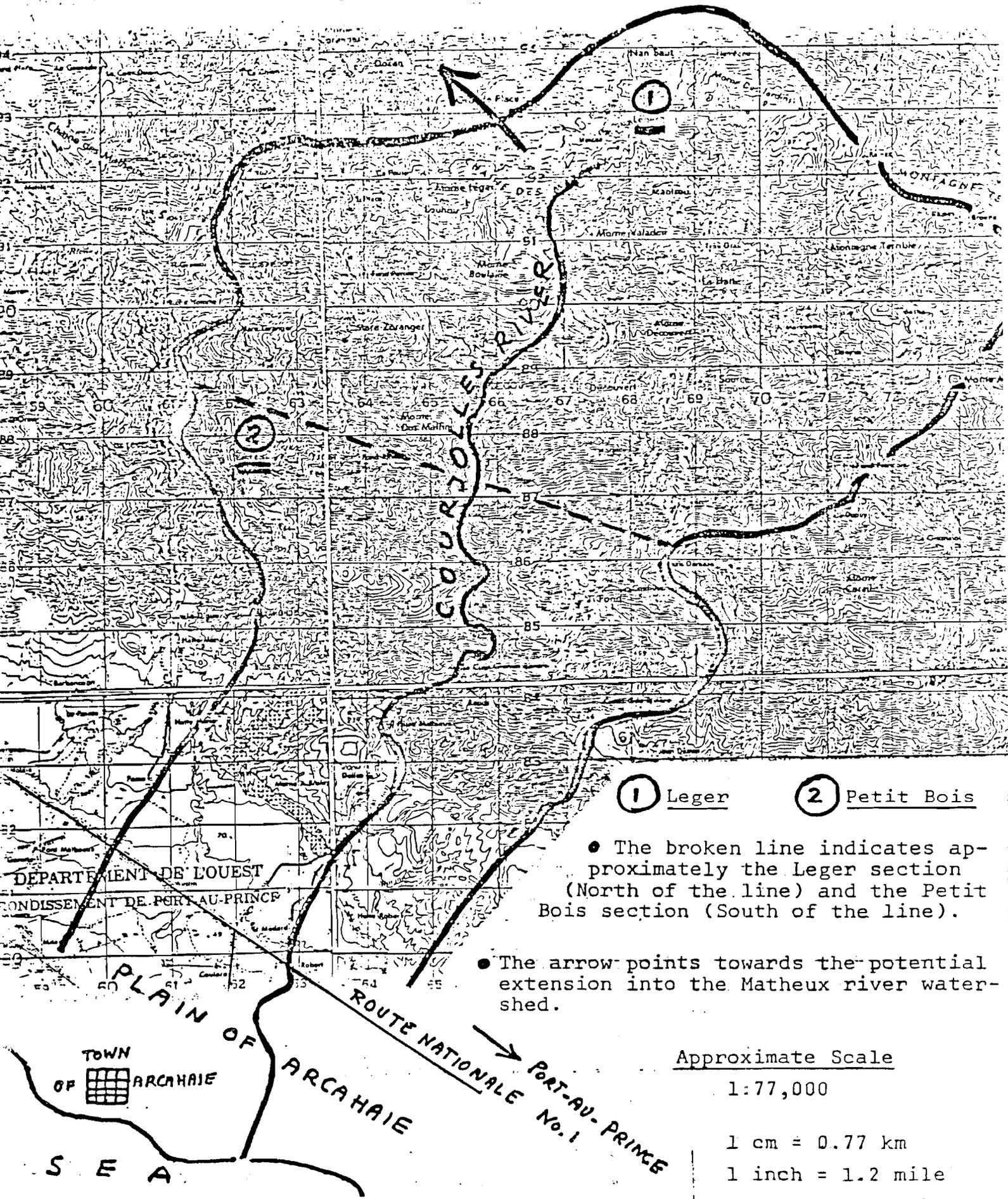
. PFP's senior representative in Haiti has the authority to represent PFP/I as pertains to all interactions with USAID concerning this project, including acceptance, disbursement and signing for advances and vouchers, with the exception of acknowledgment of this Cooperative Agreement, or as specifically excepted in writing to USAID by the President of PFP/I.

**LOCAL RESOURCE DEVELOPMENT
ILLUSTRATIVE BUDGET**

	Year 1		Year 2		Year 3		Gdes Ttl	Dols Ttl	All Ttl
	Gdes	Dols	Gdes	Dols	Gdes	Dols			
PERSONNEL	73,000	12,000	85,580	12,600	89,850	13,230	248,430	37,830	286,260
Program Manager	20,000	0	21,000	0	22,050	0	63,050	0	63,050
Water & soil Asst.	8,000	0	8,400	0	8,820	0	25,220	0	25,220
Agricul Asst.	6,000	0	6,400	0	6,820	0	23,220	0	23,220
Animal Asst.	4,000	0	4,400	0	4,820	0	21,220	0	21,220
Comm rel attache	8,000	0	8,400	0	8,820	0	25,220	0	25,220
Four monitours	12,000	0	16,800	0	17,640	0	46,440	0	46,440
Driver/mach	4,000	0	4,200	0	4,410	0	12,610	0	12,610
two donl helpers	3,000	0	1,580	0	1,650	0	6,230	0	6,230
US admin & tech.	0	12,000	0	12,600	0	13,230	0	37,830	37,830
local acct/admin	8,000	0	8,400	0	8,820	0	25,220	0	25,220
TRAVEL AND TRANSPORT	3,280	10,950	1,470	7,710	880	5,900	5,630	24,560	30,190
Consult. travel	0	2,400	0	1,890	0	660	0	4,950	4,950
PfP/I tech support	0	1,500	0	1,580	0	1,650	0	4,730	4,730
Third cty travel	0	350	0	370	0	390	0	1,110	1,110
Local travel	1,760	0	840	0	660	0	3,260	0	3,260
Intl per diem	0	4,200	0	3,340	0	2,650	0	10,190	10,190
Local per diem	1,520	0	630	0	220	0	2,370	0	2,370
shipping	0	2,500	0	530	0	550	0	3,580	3,580
SUPPLIES & EQUIP	56,500	27,500	34,600	1,000	43,320	1,000	134,420	29,500	163,920
Live plant mats.	15,000	0	26,250	0	35,500	0	76,750	0	76,750
Phys. struc. mats.	5,000	0	7,250	0	6,620	0	18,870	0	18,870
tools & tents	500	2,500	0	0	0	0	500	2,500	3,000
Aq Supplies	1,000	8,000	1,100	1,000	1,200	1,000	3,300	10,000	13,300
Shop tools	0	2,000	0	0	0	0	0	2,000	2,000
HM & Office	5,000	15,000	0	0	0	0	5,000	15,000	20,000
Bldg const or rent	30,000	0	0	0	0	0	30,000	0	30,000
OTHER DIRECT COSTS	56,000	0	16,280	0	15,650	0	87,930	0	87,930
Comm. & rep.	2,000	0	1,580	0	1,650	0	5,230	0	5,230
3/4 ton truck	16,000	0	0	0	0	0	16,000	0	16,000
four wheel drive	14,000	0	0	0	0	0	14,000	0	14,000
motos and mules	10,000	0	0	0	0	0	10,000	0	10,000
O&M	14,000	0	14,700	0	14,000	0	42,700	0	42,700
SUBTOTAL	188,780	50,450	137,930	21,310	149,700	20,130	476,410	91,890	568,300
4, 27.0%	0	64,590	0	42,990	0	45,860	0	153,440	153,440
SUBTOTAL	188,780	115,040	137,930	64,300	149,700	65,990	476,410	245,330	721,740
CONTRACTUAL SERVICES	31,800	8,080	28,840	4,160	27,500	1,460	88,140	13,540	101,840
Expat Consultants	0	8,080	0	4,160	0	1,460	0	13,700	13,700
Local consultants	18,800	0	11,340	0	7,500	0	37,640	0	37,640
labor brigades	13,000	0	17,500	0	20,000	0	50,500	0	50,500
EVALUATION & AUDIT	0	0	0	55,000	0	0	0	55,000	55,000
AID evaluation	0	0	0	15,000	0	0	0	15,000	15,000
Nonfederal Audit	0	0	0	40,000	0	0	0	40,000	40,000
GRAND TOTAL	220,580	123,120	166,770	123,460	177,200	67,450	564,550	314,030	878,580

1 salaries, commodities and services are calculated with a five percent (5%) annual increase.

ANNEX 2: Location of Project Area - Upper (Leger) Half of the Watershed



① Leger ② Petit Bois

• The broken line indicates approximately the Leger section (North of the line) and the Petit Bois section (South of the line).

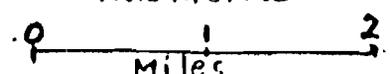
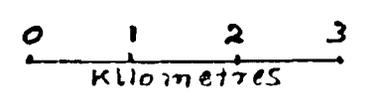
• The arrow points towards the potential extension into the Matheux river watershed.

Approximate Scale

1:77,000

1 cm = 0.77 km

1 inch = 1.2 mile





Partnership for Productivity
International

XD-AAZ-955-A

**PROPOSAL FOR A REFORESTATION, SOIL-CONSERVATION AND AGRICULTURAL
DEVELOPMENT PROJECT IN THE MATHEUX CHAIN IN HAITI**

TO USAID/HAITI

**Submitted by:
Partnership for Productivity/International
(Private Voluntary Organization)**

Submitted to:

**Dr. Vincent Cusumano
Chief, Agriculture and Rural Development
U.S. AID Mission in Haiti
Port-au-Prince, Haiti**

Submitted by:

**Andrew H. Oerke
President
Partnership for Productivity/International
2001 S Street, N.W., Suite 610
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(202)483-0067**

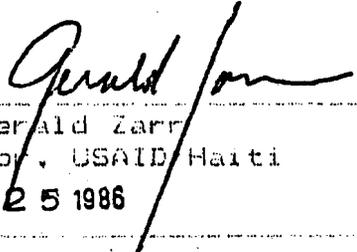
REVISED VERSION, DECEMBER 3, 1985

BEST AVAILABLE COPY

PROJECT AUTHORIZATION

NAME OF COUNTRY : Haiti
NAME OF PROJECT : Local Resource Development II
NUMBER OF PROJECT: 521-0192

1. Pursuant to Section 103 of the Foreign Assistance Act of 1961, as amended, I hereby authorize the Local Resource Development II project, to be implemented by Partnership for Productivity/International (hereinafter referred to as "PPP" or "Recipient"), with planned obligations not to exceed One Million United States Dollars (\$1,000,000) in grant funds. A total of not to exceed \$878,580 will be granted to PPP under a Cooperative Agreement, and up to \$121,420 will be used for contracting a Project Coordinator for the project.
2. The purpose of the project is to reverse the environmental degradation of the upper Couraioles River watershed and an adjacent portion of the Matheux River Watershed in the Matheux Mountain Chain. This will be accomplished by developing appropriate, environmentally sound hillside farming systems initially based on the experiences of on-going AID projects, and demonstrated by trial/demonstration plots.
3. The Cooperative Agreement, which will be negotiated and executed by the officer to whom such authority is delegated in accordance with AID regulations and Delegations of Authority, shall be subject to the terms and covenants and other conditions as AID may deem appropriate:
4. A source/origin waiver to allow the procurement of up to 4 350cc off-road motorcycles from AID Geographic code 935. Special Free World including cooperating country, is hereby authorized.


Gerald Zarr
Director, USAID/Haiti

Date: JUN. 25 1986

Clearances:

D/DIR - L. Morse
RDO - V. Cusumano
FVD - P. McDuffie
CONT - C. Brooks
DRE - R. Eysen
DRE - B. Burnett

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HIGHLIGHTS OF THE PROPOSAL

°Area of intervention: Upper zone of the Courjolles river watershed in Matheux mountain chain.

°Three segments of intervention:

- reforestation and soil-conservation structures
- farming system improvement for greater production
- commercialisation of products

°Targets:

- 375,000 surviving trees
- 1,250 hectares improved
- 1,000 hectares brought into improved farming systems

°Organization of small-farmer association for marketing produce and buying inputs in common

°Pilot production of specialty crops for export

°Upgrading of livestock

°Products for marketing in Port-au-Prince: vegetables, poultry

PARTNERSHIP FOR PRODUCTIVITY INTERNATIONAL (PFP/I)
AND PARTNERSHIP FOR PRODUCTIVITY, HAITI (PFP/H)

Partnership for Productivity International (Pfp/I) is a private non-profit organization dedicated to the advancement of low-income rural and urban populations in developing countries through improvement in their productivity and capability to manage their farm and business. Founded in 1970, Pfp/I began its activities in a number of African countries and subsequently extended its work on the Caribbean Basin countries (Haiti, Jamaica, Honduras, Costa Rica, Dominica and other East Caribbean Islands). In all Caribbean countries, Pfp assignments have involved major rural and agricultural elements.

To date, the most important among these assignments have been the projects in Jamaica and Honduras. In the Jamaican project, now in its 3rd year and extended for additional years, Pfp/I provides agricultural and marketing assistance to an association of 200 small farmers, St. Catherine Veg. Growers' Association. The Honduran project, completed in 1983, was concerned with appropriate rural technology for irrigation, dehydration of fruits and vegetables, economic stoves, etc.

Among African projects, two most important ones are an integrated agricultural project in Togo, where small farmers on some 2,000 hectares receive technical assistance, and a rural credit project in Burkina Faso.

Pfp/I team (at the headquarters and in Miami office), involved in Caribbean projects counts nine persons with intimate experience of the area and considerable length of time spent in Haiti, as well as other Caribbean locations. The team includes: Shari Berenbach, Eugene Grasberg, James Hochswender, Cheryl Lassen, John Lynch, Rick Morren, Andrew Oerke, Rolando Pinzon and Lisa Valenzuela.

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Pfp/I collaborates closely with the Agribusiness Council, especially in promoting exports of Caribbean products. In technical matters, Pfp/I has had a longstanding association with the Department of Horticulture and Silviculture of Rutgers University, Rutgers Experiment Stations and Rutgers International Food and Agriculture Program. These contacts have served both for consultations and for arrangements for training of Caribbean technicians and farmers.

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PFP/I AND PFP/HAITI HISTORY IN HAITI

Partnership for Productivity/Haiti was established as a Haitian non-profit foundation in April 26, 1982 in order to have in place in Haiti the small and micro-business development capability that was identified with Partnership for Productivity/International. Pfp/I had first begun providing its skills and services to Haitian micro-entrepreneurs in the late 1970's at the time when the Haitian Development Foundation was intituted.

Management training, finncial systems training, product and service development, and marketing were part of the skills packages Pfp was bringing to the micro-business persons, farmers and shop keepers in rural and urban setting,

When it became possible for Pfp to bring its approach to small business productivity to Haiti, Pfp had to recruit a Haitian conversant in English, French and Creole and qualified with training and business management skills. In the person of Jean Brisson, Pfp found the ideal candidate for this role. Mr. Brisson, working closely with experienced Pfp micro-entrepreneur developer (Eldon Helm), took the Pfp/I training programs and manuals and adapted them to the requirements of the Haitian business setting and to the local languages.

* Mr. Brisson provided specialized training and rural development consultancy services to the project "Income Generation for Rural Women: WID II" for the Centre Haitien de Recherches

pour la Promotion Féminine (CHREPROF) under a cooperative agreement with USAID. Pfp worked with CHREPROF to improve their internal management capabilities, and particularly its ability to conduct project analysis, feasibility studies and group training for women.

* PFP/Haiti recently received a grant from USAID for support of the "Human Resources Development Center Project". The HRDC, now being established (Nov. 1985) will be a permanent, self-supporting local institution. It will provide training and related services to increase the income of illiterate and semi-literate farmers and small business people and to help train personnel of development projects.

* Recently PFP/Haiti was chosen to execute the micro-business component, in close coordination with the Haitian Development Foundation, for the newly created Management and productivity Center. Courses for small-business entrepreneurs begin on December 1, 1985.

* During 1984/1985 PFP/Haiti conducted a test program of technical assistance to small farmers and rural entrepreneurs in the Central Plateau near Hinche. Eight groups of farmers, each twelve men strong, joined in this test.

The subjects of investigations were these:

- Methods to alleviate the constraints in production and marketing, and post-harvest losses experienced by small farmers;
- Increase in production, group consolidation, and creation of cooperatives.
- Creation of a better context for private investment in the area.

The project was financed from PFP/I own funds. Discussions with Inter-American Development Bank have been conducted, for quite a long time already, regarding new funding.

3.- PROJECT DESIGN

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PURPOSES OF THE PROJECT

The purposes of the proposed project are these:

- 1.- To reverse the degradation of the Courjolles river watershed in the Matheux mountain chain and, if practicable, of the adjacent uppermost segment of the watershed of the Matheux river and to improve the environment through reforestation, introduction of other plant forms (shrubs, grasses, etc.) and structures which improve soil and increase water retention capacity of the area.
- 2.- To modify the system of farming and other rural gainful activities in a manner which will increase their productivity and give the majority of small hillslope farmers in the area an economic interest in the maintenance of the improved environment, rather than in destructive exploitation of the area's resources;
- 3.- To develop a simple marketing and credit structure which will allow the small farmers of the area to fully benefit from their improved agricultural production potential.

THE ESSENCE OF OUR PURPOSES IS THUS: (1) TO RECREATE A STABLE PRODUCTIVE ENVIRONMENT; (2) TO PROVIDE THE POPULATION WITH A NON-DESTRUCTIVE TECHNICAL CAPABILITY OF USING THAT ENVIRONMENT TO INCREASE THEIR PRODUCTION AND INCOMES; (3) TO VALORIZE THAT TECHNICAL CAPABILITY THROUGH MARKETING AND CREDIT.

Our purpose are closely interconnected and can be realized only together. A watershed is a dynamic system of interrelated factors. Some of these factors are physical and biological. Others are human actions which affect nature's equilibrium, in desirable or undesirable directions. The last group of factors are human interrelationships of socio-economic and organizational character. It is in that last group of factors that vehicles must be found for a sustainable rehabilitation of the watershed.

The environmental improvement will be sustainable if the hillslope farmers find that the changes are to their advantage, i.e. that there is a favorable trade-off between the combined package of changes which our project will introduce, on the one hand, and the traditional destructive practices, on the other hand.

GEOGRAPHICAL SETTING, POPULATION AND AGRICULTURAL POTENTIAL

The Courjolles watershed extends for about 25 kilometers in the North-South direction from the source of Courjolles to its mouth at Arcahaie on the Golf of Port-au-Prince. At its origin it is only a few kilometers distant from the upper part of the Matheux river, the next watershed to the North-West. The watershed, above the Arcahaie Plain, has three distinct ecological zones:

-- Low zone: about 200m to about 500m very arid.

-- Middle zone: from about 500m to about 1,000m, with rainfall increasing with the elevation.

The zone includes Petit Bois. At about 1,000m (above Capoule) the soil changes from whiteish/gray calcareous to red.

-- Upper zone: above 1,000m up to 1,300m - 1,400m. The village of Léger is near the top of that zone. The ecology of the upper zone seems very similar to that of the Cap

Rouge near Jacmel.

The surface of the watershed, above the elevation of 200m, covers about 85km², i.e. 8,500 hectares, as measured on a flat map. If we consider the slopes, the surface is about 10,000 hectares.

The watershed comprises seven villages: Petit Bois, Dos Malfini, Fonds Rondole, Ti Fond, Jean Dumas, Kapoule, and Couyo. The total population is about 15,000 persons (i.e. about 3,000 households).

The current effort of the Ministry of Agriculture, directed by Mr. Edner Monosiet is concentrated around Petit Bois. It was agreed, during a recent site visit with the participation of Dr. Abdul Wahab, that the PFP segment of the project will start at the origin of the watershed, around Léger, and work down to meet finally with the Petit Bois segment. The topography of the upper zone along the road just below Léger is such that PFP activities could usefully extend on a limited section of the adjacent watershed of the Matheux river.

The area has visibly a potential of production of marketable surplus of a value considerably larger than the present one and is situated in a favorable location with regard to Haiti's largest consumer market in Port-au-Prince. Besides basic staple crops of sorghum, maize, beans, etc., and meat and poultry, the high-elevation section of the watershed offers conditions for "Irish" potatoes and vegetables comparable to those of Kenscoff.

It remains to assure that the area develops a basic commercialization structure sufficiently cost effective to render an increase in production worth the effort and money which it requires.

Until the very recent completion of the road from Arcahaie to Léger, most of the watershed was entirely isolated. Even today, such potentially productive area as the village of Dumas is still awaiting the completion of a spur which will connect it with Léger-Arcahaie road. We expect the realization of the agricultural potential first of all along that new Léger-Arcahaie axis.

CHALLENGES

The problems, challenges, which our project addresses fall into the following generic groups:

- a) an active and willing collaboration of the population of the area;
- b) the best solutions in terms of physical structures (infiltration ditches, terraces, reservoirs, roads, etc.);
- c) the best solutions in terms of farming systems, i.e. combinations of trees, other plants and livestock recommended for soil conservation, as well as for increased income;
- d) improvements of technology (agricultural practices, seeds, inputs) to maximize the income of farmers within realistic parameters of the environment, infrastructure, the farmer's modest resources and their educational level;
- e) attractiveness to the farmers of the area and competitiveness of the commercial channels which the project will promote to market the surplus produce and new specialty crops which we intend to introduce;

- f) discipline and cost-effectiveness of a credit system which should make it possible to the farmers to embark on the improvements in their operations.

The manner in which the above problems are addressed are indicated in subsequent sections of the present proposal.

PRINCIPAL SEGMENTS OF ACTIVITIES

According to the purpose of the project and the problems that must be solved, the activities of the project will fall within three broad segments:

- 1.- Activities aiming mainly at soil conservation and procurement of seedlings for tree planting. Most of these activities will be executed on the community level. Although planting and care of trees will be a private activity of participating farmers, procurement of seedlings will require contracts with nurseries, coordination of delivery and of technical assistance and advice from such organization as PADF, ODH, etc. This requires that the activities are managed on the community level.
- 2.- Activities aiming mainly at the improvement of farming systems and productivity. These activities affect farmers as individual entrepreneurs, however the technical assistance given under this heading will be most probably organized in groups, for cost-effectiveness sake.
- 3.- Activities aiming mainly at the commercialisation of the surplus farm product and at the organization of credit. These activities will involve association of farmers for business purposes (see discussion below).

SUSTAINABILITY OF IMPROVEMENTS.

Two levels must be distinguished under the above heading: that of the private domain and that of the public domain.

On the private domain level, we are confident that, barring such events as another catastrophic hurricane, the technical and commercial improvements which the project will bring into the area will be sustainable: the farmers will continue practices which increase their income. Also, once the profitability of change is demonstrated, farmers will, to the extent their increased but still very modest resources allow, look for new ways to improve their operations.

On the level of the public domain, we must observe that even in the industrial countries, the State is depended upon to take the lead in soil conservation through research, legislation, planning on the scale which surpasses single ownership unit, as well as funding. It would be unrealistic to expect the small hillslope farmer to maintain the momentum of attention to soil conservation after the project is completed. Public sanction and public resources must be involved if the improvement which the project will achieve is to be maintained and further progress to be made.

ORGANIZATION OF THE PROJECT

INTERNAL ORGANIZATION

The project will be directed by a qualified project manager. The qualification of the project manager will include a sound agricultural background, familiarity with the recent progress

in hillslope agroforestry, capability to articulate the project's objectives, establish friendly contact with, and gain confidence of, the farmers. The project manager will live in the project area, probably at Léger. We expect that it will be possible to find a well qualified Haitian agronomist to fill that position.

The project manager will be helped by two assistants. These assistants will be chosen for their qualifications at the level of a competent "agent agricole" with a diploma of the "Ecole Moyenne d'Agriculture".

One of the assistance will be responsible for the tree-planting operations, soil-conservation structures (ditches, water reservoirs, etc.) access roads and other civil engineering tasks.

The other assistant will help the project manager in the work on the improvement of farming systems, cultural practices, agricultural inputs, introduction of new crops, marketing and credit to farmers.

The above division of duties between the two assistants will not be rigid, especially in the early months of the project when various aspects of work will be still in the nascent stage and many urgent duties will have to be performed simultaneously. Even in the later stages, the project manager will strive to maintain regular communications and exchange of experiences between the two assistants, in order that they may assist, and substitute for one another, when needed.

We expect to secure the service of Mr. Edner Monosiet as a permanent consultant to the project. Mr. Monosiet's tasks will be:

- a) relations with the community with which he is very familiar and whose trust he has earned;
- b) training of "moniteurs" and "chefs d'équipe" for structural work. (This training will take place in Petit-Bois at the newly established with AID support "Centre de Formation pour Lutte contre Erosion". Mr. Monosiet works at that center.)

Two employees on the level of "moniteurs" will complete the technical staff.

The non-technical staff will comprise a driver/mechanic who will assist "moniteurs" when free of driving duties and two non-skilled workers for household, guardianship of stores, etc.

On the administrative level, the project will be supervised and assisted by the Director of PFP/Haiti.

The general and technical supervision of the project, identification and contracting of expatriate consultants, when needed, gathering of new technical information from international sources, as well as the assistance in the introduction and export marketing of the proposed new industrial crops will be assured by PFP/I headquarters in Washington, DC.

RELATIONS WITH THE MINISTRY OF AGRICULTURE

The Ministry has carried since 1983 reforestation and soil conservation activities, directed by Mr. Edner Monosiet, in the Cour-jolles watershed. The impressive network of infiltration ditches, mainly in the area around the village of Petit Bois, witnesses the seriousness of this undertaking. (A

separate section of the present proposal describe the history and present status of these activities). Efforts are made by the Ministry to obtain European funding for similar activities in the neighboring watershed of the Matheux river.

In June, 1985 and again on October 28, 1985 representatives of PFP/I discussed the present proposal with the Minister of Agriculture, Mr. Frantz Flambert and an agreement, (confirmed by a letter of the Minister of November 8, 1985) was reached on the following modalities of PFP/I intervention:

- a) PFP/I will have freedom of decision in the execution of its activities as defined in the funding agreement with USAID.
- b) The Ministry of Agriculture will support the project by designating a counterpart person to the project.
- c) PFP/I will submit technical, non-financial reports to the Ministry of Agriculture, as well as to USAID Mission.
- d) All information, experience and technical data and methods which will be developed in the execution of the project will be fully shared with the Ministry of Agriculture.

PFP/I assured Minister Flambert that, if USAID Mission approves the PFP/I proposal, PFP/I will strive to make the project a model for Ministry of Agriculture - NGO - USAID collaboration for soil conservation and agricultural productivity.

We expect that our relationships with the Ministry of Agriculture will develop in a satisfactory manner.

RELATIONS WITH THE POPULATION OF THE PROJECT AREA

A. Soil Conservation Works on the Community Level

It appears to us that the community councils (conseils communautaires) and their member "groupements communautaires" are the only civic organizations in the Courjolles watershed area which can be used as a vehicle for the work on community level, as distinct from the level of the improvement of production on individual farms. The catholic parish to which Léger belongs extends mainly on the Artibonite side of the Matheux chain, i.e. belongs partly to the Artibonite watershed.

At present, there exist two community councils in the area of the proposed project. The fully-formed council of Léger is composed of four groupements: Delice, Lassé, Lourou and Sandé.

The council at Couyo was until recently a groupement within Léger council. It has not yet formed any member groupements.

In the future, as the project extends its operations, new groupements may be formed in areas that have not yet been encompassed in any activities.

Note: in the middle and lower part of the watershed, outside of the intervention area of the proposed project there are two "conseils communautaires": Petit-Bois (which borders on our project) and Jean Dumas (which is quite distant from our area). The Petit-Bois council comprises the groupements of Dos Malfini, Fonds Rondole, Ti Fond, Kapoule, et Camas.

From our investigations to date, we have reached the conclusion that we can realistically expect a good collaboration with the community councils in the area, beginning with the

one at Léger.

In fact, we noted that the leaders of the Léger population are, understandably, very anxious to see the soil and water conservation work and tree planting begin in their area and provide an additional income flow for the local population. The sacristan of the catholic chapel in Léger can be counted among these leaders and will provide a link with the parish, to the extent that the latter's geographical position allows to develop a collaboration.

Beside the utilitarian motives of immediate income from the soil conservation work, there is an understanding of the benefits which the works already performed in the Petit-Bois area (further down the watershed) brought to farmers in the form of improved moisture, household water, etc. Indeed, certain farmers started digging infiltration ditches by themselves on their plots, unfortunately in a technically not fully correct manner.

Regarding the modalities of working with the councils, we will be careful not to upset other projects in the area by offering higher daily rates of pay or other conditions which would lead to a competition among projects and cause irritations.

At present, farmers spending one day (roughly five hours) on the community work on infiltration ditches, access roads, etc. are organized in groups (equipes) of ten to twelve workers. The theoretical norm of performance is ten (10) meters of the ditch per day per worker. (Whether that norm can be fulfilled in every geological setting is not certain).

The calculation of pay is complicated and involves some amounts, symbolical rather than real, being credited to the council, without any money actually received by the council. The final result, however, is simple: men are paid four Gour-

des per day.

The workers often prefer to be paid in food (rice, oil, etc.), because of the difficulty of frequent trips to the nearest shopping area (Arcahaie or even Duvalierville). One of the activities of our project's commercialization segment will be that of purchases in common.

While we will follow the customary level of pay, in the project budget we will establish a reserve to provide for the possibility of increases in the future, due to changing circumstances.

RELATIONS WITH THE POPULATION OF THE PROJECT AREA

B. Farming Systems and Commercialisation of Farm Products

This segment of the project aims at creation of a farmers' business association. (This form is called in Haiti a "pre-cooperative"). The principles of such an association, tested in our Jamaican small-farmer project, are as follows:

- 1.- An association is formed on a voluntary basis by small farmers situated in proximity and having similar business interest in the sale of their crops, purchase of inputs, etc.
- 2.- The association does not interfere with the property or use of the members' land.
- 3.- Every member decides for himself what and how much to grow.

4.- Every member decides freely what inputs to use and what techniques to apply.

5.- However, certain services of the association may be made conditional upon the compliance with certain requirements, such as growing a given variety of crop, planting according to a schedule, minimum or maximum of area under the crop, etc.

6.- Principal functions of the association are these:

- a) sales in common of major products
- b) purchases in common of major inputs
- c) coordinated use of technical assistance

At more advanced stages, additional functions may be added, such as:

- d) operation of certain facilities, such as grain storage, transport vehicles
- e) entering in supply contracts or joint ventures with third parties for processing, etc.
- f) irrigation
- g) electricity generation and/or distribution
- h) credit to individual farmers

We intend to proceed in a realistic manner and not to start with too ambitious a blueprint. The section on the implementation of the project indicates the gradual process in which the concept of the association will be introduced to the farmers of the area.

UTILIZING EXISTING EXPERIENCE

A separate section of the present proposal describes in detail the most important available sources of information. Here, we want to outline our approach and illustrate it by some examples. The project will follow two basic principles:

- 1.- To utilise to the maximum, and build upon, the results of the applied research and experiences of projects in agroforestry which have been executed in Haiti during the recent years, and to learn of the experiences which will be forthcoming.
- 2.- To involve the farmers in the project area in the evaluation and adaptation of the above mentioned results through on-farm verification work.

The principal sources of new solutions are:

- ADS II (which continues certain activities of PDAI)
- University of Maine team (as it accumulates results)
- Winrock projects (related to small livestock and forage)
- TAMU project (which was, however, mainly restricted to the investigations on plains rather than on hillslopes)
- Certain observations of PADF
- ODH
- World Bank's project experiences
- Inter-American Development Bank's project experiences
- FAO project experiences
- CARE

We intend to establish regular contacts with these sources, through documentation and, whenever possible, directly in person. The first recourse to the experiences of these sources will be already at a very early stage of the project:

in the design of our baseline survey.

A great deal of information on tree ecology and association, technology of planting, survival expectations and comparative values of various species has already accumulated. New data will be forthcoming, further clarifying questions in both the biological and economic aspects. Certain species have been already shown as difficult to adapt (e.g. Casuarina and Cas-sia Siamea in areas where rain is not very abundant and well distributed). Valuable indications have been obtained from Haitian farmers, concerning the indigenous, well adapted species, such as "Haitian Oak" which many farmers favor.

Economic studies by ODH researchers on "Madsen Tree Farm", which is situated on a plain, indicate that the use of trees uniquely for charcoal will not maximize the return on investment. Possibly this is also true for trees on hill slopes.

PADF has information on various ecological, climatic and farming-system questions of agroforestry. That organization expressed willingness to assist our project with the advice of its regional forester whose jurisdiction extends from St Marc to Belladere and includes the Matheux chain.

Regarding the non-tree aspects of farming systems and productivity improvements, prima facie, the greatest applicability will have the experiences of ADS II. During 1984, that project conducted experiments in the South (Jacmel and Les Cayes regions). The Cap Rouge area near Jacmel, although less than half as elevated above the sea level (500m) seems to have many similarities to the upper-middle and upper zones of the Courjolles watershed. ADS II conducted there a number of tests of considerable interest to our project. The subjects of these tests included among others:

- comparisons of performance of certain promising varieties of maize and red and black peas
- various techniques and timing of associated culture of maize, peas and sweet potatoes, or maize, peas and yams.
- dosage and methods of application of fertilizers
- reintroduction of swine (in collaboration with Winrock)
- improvement of goats

ODH work on fruits and vegetables, pasture grasses and ornamentals will be of great interest to our project. Generally, the proximity of our watershed to ODH facilities will encourage communications and exchange of experiences.

The Texas A&M Team, while not explicitly involved in soil conservation and hillslope agriculture, made some pertinent contributions to the technique of planting corn on hillslopes with ridges and furrow dikes to trap more water.

Current experiments of the Winrock projects, near Hinche and Gonaives, will be closely watched and advice will be sought concerning, first, the improved animal stock (goats and swine) which could be introduced in the area and, secondly, types of grasses and management of pastures to support that livestock.

The topography of the area makes it advisable to consider forage grasses on the bands between infiltration ditches on certain slopes. Also, on the higher altitudes, where the Courjolles river watershed is very close to the Matheux river watershed, there are certain zones suitable for pastures in association with tree planting.

The project manager will study the experiences of livestock projects and discuss with our area's farmers the most appropriate system of livestock feeding. A possible combination of tethered grazing with the harvesting of grass for silage to be used during the dry season will be studied.

Regarding chicken and turkey production, advice will be sought from COOPEP and, if practicable, a form of affiliation with that organization will be discussed.

INPUT SOURCING

There will be two main groups of inputs used in the operations of the project: tree planting stock and agricultural production inputs.

Regarding tree planting stock, the project will make use of the existing tree nurseries. There is by now a number of such nurseries established in practicable distances from the project area. Discussions with PADF identified two of them in the proximity. Equally accessible are the nurseries of the Ministry of Agriculture at Duvalierville and ODH nurseries. RETO nursery at Laboule, although more distant, may be of particular interest because of its elevation above the sea level, similar to that of the middle and upper zones of the Courjolles watershed.

Our attention was called to one important observation made in some agroforestry projects: namely that peasants often take better care of their trees if seedlings came from a nursery in their own community. This is a strong argument and psychologically easy to explain. While during the first year of our project it will be certainly advisable to procure seedling from outside, we would like to keep open the option of a small in-house nursery at a later stage. Perhaps a nursery for a single species, most favored by the farmers, would be a right psychological compromise.

Various sources developed devices to facilitate planting and survival. Here belong the "Windstrip" planting package and the root trainers, promoted by respectively ODH and PADF. These techniques do not seem to be compatible, therefore the project will experiment with both of them to find which one is most appropriate in the project's particular conditions.

For agricultural production inputs, Dr. Wahab of the Mission suggested some attractive innovative solutions. One of them would involve an agreement with the fertilizer blending plant at Bon Repos to supply at favorable price some amount of fertilizers and help technically by visits of an extensionist. A similar arrangement could be attempted with the firm of Agri-Supply for seed potatoes. In both cases the incentive for the firm would be that of helping to create a future market for their products.

Possibly, such arrangements as described above, could be established with other suppliers of agricultural inputs. Suppliers of seeds and forage grasses would be a good targets for efforts.

Certain improved seeds are permanently in short supply and there are no prospects that the shortages will be alleviated soon. The project will establish a few multiplication plots to supply the needs of farmers in the project area.

SPECIALTY PRODUCTS

For several years already, PFP/I in collaboration with the Agribusiness Council have been investigating agricultural products which could be promoted for the diversification of the Caribbean economies in order to increase farmers' cash incomes

and make them less dependent on the traditional monoculture crops of the region. While we commend the widely spread interest in the development of fruit and vegetable production for export, our experience has taught us that, with the exception of certain tree crops, these activities are rarely suitable for small farmers, especially those who cultivate hill slopes. The reasons of our conclusion include the difficulties of maintaining quality and uniformity, of logistics and management.

Accordingly, we have established contacts with commercial and/or industrial users of a number of less perishable products which may be suitable for production by small farmers. The Courjolles watershed area, thanks to the diversity of climatic and soil conditions, offers possibilities for a number of such products and we intend to introduce them, in prudent manner starting on a pilot level. The following are some of the crops in question:

-- Annato seed. This product (called "roucou" in Creole) is the seed of a tree (or large bush in some varieties) Bixa Orellana native to Central and South America and the Caribbean. The yellow-to-orange dye extracted from the seed is used for coloring foods, cosmetics, etc. Lately, with the prohibition of many artificial dyes, the industrial interest in the product has increased. We are in touch with substantial buyers-processors of annato, Madis Laboratories in Hackensack, NJ and Kalsec, Inc. in Kalamazoo, MI.

Mr. Monosiet has already considered that tree for the middle zone of the watershed and made enquiries for planting materials which must be obtained from other areas in Haiti. If the local variety is not sufficiently productive, Dr. Julia F. Morton of the University of Miami offered to facilitate the obtention of better stock.

-- Chryzanthemum Cineriaefolium. This species of the well known flower is the source of an important group of pyrethrin-
es, valuable insecticides practicably harmless to humans and
livestock. The use of these insecticides is already wide and
it is likely to become even larger as a result of the current
work to improve the stability of the products. We maintain
contact with Pfizer Chemical Corp. which is one the companies
engaged in that work.

We are also in touch with Professor Cecil C. Still of Rutgers
University who is working on developing new varieties of the
flower suitable for the Caribbean conditions, as well colla-
borates with persons at Rutgers who work on stabilizing pro-
cesses for pyrethrins. Professor Stills is most anxious to
work with us in Haiti.

An attractive characteristics of the pyrethrum products is
that they may be processed at different levels of sophisti-
cation. On one extreme, the flower may be locally dried and
powdered by appropriate technology method, for the local use
against mosquitoes and human and animal body parasites. On
the other extreme, once the production volume is large enough,
the basic product may be extracted for further sophisticated
processing by companies such as Pfizer.

-- Essential oil of Marigolds. These flowers (African va-
riety of common marigolds) have been grown in large volume
in the South of France, around Grasse. Lately, because of
the encroachment of residential construction and of high la-
bor costs, many processors are looking for alternative sour-
ces of supply. We have been encouraged by the firm of Camil-
li, Albert & Lalue (a division of Pfizer) to investigate the
possibility of growing that crop in the Caribbean. Another
product of marigolds is xantophyll, an additive to chicked
feeds.

-- Medicinal Plants. We have established contact with Dr. Edward Ayensu, former Director, Office of Biological Conservation, Smithsonian Institution, now in private industry for on-farm trials of some medicinal plants with market potential.

-- Gums and Resins. Various species of acacia and prosopis, as well as some varieties of leucaenas exude gums and related substances of industrial importance, gum arabic being the best known among them. Recent work by D.M.W. Aderson of Edinburgh University and his collaborators indicate that certain varieties already present in Haiti, or which could possibly be introduced without great difficulty, could provide marketable product. These trees grow in very arid areas and would not be appropriate for the middle and upper zones of Courjollés watershed. They could be, however, placed in the arid low zone and exploited in a cooperative manner by farmers from the other two zones. The economics of such an operation are far from being clear and further investigation will be made before we could decide whether these activities are to be recommended.

-- Castor Bean. This is, of course, not a new product for Haiti, but rather an old wild crop in decline. The principal difficulty at present is that users in the United States do not import beans, but rather oil. The volume of crop available now in Haiti does not justify a modern expensive oil extraction plant. Some time ago, in discussions with Alnor Oil Co. of Valley Stream, NY and York Castor Oil Co. of Westfield, NJ, we arrived at a tentative plan, according to which the production of beans would be encouraged by facilitating exports to European countries, until the volume reaches sufficient size to justify construction of an extraction plant. We will take up these plans at where they were left then and try to reactivate them.

The above examples give an idea of the type of products which could become a source of cash income and diversify the economy of the area of the project. This important segment of the project will concentrate on conscious development of new production options and testing the manners in which they can fit into the farming systems of the area.

CREDIT

The efforts of the project's farmers to improve and expand their production and to commercialize their products must be underpinned by a revolving credit fund. Subsequently, when some small enterprises of storage or simple processing (e.g. of pyrethrum powder for the local market, etc.) become possible, the need for credit will be even greater.

Since 1974, Pfp/I has been managing such funds in a number of developing countries, (Burkina Faso, Liberia, Kenya, Botswana), providing credit to small farmers and rural businesses which otherwise would be denied credit by conventional commercial sources. That vast experience allowed Pfp/I to work out effective methods of operation which have proved their merits by both the growth of productivity of the borrowers and good repayment record. This experience will be used in organizing the management of credit for the Courjolles watershed.

We have investigated the credit experience of the IDB project on the Cul-de-Sac Plain and discussed the matter with Mr. Wilner Pierre Louis, Director of the Bureau du Cr dit Agricole, as well as Mr. Monosiet. We are satisfied that the system of group loans, with the responsibility of repayment by a single borrower shared by other members of the group of some ten borrowers, is fully acceptable. In fact it is recommended in many cases by the Bureau.

Our arrangements for the creation of the loan fund are as follows:

1.- The project's budget comprises a modest amount of \$30,000 to start the credit activity and establish all appropriate procedures.

2.- In a conversation of October 30, 1985 Mr. Wilner Pierre Louis informed the representative of PfP/I that, although the Bureau du Crédit Agricole does not have agency in Arcahaie, it will be able to service the area of our project, i.e. to process the loans from the project's revolving fund. Indeed, the Bureau will be able to add another modest amount, equal to the amount budgeted in the project.

3.- We are now well advanced in discussions with the Inter-American Development Bank (Program for the Financing of Small Projects) regarding the creation of loan funds for small farmers in Jamaica and Haiti. The Bank indicated that, as soon as the legal requirements (approval of the project by USAID, creation of a juridical entity capable of receiving the loan and supervise its application, etc.), are fully satisfied, the PfP/I request for a \$250,000 loan will be positively received.

USE OF CONSULTANTS

Creation and Use of a Roster of In-House Specialists and of Consultants, Possible Sub-Contracting of Specific Assignments

In a project of such complexity as this one, many subjects of study and execution must be handled by specialized agents contracted for these specific purposes. Only in this way the project Manager and his assistants can concentrate on their primary objectives.

PfP disposes of considerable resources of talent and skills relevant to the present project. This personnel is mostly attached to various overseas projects and its availability is restricted. However, we shall profit from their occasional visits in the U.S.A. to make their experience and advice available to the project and, when economically feasible, to have them visit the site and make their inputs on the spot. This may be especially valuable in the case of our managers of small-credit programs.

A special effort will be made to make use of Haitian consultants whose intimate knowledge of the country background and socio-cultural characteristics will be utilized as much as possible. We shall strive to establish channels of access to Haitian knowledge and expertise in technical matters.

When necessary to look beyond Haiti, PfP will draw on its contracts with specialists in academia, research institutes and industry.

The following listing, (indicative rather than exhaustive), illustrates types of institutions and persons who would be addressed for consulting services:

In Haiti

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- Centre de Formation en Aménagements de Bassins Versants
- Faculté d'Agriculture et de Médecine Vétérinaire
- Service Chrétien d'Haiti (for artisanal activities)
- Personnel trained under various projects, such as TAMU PDAI, ADS II, etc.
- Recognized individual specialists, such as agronomes Rémillot Léveillé, Henri Louis-Jeune, Donasson Alphonse, etc.

In the United States

- Rutgers University's Cook College of Agriculture and its stations.
- Texas A&M, Texas Technical University and its International Center for Arid and Semi-Arid Land Studies (ICASALS).
- Water Harvesting/Aquaculture project of Joint PVO/University Rural Development Center in consortium with Auburn University.
- Agribusiness Council (for marketing of specialty crops)
- Individuals, such as Drs. Harold Dregne of ICASALS, Ernest Imle, formerly in charge of foreign technical assistance at U.S.D.A., Bernard Pollack, former chairman of Dept. of Horticulture and Silviculture at Rutgers, etc.

We expect that carefully chosen short-term consultants, especially Haitian ones, will be utilized for the following subjects:

1. Creation of the Data Base for the project and survey of the Courjolles river watershed.

2. Selection and prioritization of non-traditional plant species to be introduced for their soil-conservation and/or income-producing role; advice on their adaptability.
3. Civil and hydraulic engineering aspects of soil conservation structure. Economics of construction and maintenance. Organization of a sustained maintenance. (For study and advice on these subjects we should like to draw as much as possible on Haitian specialists in order to develop local capacity of technical support for the project.)
4. Human-services aspect of the project: home-economics, nutrition, health, school, etc. (If we wish to have sincere community support for the project, the project should show a reciprocal interest in the above mentioned issues. We would like to have advice of a Haitian PVO specialised in these matters and, if feasible, to contract with it for a small program, such as, for example, periodic visits of a nurse/nutritionist.)
5. Development of artisanal activities. These activities, a subsidiary source of income, can be most effectively developed with the help of a Haitian association or individual active in that field.
6. Appropriate technology, when needed for processing of local produce (e.g. solar driers).
7. Questions of land tenure and security of titles. According to the report of the Limbé Center (see the section on sources of information), the improvement of certain parcels of land resulting from soil and water conservation works has already caused tensions related to the ownership of the land. The project may need expert

advice how to minimize such situations.

OUTPUTS OF THE PROJECT

The proposed project aims at the realization of the following outputs:

- 1.- Planting of trees
- 2.- Soil and water conservation structures
- 3.- Improvement of farming systems, diversification of crops and increased productivity
- 4.- Commercialisation of surplus product
- 5.- Downstream effects

The above targets are discussed on the following pages of this section.

With respect to the two outputs of the project most visibly related to the objective of soil conservation, tree planting and physical structures, the efficacy of management obviously must follow a learning curve. Accordingly, the numerical objectives are increased from year to year.

In budgeting for seedlings and work on soil and water conservation structures, we created a built-in reserve for the possibility of significant cost increases in the future. We calculate the cost of seedlings at \$0.10, while the current cost is nearer \$0.07. For the pay of workers on structures, roads, etc., we assume 5 gourdes per day, while the actual pay is now 4 gourdes. If the prices do not rise significantly and if the project's learning curve is satisfactory, outputs will be increased.

Tree Planting

Trees will be of various species, including fruit trees whose seedlings are more costly and require more care than those of other species. Our output objectives, though, are calculated in terms of cost equivalent of average non-fruit trees.

We assume a conservative survival rate of 50%. Further, we assume that non-surviving plants will be replaced by new seedlings. Finally, we assume the average density of 500 trees per hectare. (Some trees will be planted in dense stands, some sparsely along ditches to prevent too much shade, etc.)

The numerical targets of tree planting are as follows:

Year	Number of Trees Planted	Number of Trees Surviving	Equivalent of ha at 500 trees/ha	Cost* \$\$
1	150,000	75,000	150	15,000
2	250,000	125,000	250	26,250
3	350,000	175,000	350	38,590
TOTAL	750,000	375,000	750	79,840

*Assuming 5% annual inflation

As mentioned earlier in the text, with few exceptions, trees will be planted by individual farmers on their land and will belong to these farmers. The present policy in Agroforestry outreach program is to give seedlings free of charge. It is not easy for a single project to be out of line in this respect. However, if possible, we should like to try to charge a very small, nominal price for seedlings, for psychological reasons. The amounts received could be used for purposes of community improvement, e.g. supplies for the school or infirmary, if the latter is organized in the area.

Soil and Water Conservation Structures, Roads, etc.

Regarding these activities, a kind of public works program, which will bring cash or food income to people engaged in them, an important concern is not to create a situation in which the income from them will compete with time, effort and interest given to agricultural production of the project area. We would not wish to create a miniature Nigeria where farmers abandoned their land and preferred to earn their living in the oilfields.

On the basis of the experience in Petit-Bois area, as related to us, we set our objective at an annual average over three years of 400 men working 125 days per year. According to the learning curve, we start with a smaller number in the first year and gradually increase it.

We assume that the improvement of one hectare of land requires 1,000 linear metres of ditch (1m deep x 1m wide) and, additional work on retention basins, etc equivalent to work in 200 metres of ditch. I.e. one hectare requires an equivalent of 1,200 metres of ditch, or 120 man/days of work.

The numerical objectives are as follows:

Year	Man Days of Work	Equiv. in linear meters of ditches	Equiv. in ha	Cost* \$\$
1	40,000	400,000	333	40,000
2	50,000	500,000	417	52,500
3	60,000	600,000	500	66,150
TOTAL	150,000	1,500,000	1,250	158,650

*Assuming 5% annual inflation

The average cost of all combined structures and access roads is \$1,200 per hectare in 1985 dollars.

Agricultural Improvement

This aspect comprises better varieties of crops and better seed (some of it multiplied on in-project plots); new multi-crop combinations and more intensive use of land thanks to these combinations; new specialty products; introduction of improved

livestock (Winrock goats) and better forage grasses; production of fruit (citrus and possibly pineapple); technical assistance in cultural practices.

In the documentation of ADS II and other centers on performance of new recommended crops and systems, or on capability of areas similar to the Courjolles watershed, we have not found sufficient basis for safe projections of the economic benefits of all above mentioned improvements. We shall, however, attempt to gage the order of magnitude of expected benefits.

Outstanding reports (ADS II 1984, UNDP/FAO Limbe Project 1984 report and some private communications) indicate great differences in the degree of improvement attributable to new varieties, use of fertilizer, innovative multicrop combinations, etc. The range is from 10 percent to 200 or even 300 per cent of improvement in yields, with observations in the higher range as frequent as those in the lower range. Improvement in net revenue shows similar wide range. We shall probably not be too optimistic to assume an improvement of 40 percent in net income as a result of all improvements introduced in the area.

Judging from studies of similar areas, (Cap Rouge near Jacmel or vicinity of Limbé), net revenue from a hectare of interplanted crops cultivated in the traditional manner is of the order of \$800 per year. Thus, an 40 per cent increase in revenue will be of the order of \$300 per year.

We expect that, over the three years of the project, 1,000 hectares of small-farmer holdings will be launched on the road to improvement through better systems and inputs, more even moisture and underground water, better conditions of certain lands now approaching final degradation, etc.

Thus, the improvements should gradually give origin to an annual flow of new incomes of the order of \$300,000.

Commercialisation

The commercial structure of sales and purchases in common described in previous section, will not only valorize the increased output of staple commodities and diminish cost of inputs. They will also make it possible to grow and market higher-value items, like vegetables and fruit, for Port-au-Prince. Finally, we expect that a number of specially products (annato, etc.) will be marketed.

Assuming that an equivalent of 50 hectares in the watershed will be used for higher-value products, giving an additional \$500 per hectare, and that specialty crops will add an equivalent of 50 hectares with \$500 revenue, we expect the commercialisation to create an additional annual flow of \$50,000 of revenues.

Downstream Effects

Courjolles river, along with its neighbor rivers, the Matheux river to the North-West and Torcelle river to the South-East provide water for the irrigation of Arcahaie Plain. That plain, comprising about 5,000 hectares is an important source of food supplies for Port-au-Prince.

The progressive deforestation and degradation of the Courjolles watershed has as an effect great variations in the flow of the river and floods which bring masses of mineral materials and endanger houses and fields. The level of the river bed at the plain is said to have risen about 10 meters during the last 60 years, due to the transport of sedimentation from higher levels of the watershed.

In the absence of quantified observations it is difficult to calculate numerical downstream effects of proposed improvements in the higher

zones of the watershed.

However, it can be said in qualitative terms that these effects will include:

- A more stable flow of water for irrigation of Arcahaie plain, (and probably more of that water will be usable).
- Less sedimentation brought downstream and less silting of irrigation canals.
- Greater safety of homes and fields from flooding.
- Less expense on keeping the river bed clear.

GUIDELINES FOR IMPLEMENTATION

This chapter treats the following subjects:

The opening stage of the project

Soil and water conservation segment

Farming systems and productivity segment

Commercialisation segment

Evaluation plan

THE OPENING STAGE OF THE PROJECT

A. RELATIONSHIPS WITH PEASANTS

We fully understand that the success of this project will depend to a very large degree on the mutual sympathy and trust between the personnel of the project and the population. It is above all for that reason that the project manager will reside on the project, to be accessible and to participate in the life of the community. We believe that a very impor-

tant contribution of Mr. Monosiet, as consultant to the project, will be to help establish desirable relationship.

The physical setting down of the project will begin with the choice of a site to accommodate the living quarters of the project manager, facilities for storage of supplies, for paper work and for meetings with farmers, a safe area for vehicles. Our intention is to find such a site and rent or construct the required modest structures in proximity of the market area in Léger.

The earliest task of the manager will be to get well acquainted with the community and, first of all, listen to their problems and stimulate them to think about solutions to these problems. He will discuss the purpose of the project in formal meetings and informal conversations. One important part of his message will be to tell how small hillslope farmers in other areas undertook tree planting as an attractive business investment. If possible, trips to some nearby areas will be made so our farmers can see for themselves and talk to their peers.

The aspect of soil conservation will be discussed in an open fashion, showing an understanding that a small impoverished farmer naturally is very much interested in the income he can get from the paid work on infiltration ditches, etc. However, people in the area have seen by now enough positive effects of these works, such as the resurgence of a some springs which had been dry for many years, to have realized that soil conservation may have some dramatic effects in relatively short run. The theme of the project manager's approach to people will be: **WORKING TOGETHER WE CREATE A BETTER PHYSICAL ENVIRONMENT IN WHICH EACH FARMER CAN INCREASE HIS INDIVIDUAL INCOME.**

B. SURVEY: CREATION OF A DATA BASE

Our project will not engage in research for research's sake, however, there is no need to explain here the importance of adequate data in a project that will affect the wellbeing of thousands of people. Such a base will be initiated by the preliminary survey of the project area. It will be further enriched during the implementation of the project.

Some of the needed data will be found in the usual sources. Some will have to be estimated. It is worth noting, as an illustration of the lack of information, that it is only now that a rain-measuring station is being installed at Petit-Bois, for the first time in the history of the watershed. Thus the most important of all data will not be available until some years from now.

In designing and executing the survey, we will make use of the experience of the ADS II project, its area sampling frame and questionnaire which were used in the Jacmel and Les Cayes surveys. This work, besides a "rapid reconnaissance" and a general census of households, included detailed surveys of the composition of farms by crops, of crop yields, of the composition of the livestock, of tree species, of rainfall, etc.

The survey will cover to the extent possible, the following points:

i. Location

- physical and administrative units, towns and villages, "habitations"
- total land area within the watershed perimeter

- ii. Physiography, geology, slopes, soils, land capability-classification
 Climate, estimated rainfall and temperatures
 Hydrography, impact of recent deforestation
 Degree of deforestation, erosion, soil loss
 Soil Conservation structures and reforestation achieved to date
 Present non-cultivated plant cover
 Species which are especially favorable to conservation because of their:
- ° root system;
 - ° ecological tenacity;
 - ° growth vigor.
- Interviews with populations regarding valuable species which have disappeared.
- Charcoal production: for local use; for shipments outside the perimeter.
- iii. Present farming and agro-forestry (if any) systems
- field crops, yield estimates
 - tree crops, yield estimates
 - livestock, pack animals, fishpond
 - tools and equipment
 - man-woman division of labor
 - market channels, principal flows to markets within and outside the perimeter
- iv. Land use and tenure
- size-distribution of farms
 - ownership, tenure, forms of tenancy, title security, squatters, etc.
 - government land
- v. Roads and other infrastructure

- vi. Irrigation, existing and potential
- vii. Demography, health services, schools
- viii. Incomes: agricultural, non-agricultural
- ix. Institutions and organizations in the area
 - government
 - non-government: local (various levels) and national; formal, informal
 - international, foreign PVO's, etc.
- x. As an addition to the data base, we will assemble a basic reference collection of important articles, monographs and other documentation relevant to our project site. Also, we will establish contact with principal sources of information in Haiti (School of Agriculture, AID archives, Ministry of Agriculture, Institut Français, Offices of DAS, IICA, etc.) and in the United States (AID/S&T, etc.).

C. OUTLINE OF A WATERSHED MANAGEMENT PLAN

Once the relationships with the project's population are well established and the area's data have been collected, the project manager will introduce local leaders to the concept of a watershed management plan. Great care will be taken that this concept be not understood, (and consequently resented and feared), as an attempt to impose from above restrictions harmful to farmer's incomes or dictate what they should do. Rather, the project manager will ask for, and listen to the opinions of experienced farmers concerning various types of locations within the project's perimeter:

- locations where the advanced erosion calls for immediate action;

- the role of infiltration ditches and associated structures in channeling underground moisture;
- locations most suitable for the association of trees with garden crops;
- commonalities, (and/or conflicts), of interests between farmers cultivating the same slopes or different slopes;
- commonalities, (and/or conflicts), of interests between the farmers with the project's perimeter and outside of the perimeter; (Mr. Monosiet's role as a person trusted by the populations of both the upper and the middle zones of the watershed will be very important in this respect).

The above considerations will be complemented by consultations with the personnel of ADS II, University of Maine team, etc. If possible, we will arrange for visits of these specialities in the project area and meetings with small farmers to discuss the ways of improving the environment and productivity in the watershed.

The final result of all that consciousness raising and thought provoking work ought to be an outline of consensus among the farmers and between the farmers and the project personnel on the direction of future activities: an outline of the Courjolles river management plan.

SOIL CONSERVATION SEGMENT

1. The work on the outline of the watershed management plan, done together with the most active and interested members of the community, as described in the preceding section, will be an appropriate introduction to the establishment, together with the community council of Léger and other interested locations, of a program of work for the first twelve months of

activities. That program will cover the following aspects:

- a) organization of work, recruitment of "equipes", etc. (Note: there is an agreement among all concerned in the project that only people from the project area may get work on "equipes")
- b) norms of performance, payment (rates, food, money, etc.)
- c) spatial sequence of work
- d) technical guidelines
- e) targets (annual, seasonal, monthly)
- f) quality and quantity control (In the Petit-Bois area, targets are indicated with pickets, or cords, etc. and "Chef d'equipe" is responsible for assigning functions and for reaching the target. Payment is made only after an inspection of the work performed).
- g) reporting systems and audit:
 - i. performance
 - ii. money, food

2. Future "chefs d'equipe" will undergo one month of training at the recently established, with AID support, "Centre de Formation pour la Lutte Contre Erosion" at Petit-Bois. The training will involve both classroom sessions with audio-visual presentation and work on on-going works in the Petit-Bois area of the middle zone.

The center proposes to conduct periodic seminar and other training events and its proximity to the area of our proposed projects is a considerable asset from the viewpoint of acqui-

sition of skills, as well as from that of motivation.

3. The magnitude of labor and money investment in soil conservation structures warrants a study how to use resources in the most effective way. The optimum design of structures may vary from place to place depending on the degree of slopes, permeability of soil and intensity of rain (the latter to be estimated due to the lack of records. It has been already observed during our preliminary investigations that the soils of the upper zone will require a different type of ditches from the one used in middle zone. The "herringbone" pattern with a retention reservoir at the bottom of the "spine" has been suggested. We should like to make a review of these questions early in the implementation. We would like to secure consultation from the "Centre de Formation en Aménagement de Bassins Versants" at Limbé. Some member of that center are familiar with Courjolles watershed and, as noted in the section on sources of information, have contributed significant comments and suggestions. If foreign advice is required, our first choice will be Dr. Harold Dregne of International Center for Arid and Semi-Arid Land Studies (ICASALS), at the Texas Technical University, Lubock, TX, as consultant. If Dr. Dregne is not available, competent consulting personnel for that study will be found at the USDA which is preparing currently a "Skills Inventory for Extension Personnel Interested in Overseas Assignments". We have been informed that that inventory will be available early in 1986.

An additional subject covered by the above consultation will be suggestions for an inexpensive organization of maintenance and of a simple system of measurement of rainfall, river flow, soil moisture and evatranspiration.

4. The great success of the Forestry Outreach Program in recent years indicates that probably tree planting can be very largely considered a part of the farming systems seg-

ment, rather than of the segment implemented in collaboration with the community councils. There may be, however, certain locations requiring that collaboration.

Regarding the supply of seedlings, arrangements will be started at an early date with the nurseries for supply contracts. Quality, choice of varieties, availability of advice and logistics will determine the choice of suppliers.

FARMING SYSTEMS AND PRODUCTIVITY SEGMENT

Activities under the above heading will develop along the following lines:

1. Identification of group of farmers interested in various aspects of innovations and improvement, such as:
 - higher-altitude vegetables and fruits for marketing in Port-au-Prince (possibly also Arcahaie and Duvalierville), in or without, association with traditional crops of maize, sorghum, etc.
 - livestock grazing of grass bands and leucaena leaves
 - more intensive cropping in various systems of association
 - pig and poultry raising, etc.
2. Consultations with sources of experience and information (ADS II, Winrock, etc.) concerning varieties, methods, etc. (A separate section of the present proposal describes the types of information and advice available and their sources). As mentioned in the preceding section, the project will make efforts to bring specialists

from these sources for meeting with the watershed farmers.

3. Arrangements with commercial sources of planting materials, fertilizers, etc. to establish a joint program which by assisting the farmers would develop a market for these commercial enterprises. (Also these sources are described in a separate section.)
4. Arrangements with promising farmers to establish in-project seed multiplication for these types of seeds which are in short supply.
5. Initiation of on-farm variety verification plots and demonstration plots with selected promising farmers.
6. Arrangements with individual farmers for trials of specialty crops for future commercialisation (Chrysanthemums for pyrethrum, etc., as mentioned in a preceding section).
7. Establishment of rules of Technical Assistance for all the above mentioned activities:
 - a) classroom meetings, audiovisuals, etc.
 - b) field visits on demonstration plots
 - c) consulting and remedial visits to individual farmers, etc.

COMMERCIALISATION SEGMENT**1. DEMONSTRATION STAGE**

Marketing in common of product and buying in common of inputs is as yet an unusual concept in many, (probably most), areas in Haiti. Consequently, it may prove not advisable to confront the Courjolles farmers with a fullfledged option of a formal, legally defined organization such as a pre-cooperative. Contacts with peasants during the early weeks of the project will allow the project manager to gage their psychological readiness, of lack of it, for that form of cooperation.

If there are doubts as to the farmer's readiness, it may be expedient to start the activities of the commercialisation segment with a preparatory, informal demonstration stage. this stage would involve the following steps:

- a) A short, (half of a day, or so), visit by a few peasants (probably women) accompanied by the project manager and his assistant, to the Port-au-Prince markets to get an idea of prices and attractiveness of potential commerce.
 - b) An offer of the project truck for gas-expense-shared trips twice a week, during, say, four weeks for persons interested selling in Port-au-Prince (or Duvalierville).
 - c) Suggestion to form an informal group to sell in common, with appropriate control arrangements to allay mutual suspicions.
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2. ASSOCIATION STAGE

By advice and encouragement, the Project Manager will exercise special efforts to make the above described demonstration stage a success. From our Jamaican experience, we fully expect that a success will be achieved.

In the association stage, the Project Manager will:

- a) Start by discussing with interested individuals the idea of a formal association;
- b) Explain the procedures necessary to constitute a legal entity (probably a "pre-cooperative") for business purposes of buying and selling in common, and the rights and obligations of members of such an entity. It will be advisable to let some time pass after these explanations, to give farmers sufficient opportunity to discuss the subject among themselves, come to the manager for additional explanations, etc. We expect that the decision of most of the farmers will be positive.
- c) Help in the procedures of establishment.
- d) Assign one of his assistants to help in the management, accounting, cash settlements, and logistics.

A similar method will be used to introduce to the prospective association members the concept of purchases in common. As mentioned in the section of input sourcing, we expect to establish relations with some reputable suppliers of seeding stock, fertilizers etc. These relations, as well as contracting with nurseries for seedlings, will serve as a vehicle for organizing a system of purchasing in common. Another vehicle, more of the type of a consumer coop might be provided by bulk purchasing of staple foods, (rice, cooking oil, etc.).

which will be given to persons working on community-level work (infiltration ditches, etc.)

The Association will charge his members a commission on the products sold. The rate of commission must be sufficient to cover the cost of transport to the market (truck depreciation, driver, gas, etc.) and leave a certain surplus for the expansion of the association's activities, and eventually for the pay of an employee of the association assigned to the marketing duties.

As can be seen, the objective is to create a self-sustaining operation which will cover all its costs, provide a surplus and, eventually qualify for commercial credit for expansion, acquisition of trucks, etc.

During the early period, the association sales will consist mostly of products and, perhaps, poultry. As the trees planted in the project reach an appropriate size, poles for construction and other tree products may be added.

While we intend to proceed cautiously in the expansion of the association, to avoid pitfalls of a development which would exceed the management capability, the concept of the farmer association which PFP/I has promoted in various countries is openended. It lends itself to gradual expansion both in size and in the scope of activities.

EVALUATION PLANS

There will be an internal evaluation every year. It is expected that the project manager at the Mission, or his representative, will participate in it.

Two external evaluations will be organized: the first, in the middle of the project period and the second, some months

before the project's completion. Pfp/I will submit the names of proposed external evaluators for the Mission's approval.

SOME DATA ON THE COURJOLLES RIVER WATERSHEDINTRODUCTION - RELATIVE IMPORTANCE OF THE WATERSHED

The Courjolles River drains a watershed of about 84 square kilometers from the altitude level curve No. 200. This river is before the Matheux and Torcelle Rivers the main supplier of water to the Archaie Plain, which counts 5,312 hectares, receives an annual rainfall of about 900mm, and constitutes the most important source of banana-type food for the Port-au-Prince area, besides an array of various other commodities, especially sugar cane and its industrial by-products: molasses and white rum (clairin).

POPULATION

The population figure must be estimated, because the watershed belongs to two census units. One of them is entirely within the watershed and, according to the schoolmaster at Petit-Bois, comprises 10,000 persons. The other extends beyond the watershed. We estimate total population at 15,000, i.e. 3,000 households.

ECOLOGICAL ZONES

The Courjolles watershed appears to have three distinct ecological zones:

- 1.- low zone between elevations 200 and 500 meters, above sea level.
- 2.- middle zone from about 500m to 1000m.
- 3.- upper zone above 1000m.

1.- LOW ZONE 200 - 500m

This zone, adjacent to the plain, is characterized by a xerophytic vegetation of wooded savanna type: perennial shrubs - cactoid, prosopis sp., agave sp. - dry pastures with gramineous and leguminous plants. In the general ecological classification based on Holdridge, this area is integrated in the class "Dry forest of the subtropical zone".

- Annual rainfall estimated at about 600m.
- Soils of the loose, calcarous type of mountainous formation, with slope of 25-50 percent in general and some bands of 12-25 percent in the bordering areas of the zone and some pockets of slope over 50% in the center area of the zone.
- Temperature
- Population: This zone is poorly populated although some agriculture is practiced (sorgho, sweet potato, bitter cassava...) by peasants living in the nearby higher zone endowed with wilder climate, or in the Plain. Also some extensive conservation works (contour canals and tree plantings) have been realized, unfortunately with no apparent connection between the two operations.

2.- MIDDLE ZONE - 500 to 1000 Meter Elevation About Sea Level

This zone includes in its lower part the agglomeration and area of Ti Bois located at an altitude of about 560m and 12 kms from the National No.1 Road. It benefits of a better complex of environmental conditions: temperature, rainfall, soils, which tend to improve with elevation of altitude.

- Temperature: No records - vary with altitude with high daily variations in lower areas (Ti Bois).
- Rainfall No records exist. It has been estimated at an average of 800 to 1200 m depending on altitude.
- Soils: Various types of soils are encountered:
 - a- At Ti Bois proper (560m), one finds 2 types of soils:
 - ferroginous sandy soils lying on calcarous base with a thin layer of humus and consequently low fertility.
 - white calcarous sils with a ph of up to 7.6, very eroded.
 - b- At Dos Malfini (alt. 700m), the soil is a black clayish marl with low percolation capacity.
 - c- At Capoule(alt. 950m), soils are mostly of the ferralitic type, very deep, with ph varying from 4.7 to 7.3. These soils are the result of mineral deterioration with release of iron and magnesium and a low ion exchange capacity.
- Topography: Topography vary much more in the middle zone than in the two others. Slopes over 50% cover an area about as large as that area of 25-50% slope with only four (4) pockets of 8-12% slope at altitudes 700 - 900m (Dos Malfini, Fond Perrier) and two small others of 12-25% at Découverte and Mare Zoranger.

Extensive soil and water conservation works have been executed in the second zone:

- Two small forests totalising about 40 hectares planted in 1980 have trees measuring presently about 14 feet. The trees are of the following varieties:

local Mahogany	Swietenia Mahogany
Venezuelan Mahogany	Swietenia macrophylla
Tavernon	Lysiloma Latisiliqua
Cedar	Cedreula odorata

- Between September 1983 and September 1985, the Ministry of Agriculture personnel has supervised the planting of 86.500 trees and the treatment of 2.650 hectares with contour canals in habitations: Ti Bois, Dos Malfini, Fond Rondelle, Ti Fond, Jean Demas, Kama, Ka Poule.⁽¹⁾

A total of 720 people have worked daily in the 7 sites under the control of 8 Foremen and 1 Supervisor.

The contour canals are 1m deep and 1m large. Instead of the usual 1% slope in such structures, they have a 0.50m bulge every 50m. Distance between two canals vary with the slope of the area. An average interval of 10 meters has been found.

Two or three contour canals are linked to round holes of 3-4 meter deep and 3-4 meter large. These basins or reservoirs serve at least during the rainy season for all domestic purposes, especially as a source of water for washing and animal watering.

(1) Data received from Agr. François SEVERIN, Director of Soil Conservation Service.

- Two important observations have been made:
 - a- The intervals between canals are not cultivated also on contour ridges; some ridges have been erected rather desastrously in the slope direction.
 - b- The biological implantations which should constitute the second phase of the program has been delayed too long, reducing the efficiency of the physical structure at each rainfall: some gullying has been seen and 2 year old canals are half filled.

FISH CULTURE

Besides erosion control structures, the TiBois Project has tried to introduce fish culture as a way of capitalizing further on water conservation to improve the local population's diet. Two fish ponds have been dug, one at Ti Bois, the other at Capoule. They measure 15m in diameter and 2m deep. A first harvest of fish was distributed at the end of the 1984 rainy season among the community members who has attended the needs of the activity. The Capoule pond is not yet in operation.

VEGETATION

The natural vegetation of the Middle zone changes gradually from Holdrige's class "Dry forest of the Subtropical zone" to that of "Damp forest of the Subtropical zone: in the lower part, at the Ti Bois level, natural vegetation is still xerophytic, predominantly ligneous *Acacia* spp, *Prosopis* sp.. A few forest trees are now present.

At a higher level - Capoule: 800m - the vegetation tends to be of folious type *Sucrin*, *chêne* (*catalpa longissima*).

Numerous trees have appeared: Mango, Avocado-pear, citrus trees, etc...

Similarly, cultivated crops progress with altitude from a mixture of sorgho - corn - cassava - pigeon pea to a less drought resistant one of corn - casava - sweet potato - beans at Capoule level.

POPULATION AND LAND TENURE

It seems that Ti Bois and several other neighboring habitations have been colonized under donations to specific families by the Boyer Administration (1818 - 1843). With time and the multiplication of those families, the former large, collectively owned habitations have been fragmented into small holding which seem to be mostly owned by the occupying farmer who, on the other hand, often cultivates several plots at various levels...

3.- UPPER ZONE: Elevation above sea level 1000 - 1397m

This zone presents gradually above Capoule, a complex of ecological conditions which class it in the ecologic map drawn by the "Mission d'Assistance Technique Intégrée de l'OEA" (1968 - 1970) as "Damp forest of low altitude mountain".

Temperature has been estimated at 16° to 24° Celcius

Rainfall also has to be estimated as for the two other zones: 1200 to 1800mm spread seemingly on two seasons: March to June and August to November.

Soils are of the group oxysol, red often deep soils on calcarous base obtained by leaching calcium and magnesium ions and release of iron and aluminium oxydes.

Topography: In the upper zone, the mountain presents several plateaus with a slope of 8-12% or even 3-8% (Léger).

These plateaus are staged between several strips of 12-25% slope, or 25-50% and only two small bands with slopes over 50%, one in the areas of Ravine Fond Diable on the far left corner of the watershed and the other one at Ravine Gros Bassin on the far right corner (see Map).

Vegetation: At this level is found a small pine forest over pin the top watershed of both River Courjolles and River Matheux. A few old seed propagators are still present but the forest is rapidly deteriorating under the population pressure for timber. The natural reproduction capacity of the *Pinus occidentalis* is suppressed but could be regenerated with a few simple protection measures. Various folious trees typical of the Holdridge class Fh-Mb: damp forest of low altitude mountain (Ref. Ecology Map of the OAS Integrated Technical Assistance 1968-70)

Vestiges of former prosperous coffee plantations are present (old trees-colonial ruins) and signs of timed efforts of regeneration of this cash/reforestation crop by the concerned Government entities can be found: young trees, small nurseries. But, it has been stated by a local leader that in 1805, Emperor Dessalines, on his way from Marchand to Port-au-Prince, crossed these mountains and was so impressed by a maturing coffee plantation left by a departed French colonial that he appropriated it himself under the Government policy of donating vacated colonial properties to generals who had fought the independance war.

Also Moreau de St Mery reports that the coffee production of Fond Baptiste and Matheux at the end of the wighteen century was between 3 and 4 million pounds.

Fruit trees, avocado, citrus, etc...are in excellent conditions but we have not seen a few apple and peach trees said to have been introduced to the area.

Cultivated crops: A mix of tubers, grains, vines and fruit trees.

Population: It is worth observing that this upper zone counts the largest rural market of the whole area: it is held on Monday at Léger also site of the largest and oldest church (roman catholic) of the mountain. in this rural market are sold:

- Local staples: coffee, citrus, sweet potatoes, yam, beans, mirliton (chailotte), bananas, grain and ground corn...

- Agricultural staples brought from lower area on both sides of the mountains, sorgho, rice, onion and eggplant from the Artibonite Valley...

- Industrial or semi-industrial products from Port-au-Prince or the Artibonite Valley: clothes, textiles, cooking soil, salt...

- Cooked food, raw meat, especially imported pork...

Land Tenure: Lands are mostly owned by occupying peasants. But presence of large holdings owned (inherited) by Port-au-Prince people has been reported.

RELATIVE IMPORTANCE OF THE UPPER ZONE AGAINST THE TWO OTHERS

Beside its location further from the main road, the upper zone appears to be more important than the two others for an intensive application of technical, financial, educational, and organizational inputs directed towards improving peasant standards and soil and water management. Main reasons for that are:

- A higher annual rainfall.
- Higher potential of soils in terms of quality, depth, slope, preservation...

Concentration on this zone should have higher and longer lasting impact on the population, the watershed, and the two rivers: Courjolles and Matheux.

ACCUMULATED EXPERIENCE:SOURCES OF INFORMATION AND ADVICEAND SOURCES OF INPUTS

In the course of last few years a great deal of experience has been gained by various organizations engaged in agroforestry and agricultural productivity projects. In the process of preparation of the present proposal we have contacted all the important ones, we studied their documentation and had meetings with their personnel.

The following table summarises in the form of a matrix various types of information and advice which can be obtained from the above mentioned sources. The table also indicates some interesting sources of agricultural inputs.

- The table is followed by some observations on the sources in question. These observations are arranged in the same order in which the sources are presented in the matrix table.

S U B J E C T S O F I N F O R M A T I O N A N D S U P P L I E S

S O U R C E S	E C O L O G Y	T E C H N O L O G Y	F A R M I N G S Y S T E M S	C O S T D A T A	S O U R C E S O F I N P U T S	R E L A T I O N S H I P S W I T H P E A S A N T S
	a. Species of trees suitable for various zones b. Species of crops (incl. grasses) - Suitable for various zones c. Multicropping systems	a. Trees - nursery b. " - transplanting c. " - protecting against livestock d. " - survival data e. " - other subj. f. Crops-cultural practices g. Soil conservation struct h. Livestock	a. Results of trials b. Combinations of various trees crops + livestock c. Crops/livestock combinations d. Forage production e. Poultry	a. Nurseries-investment b. " " cast part c. Tree planting, cast per tree, cast/ha d. Grasses e. Structures - ditches cost perm. - etc. f. Food crops	a. Nursery stock b. Seeds, vegetative propagation c. Fertilizers d. Pesticides e. Livestock reproduction	a. Animation b. Techn. Assistance c. Organizations d. Land tenure issues e. Training courses f. Formulae of community work
PADF PROJET PYEBWA	(a)	(a), (b), (c), (d), (e)	(b)	(a), (b), (c)	(a)	(b), (c)
U.NIV. OF MAINE TEAM	in near future: (b)	Systematised info. from all other sources (a), (b), (d), (e)	---	Systematised info. from all other sources (a), (b), (c)	---	---
FAO/UNDP PROJECT AND LIMBE CENTER (CFABVL)	(a), (b), (c)	(c), (d), (e), (f), (g), (h)	(a), (b), (c), (d)	(e), (f)	---	---
COH (OPER. DOUBLE HARVEST)	---	(a), (b), (d), (e)	---	(a), (b), (c)	(a)	---
IDB - RIVIERE BLANCHE PROJECT	(a)	(d), (g)	---	(a), (b), (c), (d), (e)	---	(b), (c)
FOODCROP PROMOTION PICV PROJECT (IFAD)	(b)	(a), (b), (g)	(b)	(e)	---	(a), (b), (e)
DESSALINES CONSERV. PROJECT	---	(d), (g)	---	(e)	---	---
ODBFA (ARTIBONITE)	---	---	(b), (f), (g)	(c), (d), (e)	---	(a), (b), (c), (e)
ADS II (PDAI, TAMU) UNIV. OF ARKANSAS TEAM	(a), (b), (c)	(a), (b), (c), (d), (e)	(a), (b), (c)	---	(b)	---
SALAGNAC CENTER (Miragoane)	---	(g)	(a), (b), (c)	(e)	---	---
WYNROCK PROJECT	(b)	(c), (h)	(d)	(d)	(b), (e)	(e)
RETO NURSERIES (J. de Saint Christo)	(a)	(a), (b), (c), (d)	---	(a), (b)	(a)	---
ASSA (FERTILISER CO., BON REPOS)	---	(f)	---	---	(c)	(e)
AGRI-SUPPLY CO. (PORT-AU-PRINCE)	---	(f)	---	---	(b), (d)	---
COOPEP (PORT-AU-PRINCE)	---	---	(e)	---	(e)	---

PADF, Projet Pyebwa

By the end of 1985, the Projet Pyebwa will have planted about 15 millions trees in projects involving some 30,000 to 50,000 small farmers. Most of these trees are planted on slopes at broad ranges of elevations above the sea level. Thus many experiences of PADF concerning planting techniques, adaptation of species, survival rates and similar aspects are of direct importance to the Courjolles watershed project with its diversity of slopes, soils and elevations.

Project Pyebwa does not plant trees itself, but acts through the intermediary of organizations religious, cooperative, etc. operating on various levels, from that of a village to that of a region. Among the organizations involved are community councils (conseils communautaires). Again, Project Pyebwa experiences in work with local organizations are of value to the Courjolles project.

During its four years of existence Project Pyebwa has experimented with some 30 various tree species, both indigenous and exotic, and is now in the position of sharing the experience of the performance of these species in various ecological conditions. One of the finding has been that six widely used species have lately (1984) made up to 80 per cent of plantings. These species are:

- 1.- Eucalyptus camaldulensis
- 2.- Cassia siamea*
- 3.- Catalpa longissima ("Haitian Oak")
- 4.- Azadirachta indica (neem)
- 5.- Casuarina equisetifolia*
- 6.- Leucaena leucocephala

*) These species have relatively rigid climatic requirements, as other studies indicate.

In conversations with the management of PADF we have been informed that the Courjolles watershed project can expect advice from the Projet Pyebwa regional forester whose jurisdiction extends from St. Mark to Hinche and includes the Matheux chain. If an annual plan of work can be established with a sufficient lead time, these consultations can be scheduled in a manner to coincide with the rythm of the work in the watershed.

Projet Pyebwa has also gained valuable experience in integrating trees into farming systems of participating peasants. The following practical advice may serve as an example: If trees are associated with grazing, the owner of cattle ought to be the owner of trees. In this manner, the best care will be taken to stop the animals from destroying young trees.

Projet Pyebwa has helped to establish by various local organizations some 30 nurseries. These bodies were given technical assistance, including plans and specifications of different installations, information on the cost of materials, etc. Most nurseries have proved to be viable enterprises, at least as long as Projet Pyebwa contracts for seedlings for distribution. The management of the project told us that a contractual arrangement can be established with some of PADF sponsored nurseries to sulpply seedlings for the Courjolles watershed project.

The solution can certainly facilitate the operation of the Courjolles project, at least in its first year when many urgent tasks will absorb attention of the personnel. In the long term, however, another among PADF observations may constitute an argument for a small nursery on the project site: namely, PADF has observed that small-farmer groups which are themselves involved in cooperative ownership of a nursery take a better care of trees than other groups. In psychological terms that fact seems easy to understand and appreciate.

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University of Maine Team

This group is in the middle stage of its work which will be a systematisation of all results obtained to-date on various agroforestry projects, and guidelines for further research. We were informed that by March 1, 1986 most of the Team's publications will become available. They will include also cost/benefit estimates for various species and systems of cultivation and marketing.

By mid-1986 results of trials of survivability will be available.

Among publications available in coming March will be a classification of tree species adaptable to various ecological zones of Haiti.

It remains to be seen whether the work of the Maine Team can be used with advantage on micro level, or will be mostly useful on policy level.

PROTECTION AND MANAGEMENT OF LIMBE MOUNTANEOUS BASSIN

FO: DP/HAI/77/005 TERMINAL REPORT

CONCLUSIONS AND RECOMMANDATIONS

FAO - UNDP - ROME 1984

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It seems relevant to quote summarily some important part of this FO: OD/401/77/005 Project:

In part (a): ORIGIN OF THE PROJECT, it is said that the deterioration problem of Haiti's mountains has always been watched by Haitian Administrations, which have tried numerous times to resolve it. The various activities or soil conservation projects executed with or without external assistance have never fully met their objectives; for external reasons or above all because certain constraints or important factor of sometimes structural order have never been understood. The last GOH/FAO/PNUD/72/012 Project is no exception and its evaluation report (June 1976) stress the fact that, unfortunately, the peasants do not maintain the infrastructure works and that it is necessary to engage into a deeper and more durable action to save what already has been realized...

...The purely forestry approach (tree or even fruit-tree planting) or even the mechanistic approach have to be replaced by an integral approach that make allowance for the majority of the most important factors such as the peasant himself and his motives, the agrarian structures, the capacity of each homogeneous parcel in every bassin or sub-bassin, the possibility to increase yields, the actual measured efficiency of the works, the interaction between plains and mountains, the social and economic costs and benefits, the necessity of trained personnel and efficient institutions.

2.2.1 Definition fo the agro-sylvo-pastoral management model

The physical conditions of the pilot zone should lead to think that because of soil conservation most of the area's lands should be excluded from cropping.

The results of management works at MORNE LIBERAL, the site of the model farm have shown that it is possible with soil conservation measures to maintain the potential of the soils and to farm hilly lands of more than 25% slope.

Due to the high density of the population, the Project has accepted to consider as agricultural lands those with slope 0 to 45%.

.....

2.2.2 Protection and management methods

The following management methods have been proposed by the Project, based on the slope of the land and the cultural methods traditionally applied in the Limbé region (ridges, mounds, flat):

2.2.2.1 Lands with slope 0 to 7%

This area is more than 50% wooded, with a high population density and extremely small holdings fenced by quickset hedges. Due to this last element, these lands can be cropped with traditional production method without any conservation measure.

2.2.2.2 Area with slope 7 to 12%

This zone is also largely wooded. The humid part generally planted with coffee and cocoa. Parcels are also very small and often fenced, especially in the northern side, by quickset hedges allowing traditional cropping methods. The southern side is more or less cleared of trees with also less quickset ledges. To protect the soil there, traditional farming methods have to be backed by vegetal bands spaced 12 to 15m apart. These vegetal barriers must be reinforced by forest or fruit trees. (*Simaruba glancea* - (chêne) - *Suivietenia mahogani*).

2.2.2.3 Land zone with slope 12 to 45 %

Most of this zone has no trees and is cultivated with food crops, and its southern side is totally eroded. To keep it under permanent cropping calls for mechanical erosion control structures, reinforced with a biological method and oriented towards the diversion of excess water.

The Diversion Terraces System selection is the result of works done at Morne Libéral. It is a combination of mechanical and biological methods already used successfully by several FAO projects to protect and improve cultivated lands in similar conditions in various countries: Jamaica, Hondura, El Salvador, Philippines, Taiwan. It is consisted of narrow, parallel terraces erected more or less at the same distance with a slight longitudinal slope 5%.

The terrace's platforms are reserved for fruit trees, the embankments for forage crops, sugar cane or ananas to ensure at the same time land stabilization and satisfaction of immediate peasant needs.

The intervals between terraces are cultivated with peasant traditional methods.

Experiments have demonstrated that the diversion terraces network, associated with ridges cultivation in the intervals can reduce soil loss by erosion by as much as 80% compared with lands cultivated without protection.

This management system has met with a great success from the peasants of Ravine des Roches and Morne Libéral. The land there, dangerously eroded before has become a rich agricultural domain with intensive cropping in all available parcels.

2.2.3 The Demonstration Center

The Center has performed for demonstration and chiefly formation purposes the following structures:

- agricultural terraces in stairs
- diversion terraces
- V form arboricultural terraces
- individual terraces
- vegetal barriers

2.2.6 Yields of managing 1 ha of land with 35% slope

Factors with the diversion terraces method:

- slope and platform size of the terrace
- hand-labor quality
- difficulty of the land

Payment method: mechanical works were paid with PAM food: for 12 working man/day: 10 food rations equal to:

- one 50 pound bag of corn flour
- 0.5 gallon of edible oil
- 8 small sardine cans

Total commercial value ± \$US 12.00

Yields of up to 2.-2.5m³/h/j can be obtained

2.3.1 Applied research

2.3.1.1 Tested varieties

Corn, vigna, beans, manioc, yam, sweet potato, mountain rice, banana, papaya, pineapple, sugar cane.

2.3.1.2 Cultural technics

- For rice, corn and sorgho, best results are obtained from land preparation in partitioned ridges without preliminary tillage.
- For manioc, sweet potato, and yam, especially on the northern side: non partitioned ridges without preliminary tillage.
- For beans, vigna, and pigeon pea: tillage and no ridging.

2.3.1.3 Fertilization

- Organic fertilizing is a sine qua non condition for production of corn, rice, sorgho, vegetables, manioc, sweet potato, yam, forrage and fruit trees.

Most significant dose 25-30T/ha.

2.3.3 Technical vulgarization

Table of yield difference between traditional and improved cropping systems:

C R O P S	TRADITIONAL	LAND IMPROVED WITH FERTILIZER
	YIELDS: Kg/ ha	
Corn	750	3,000
Bean	400	1,000
Vigna	450	1,000
Manioc	9,000	30,000
Sweet Potato	7,000	15,000
Rice	800	2,200

2.5 Animal and Forage Production Activities

Recommandations for various grasses and legumes for soil protection and animal production.

Grasses

Panicum maximum (Guinea grass) very common in low areas.

Cynodon dactylon: low and humid areas, recommended for outlets protection.

Melinis minutiflora (molasses grass): easy multiplication, good cover, resistance to unfavorable conditions.

Festuca elatior: deep rooting, drought resistant.

Digitaria decumbens (Bangola grass): good protection against erosion in marginal lands.

Pennisetum purpureum (Elephant grass): good for terrace embankments.

Tripsacum laxum (Guatemala grass): very interesting results for fodder and terrace embankments.

Leguminous

Stylosanthes gracilis: very good for marginal and steep lands.

Stizolobium (Velvet bean): recommended for fallow lands.

.....

2.6.2.2 Principal obstacles to reforestation:

- free of charge distribution of seedlings
- lack of cultivable lands
- difficulty to protect young plants from animal damages
- facility to find firewood locally

CFABVLCentre de Formation en Aménagement de Bassins Versants du Limbé

This training institution which is an agency of the Ministry of Agriculture made in the summer of 1985 a brief survey of the Courjolles watershed, concentrating mainly on the activities in the Ti-Bois segment, with visits at Kapoulé and Leger. This survey was to be followed by visits to other watersheds. The objective is to create a body of experience to enrich the contents of the training dispensed by the Center.

The report of the survey comprises brief information of soils and vegetation of the watershed, crops and principal crop association. Current erosion status is briefly evaluated and antierosion status is briefly evaluated and antierosion structures are described.

The report then succinctly evaluates the effects of the project to-date, including the incipient problems of land-tenure coming to the surface as the degraded land acquires new value thanks to the improvements in water retention, etc.

An interesting critique of the design of irrigation ditches and of furrows between ditches, as well as recommendations on these subjects complete the report.

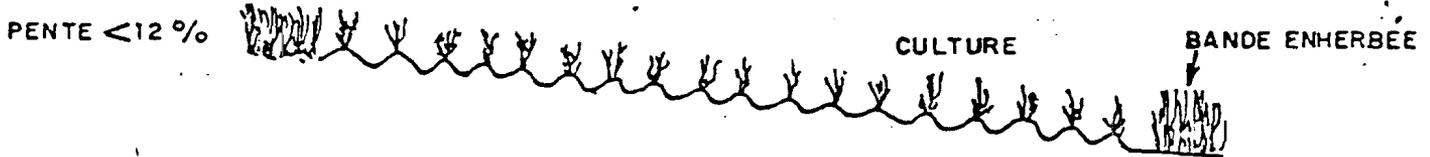
The report in question leaves one under the impression that the Centre at Limbé may become a valuable source of advice, above all on the subjects of soil-conservation methods and of sociological problems that may arise as side-effects of watershed management work.

METHODES D'AMENAGEMENT DES TERRES DE CULTURE EN PENTE

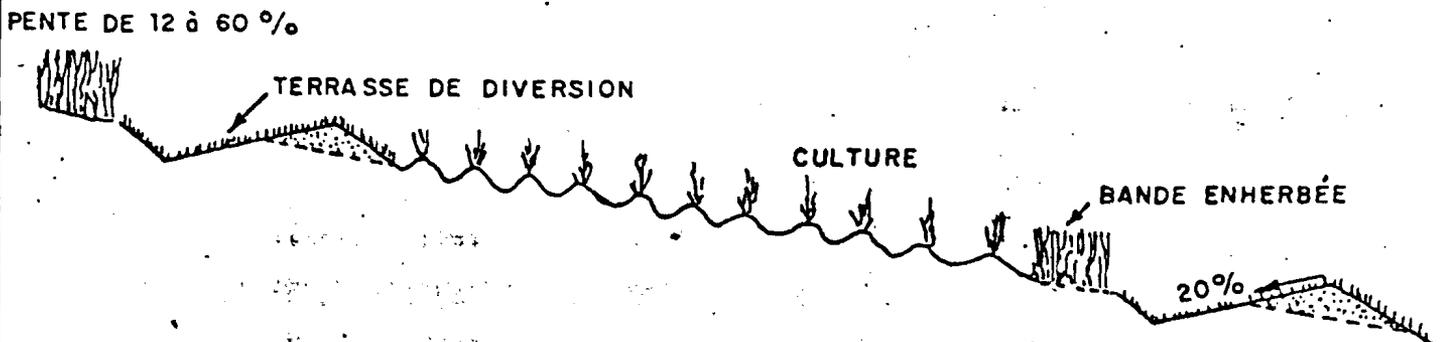
1 - CULTURE SUR BILLONS SUIVANT LES COURBES DE NIVEAU



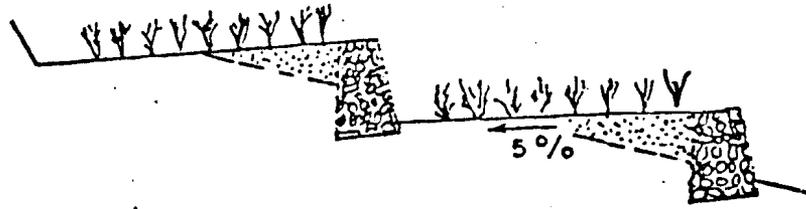
2 - CULTURE SUR BILLONS ENTRE BANDES ENHERBÉES



3 - CULTURE ENTRE TERRASSES DE DIVERSION



4 - TERRASSE AGRICOLE EN ESCALIER



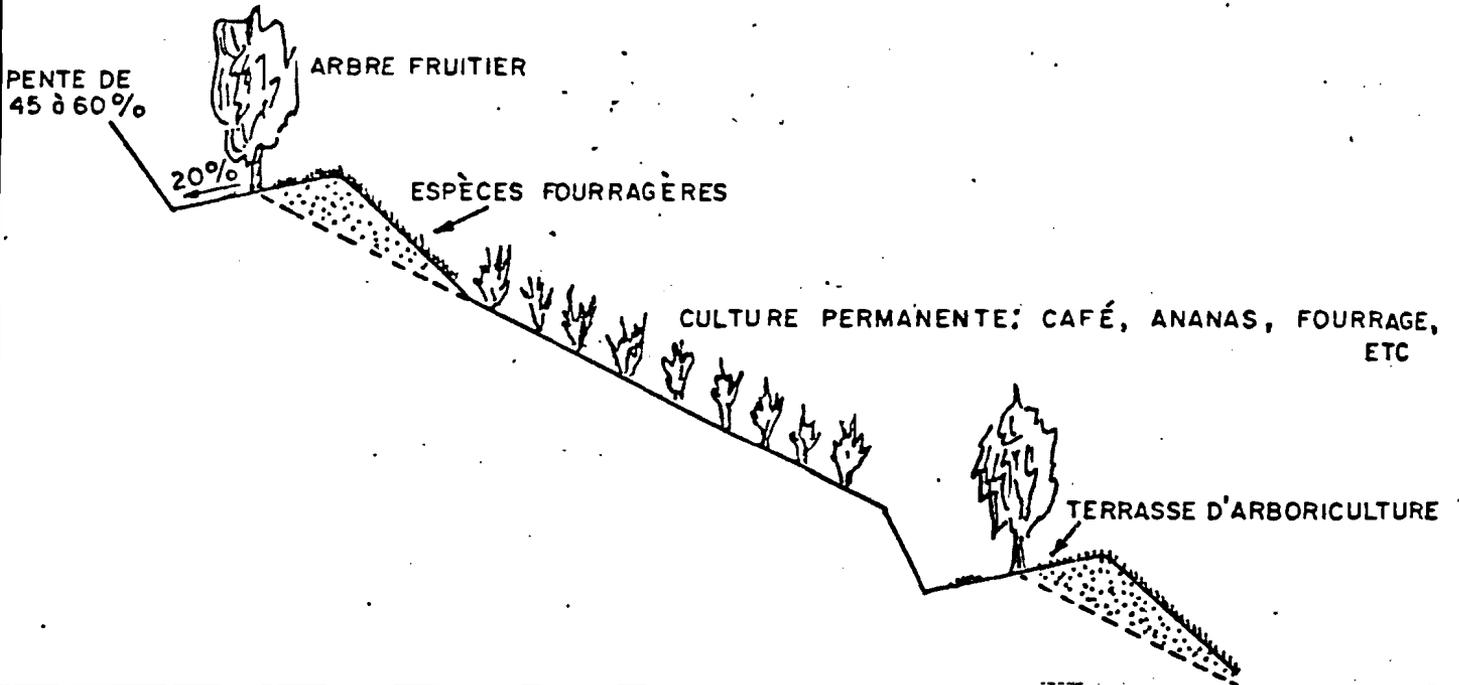
PENTE
12 à 45 %

CULTURE

ESPÈCES FOURRAGÈRES

5 %

5 - TERRASSE D'ARBORICULTURE



PENTE DE
45 à 60 %

ARBRE FRUITIER

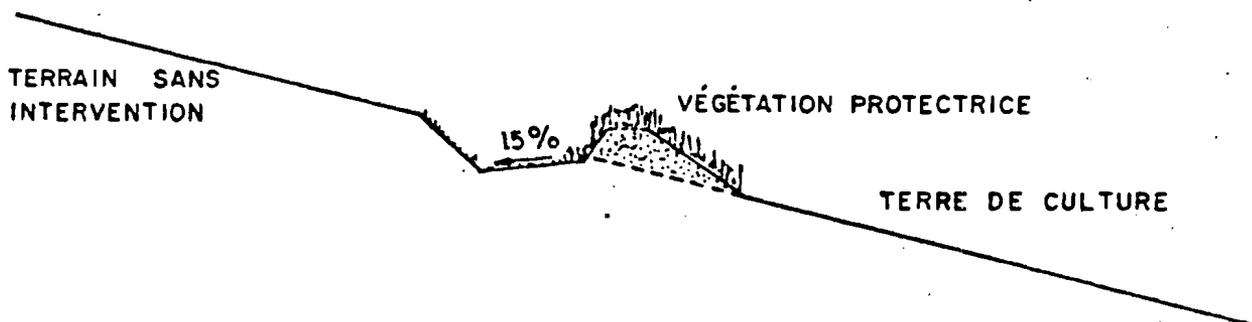
20 %

ESPÈCES FOURRAGÈRES

CULTURE PERMANENTE: CAFÉ, ANANAS, FOURRAGE, ETC

TERRASSE D'ARBORICULTURE

6 - CANAL DE DIVERSION



TERRAIN SANS
INTERVENTION

15 %

VÉGÉTATION PROTECTRICE

TERRE DE CULTURE

OPERATION DOUBLE HARVEST ODH

Persons contacted: Mr. Gerald LARSON, fruit tree specialist
Peter WELLE, forester.

Double Harvest runs a fairly large operation of seedling grains, vegetable and ornamentals production. The seedling and fruit tree production has considerably enlarged recently, the latter because of increased availability of improved varieties for budding purposes.

The maturation of the first Leucena planted and the marketing of charcoal-firewood and lumber produced from those trees has permitted to issue a very valuable "Tree Plantation Budget Estimation" that constitutes a financial flow chart showing for 8 years the inputs and outputs per annum of such a plantation. (see annexed sheets)

Although this paper seems to be based on tree plantations in the agricultural lands of the Cul-de-Sac plain, it can serve as an indicative base for revenue calculation of similar activities in the project area.

The citrus nursery has been briefly visited with Mr. Larson which gave the names of 9 varieties available for sale:

	Persion lime
	Duncan (grape fruit)
	Ruby red (grape fruit)
*	Hamlin (sweet orange)
*	Temple (" ")
*	Washington Navel (sweet orange)
	Valencia (" ")
	Dancey (mandarin)
	Barris (lemon)

* Recommended by Mr. Larson for altitudes similar to the project site.

INTER-AMERICAN DEVELOPMENT BANK

ADDITIONAL FINANCING FOR THE FIRST STAGE OF THE DEVELOPMENT OF THE CUL-
DE-SAC PLAIN (RIVIERE BLANCHE PROJECT) (HA-0068)
PROJECT REPORT - September 1985

E. Policy for Developing the Cul-de-Sac Watershed

2.62 The agricultural development of that watershed has been planned in consonance with the national objectives for the agriculture and livestock sector, which can be summarized as follows:

-a Increase production and improve agricultural productivity through the introduction of technology suitable for the circumstances and realities of the Haitian farmer.

-b Increase the scope and effectiveness of basic support services (extension, training, and courses).

-c Increase the domestic supply of basic foods in order to save foreign exchange through the substitution of imports and the increase in exports.

I. Execution Status of the Project

2. Subproject B. Erosion control

3.08 The direct construction cost of this subproject would be US\$ 930,000 equivalent. The subproject consists essentially of the following works:

-a 2,500 ha of reforestation work, involving the planting of 700,000 trees (280 trees/ha) in trenches following the contour lines on the hill-sides, with 2.5 meters in between each tree and 15 meters between each row.

Various species that have already been sufficiently tested in other areas of the country would be used;

-b Construction of retaining walls along turbulent streams in the main watershed; these walls would be on average 2m wide, 1.5m high and 10m long; and

-c The planting of 1,500 ha of pasture land in the foothills to serve as ground cover and provide a grazing area for small and large livestock.

Subproject B. Erosion control

This subproject is estimated as being 86% completed. The following actions have been taken:

-a Reforestation: 2,000 ha of the planned 2,500 ha have been completed;

-b Retaining walls: Structures have been built to protect 3,500 ha of the 4,000 ha planned for downstream of the water intake under the project; and

-c Establishment of pastures: Totally completed.

IV THE PROJECT AND SUPPLEMENTARY FINANCING

A. Objectives and Goals

2. Subproject B. Erosion control and environmental protection

4.08 This subproject, whose goals remain unchanged under the present reformulation, includes works and activities designed to stabilize and control erosion in the mountain areas upriver (see erosion control area on Ma 2) from the project's irrigation zone so as to preserve and conserve the natural resources. To that end, the following works will be conducted:

- a Planting trees that produce timber having some market value, over an area of 2,500 hectares in the high mountain zone (cost US\$ 350,000) (\$140/ha - 288 trees/ha - \$0.49/tree).

- b Establishing and building anti-erosive mechanical structures, such as embankments on the silt areas, levees , retaining walls, and drainage canals. The purpose of these works is to protect close to 4,000 hectares of mountain area adjacent to the project (cost US\$ 750,000) (\$188/ha)

- c Planting range grass in the low mountainous area where the grade is gentlest, in order to consolidate loose run-off materials and firm up the soil, over an area of some 1,500 hectares (cost US\$ 166,000) (\$111/ha)

CENTRAL COMMITTEE FOR COMMUNITY ACTIVITIES IN DESSALINES (C.C.A.C.D.)

SOIL CONSERVATION AND REAFFORESTATION (October 1985)

Realizations between October 1981 and September 1982:

- 31 km of stone walls and contour canals
- 100,000 lemon trees planted on and between contour structures.

Rate of survival (September 1985) : 61.5% - flowering stageObjectives and General costs for 1985-1988: 1 million lemon trees to be planted or 2,500 hectares of hilly lands.FOOD CROPS PROMOTION PROJECT - MARNDR/IFAD (PICV)

WATERSHED MANAGEMENT FOR 8,000 HAS IN ZONE I (PORT-DE-PAIX) AND 1,000 HA IN ZONE II (BELLADERE)

Description of situation: rainfalls, soils, climate, vegetation, cropping systems, land tenure in the two zones.Description of soil conservation methods for various situations with design criteria diagrams and cost data for Zone I:

Stone bands and contour canals:	1,019 km
Plantation of trees	321,000
Plantation of grasses	8 million units

Stone dams in ravines (head to toe method) 4,000

(See drawings)

SEUILS de THERRE

4
P.L.V. Part. de Pont

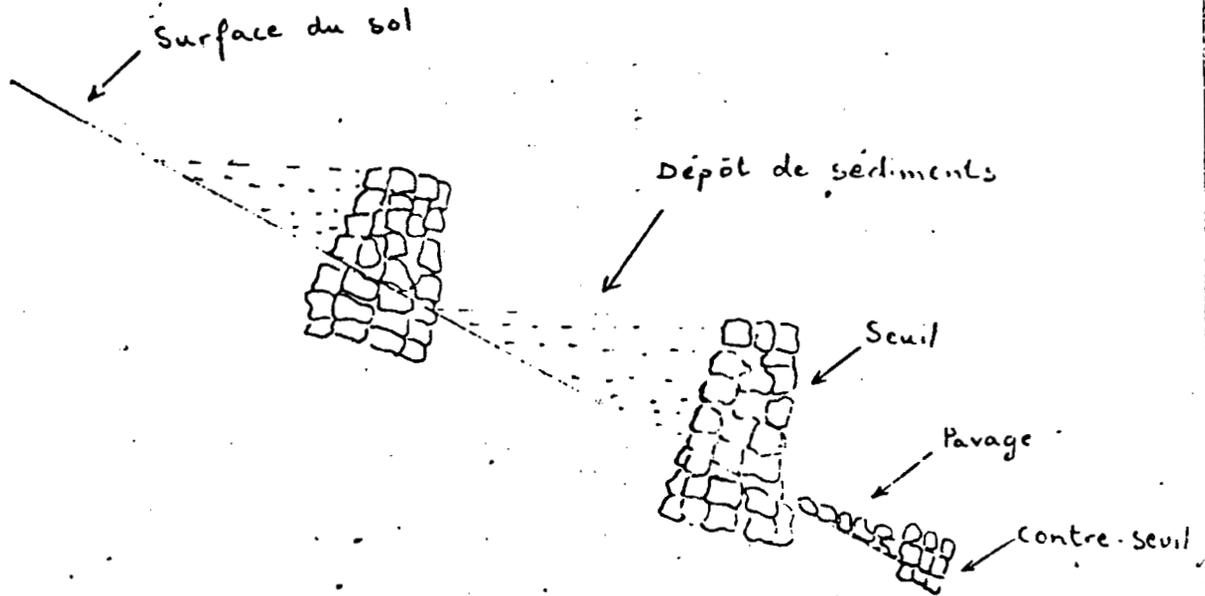


Figure 1. Seuils vus de profil.
METHODE "head to toe"

Design criteria

Forme convexe

Ailes surelevées et encastrées à 0,50m dans les berges

Fondation dépend de la hauteur du seuil $B = 0,45 h$

Le pavage évite l'affouillement de la base

$B =$ base

$h =$ hauteur

SEUIL de PIERRES

5
PIERRE Port de l'avis

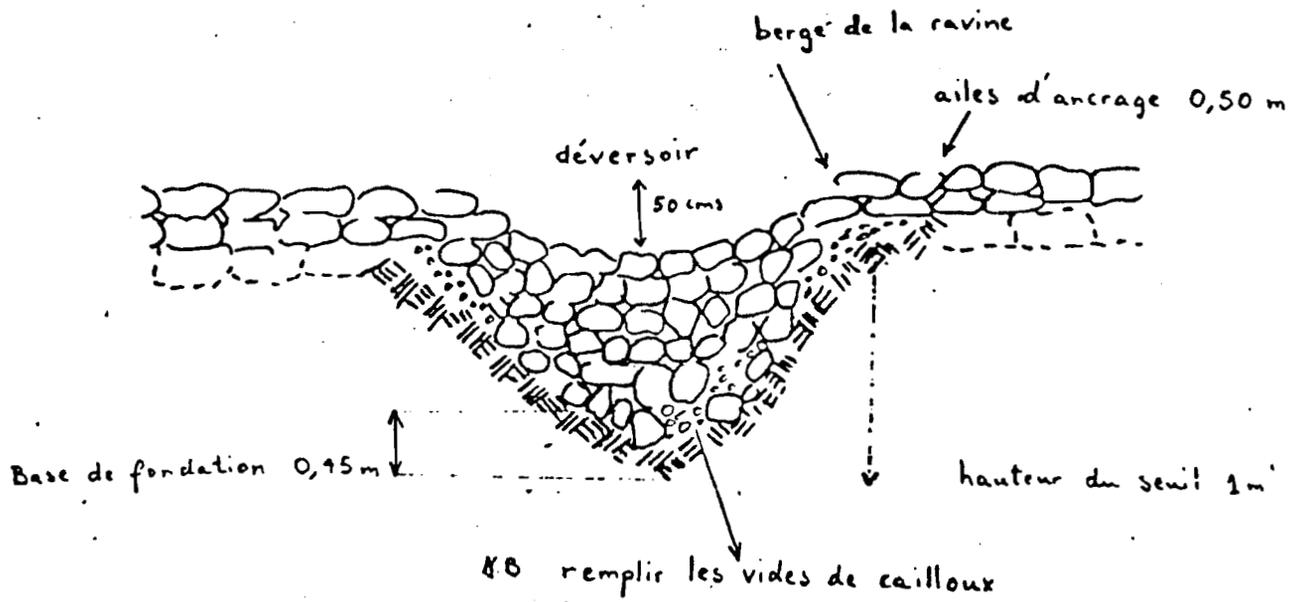
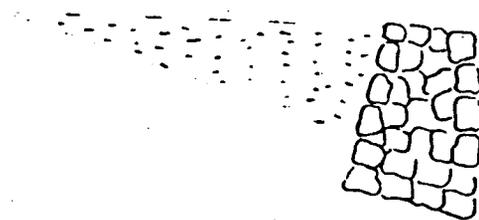


Figure 2. Seuil vu de face

Cordons de Pierres

6
YICV Part d. P. 113



Design criteria

Fig. 3

- Excavation 0,30 m
- Hauteur utile 0,60 m
- Largeur à la base 0,30 m
- Largeur au collet 0,20 m

Canaux de diversion

7
à retourner à fleur
est de faire

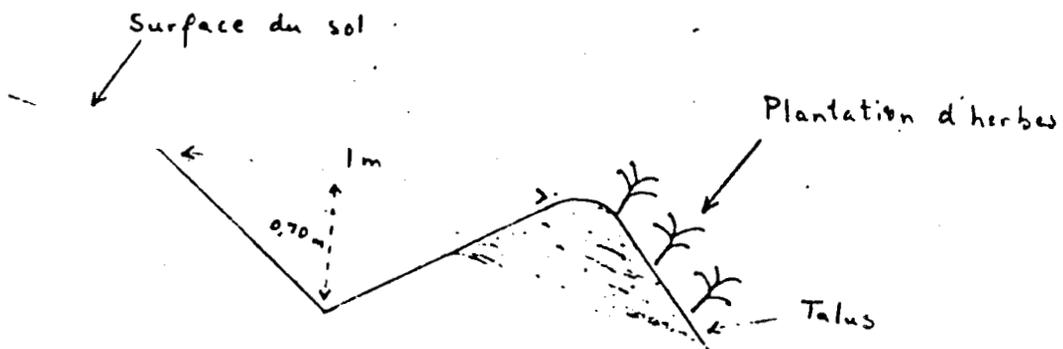


Fig 4 Coupe de canal de diversion

Design criteria

Profondeur canal 0,70 m

largeur canal 1 m

Pente longitudinale 1%

N. B - Le talus aval fait de remblai de terre
Sera stabilisé par des plantation d'herbes
comme le napier et l'herbe de guinée.

ORGANISM FOR THE DEVELOPMENT OF ARTIBONITE RIVER HYDROGRAPHIC BASSIN (ODBFA)

MANAGEMENT PROJECT FOR THE ARTIBONITE RIVER WATERSHED (September 1985)

Specific Objective: Soil restoration of 12700 hectares of watershed close to the PELIGRE reservoir and creation of revenue generating activities in the area.

Strategy: Systematic integration of the local population to the development process through profit-earning conservationist agriculture.

Data: Execution costs for:

- treatment of 6 km of ravines with 38,000 cubic meters of stone dams.
- treatment of subwatershed with 118,000 cu. meters of stone walls and 68,000 cu. meters of contour canals.
- planting of 180,000 Fruit trees.

Organization and Administration: Execution of activities by community groups -- training of the labor force by ODBFA -- contractual agreements for each activity based on unit cost/volume -- continuous supervision at the technical level.

- Data collection and treatment in view of periodic evaluation

ADS - II, (Agricultural Development Support - II)
(University of Arkansas, Winrock)

It has not been possible to obtain from ADS II personnel any farming-system advice directly tailored for the Courjolles project site. The farmer-managed trial "philosophy of the ADS II group rightly calls for a 6-8 week primary socio-economic survey of the milieu, followed by farmer-managed trials under the supervision of ADS II personnel.

The personnel of that agency stated that they could include the project area in their testing and evaluation program if they receive a formal request and an authorisation from their supervisory authorities. We hope that such an arrangement will be possible and that Courjolles area will be able to benefit from such a survey.

We think that, even within the limitations imposed by the reticency of ADS to pronounce upon an area they had not thoroughly investigated, the research already done by ADS II to test the findings of PDAI-TAMU in areas like Haut Cap Rouge (altitude 700 m to 1,000 m) can be of use to our project because of various similarities, such as ferralitic soils, altitude, rainfall and crop mix.

For instance, the comparison by ADS II at Haut Cap Rouge of two crop associations: Maize-Bean and Maize-Bean-Yam is very useful in its conclusions;

1. One annual crop of Maize-Bean-Yam is much more advantageous than two annual crops of Maize-Bean (\$10,799 vs. \$1,892).
2. Yam is often absent from the association because of the lack of credit for the first planting season.

The above observations are from the ADS II 1984 Annual Report.

Madian-Salagnac Center

Program of Construction of Cisterns for Rural Development

This center benefits from the French Government financing and technical assistance. Extensive testing of peasant farming systems and improvements have been conducted for several years by the personnel of the center. As years passed, it became more and more urgent to launch an action to improve the water supply for the mountain peasantry.

Once that priority was agreed upon, a convention was signed in 1980 between the Ministry of Agriculture and the European Economic Community to start a research and development program. To date, 140 cisterns have been constructed. A system for community organisation (technical training, input procurement, credit, etc.) has been worked out, so that by now 50 cisterns can be built annually.

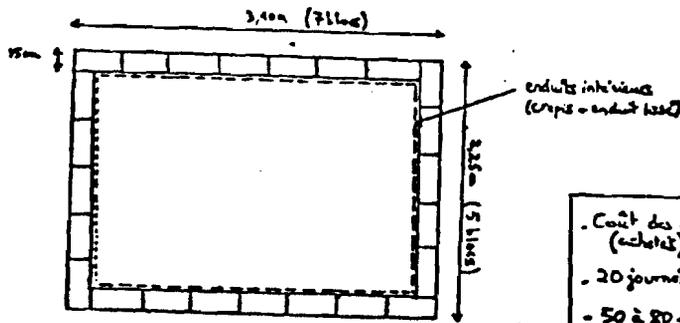
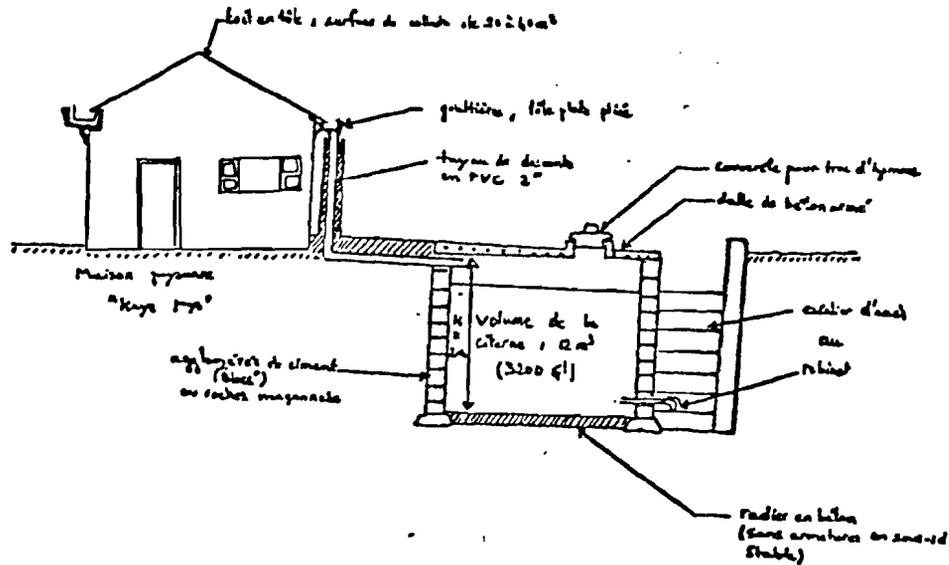
At a cost of \$300 a cistern of 12 m³ (10,000 liters) capacity can be constructed by local masons helped by the unskilled labor of the farmer. Collective reservoirs have also been constructed using paved roads or eroded mountain slopes as influviums (see drawings on the following pages).

(Source: Mathieu, Ph. and Wolf, F. in Research and Rural Development, Vol. 1, no. 2, June 1985).

MADIAN - SALAGNAC CENTER

Construction de Citerne

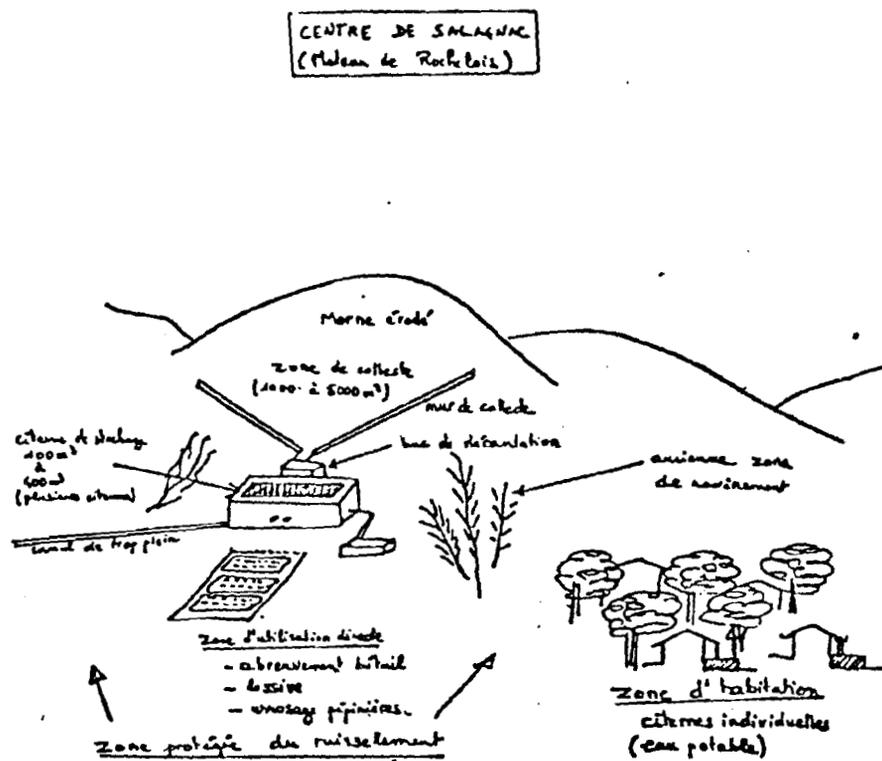
Modèle de citerne paysanne semi-enterrée, maçonnée. Centre de Salagnac



Vue en coupe de la citerne

- Coût des matériaux = \$ 300 (achetés)
- 20 journées maçon
- 50 à 80 jours travail paysan
- Volume = 12 m³ (3200 gal)

Fig. 1. Modèle de citerne au Centre de Salagnac



Mise en valeur de zones en voie d'érosion
et intensification de la production agricole

Impluvium de collecte
→
Bassin de stockage
des
eaux de ruissellement.

Coût : \$ 2200 pour 300 m³ de stockage
(y compris démolition de la muraille d'enceinte collective)

Figure 2. Citerne collective au Centre de Salagnac

WINROCK INTERNATIONAL

Among the principal concerns of the projects of Winrock International (WI) are:

1. Improvement of the race of goats in Haiti, to increase the yield of meat and milk;
2. Identification of species of forage grasses appropriate for diverse conditions met in Haiti, (i.e. various altitudes, different rainfall conditions, etc.), and increase in the availability of planting material for these grasses.

Many recommendations resulting from WI's work to-date (November 1985) can be found in the following documents:

- WI report of activities for 1984;
- 1985 report of Gerald Prober of CATIE, with recommendations on grasses for areas with high rainfall or irrigation;
- 1985 report of Martin Gonzalez, with recommendation of grasses for areas at different altitudes and with different rainfall (this report is due in late November/early December, 1985).

FORAGE GRASSES

The Gonzalez report will be of special interest for the Courjolles river watershed, because of the great diversity of rainfall at different altitudes of the watershed. According to informal information from WI personnel, Mr. Gonzalez recommends Buffel grass for areas with as little as 200mm of rain per year. This could increase the value of the lower zone of the watershed as a pasture area.

At present, for many grass species, planting materials (seeds or vegetative materials) are not available in Haiti. WI will start, within few months, a propagation site and will serve as source of them. Our discussions indicated that, if a propagation site for vegetative planting materials is established in the watershed, WI will be willing to provide starting materials and technical assistance.

GOATS AND OTHER LIVESTOCK

WI project is concerned exclusively with goats, however individual members of the personnel can give consultations also on swine and sheep.

WI will be ready within six months for distribution of the recommended crosses of goats (Nubian/Haitian and Alpine/Haitian - 25% / 75%)

The distribution involves the exchange of an improved male against an Haitian male which must be brought to WI center by the farmer. The farmer stays at the center for a two-day training course, the cost of his stay being borne by WI.

WI would be willing to accommodate parties of up to 15 persons from our project. These would be farmers of Courjolles watershed who wish to intensify their goat production.

(Note: Although WI offers that service free of charge, it seems to us that a minimal, nominal amount ought to be charged for psychological reasons. The monies could be divided between WI and our project. Our project's share could then be used for some community improvement, e.g. supplies for the school).

WI operates two centers, one near Hinche and another near Gonaives. For our project, the Gonaives location would be much easier to work with.

DE SAINT CHRISTO (Jean Pierre) NURSERY

Vallée Heureuse - LABOULE

Contacted about availability of fruit trees, especially budded citrus, and the possibility of a contract between the Project and his nursery to supply young plants of various sizes, Mr. de SAINT CHRISTO has answered positively:

- He is willing to visit the target watershed with us and to counsel on various problems related to the implantation of his young plants.
- Due to relatively high pressure of demand on his available budded citrus, it is necessary to keep in mind that it takes one year to prepare such plants.
- A few hundreds will be available by February / March 1986.

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AGRICULTURAL SERVICES S.A. (ASSA)

Mr. John CURRELLY, President of this commercial fertilizer firm has manifested much interest in the Project. Besides the fertilizers that can be found, he has promised:

- to go with us to the Project site for a brief visit survey;
- to make at ASSA the chemical analyses of the Project's soil samples;
- to prepare the fertilizer program necessary for each cropping cycle being planned;
- to participate in any seminar or training course organized by the Project.

AGRI-SUPPLY

This commercial firm is a supplier of various agricultural inputs (seeds, veterinary products, etc...) and equipments. His President, Mr. LEGER, has confirmed their intention of participating in the promotion of Irish potato production for export.

BUDGET

	1st. Year \$\$	2nd. Year \$\$	3rd. Year \$\$	TOTAL \$\$
1. Personnel (Haitian)				
Project Manager	20,000	21,000	22,050	63,050
Two Assistants @ 8,000.-	16,000	16,800	17,640	50,440
Attaché for Comm. Relations & Train.	8,000	8,400	8,820	25,220
Two Moniteurs @ 4,000.-	8,000	8,400	8,820	25,220
Driver/Mechanic	4,000	4,200	4,410	12,610
Two General Help @ 1,500.-	<u>3,000</u>	<u>3,150</u>	<u>3,310</u>	<u>9,460</u>
Subtotal Personnel	(59,000)	(61,950)	(65,050)	(186,000)
2. Direct Project Support Pfp/I & Pfp/H	30,000	31,500	33,075	94,575
3. Consultants & Contractual Services	24,600	25,830	27,120	77,550
4. Travel				
Domestic Travel in Haiti	2,400	2,520	2,645	7,565
Pfp/I Project visits (4/yr.)	<u>4,200</u>	<u>4,410</u>	<u>4,630</u>	<u>13,240</u>
Subtotal Travel	(6,600)	(6,930)	(7,275)	(20,805)
5. External Evaluations	6,000	---	6,615	12,615
6. Communications, Shipping, Misc. Office Supplies	3,000	3,150	3,310	9,460
7. Soil Conservation Labor	40,000	52,500	66,150	158,650
8. Supplies for Soil Conservation	4,000	5,250	6,615	15,865
9. Tree Plant. Stock & Delivery	15,000	26,250	38,590	79,840
10. Supplies for Agr. Work	2,000	2,100	2,205	6,305
11. Construction, Equipment, Vehicles	81,000	---	---	81,000
12. Vehicles, operation and Maintenance	<u>16,000</u>	<u>16,800</u>	<u>17,640</u>	<u>50,440</u>
SUBTOTAL LINES (1) TO (12)	287,200	232,260	273,645	793,105
13. Overhead, 27% of above subtotal	77,545	62,710	73,885	214,140
14. Loan Fund	<u>7,500</u>	<u>10,000</u>	<u>12,500</u>	<u>30,000</u>
TOTAL LINES (1) TO (14)	<u>372,245</u>	<u>304,970</u>	<u>360,030</u>	<u>1,037,245</u>
Less: Value of the loan fund at the end of the third year				<u>25,000</u>
				<u>1,012,245</u>

FUNDS MOBILIZED BY PFP:

15. Various contributions by PFP/I and PFP/H (see notes to the Budget)	59,000
16. Expected financing by BCA of the loan fund	30,000
17. Expected financing by IDB of the loan fund	<u>250,000</u>
TOTAL LINES (15), (16) and (17)	339,000

NOTES TO THE BUDGET

GENERAL NOTE: We have assumed a five per cent increase in the level of costs from year to year. This is to account for customary salary increases and for inflation of operating costs.

NOTES TO PARTICULAR LINE ITEMS:

1. Personnel. The "attaché for community relations and training" will be M. Edner Monosiet.

2. Direct support of PFP Haiti will include some office supplies, record keeping, help in input procurement, financial management and help in the administration of the credit system. \$12,000

Direct support from Home office and Miami office will comprise 1/4 of the time of a senior person per year (\$12,500 incl. benefits) and 1/3 of the time of an executive assistant per year (\$5,500 incl. benefits), i.e. a total of \$18,000

3. Consultants and contractual services. This item was estimated in the following manner

Expatriate consultants: 24 days @ \$300	\$ 7,200
Expatriate consultants travel, 4 trips @ \$600	2,400
Local consultants : 75 days @ \$200	<u>15,000</u>
	24,600

4. Travel. Domestic travel includes transport for Haitian consultants, when appropriate.

PfP project visits: based on recent costs of tickets and accommodation.

5. External evaluations. Cost based on comparable visits in the Caribbean area.

7. Soil conservation labor. See details in section 4. "Outputs of the Project."
8. Supplies for soil conservation. Materials mainly for water retention structures: cement, iron, rocks, etc.
9. Tree planting: Stock and delivery. See details in section 4. "Outputs of the Project."
10. Supplies for agr. work. Only current supplies for equipment, see next line item.
11. Construction, Equipment, vehicles.

Construction of Lodging, storage, office	\$ 25,000
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Equipment for soil conservation mainly surveying tools, tents	\$ 3,000
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Equipment for agr. work, on-farm trials, specialty crops	<u>9,000</u> 12,000
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Repair work shop tools	1,000
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Office furniture	2,000
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Radio	4,000
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Training aids, audiovisual	<u>1,000</u> 7,000
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Vehicles:

1 half-truck	14,000
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1 four-wheel drive veh.	14,000
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4 motorcycles	8,000	<u>36,000</u>
		\$81,000

14. Loan Fund.

It is expected that the cost of setting up the credit system, and bad debts will absorb about \$5,000.

15. Various contributions by PFP/I and PFP/H

Work in the USA and Mexico identification specialty crops and search for commercial and industrial users.

Inputs above those charged to the project. \$8,000

per year

\$ 24,000

Working capital for the commercialisation of specialty crops (probably in association with VICOPRO Co. of New Jersey)

30,000

Direct investment in a small on-project nursery

5,000

\$ 59,000