5210095-2

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PD-AAB-014-B1

129p

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
Washington, D. C. 20523

PROJECT PAPER

HAITI

APPROPRIATE TECHNOLOGY

Project Number: 521-0095

LA/DR:78-

UNCLASSIFIED

PROJECT PAPER

APPROPRIATE TECHNOLOGY

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PART 1. SUMMARY AND RECOMMENDATIONS

A. FACESHEET

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

TO BE COMPLETED BY ORIGINATING OFFICE

1. TRANSACTION CODE ("X" appropriate box): [ ] Original [ ] Change [X] Add [ ] Delete

PP

DOCUMENT CODE: 3

2. COUNTRY/ENTITY: HAITI

3. DOCUMENT REVISION NUMBER:

4. PROJECT NUMBER: 521-0095

5. BUREAU: a. Symbol: LA; b. Code: 05

6. ESTIMATED FY OF PROJECT COMPLETION: FY 81

7. PROJECT TITLE - SHORT (stay within brackets): [APPROPRIATE TECHNOLOGY]

8. ESTIMATED FY OF AUTHORIZATION/OBLIGATION: a. INITIAL mo. yr. 78; b. FINAL FY 81

9. ESTIMATED TOTAL COST ($000 or equivalent, $1 =)

a. FUNDING SOURCE	FIRST YEAR FY ___ b. FX	c. L/C	d. Total	ALL YEARS e. FX	f. L/C	g. Total
AID APPROPRIATED TOTAL	533		533	1332		1332
(Grant)	(533)	( )	(533)	(1332)	( )	(1332)
(Loan)	( )	( )	( )	( )	( )	( )
Other U.S. 1						
Other U.S. 2						
HOST GOVERNMENT		71	71		346	346
OTHER DONOR(S)						
TOTALS	533	71	604	1332	346	1678

10. ESTIMATED COSTS/AID APPROPRIATED FUNDS ($000)

a. Appropriation (Project Title)	b. Primary Purpose Code	c. Primary Tech. Code	FY 78 d. Grant	e. Loan	FY 79 f. Grant	g. Loan	FY 80 h. Grant	i. Loan	ALL YEARS j. Grant	k. Loan
SI	B752	873	533		580		150		1332	
		873	533		580		150		1332	
		TOTALS								
11. ESTIMATED EXPENDITURES										

12. PROJECT PURPOSE(S) (stay within brackets) [ ] Check if different from PID/PRP

[- To test, adapt for site-specific conditions and introduce as prototypes simple technological devices and methods appropriate for use in rural Haiti; and
- To develop within the Haitian Government an organization capable of continuing adaptive research and development of appropriate technologies.]

13. WERE CHANGES MADE IN BLOCKS 12, 13, 14, or 15 OF THE PID FACESHEET? IF YES, ATTACH CHANGED PID FACESHEET.

[ ] Yes [X] No

14. ORIGINATING OFFICE CLEARANCE

Signature: [signature]

Title: Lawrence D. Harrison
Director
USAID/Haiti

Date Signed: mo. 11 day 18 yr. 77

15. Date Received in AID/W, or Per AID/W Documents, Date of Distribution: mo. day yr.

AID 1330-4 (7-76)

B. SUMMARY DESCRIPTION

This paper proposes an AID grant to the Government of Haiti (GOH), acting through the National Planning Council (CONADEP) and its Office of Science & Technology (OST), for the purpose of carrying out a project to establish and implement an appropriate technology program for Haiti. Under this project, a certain number of technological prototypes will be selected for on-site testing and adaptation leading to broader dissemination among the low-income rural majority. An Appropriate Technology Center (ATC) will also be created within the GOH to carry on a continuing appropriate technology program.

The cost of this three-year grant project will be $1,677,800 to which AID will contribute $1,332,000 (79.4%). AID will provide approximately $1,083,000 for technical assistance; $130,000 for commodities; $5,000 for off-shore training; and $24,000 for evaluations during the life of project. An inflation allowance of up to $90,000 (6.8% of the total AID contribution) has been included.

The GOH will contribute approximately $345,800 (20.6%) of total project cost, which will include personnel and office support ($70,000); commodities, POL, and equipment ($112,000); ATC renovation ($60,000); and training costs ($5,000) for local staff. Contingency and inflation on the GOH side total $98,800.

The official GOH Letter of Application for this project is attached (Annex A).

C. CONDITIONS AND COVENANTS

Conditions Precedent to disbursement will be contained in the Project Agreement. The following CPs are those deemed necessary to insure proper control of AID funds and progress toward project objectives:

Conditions Precedent to First Disbursement

(a) Opinion of Counsel that the Agreement has been duly authorized and/or ratified by and executed on behalf of the GOH (Grantee), and constitutes a valid and legally binding obligation of the Grantee in accordance with all its terms;

(b) A statement of the name of the person holding office or acting in the office of the Grantee and any additional representatives together with signatures of authorized representatives;

(c) Evidence that all budgetary commitments of the Grantee to support the Office of Science and Technology in CONADEP have been met in accordance with the Project Grant Agreement (Annex 1);

(d) Evidence that the Office of Science and Technology (OST) of CONADEP has been established as a separate Division reporting directly to the Executive Secretary of CONADEP; and that the OST is authorized to enter into agreements with other Ministries and entities (public or private) for planning, testing or dissemination of appropriate technologies or has other administrative arrangements which have been approved by USAID/Haiti.

Conditions Precedent to Disbursement for Vehicles and Equipment

Prior to disbursement under the grant to finance vehicles and equipment, the Grantee will obtain AID approval of plans, specifications, procurement schedules and other documentation relating to selection of suppliers and solicitation of bids.

Conditions Precedent to Disbursement for Long-Term Technical Assistance

Prior to disbursement under the grant to finance long-term technical assistance, the Grantee will furnish to AID a copy of an executed contract with a firm acceptable to AID for the technical services in question.

Conditions Precedent to Disbursement for Renovating or Equipping the Appropriate Technology Center

Prior to disbursement under the Grant to finance renovation of facilities for the Appropriate Technology Center, the Grantee will obtain AID approval both of the local firm(s) selected to carry out the design and actual construction, and of final plans and cost estimates. Grantee will also provide evidence that the ATC has been officially established with the necessary authority to carry out technical execution of this project; and the central OST has been fully staffed in accordance with the terms of the Project Agreement (Annex 1).

Conditions Precedent to Disbursement for Prototype Development

(a) Prior to disbursement for development of appropriate technology prototypes, the Grantee will furnish to AID evidence that the Appropriate Technology Center has been fully staffed in accordance with the terms of the Project Agreement (Annex 1).

(b) Prior to disbursement for each particular prototype sub-project, the Grantee will furnish to AID:

(1) An executed contract for short-term technical services with local and/or U. S. firms, organizations or individuals acceptable to AID;

(2) Plans, specifications, cost estimates and time schedules for carrying out the sub-project;

(3) A plan for evaluating the results and potential benefits of each prototype to be developed, and for seeking dissemination of the finished prototype to the rural areas.

Terminal Dates

CPs to Initial Disbursement and CPs for procurement of equipment, and vehicles are expected to be met within 90 days from signature of the Project Agreement; CPs for disbursement for long-term technical assistance should be met within 120 days; CPs to disbursement for renovation of the Appropriate Technology Center should be met within 120 days and CPs to overall prototype development, within 240 days.

Additional terminal dates for development of each individual prototype will be established as appropriate in the annual work plan to be submitted in accordance with the terms of the Grant Agreement.

D. ISSUES

1. Level of AID Contribution

This project was originally intended for FY 1978 funding at a level of about $435,000. When the 1979 ABS was reviewed in June and July 1977, a slightly different project proposed for FY 1979, "Simple Technology", was considered so similar in aim and scope as to warrant combining the two into one FY 1978 project. This project will thus require a Congressional Notification.

USAID has observed that the merger of the two projects significantly increased the number of short-term consultants needed to carry out prototype development. Although every effort will be made to spread arrivals of short-term consultants for supervision purposes, the GOH, USAID, and long-term contractors may face a serious management problem in trying to monitor, coordinate, and support many complex and diverse research activities going on virtually simultaneously in several parts of the country. Should such a problem become apparent, we would want to contract one additional long-term consultant to be assigned to the ATC for approximately 18 months during the period of heaviest field activity (between early FY 1979 and mid-FY 1980). This would bring the long-term team to 3 total (with the other two being in Haiti 36 and 30 months respectively). An additional consultant would cost approximately

$150,000 ($8,000 per month plus travel, local support cost, and contingencies).

However, the project does not have sufficient funds to absorb this requirement at the $1,182,000 combined total of the Intermediate and Simple Technology projects. None of the current programmed long-term assistance, vehicles, commodities, training, evaluation, or inflation factor are expendable. The program for short-term consultants represents the bare minimum of person-months required to carry out all the tasks required to develop individual prototypes.

We consequently are recommending a total AID contribution of $1,332,000, with the understanding that approximately $150,000 would be deobligated if it became apparent that the third long-term consultant were not necessary.

2. What happens after this project is completed

A final evaluation will serve as the basis for a decision as to whether the ATC should be continued. If the project is successful, the presumption is that there will be an AID-financed follow-on project. If the project has not been successful, the presumption is that the ATC will be disbanded.

3. Government Contribution Below 25 Percent

The Government of Haiti contribution to this project accounts for 20.6% of total costs. Because the project is experimental in nature, and given the limited resources available to the Haitian Government, we recommend that the 25 percent requirement be waived.

I. FINDINGS AND RECOMMENDATIONS

The project has been found to be technically, financially, socially, and environmentally sound. Therefore, it is recommended that the Assistant Administrator for Latin America authorize the Director, USAID/Haiti, to sign a Grant Agreement with the Government of Haiti for a three-year $1,332,000 project entitled Appropriate Technology to commence in Fiscal Year 1978.

PROJECT COMMITTEE

USAID/Haiti

Tibor Nagy	C/ENG
Ann McDonald	C/CAP
Frank Bettucci	CAP
Dean Bernius	A/Program Office
Lea Knott	Program Office
Jean Lafontant	Program Office - Sociologist
Albert D. Hulliung	CONT
William Garvey	ADO
Linda Morse	PHO

AID/W

Tom Geiger	GC/LA (TDY)

CONSULTANTS

* Raymond Manoff	Team Leader, Experience, Inc.
* Eric Ericsson	Industrial Advisor, Experience, Inc.
* Cameron Pippitt	Design Officer, Experience, Inc.

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* See Professional Qualifications, Annex B

PART II - PROJECT DESCRIPTION

A. LOGICAL FRAMEWORK

The goal of this project is to improve the quality of life for the people of rural Haiti through the introduction of low-cost technological devices and methods which will contribute to solving their food, fuel, power, and water problems. It falls within the category of development activities specified by Sec. 107 of the International Development and Food Assistance Act of 1975 in that it will:

-- promote the development and dissemination of technologies appropriate to a developing country in agriculture, rural development, and energy;

-- identify and adapt technologies which have already been developed and tested and are in use elsewhere;

-- field test these technologies;

-- support the expansion and coordination of the developing country's efforts in this field.

Implicit in the goal is the assumption that any increase in the amount of food or water, or the introduction of any mechanism which will alleviate the conditions under which Haiti's rural people live and work, will better their lives. The degree to which this project contributes toward achieving this goal can be measured by the degree of adoption by low-income rural residents of the new technological devices and methods introduced under the project. The degree to which the Haitian peasant accepts and uses these new technologies will indicate his receptivity to new ideas, methods, and devices.

This project has two purposes:

-- to test, adapt for site-specific conditions and introduce as prototypes simple technological devices and methods appropriate for use in rural Haiti; and

-- to develop within the Haitian Government an organization capable of continuing adaptive research and development of appropriate technologies.

Some of the devices or methods to be tested and site-adapted are in use in rural Haiti at present. There is a developing but small handicrafts industry. Some potable water and irrigation systems exist. Salt water fishing is practiced on a small scale. However, most of the techno-

logies in question will be new to rural Haiti. Because broad-scale dissemination will usually take several years, their impact will be measurable on only a very limited basis during this project. The testing and site-adaptation, however, should indicate the potential impact of a given technology on the quality of rural life.

For new technological methods and devices to be disseminated on a scale sufficiently broad to contribute toward achieving the goal of this project, a Haitian Government organization must be in a position to push. The nucleus of such an organization exists in the CONADEP Office of Science and Technology (OST). Its development as an organization able to plan, supervise, and coordinate the appropriate technology program is the second of the two purposes of this project. OST is presently a part of the CONADEP Division of External Affairs. That OST become a separate Division within CONADEP is essential to assure that it will have sufficient authority to supervise and coordinate the appropriate technology program at the interministerial level and among other donors and PVOs.

By the end of the project, all technologies will have been field tested at selected rural sites. The Office of Science and Technology will have determined which prototype should be promoted and will have started the dissemination process. It will also have identified additional technologies for continuing adaptive research.

Inputs and Outputs are defined in greater detail elsewhere in this paper. See also the Project Logical Framework at Annex A.

B. DETAILED DESCRIPTION

1. Project Structure and Location

CONADEP's Office of Science & Technology will serve as the institutional locus for creation and implementation of what is hoped will become an on-going appropriate technology program involving GOH, private voluntary, and other donor entities working in Haiti's rural areas. A grant-financed, long-term Chief Technical Advisor will assist OST in devising implementation plans, and in monitoring, evaluating, and disseminating results obtained. Actual field work will be done at an Appropriate Technology Center (ATC) -- a workshop for designing, constructing, and testing prototypes -- which will be set up in a location removed from Port-au-Prince to allow prototype development and testing to occur in a rural setting. On-site adaptation of prototypes will also be carried out in other rural areas.

Part of the GOH contribution to the project will be used to renovate the building(s) selected to house the ATC. AID grant funds will

equip the ATC, and provide vehicles and equipment necessary to conduct site adaptation work in more remote areas. The site for the ATC has been tentatively identified as the rural town of St. Marc, about 60 miles north of Port-au-Prince.

St. Marc offers ready access to the Northwest as well as to other areas of rural Haiti. It is sufficiently close to Port-au-Prince (by good highway) to permit regular communications with the central office (OST), and offers certain essential basic services, such as electricity, not available in other towns. Under an AID project proposed for FY 1979, St. Marc may be the location for a new para-professional engineering school, as well. Students would be trained in the areas of transportation, water resources and rural (particularly agricultural) development projects. The ATC and the school would complement each other, providing opportunities for interchange of ideas, knowledge, services, facilities and personnel.

USAID considers that location of the ATC outside Port-au-Prince is desirable both to insure that prototypes are tested in rural conditions and to avoid the diversion of personnel and resources to other peripheral tasks. However, St. Marc does not offer the range of services available in Port-au-Prince. In particular, the local schools are inadequate, and this may constitute a problem in attracting qualified Haitian and foreign advisor personnel to live and work outside Port-au-Prince. Should this problem materialize, we would want to consider moving the ATC closer to Port-au-Prince.

OST/ATC will serve as the central point for identifying new technologies with potential for adaptation to the rural Haitian environment; selecting prototypes to be tested; determining the testing schedule and appropriate testing means (foreign technical consultant, private voluntary organization, other); providing logistics and technical support to personnel engaged in field work; evaluating the results of prototype testing; and promoting prototype dissemination to the rural population.

OST will use Memoranda of Understanding to arrange participation by Ministries and other entities in the testing and/or dissemination of technological prototypes. Each Memorandum of Understanding will contain a detailed description of responsibilities, respective contributions of manpower and resources, and the implementation schedule to be followed. Where known, expected target populations for dissemination will be specified. No AID funds will be disbursed for development of any prototype without execution of a Memorandum of Understanding.

The Memorandum of Understanding will stipulate, among other things the number and qualifications of counterpart personnel to be assigned by the participating entity to work with ATC personnel in

testing and adaptation of prototypes. Based on preliminary identification of the prototypes to be tested under this project (Part II-B-2 and 3), and on discussions between USAID, OST, and potential participating entities, the following is a tentative list of counterpart person-months to be made available to the OST:

Participating Agency	Prototype	Required Qualification	Person Months
DARNDR*	Arid Land	Ag. Engineer	4
	Small Craft	Fisheries Tech.	4
	Fish Ponds	Fish Farm Spec.	3
	Food/Seed Stor.	Food Storage Spec.	4
INAREM*	Organic Briquettes	Engineer	2
	Solar Fuel Source	Mechanical Tech.	3
	Solar Desalinization	Engineer/Tech.	3
	Pyrolysis	Mechanical Eng.	2
	Methane Generator	Engineer/Tech.	2
IDAI*	Hand Tools	Metalwork Spec.	3
IDAI/HACHO*	Artisan Industry	Artisanry Spec.	3
	Pumps/Windmills	Engineer/Hydrologist	4

The participating entities will pay the salaries of their counterparts assigned to temporary duty at the ATC. Their housing and other support costs during the period they are working at the ATC will be paid under this project.

Counterparts loaned by the participating entities will take back to their respective organizations knowledge gained in methodologies for identification and selection of prototypes as well as knowledge or organization and implementation procedures for prototype testing and site adaptation. This is expected to spread interest and participation in the OST's appropriate technology program, as well as provide trained liaison personnel for assistance in disseminating the prototypes developed.

The ATC will have a grant-financed, long-term Field Technical Advisor and two Haitian counterparts to be hired by OST to oversee and coordinate the work of an estimated 12 short-term technical consultants who

* DARNDR -- Department of Agriculture, Natural Resources and Rural Development
* INAREM -- National Institute of Mineral Resources
* IDAI -- National Institute for Development of Agriculture and Industry
* HACHO -- Haitian American Community Help Organization

will conduct on-site testing and adaptation of the selected prototypes. The ATC will have office facilities and minimal overnight accomodations, in addition to an equipped workshop, for visiting OST staff, short-term technical advisors, and their short-term counterparts from other entities. The responsibilities of grant-financed, long-term advisors are spelled out more fully in Part III-D. The tentative implementation schedule is Part IV-C.

2. Criteria for Prototype Selection

During intensive review for this project, Experience, Inc., a highly qualified consulting firm (Annex B) retained by USAID to evaluate the feasibility of an appropriate technology project, identified a number of priority problem areas, or constraints, to rural development, for which there exist promising technologies:

Poor Nutrition

Drought, pests, poor seed, soil depletion and deterioration, lack of food storage, and limited dairy and egg production, all combine to produce chronic food shortage and/or inadequate nutrition for most rural Haitians. Poor nutrition (most evident in young children) is at the root of many of rural Haiti's problems of poor health and low productivity.

The caloric intake of rural Haitians is estimated to be less than the national average of 1,850 calories per day, well below maintenance level and very low by world standards. Meals tend to be high in carbohydrates and low in protein. Fruits and vegetables are generally accessible. However, recurring cycles of poor crops combined with lack of storage means that fruits and vegetables, when available, cannot do much to combat the endemic malnutrition. Fish and crustacea are underutilized, even where more or less readily available; and there is little or no exploitation of freshwater fish possibilities. Above all, the rural Haitian's diet is limited by low income. Therefore, any improvements realized must be easily affordable.

Four of the technologies proposed for testing under this project address nutrition: cultivation of freshwater fish in local fish ponds, development of simple equipment and boats for salt-water fishing and fish processing; re-cycling irrigation water in areas of limited water supplies; and low-cost food and seed storage facilities to reduce losses.

Water Access

Rural Haiti is characterized by difficult access to water for consumption, utility or irrigation. Water is often contaminated at the source or in handling. In the arid Northwest, particularly, improvement

of access to water is essential to support life and facilitate further development efforts.

This project will address water access problems by testing catchments, simple stone and sand filtration system, hydraulic rams, short distance pumping and piping (now uncommon or non-existent), as well as water spreading through simple low-cost dams, basins and reservoirs that can be constructed largely through self-help and that can eliminate the need for more expensive and complicated irrigation systems.

Alternative Energy Sources

In Port-au-Prince alone it is estimated that some 650,000 people daily use charcoal -- some 75 tons. Forest resources have been decimated to supply Haiti's rural and urban residents with charcoal. There has been little action to protect the land or replenish the forests. Coupled with poor cultivation practices, this has led to serious soil deterioration and loss through erosion, which is increasing rapidly as the tree and other plant cover continues to be depleted for charcoal. As most Haitians cannot afford presently available alternate fuels (bottled gas or kerosene are many times more expensive than charcoal), there is, as yet, no viable means of reducing the demand for charcoal. In the Northwest area the rural poor are dependent on charcoal as a source of income as well as of fuel, because recurring drought has made it impossible to carry on normal food cropping. The farmer and his family barely survive on the approximately 60 cents per day earned by making and selling charcoal.

Under this project, various low-cost fuel substitutes will be tested including solar power (for cooking and heating water); methane generators; and flammable organic briquettes which can be made from natural materials available locally. All of these prototypes (as well as others mentioned in this paper) will be examined as potential alternate income sources for charcoal producers.

Lack of Off-Farm Income

Unskilled labor is in perpetual surplus in Haiti. Population growth and deterioration of the land have made it impossible for the land to support the numbers of people dependent on it for survival. The absence of power, water, roads and basic services has to-date prevented the development of agricultural and other small industries which could provide off-farm employment and income for the rural population. The few developing areas, such as Port-au-Prince and Cap-Haitien, cannot hope to absorb the available excess labor. (Port-au-Prince already has a sizeable population of unskilled unemployed for which the city can provide neither jobs nor sustenance). The best solution appears to be to attempt to create off-farm employment opportunities which can provide needed services, utilize the produce of the rural areas, and keep surplus labor from migrating to the urban areas.

Several prototypes to be examined under this project address the off-farm income problem: low-cost hand tool production; methods for food processing and storage and the associated devices for corn shelling, rice milling, and grain grinding; and small handicrafts activities for rural cottage industries.

Selection Criteria

The prototypes selected for development under this project both address one or more of the priority constraints identified above and meet the following initial selection criteria:

(a) Economic Feasibility - the prototype has a potential for being financially accessible to the low-income rural poor;

(b) Time Constraints - the prototype can be designed, tested, and conclusions drawn with respect to dissemination within the life of the project;

(c) Benefit Incidence - the prototype has a potential significant, near-term benefit for the rural poor;

(d) Production/Maintenance Feasibility - the prototype has potential for construction and maintenance using readily available materials, parts, and local labor; or it can be imported cheaply;

(e) Socio-Cultural Acceptability - the prototype has no aspects which would be likely to make it socially or culturally unacceptable to the rural poor;

(f) Prior Experience - the prototype has been or is being successfully used elsewhere in the developing world;

(g) Dissemination Potential - if proven workable, the prototype has the potential to be easily disseminated in the rural areas through appropriate organizations (e. g. GOH Ministries, private voluntary agencies) who can provide funds for dissemination and/or incorporate the new technologies into their own rural development program.

Some adjustments in the present list of selection criteria may be made after actual field work provides experience in what prototypes and/or testing methodologies are more likely to be successful. The long-term advisors will assist OST in periodically reviewing the selection criteria for accuracy in predicting the probable success of a given prototype.

It was not possible to weigh the list of selection criteria (no one seemed more important than the others). And there were no perfect prototypes that ranked high against all the criteria. The rankings themselves were somewhat subjective, so that the final decision represents the best judgement of a professional consulting firm (Experience, Inc.), USAID, and GOH entities involved in rural development.

3. Detailed Description of Prototypes

Based on the preceding criteria, the OST has identified the following prototypes for testing and site adaptation under this project. The order in which testing actually begins will be primarily a function of the availability of short-term consultants specialized in developing such prototypes. The OST will present a time-phased work plan for each prototype for carrying out the testing and adaptation (See Conditions and Covenants). However, this plan will be subject to change by mutual AID-GOH agreement as flexibility is needed. Some funds are being held in reserve to permit the substitution of new technological innovations meeting the selection criteria for those prototypes which may prove unfeasible for full development.

OST may suspend further work on any prototype if at any stage of development the prototype proves ineffective, uneconomical, technically unsound, or it does not appear that it will satisfy the objectives for which it was selected.

A request to USAID for deletion or substitution of any prototype on the original work schedule will be accompanied by adequate justification. Wherever possible, a deletion request will be accompanied by a detailed proposal to commence development of another prototype which meets the selection criteria. The decision to terminate and/or substitute prototypes will be taken after the careful consideration and concurrence of the GOH, AID and any other concerned parties.

Each of the prototypes to be developed under this project is described below. A more detailed technical description of each prototype with drawings is contained in Annex B.

1. Nutrition Improvement Technologies

(a) Arid Lands Crop Development Prototype

Under particularly arid conditions, the use of covered crop areas and the capture and re-use of run-off and irrigation water has been a successful (though frequently high-cost) technique for growing vegetables. Utilizing indigenous material to the maximum extent possible, the system will be designed at the ATC and field tested in an arid zone, probably

in the Northwest. A short-term consultant will be contracted for up to 6 months to supervise construction and test maintenance of the prototype. A proposed FY 1979 Rural Community Development project to be financed by AID will provide assistance for specific projects in the Northwest which will be administered by HACHO. That project is a potential vehicle for disseminating this prototype through community organizations.

(b) Salt Water Fishing Prototype

While Haiti does not border the Caribbean edges of the Continental shelf, near off-shore availabilities of snapper, bonita and crustacea are sufficient to add to Haitian protein resources. The Haitian fisherman, however, is restricted to use of small sail craft capable only of close-in fishing (1 - 3 miles). The prototype package will include development of better craft capable of covering greater distances, improved low-cost fishing gear and techniques, and identification of processing and marketing mechanisms best suited to absorb or distribute the increased catch.

The OST, with the help of the senior technical advisor, will identify an appropriate seacoast community for site testing and adaptation. A likely candidate is Port Salut, a fishing village on the South coast, where a PVO (the Oblate Order) has already established a fishing cooperative and where improved methods and equipment have been introduced. A short-term technical advisor will be contracted for up to 6 months to study current fishing practices; prototype low-cost vessels suitable for local construction (including traditional wood hulls, ferro-cement hulls, and power-sail mixes); low-cost equipment or labor training and utilization improvements to make fishing operations more efficient; and possible shore facilities including boat maintenance, refrigeration, and salt preservation and drying to aid storage and marketing. The finished prototype package should include the outline of an experimental marketing scheme. With no international donor or PVO engaged in fishing programs to a major extent, dissemination will likely be through DARNDR's on-going fishing development activities.

(c) Fish Ponds Prototype

The OST will contract for short-term technical assistance (up to 4 months) to install and study three or more test ponds in rural areas. Prototype development will cover study of the best maintenance and impounding techniques; harvesting policies (which may be developed individually, through cooperatives, or community councils); and labor-intensive, low-cost installation and preparation techniques.

The work to be done will provide a large share of the necessary feasibility information needed by USAID to decide on the final design of a proposed FY 1979 Nutrition project involving fish ponds.

(d) Food and Seed Storage and Preservation Prototype

The almost total absence of storage capacity or know-how in the rural areas often means that the rural family must rapidly dispose of most of its produce shortly after harvest, and buy food to survive (usually at high prices) the rest of the time. The absence of storage or preservation capability also leaves rural dwellers unprotected against food shortages which occur in times of drought or other natural disaster. Up to 4 months of short-term consultant services will be contracted by OST to evaluate alternate storage methods, such as use of ceramic clays (abundant in the Northwest) as well as stone, cement and/or other materials appropriate to prevent access by pests. Prototype methods of food processing/preservation (e. g. grinding, salt drying, smoking, pickling, cooking) will also be developed.

The finished prototype package should include both a variety of methodologies appropriate for food storage and preservation in rural Haiti, and ways and means of educating rural Haitians to accept, fabricate and utilize these methodologies.

A number of PVOs, including the Oblates, have been working with food storage and preservation techniques and may be used either to help develop the prototype and/or assist in dissemination. DARNDR is already experimenting with some drying techniques for cereal grains, and is extremely interested in low-cost techniques for their on-going programs. HACHO is also interested in useable prototypes for community development work in the Northwest; and particularly in related low-cost "adjunct" technologies (e. g. shelling and grinding of grains) which may be disseminated as income-producing prototypes.

2. Alternate Energy Technologies

(a) Solar Cooker and Water Heater Prototypes

The OST will contract for up to 5 months of consultant services to produce a prototype solar cooker which uses low-cost materials. A prototype cooker already exists, having been developed by the University of Florida under contract to USAID. But it is too expensive for broad reproduction. The finished prototype should be low cost, and the consultant should recommend methods for gaining wide acceptance of the device in rural areas.

Concurrently, a prototype solar water heater will be developed. Such devices would be intended to meet needs for warm to hot water for domestic utility, particularly infant hygiene. The finished prototype will be constructed at the ATC of low-cost materials which are readily obtainable, and will be as easy and safe to operate as possible. At least three units

will be constructed at the ATC and evaluated in other rural areas for acceptability.

PVOs have for some time been interested in solar-fuel devices for rural use. Significant cost reductions in the prototype should make PVOs a natural dissemination channel. DARNDR would likely be active in dissemination efforts, and INAREM has expressed interest.

(b) Pyrolitic Processes

Up to 5 person-months of short-term consultant services will be contracted by OST to develop several related prototypes under the generic heading of pyrolysis:

(1) Methane Generator

A methane generator utilizes organic slurries composed of animal and vegetable wastes for direct burn applications. Two methane generator prototypes will be built and tested under this project. The consultant will also be expected to evaluate the most efficient combinations of animal/vegetable waste and the availability of these materials in rural Haiti. The consultant will recommend steps to be taken to gain acceptance of the concept in the countryside. Since utilization is most economical on the community scale (e. g. community kitchens), HACHO and other PVOs working with community groups probably will be the most natural channels for dissemination.

(2) Agricultural Pyrolysis

This pyrolysis process involves continuous or batch reduction of high cellulose agricultural wastes into char, oil and combustible gases. If it is demonstrated that suitable waste materials are available in quantity, such a prototype could add significantly to useable fuel volumes. Existing pyrolysis technology is not highly complicated, but is sufficiently complex to require a capital investment level and trained personnel which are not now suitable for rural Haiti.

Therefore, in addition to constructing a device(s) that will operate successfully (probably using ATC facilities), the consultant will be expected to indicate how the prototype can be usefully disseminated in rural Haiti. If successful, the prototype might well become an income-producing activity under AID's proposed FY 1979 Rural Community Development project.

(3) Combustible Organic Briquettes and Lignite

Briquetting of agro-waste material involves compression of high cellulose materials with appropriate binders to yield a flammable briquette of acceptable caloric output and burning qualities. At least

one low-cost briquette is already being produced on a limited scale in Haiti. The consultant will evaluate this and other possible materials combinations; fabricate a low-cost block machine using ATC facilities; and test the prototype for cost and environmental acceptability.

The finished prototype package will include recommendations (based on further investigation of the quantities, quality and feasibility) for using deposits of lignite reported near Camp Perrin, Maissade, and Asyle to produce alternate fuel. The prototype package may include methodology for combining lignite with readily available agricultural wastes in briquettes, if this produces a more cost-efficient energy source. Of particular interest will be the consultants' recommendations with respect to social acceptability, and how to motivate large numbers of rural dwellers to reduce or eliminate charcoal usage in favor of briquettes. As charcoal substitution is considered to be a high priority for Haiti, a wide range of public and private disseminating agents should be interested in promoting wide-spread adoption of an alternate.

3. Water Access Prototypes

(a) Delivery and Storage Mechanism

This prototype is a package consisting of several water delivery devices such as pumps, windmills and water rams. Under this project, at least one windmill and pump will be erected at an enclosed potable water source (well or cistern). The well will be made free from contamination and convenient for local consumption and utilization. One windmill, motor pump and one hand-operated pump will be erected at water sources devoted to irrigation. One hand pump will be installed at a potable water source. One hydraulic-ram installation will be erected to raise water from a stream or reservoir to a higher point for village use, and one small stream water catchment will be constructed appropriate for use with other water delivery devices.

OST will contract for up to 6 months of services of a water access specialist to supervise construction and evaluation of these devices in various suitable rural locations. Several PVOs have been experimenting with such devices for some time (notably the Missionary Church). Both they and HACHO are very interested in low-cost, easy to build and maintain prototypes that could be used by communities to improve chronic water waste and/or shortages.

(b) Solar Desalinization

Although this is considered a water access prototype, development will be carried out by the short-term consultant working on the other solar-powered prototypes mentioned above. The prototype could provide a cheap source of potable and utility water for coastal villages whose

access to useable water is often as limited as it is for inland rural dwellers.

HACHO is now experimenting with a somewhat costly desalinization machine in one small coastal village. So far, it has also been necessary to site such devices carefully to assure sufficient solar exposure, and to allow proper elevation for salt water feed. The completed prototype will utilize low-cost materials for construction, but will likely have to be disseminated by PVOs and other trained community development personnel, because of the technical complexity of installation and maintenance.

4. Artisanry Prototype

Up to 5 months of artisanry consultant services will be contracted by OST to examine all aspects of Haiti's artisan production and develop a prototype for producing and marketing handicrafts so as to increase the return to the producer. Wood crafts will be discouraged due to their adverse environmental impact. The finished prototype package will, it is hoped, contain alternate crafts which can produce a return more attractive than wood products.

HACHO and other PVOs are already active in promotion of rural cottage industries, and marketing of handicrafts. These organizations are expected to contribute heavily to development of the production/marketing prototype, and to be logical vehicles for later dissemination.

5. Hand Tools Production Prototype

The OST will contract for up to 5 months of consultant services to set up at least one prototype hand tool production facility using low-cost forge and blacksmithing techniques. The prototype facility should be able to produce hand tools at a rate and cost which will permit a significant improvement in local agricultural production. The facility will produce only the simplest implements for which there is greatest small farmer demand (hoes, machetes and picks). In developing the prototype, attention will be given to how the activity can be organized for commercial production and how it will be managed for maximum return. At least one PVO is already operating such a facility in the rural areas. Such a prototype could well be used in the proposed FY 1979 Rural Community Development and Rural Small Enterprises projects; and will most certainly be of interest to various PVOs involved in rural development.

1. Budget and Financial Tables

The financial analysis is presented in the following Tables:

1. Table II-A: Summary Financial Plan
2. Table II-B: Technical Services Cost Detail
3. Table II-C: Schedule of Expenditures

TABLE II - A. SUMMARY FINANCIAL PLAN
($ U.S. 000)

		AID 1/	GOH 2/	TOTAL
Technical Assistance				
Long-term (84 PM)		1,083	--0--	1,083
Short-term (52.5 PM)		683	-----	683
		400	-----	400
Local Personnel				
Professionals		--0--	70	70
Clerical		-----	40	40
Support		-----	13	13
Other Agency Counterparts		-----	6	6
		-----	11	11
Commodities				
Vehicles		130	112	242
POL		35	-----	35
Equipment		-----	22	27
		95	90	190
ATC Renovation/Maintenance		--0--	60	60
Training		5	5	10
Evaluation		24	0	24
	Sub-Totals	1,242	247	1,489
Contingency/Inflation		90	99	189
	TOTALS	1,332	346	1,678
Percentage Contributions		79.4%	20.6%	100%

1/ All Foreign Exchange except for local support costs of technical assistance contractors

2/ All Local Currency

TABLE II - B. TECHNICAL SERVICES COST DETAIL
(In person-months and $ U.S. 000)

	TOTAL P - M	TOTAL COST	FY 1978 P - M	FY 1978 Cost	FY 1979 P - M	FY 1979 Cost	FY 1980 P - M	FY 1980 Cost	FY 1981 P - M	FY 1981 Cost
Long-Term Sub-Totals	**85**	**683**	**10**	**80**	**36**	**288**	**30**	**242**	**9**	**73**
(OST Chief Tech. Advisor)	(36)	(293)*	(6)	(48)	(12)	(97)	(12)	(99)	(6)	(49)
(ATC Chief Field Advisor)	(30)	(240)	(4)	(32)	(12)	(96)	(12)	(96)	(2)	(16)
(ATC Agro-Engineer)	(19)	(150)			(12)	(95)	(6)	(47)	(1)	(8)
Short-Term Sub-Totals	**52.5**	**400**	**13**	**114**	**14.5**	**112**	**17**	**136**	**4**	**32**
(Arid Crop Dev. Spec.)	(6)	(48)	(3)	(24)	(3)	(24)				
(Small Craft Fishing Spec.)	(6)	(48)			(3)	(24)	(3)	(24)		
(Fish Pond Spec.)	(4)	(32)					(2)	(16)	(2)	(16)
(Solar Energy Spec.)	(6)	(40)	(3)	(24)	(3)	(24)				
(Pyrolysis Spec.)	(6)	(40)	(3)	(24)	(3)	(24)				
(Artisanry Spec.)	(5)	(40)			(1)	(8)	(4)	(32)		
(Hand Tools Spec.)	(5)	(40)					(3)	(24)	(2)	(16)
(Food Storage Preserv.Spec.)	(4)	(32)	(4)	(32)						
(Water Access Spec.)	(6.5)	(48)			(1.5)	(14)	(5)	(40)		
(Consulting Reserve)	(4)	(32)		(U N A T T R I B U T E D)						
Technical Assistance Totals	137.5	1,083	23	194	50.5	400	47	378	13	105

* Includes $5,000 for the services of a U.S. institution (beginning FY 1979) to monitor scientific/development literature and advise OSI of new technologies with potential for adaptation in Haiti.

TABLE II - C. SCHEDULE OF EXPENDITURES
($ U.S. 000)

	FY 1978	FY 1979	FY 1980	FY 1981	TOTAL
AID Sub-Total	221	420	430	171	1,332
Technical Assistance	173	365	392	153	1,083
Vehicles	28	7	-	-	35
Commodities	15	40	30	10	95
Evaluation	-	8	8	8	24
Training	5	-	-	-	5
Inflation		(UNATTRIBUTED)			90
GOH Sub-Total	71	81	72	23	346
Personnel	10	26	26	8	70
ATC Renov./Maintenance	40	7	7	6	60
POL	5	7	7	3	22
Commodities & Equipment	15	39	30	6	90
Training	1	2	2	-	5
Contingency/Inflation		(UNATTRIBUTED)			99
TOTAL AID & GOH	292	501	502	194	1,678

The total project is expected to cost approximately $1,678,000 of which AID will contribute a total of 79.4% (all foreign exchance requirements, except for local support costs of technical assistance contractors). As this is essentially an R & D project, most of the AID contribution ($1,083,000) will go for 84 person-months of long-term and 52.5 person-months of short-term technical assistance.

Long-term technical assistance contracts are to provide advisory coverage for the OST & ATC staffs throughout the project. The requirements for short-term consultants were estimated on the basis of complexity of the prototype(s) to be developed, considering such factors as need to construct working models, observe test results, perform corollary research and write a final feasibility report.

As mentioned elsewhere, the arrival of short-term consultants and disbursement for their services will depend on their availability. However, Table II-B. shows a tentative plan designed to spread the presence of such consultants over a period manageable for a supervision standpoint. In calculating expenses for technical consultants, a figure of $8,000 per person-month was used as the average. This figure is drawn from recent USAID experience with both long and short-term contractors. Costs for short-term consultants may actually fall below that while individuals are in the field; but for purposes of this analysis, the $8,000 figure is considered appropriate. Finally, up to 4 person-months are held in reserve to cover any additional short-term consulting needs which were unanticipated in designing this project.

AID funds will cover the cost ($35,000) of four vehicles to be utilized by the long and short-term advisors. One vehicle each will be assigned to the long-term advisors to the central OST and the ATG. The other two will be shared by short-term consultants operating out of the ATC. When short-term consultants must spend time in Port-au-Prince (such as to contact PVO headquarters or research available literature), support costs including vehicles will be included in the contract negotiated with the GOH. (A detailed description of the vehicles to be procured is at Annex D.)

The AID grant will also be used to procure a variety of equipment for the ATC at St. Marc. Up to $95,000 will be made available for basic workshop equipment, field office and radio equipment, equipment for the development and testing of prototypes, and camping-field support equipment for short-term consultants. (See equipment descriptions, Annex D.)

Three project evaluations will be conducted by an independent US firm under the grant ($24,000), and AID will match GOH resources ($5,000) in meeting short-term training needs of counterpart personnel as identified under the project. Up to 2 person-months ($2,500 each of AID funds) are budgeted for possible off-shore training.

Due to the fact that the majority of AID's costs will be forward funded, and most procurement will be completed by the end of the second year, the inflation factor has been kept relatively low, totalling $90,000, or 6.8% of the total three-year AID contribution.

The GOH will contribute approximately $70,000 in the salaries of personnel associated with the project. Two professionals each will be hired in the central OST and the ATC (at an estimated $300 per month each) to act as counterparts to the long-term technical advisors. An additional secretary will be hired to support the OST project staff, and another secretary will be employed at the ATC. Secretarial salaries are estimated at $200 per month each. The ATC will retain two driver-mechanics ($110 per month, each) to drive and maintain project vehicles. Finally, participating GOH entities will continue to pay the salaries ($300 per month) of professional counterparts on TDY to the ATC to work with short-term consultants in developing prototypes. At least 37 person-months of such other-agency counterpart participation is anticipated.

The GOH will provide up to $22,000 in POL ($15,000) and maintenance ($7,000) for project-financed vehicles, and $90,000 in ATC furniture and equipment, field support equipment and prototype equipment. (See Annex D.)

An inflation factor totalling $37,000, or 15% of the total three-year GOH contribution, has been included. This is a conservative estimate considering the current 15% annual inflation rate. It is expected that, the cost of GOH-financed POL, equipment, and locally-purchased materials will rise over the life of the project.

The GOH is supporting all contingency costs ($62,000) of the project. Due to the experimental nature of the project, it is considered prudent to maintain a fairly large contingency cushion. A number of uses for these funds are already contemplated. There is a strong likelihood that the GOH will contract with one or more PVOs to supplement or refine the prototype development work done by short-term consultants, and/or to commence trial dissemination of finished prototypes. The developing prototypes will also need economic and social feasibility analyses, which are to be built into the scope of work for each contract issued. Where the individual short-term consultant is not qualified to perform such analysis, specialists in these areas will be contracted by OST. The extent and frequency of such services cannot be reliably estimated at this time, but will be covered by the GOH through contingency funds.

Finally, the contingency allowance will cover possible needs for small amounts of credit to help adopting communities take advantage of prototypes developed under the project. The extension of such credit might occur as part of the testing for economic viability, or to support initial dissemination of a prototype.

PART III - PROJECT ANALYSIS

A. ECONOMIC ANALYSIS

Haiti's rural areas are characterized by an extreme scarcity of capital, infrastructure, and trained manpower. Dominated by small (less than 2 hectare), low-production farms and surplus labor, the rural economy is a matter of national concern and priority. Development programs have been started with the assistance of a number of external donors. However, it will be a long time before their benefits will begin to appear as measurable economic advances for the rural sector.

In the interim, appropriate technologies, carefully tested and adapted to Haitian conditions, can be introduced to produce a near-term, significant beneficial impact on the quality of rural life, and perhaps better prepare rural inhabitants to absorb further benefits of development. To be economically viable, these technologies should make optimum use of the resources available in the rural environment (labor, local materials, community organizations); be efficient on a very small scale; require little skill or training to use and maintain; and be financially attractive relative to the alternatives available to the extremely poor peasant family.

Although this first experiment with appropriate technology represents a heavy investment in relatively high-cost external technical experts and equipment, the non-reimbursable nature of AID's assistance makes this an economically acceptable investment for the GOH at this time. Assuming that participating OST and other agency counterparts can be trained to form a nucleus of expertise for evaluating and disseminating new technologies, the recurring cost to the GOH of a continuing appropriate technology program might run around $200,00 per year, mainly for OST and ATC personnel and equipment. (If this initial project proves successful, USAID would consider proposing follow-on assistance to help pay the costs of external technical experts needed to develop prototypes for which no Haitian expertise exists). This figure assumes the same level of prototype development activity continuing after termination of this project; and it assumes that the costs of broad prototype dissemination will be borne through other rural development programs, participating PVO's, or by the open market (dissemination costs cannot be estimated until the prototypes have been tested and adopted).

This project deals in two specific categories of technology: a) on-shelf or simple "catalog" technology already in use somewhere in the developing world, which has relevance to Haitian needs and can be transferred either intact or with very minor adaptive modifications; and

b) technology which is responsive to a particular "need" (priority development constraint) but which requires more extensive research and adaptation. An example of the latter would be the solar cooker. Solar cookers are now available at $39.00 and upwards obviously too expensive for rural Haitians. Experimentation to make the cookers more effective will include adaptive research to lower the cost of the cookers and insure their wide acceptability.

A tentative judgment as to economic feasibility has already been made of the prototypes chosen for testing under this project. Where current costs of a given prototype are known to be high, the prototype was retained in the list for development if there was a reasonable prospect that further experimentation might lower costs to economically viable levels.

In other instances, the potential economic benefits were clear, such as in the case of hand tools production. Haiti imports all tools (with the exception of machetes). Many simple hand tools, however, could be produced locally. The following is an estimated retail price comparison* of imported versus locally produced items:

Item	Price of Imported Item	Retail Price if Produced Locally	Savings
Hammer	$2.75-9.95	$1.60	$1.15-8.35
Chisel	.60-3.00	.20-1.20	.40-1.80
Pick	3.25-5.75	2.10	1.15-3.65
Hoe	2.75-5.50	1.40	1.35-4.10
Sledge	3.50-7.50	2.50	1.00-5.00
Bucket (metal)	3.25-4.50	2.50	.75-2.00
Shovel	3.75-9.75	2.10	1.65-7.65
Crow Bar	1.75-3.75	1.40	.35-2.35

Farmers would benefit substantially through access to cheaper but functional locally-produced tools, and the anticipated demand is strong. In addition, the production process itself should generate some limited off-farm employment opportunities.

Prototype analysis to be performed under this project will include not only estimation of initial cost to construct, but also projected costs of operation and maintenance to the user(s), estimated return on investment (including labor or in-kind investments), potential income generation, and any factors (e.g. site selection, production economies of scale) which would affect the estimated return. The individual short-term consultant will be responsible for producing and economic as well as technical analysis of the prototypes they develop. Where necessary, supplementary economic analysis will be contracted with local funds. Trained economists

* Done by the Experience Inc. TDY team in May, 1977.

are available in Port-au-Prince. A very probable source would be the University of Port-au-Prince School of Economics. The final consultant report on each prototype should contain sufficient evidence to assure the GOH and USAID that efforts to dissiminate the prototype package in the rural areas would be economically justified.

A cost/benefit ratio will be determined as part of research and development of each package. For example, lifting and pumping devices will be evaluated according to the size, capacity and power requirements against the potential return form improved irrigation. In all cases, the final prototype package will be geared to the economic realities of potential rural adopters and will maximize non-capital resource inputs (particularly labor) available to the peasant for construction and operation of the models.

This does not preclude the possibility of disseminating relatively costly prototypes. Prototypes such as water delivery devices, arid land closed cropping devices, and alternate fuel sources may require an initial capital investment (even after adaptation) which would place the prototype beyond the reach of the Haitian peasant. Certain prototypes (e.g. arid land closed cropping and salt-water fishing) may not have a sufficiently wide application to permit satisfactory economies of scale. Nonetheless, the potential benefits may be so great that the GOH, a private voluntary agency, and/or another donor will decide to help underwrite the costs of dissemination.

B. SOCIAL SOUNDNESS ANALYSIS

Socio-Cultural Feasibility

A study of the general characteristics of the prototypes reveals the following:

-- the prototypes are simple. They transform raw energy sources directly into useful energy. These raw energy sources are free and relatively plentiful in Haiti -- solar energy, wind power, water pressure.

-- the simple and direct nature of the transformation results in low-cost operation of these prototypes.

These characteristics are particularly pertinent considering the social constraints of the environment.

-- The fundamental needs of the peasant are those of survival -- food and water. The prototypes are designed to meet these needs rapidly and at low cost.

- The rural population of Haiti is illiterate, which does not mean that it is not intelligent and experienced. The technological simplicity of the prototypes will encourage their adoption and use by the local population.

-- Despite his traditionally accepting nature and the fact that he willingly works with others on specific tasks and for a limited time, e. g., coumbite, the Haitian peasant is reputedly jealous of his independence and autonomy.

These features are the psychological consequences of an historical background characterized by

-- poverty, which induces him to rely on what he considers the safest sociological unit -- the family;

-- geographic and psycho-social isolation or break-up of the rural environment which has introduced a theory of true social dualism: urban - rural;

-- relative abandonment of the peasant by the central government which the peasant perceives primarily as a tax collector rather than a source of any kind of help.

The prototypes in their simplicity should alleviate the mistrust of the peasant of the more or less autocratic initiatives emanating from the central Government.

As long as the prototypes are easily adoptable and their effects or results concrete, the peasants will use them to meet needs which they, the peasants, have already defined. The permanent and massive involvement of the central Government is not required as would be the case in a project with a complex technology. In this project, the central Government, through OST, will be involved only as technical support and as a coordinating and disseminating center (among others) of the prototypes.

Expected Distribution of Benefits

The local units in charge of managing the prototypes are not yet selected. Negotiations are being conducted with OST. However, it can be asserted that these units will be composed of

- local groups with a special interest in the prototype (e. g., the local nutrition center will be selected for installation of a prototype for use in nutrition).

-- local groups likely to distribute the benefits throughout the community. The adequacy of community councils has been seriously questioned. These councils have advantages and disadvantages. The decision will be made on the basis of analyses and discussions with Haitian counterpart organizations.

The direct beneficiaries of the installation of the prototypes will be a small farmer population of the following characteristics:

-- average farm size, 1.4 hectares;

-- cash income less than $80 per annum;

-- under- and malnourished; 60% of the children are judged underweight and suffering from first-degree malnutrition.

However, it can be expected that the better-off farmers will also benefit. Those who will benefit the least will undoubtedly be the landless peasants whose situation forces them to become a mobile labor force which, until now, has been relatively unstudied.

The beneficiaries and the local project managers will constitute a group, and, hopefully, a group that is relatively cohesive. Those prototypes contributing to agricultural production may encounter difficulty because of the nature of agricultural holdings: the division of an estimated 40.5% of the land into small parcels with the concomitant potential for conflict over ownership of yield.

Expected Spread Effect

We anticipate three dissemination levels for the prototypes:

-- flow of information between users and their counterparts in neighboring villages who do not yet have a prototype (e. g., through meetings on market days);

-- use of regional organizational structures by local administrative units (e. g., federation of community councils, DARNDR extension agents);

-- OST dissemination of information by its representatives or radio.

Role of Women

An estimated 22% of gainfully employed women were engaged in some form of trade in 1970. The increase of women in commerce over the past 20 years, accompanied by a decrease in women directly employed in agriculture (from 82% to 60%) suggest that women carry on a substantial share of all commercial trade in the country. Recent surveys indicate that, in the South, the mother of a family may spend as much as 62% of her time in commercial transactions suggesting that women are the major force in market activities, and making these transactions is the rural woman's most demanding responsibility.

At the same time, women continue to bear the major burden in child rearing, home management, and active cultivation of agricultural land while their men are working other plots of land, often located at a considerable distance from the home.

Given their highly active involvement in marketing and day to day business activities, rural women play an important role in the diffusion of new ideas and practices. Women's acceptance of prototypes produced under this project is of prime importance and attention will be given to identifying means of reaching women particularly with information to promote prototype dissemination.

Each prototype will be evaluated to determine

(1) whether it meets the particular needs of rural women;

(2) whether rural women have views and suggestions which should be considered, and

(3) whether there are ways and means of using women as agents of implementation during the dissemination process.

On the whole, women should benefit equally with men from some of the prototypes developed under this project (e.g., food storage, and hand tools production). Some prototypes will benefit women even more than men, (such as through water delivery mechanisms which relieve women of hours of back-breaking labor).

However, the OST and their advisors will be particularly alert to situations which may threaten women's economic status, such as alternative fuel sources which may reduce the income of women who traditionally make and market charcoal.

C. Environmental Analysis

Due to the limited nature of research and development activities under this project, no physical damage or disturbance to the environment is anticipated. If anything, resulting changes in production or daily living patterns should bring about long-term benefits to the environment.

The prototypes are largely oriented toward ecological repair or more efficient utilization of scarce natural resources. Alternate fuels to charcoal should help reduce excessive tree cutting. The alternate fuels themselves would make more productive use of non-destructible resources (solar energy) or renewable resources which can be recycled (agricultural waste).

Improved water access should also create much more efficient use of water resources which are largely going to waste for want of proper delivery and storage methods.

Prototypes intended to improve nutrition levels rely either on improving the productivity of marginal land (arid land closed cropping), on better distribution of food demand over available resources

(extension of fishing ranges from the near shore to farther out) or on other technologies which have no demonstrable adverse environmental impact (food storage).

The prototypes to be developed under the original Intermediate Technology project were the subject of an Initial Environmental Examination approved by AID/W about February, 1977. The IEE Statement (Annex A) has been revised to reflect the merger of the Intermediate and Simple Technology project proposals in this project. However, it is the feeling of the Mission that the "simple" technologies incorporated herein have even less potential for creating adverse environmental impact than the more complex technologies approved originally.

Each prototype will be thoroughly evaluated for environmental effect, especially if it is to be adopted on a relatively wide basis.

D. INSTITUTIONAL ANALYSIS

1. CONADEP/OST

The National Council for Development and Planning (CONADEP) will be the primary implementing agency for this project. The President of the Republic of Haiti personally holds the title of President; however, day-to-day authority is exercised by his appointed Executive Secretary. The Council is composed of the Secretaries of State for:

- Finance and Economic Affairs
- Commerce and Industry
- Agriculture, Natural Resources and Rural Development
- Public Works, Transport and Communications
- Public Health and Population
- National Education;

and the President and Director General of the National Bank of Haiti - (BNRH).

The functions of CONADEP are to develop general policies for economic and social development of the nation by formulating plans to:

- Direct and intensify development planning and programming for various projects of public and private institutions, and
- To coordinate and evaluate the activities of public organizations and official entities engaged in development activities.

CONADEP prepares the national five-year plan; monitors disbursement

of development funds forming the counterpart contributions of GOH entities to other donor projects; and coordinates development planning activities undertaken by GOH Ministries and the external donors.

A Coordinator, reporting to the Executive Secretary, oversees the daily activities of CONADEP's Divisions (or Services) of Planning; Statistics and Information; Project Preparation; Budget and Finance; Environment; and External Affairs.

The Office of Science and Technology (OST) is presently under CONADEP's Division of External Affairs. OST has responsibility for coordination, planning, designing and administering all aspects of development relating to technological and scientific improvements for Haiti. The office is understaffed (2 professionals and 1 secretary), with a limited budget and no practical means of testing or adapting ideas and innovations. In addition, they have no contact with other GOH or private entities or authority to make such contacts independently.

A Condition Precedent to disbursements under this project requires that the Office of Science and Technology be made a separate Division reporting directly to CONADEP's Executive Secretary. This elevation of OST is considered essential to provide the status needed to coordinate the appropriate technology program at the inter-Ministerial level, and among other donors and private voluntary organizations. It will also insure the Executive Secretary is promptly and fully informed of all developments under the project.

As will be noted from the schedule for short-term consultants (Part II-B-4), a number of individuals will be working on different prototypes in different parts of the country at any given time during the course of the project. The central OST office will have to meet the varying (probably simultaneous) demands of these individuals for logistics support and contacts with other institutions (while the contractors are doing general orientation or background work in Port-au-Prince); preparations for commencement of field work; negotiation of Memoranda of Understanding; monitoring the development of the respective prototypes; contracting for corollary support to complete prototype reports (such as economic and social analysis by qualified local firms or individuals); promoting and arranging for broader dissemination of finished prototypes; and monitoring the emergence of new technological innovations world-wide which could be candidates for future prototype development in Haiti.

As presently staffed, the OST could not possibly handle the anticipated scope and diversity of workload associated with the project. Therefore, the central OST plans to increase its staff by two professionals and one secretary. The chief of the OST will serve as Project

Manager and principal counterpart to the long-term Chief Technical Advisor to be financed under the grant. The Project Manager will concern himself with overall planning and scheduling of major project activities; high level coordination with participating institutions; and evaluation of results. Two additional local professionals will be hired to serve as counterparts to the Technical Advisor and perform the day-to-day coordination, back-stopping and monitoring necessary to support activities of the ATC, the short - term consultants, and to coordinate the participation of other entities.

USAID will approve OST's two new professionals prior to their selection for employment. OST will attempt to recruit candidates with appropriate experience both in rural development and in testing and adapting technological prototypes similar to those to be developed under this project.

The Senior Technical Advisor will serve as Chief-of-Party, as well as principal advisor to the OST Project Manager. The Advisor will be stationed in Port-au-Prince with an office in the OST. His duty time will be divided between Port-au-Prince, (where he will advise OST's Project Manager on project administration, and coordination with ministries, other GOH entities and PVO organizations) and St. Marc where he will monitor and advise on prototype research and adaptation. He will be involved in the Substance as well as the Administration of the project.

The Senior Technical Advisor should have experience in international and rural development; working with community groups would be particularly helpful. An appropriate technology background is desirable; however, engineering or other technical qualifications may be considered sufficient. The individual selected should be strongest in administration, program planning and evaluation, with some experience in promotional (or information distribution) techniques. He should be fluent in French.

ATC in St. Marc will be the project's focal point for technical development and adaptation of the various prototypes in a rural setting. The Center will serve as the base of field operations for all short term consultants; and its workshop will contain the equipment necessary to construct a wide variety of working prototype models (see Annex D).

Two Haitian professionals will be hired as counterparts to Senior Field Advisor, responsible for supervising and coordinating all activities at the ATC. These two counterparts should be chosen for the strenght of their technical background in engineering and/or agronomy, and experience in practical applications of research in rural conditions. Some experience with R & D projects would be highly desirable. However, as with the professionals to be hired for service in the central OST, these requirements are not rigid. Fully qualified

personnel may be difficult to locate (especially since AID is not supplementing salaries under this project); and the two who are employed will receive most of their training on-the-job from the Senior Field Advisor stationed at St. Marc. In view of the close and frequent contact these two people will have with U.S. technicians, it would also be desirable for both to be bilingual in English and French.

The long-term contract Senior Field Advisor will oversee all field activities related to the testing and site adaptation of all proto - types to be developed under this project. This individual will reside in St. Marc and have an office in the ATC but will be expected to travel extensively throughout the country (as will his two professional counterparts) visiting rural prototype testing sites. He will organize, monitor, and report to the OST and the Senior Technical Advisor regularly on the day-to-day work of the ATC.

This individual should have an engineering or agronomic degree or equivalent, plus experience in appropriate technology. Because he will be required to live in a relatively small town at some distance from the capital with frequent and extended working visits to remote areas, the Senior Field Advisor should have had field experience in foreign, rural environments. He should be able to read, speak and understand French, and be prepared to learn Creole soon after arrival in country.

The Senior Field Advisor is scheduled to arrive in Haiti some 2 months after OST's Senior Technical Advisor.

The ATC facilities are projected to be renovated and ready to support the short-term consultants at approximately the same time as the field advisor arrives. Hiring of counterpart and local support personnel is also scheduled to coincide with his arrival.

The short-term consultants will be the key to success or failure of the project. Careful attention will be given to professional qualifications and experience in rural settings of lesser developed countries in selecting these individuals. Equal care will be taken in the drafting of their individual Scopes of Work to insure total agreement with OST as to the nature and timing of work to be done and results expected. Each consultant will work directly with participating GOH or PVO organizations (providing on the job training for their TDY counterpart personnel), with community organizations, and will be responsible for producing a complete final report on the prototype (s) tested and adapted indicating technical, economic, environmental, and social feasibility; and recommending appropriate channels and methods for dissemination. Every effort will be made to locate French-speaking short-term technicians. Field contacts

with rural Haitians will require that each consultant be accompanied by a Creole-speaking counterpart (either from a participating agency or from the ATC), or assisted on-site by PVO personnel. Where the short-term technician is not French-speaking, the short-term counterpart will be selected, in part, for English language capability.

2. Participating Entities

A number of other entities will participate with the OST in this project, either by providing TDY counterpart personnel to the short-term technical consultants, and/or by disseminating the tested prototypes:

1. The Department of Agriculture, Natural Resources and Rural Development (DARNDR), is the principal GOH institution responsible for development of agriculture and livestock, natural resources (including soil conservation and irrigation), rural education, and vocational agricultural education. Several semi-autonomous agencies under DARNDR have important responsibilities in agriculture: the National Coffee Institute (IHPCADE); the Bureau of Agricultural Credit (BCA); the Artibonite Development Organization (ODVA); and the Gonaives Plain Development Organization (OPDG). The regional development organizations may be of particular interest as later vehicles for dissemination of prototypes.

The effectiveness of DARNDR has been analyzed in considerable depth in other documents (see Project Paper Loan 008, Integrated Agricultural Development). The institutions problems include insufficient personnel with inadequate training; inadequate budget; concentration of personnel in Port-au-Prince; and fragmentation of rural development responsibilities through many sub-entities with overlapping functions.

DARNDR has a strong interest in a number of the prototypes under this project, particularly those involving increased food production (salt water fisheries, fish ponds, arid land technologies) and preservation of natural resources (various alternate fuel technologies).

2. INAREM: National Institute of Mineral Resources

This Government agency is headed by a Minister without portfolio. Its Technical Director is also the Dean of the Faculty of Science of the University of Port-au-Prince. INAREM is equipped with office, shop, and laboratory facilities. These facilities are specialized for mineral research, but are modern, in relatively good condition, and may be made available to short-term consultants under this project as needed. The organization is staffed with geology and mining professionals, as well as an administrative cadre. A number of the

staff are rotated to field activities as surveys and projects require.

INAREM has responsibility for development of Haiti's mineral resources, including research and development activities which have a direct bearing on some of the alternate fuel prototypes to be investigated under this project, e.g. the exploitation of lignite in the Camp Perrin area funded by World Bank. INAREM has been working on briquetting of pulverized lignite.

INAREM has informally agreed to cooperate with the OST and to furnish qualified counterparts at the required time for development of prototypes in which INAREM is interested.

3. IDAI: National Institute for Development of Agriculture and Industry

This quasi-governmental organization is active in small industrial and agro-industrial project development, research,and financing. Headquartered in Port-au-Prince, IDAI has laboratory facilities in the capital, personnel in the field, and is engaged in a number of appropriate technology efforts. IDAI is expected to provide counterpart personnel for prototype testing in the areas of water access and alternate income (artisanry, hand tools production).

4. HACHO: Haitian American Community Help Organization (Care Inc)

This bilateral organization was founded in 1960 and received an AID grant to CARE Inc. It acts as a regional development organization for the poorest and least developed area in Haiti, the Northwest. Operations include health units, nutrition and education programs, road construction, agricultural development and extension, irrigation, potable water, and crafts. HACHO has a base office in Port-au-Prince (which may soon be moved to the Northwest) and regional service offices at Gonaives, Terre Neuve, Anse Rouge, Jean Rabel, and Bombardopolis in the North and Northwest.

HACHO is willing to provide counterpart personnel for development of prototypes in geographic areas of interest to the organization. It may provide, as well, some operational support, (e.g. use of its field office facilities and field staff for consultation and coordination of on-site prototype testing). HACHO can contribute substantially to the project with its wealth of community development experience. The organization is well established in local communities and its contacts with community councils, will facilitate acceptance of prototype development in selected areas.

HACHO is currently under-going reorganization, and has experienced

administrative strains in trying to respond to the difficult demands of a recent drought emergency in the Northwest. However, as a recipient of a proposed AID FY 1979 Rural Community Development grant, HACHO will be in an excellent position to serve as a major disseminating channel for many of the prototypes developed under this project.

5. Private Voluntary Organizations

It is expected that both the long and short-term consultants will have extensive dealings with PVO's, and PVO's will participate actively in the testing and dissemination of prototypes. Over 150 PVO's are officially registered with Haiti's Ministry of Social Affairs.

Many more are not registered, but are present and working in Haiti. Approximately 7 of the PVO's which might be involved in this project are registered with AID in accordance with Part 203 of 22 CFR (Regulation 3) issued on June 7, 1977 (see Annex C for conditions of Registration and list of registered organizations).

While many of the PVO groups are small independent missionary organizations, there is a large number active in development, and making very positive contributions to the economic and social betterment of the areas in which they work. Many of the PVO's working in Haiti:

a) have an established record of service and continuity in the rural areas;
b) have the confidence of an established rural (usually community) constituency;
c) have personnel, both national and expatriate, who speak Creole and French, and have an excellent understanding of the social, cultural and economic milieu in which they work;
d) are already pursuing activities closely paralleling the kind of on-site technology adaptation and dissemination planned under this project.

Many of the PVOs are members of the established council of Evangelical Churches of Haiti (CEEH), comprised of 24 local denominated groups with about 550,000 members. They are also members of the Association of Non-Governmental Organizations in Haiti, which is comprised of some 12 non-missionary organizations, including major international donors such as CARE, CWS and Catholic Relief Services (CRS). These two "umbrella" organizations will serve as channels to identify and reach a large number of potential rural technology testers adn adopters.

USAID has tentatively identified certain PVOs which it believes

could effectively help carry out field work in testing, adaptating, and/or disseminating prototypes:

Missionary Church Association (MC)

In cooperation with the Mennonite Central Committee, the Missionary Church (MC) has implemented an aggressive community development effort in the Central Plateau, around Hinche and further north at Grande Rivière du Nord.

The MC is actively developing a fish pond project. Twenty ponds are already in existence, and a technical advisor arrived in August to help expand the program. MC also plans to work in food storage, and information is being developed on small scale food processing facilities. Water delivery mechanisms have already been developed e.g. a prototype water pump handle,and MC is supporting a hand tool forging project.

MC is also interested in other appropriate technologies (e.g. mud brick construction and modified bullock yokes) which eventually may be ivestigated bu the GOH under an on-going appropriate technology program.

Depending upon short-term consultant findings, the MC may be asked to participate in prototype testing and/or go right to broader dissemination under this project.

Oblates of Mary Immaculate

The Oblates, active in the Southern peninsula, are pursuing projects designed to spur agricultural production. In the Les Anglais area, the Oblates have established one of the strongest and most effective cooperative systems in the country; have created experimental demonstration farms at Rendel, Les Anglais and Carice to teach improved farming practices, and have been instrumental in establishing seed banks and revolving credit funds for seed purchase.

The Oblates, have also introduced inexpensive, hurricane proof construction techniques to Southern coastal communities; sponsored (at Port Salut) the only fishing cooperative now in existence in Haiti and introduced improved nets, fish traps and other fishing tools, many of which are now produced locally; introduced and adapted simple technologies such as corn shellers, and grain drying and storage devices; and are heavily involved in local erosion control and soil conservation efforts, such as experimentation with new types of trees and erosion barriers.

Other organizations working with technological improvements include:

- Chruch of the Nazarene, esperimenting with low cost fiber glass building materials, including use of indigenous fibers; and
- Baptist Mission at Kenscoff, experimenting with methane generators, windmills, soil conservation and terracing.

OST will enter into agreements with the participating PVOs, through the Memorandum of Understanding mechanism, to insure agreement as to the exact scope and schedule of work to be performed, the geographic area to be covered, the target group and beneficiaries of the work, and the monetary or in-kind contribution expected from all parties involved (OST, the PVO staff, and/or local community self-help). See Annex E for detail on PVO's.

In view of the existence of a number of well qualified and very active PVO's in Haiti, the OST and USAID considered the possibility of contracting with certain PVO's for development of prototypes in lieu of contracts with U.S. short-term consultants.

The firstneed is for a technically competent survey of all activities going on in Haiti related to development of the prototype in question, and a technical decision as to the "best" (a case-by-case definition) model of each prototype to pursue. PVO's will have difficulty with this kind of analysis, in part because their activities are generally circumscribed by geographic limits set by the organizations themselves. However, it is possible that they will be interested in, and able to manage prototype development contract and it is likely that one or more consultants will recommend that a PVO - developed prototype be adopted by OST as the preferred model for broad dissemination, without going into any further site-testing or adaptation. Certainly, OST and the short-term consultants will maintain close contacts with PVO's and make extensive use of their personnel and community acceptance to test and disseminate prototypes under this project.

6. U.N. Development Program

Finally, the UN Development Program (UNDP) in Haiti has opened modern, well-equipped laboratory facilities in Port-au-Prince where student engineers have access to mechanical and metallurgical training and equipment. Officials of the UNDP training program expressed considerable interest in cooperating with the OST under the Appropriate Technology project. UNDP would be willing to make both their laboratory facilities and students available to help test prototypes. USAID staff visited the laboratory facilities, and concluded that there is a definite possibility of using some of the equipment available there to supplement the facilities at the ATC in St. Marc.

PART IV - IMPLEMENTATION PLAN

A. DETAILED IMPLEMENTATION SCHEDULE

Assuming the Project Paper is reviewed and approved by AID/W during the first week in December, 1977, USAID projects the following calendar of key events:

Approximate Sequence	Month	Event
1	12/77	. Project Agreement signed
2	2/78	. Initial CPs to Disbursement met
3		. CPs to Vehicle Equipment Procurement met. IFBs issued
4	2/78	. CPs to ATC Renovation met; contract advertised
5		. OST fully staffed
6		. Contracts awarded for vehicles/equipment
7		. CBD advertisement for long-term T. A.
8	3/78	. ATC contract let; renovation begins
9	4/78	. Long-term T. A. contractor selection reviewed by AID/W
10	5/78	. Long-term T. A. contract signed
11	6/78	. Chief of Party arrives Haiti
12	8/78	. ATC renovation complete
13		. Senior Field Advisor arrives Haiti
14		. ATC fully staffed
15		. Vehicles and equipment arrive Haiti
16		. First annual work plan submitted to AID
17		. CPs to Disbursement met for first Prototype to be developed
18	9/78	. First short-term consultant contract executed
21	10/78	. First short-term consultant arrives
22	12/78 1/79	. First project evaluation conducted

Approximate Sequence	Month	Event
23	8/79	. Second annual workplan submitted to AID
24	12/79-1/80	. Second project evaluation
25	11/80	. Final project evaluation conducted
26	12/80	. Project assistance completion date

Table IV - A. below is an illustrative TDY schedule for short-term consultants in Haiti. The schedule is speculative at this point. It does, however, illustrate the supervisory problem anticipated in PART I - D. ISSUES.

TABLE IV-A. TENTATIVE SHORT-TERM CONSULTANT SCHEDULE

Short-Term Consultant Duration in Haiti	CALENDAR YEAR																																			
	1978												1979												1980											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Food Storage													X	----------			X																			
Solar Tech										X	----------				X																					
Pyrolysis											X	----------				X																				
Arid Land														X	----------					X																
Small Craft																		X	----------					X												
Artisanry																				X	----------		X													
Water Access																						X	----------				X									
Fish Ponds																									X	----------			X							
Hand Tools																													X	----------				X		
Related Dates																																				
Mid-Evaluation																		X																		
Final Evaluation																																				X
PACD																																				

The implementation schedule is extremely tight, especially in the early phases (first six months) of the project. During this phase, a number of key things must happen in rapid order, including hiring of OST staff, location and renovation of the ATC facilities, placement of long-term technical services contracts, and ordering the necessary vehicles and equipment. It is due to this heavy workload that the central OST should be fully staffed by March/April 1978, -- well in advance of the projected arrival of the Senior Technical Advisor. USAID will work directly with the OST staff in carrying out this early phase activity and in meeting CPs so that disbursements can occur.

B. CONTRACTING AND PROCUREMENT PLANS

The GOH will use standard competitive bid procedures to obtain the vehicles, commodities, technical assistance, and training called for under this grant. In accordance with the most recent guidance for least-developed (all-grant) countries, procurement will be allowed from Code 941 countries. However, USAID expects that all AID-financed costs will be for U. S. source and origin goods or services. The only local costs expected to be paid with AID funds will be the local support costs for technical advisors. In order to minimize implementation delays due to long procurement lead times, vehicles and equipment will be ordered on presentation of an acceptable procurement plan by OST, without waiting for official establishment of the ATC. Since the OST staff is as yet totally inexperienced in standard (let alone AID) procurement practices, USAID expects to provide considerable direct assistance in preparation of bid documents, scopes of work, etc., at least in the first six months of the project.*

Ultimately, OST should be left with an internal capability to seek, evaluate and contract with a wide variety of local and external specialists, and procure equipment or supplies at reasonable prices without direct AID assistance. USAID expects to ask GC/LA assistance in coordinating the required AID/W review of the proposed long-term technical services contract, before it is awarded. Since the remaining contracts will be under the $100,000 mandatory AID/W review limit, AID/W advice and assistance will be sought only on an as-needed basis.

The Grantee will be encouraged to use the Direct AID Letter of Commitment for foreign exchange cost disbursements to save time and banking charges. Technical consultants will submit the standard documentation to the Controller/USAID for reimbursement of local support costs in accordance with the terms of their contracts.

* It should be noted, however, that OST will need almost immediate assistance in preparing the documents for vehicle and equipment procurement. As USAID/Haiti will be short-handed just at that time, Tech Support funds will be used to obtain a TDY contracting expert for one month to help OST prepare the necessary documents.

C. USAID MONITORING

The head of USAID's Engineering Office will be primarily responsible for project implementation and monitoring, and liaison with officials of the OST, as well as with long and short-term consultants. USAID's Program Office will advise and assist the Engineering Office in matters relating to participating PVOs. The USAID Controller will monitor disbursements of AID funds, and insure that proper documentation and financial records support these transactions. The Capital Development Office will assist and advise the Office of Engineering on project implementation, procurement of project-financed goods and services, and assist in preparation of basic implementation documentation (Project Agreement, Project Implementation Letters, etc.).

To supplement day-to-day USAID liaison with project officials, the senior Technical Advisors will submit written monthly progress reports based on the most current annual work plan. These reports will serve as the agenda for discussion at monthly status review meetings to be held between USAID and OST officials with long-term advisors, ATC staff, short-term consultants, PVO or other entities as appropriate. These sessions will be informal, and intended to surface any potential problems for immediate action before such problems can cause undue delay in project implementation.

D. EVALUATION PLAN

Three evaluations are planned for this project: the first is scheduled for late 1978/early 1979 after initial obligation of funds. The second will be about twelve months later. The third will be the final project evaluation scheduled about November, 1980. Three evaluations are considered for this project as it is essentially devoted to adaptive research, developing and testing prototypes and close monitoring of the project is necessary to assure schedules and target are being met. Day-to-day problems should be handled through ordinary implementation monitoring described in the preceding section.

Representatives of the Haitian Government Office of Science and Technology, AID and the U. S. contractor will participate in each evaluation. Evaluations will be carried out by an independent organization under an IQC or other short-term contract arrangement. In the interest of continuity, it is preferable that the same team conduct both of the evaluations planned.

The performance of the Haitian Government and the U. S. contractor will be reviewed at each evaluation:

The Haitian Government for

-- The efficacy of OST and ATC efforts under the project;

-- adequacy of the amount and timing of the GOH contribution; and

-- participation of other public and private entities in testing prototypes and integrating successful technologies into their own projects or programs.

The U. S. contractor for

-- success in producing prototypes which meet stated feasibility requirements, i. e. can be reproduced easily and quickly; are socially, economically and environmentally feasible; use local materials and are labor-intensive to maximum extent possible; increase the amount of available food or water, provide alternative sources of fuel or a reduction in fuel requirements;

-- success in producing prototypes as scheduled;

-- competence and effectiveness of management and technical personnel provided;

-- success in transferring technical and administrative skills to Haitian counterparts.

At the time of the first evaluation, the primary measure of achievement will be actual outputs compared with target outputs. The project Logical Framework (Annex A) specifies the expected outputs by fiscal year. Results from at least three tested and adapted prototype experiments should be available for this evaluation. The second evaluation will consider achievement of actual outputs compared to target outputs for tested prototypes from the previous evaluation, taking into consideration recommendations made in the first evaluation.

The end-of-project evaluation requires consideration of factors which are both quantitative and qualitative:

- the degree of success which the new technologies have achieved as shown by acceptance and continuing use (where known) of the prototypes;

-- the degree to which the Haitian peasant is receptive to new ideas, methods, and devices;

-- the adequacy of GOH institutional arrangements,

-- the overall promise of the project.

ANNEX A

Exhibit 1

GOH LETTER OF APPLICATION

(To be submitted to LA/DR on November 28, 1977)

ANNEX A
Exhibit 2
Page 1 of 13

6C(1) - COUNTRY CHECKLIST

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Security Supporting Assistance funds.

A. GENERAL CRITERIA FOR COUNTRY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in consistent pattern of gross violations of internationally recognized human rights?

   All AID projects in Haiti are aimed at the rural poor majority who comprise 95% of the population and whose average per capita income is less than $100 per year. The Department of State has not determined that this government has engaged in consistent pattern of gross violations of internationally recognized human rights.

2. FAA Sec. 481. Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully?

   Haiti's law regulating the use & control of narcotic drugs was signed in December 8, 1975. It provides stiff penalties for use & distribution of illegal drugs & Haiti cooperates with the U.S. controlling drug traffic.

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3. FAA Sec. 620(a). Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba?

   No

4. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the International Communist movement?

   Yes

5. FAA Sec. 620(c). If assistance is to a government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) the citizen has exhausted available legal remedies and (b) debt is not disputed or contested by such government?

   There is no evidence that Haiti is so indebted.

6. FAA Sec. 620(e)(1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?

   There is no evidence that Haiti has taken such actions.

7. FAA Sec. 620(j), App. Sec. 108. Is recipient country a Communist country? Has assistance been provided to the Democratic Republic of Vietnam (North Vietnam), South Vietnam, Cambodia or Laos?	No
8. FAA Sec. 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression?	No
9. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property?	There are no incidences of such action in recent years.
10. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason?	An investment guaranty agreement with Haiti is in effect.
11. FAA Sec. 620(o), Fisherman's Protective Act, Sec. 5. If country has seized, or imposed any penalty or sanction against, a U.S. fishing activities in international waters,	Haiti has taken no such action.
a. Has any deduction required by Fisherman's Protective Act been made?	Not applicable.
b. Has compliance been waived by the Administrator?	Not applicable.
12. FAA 620(q), App. Sec. 505. Has (a) government of the recipient country been in default on interest or principal of AID loan to the country? (b) Has country been in default exceeding one year on interest or principal on U.S. loan under which App. Act appropriates funds where debt was earlier disputed, or appropriate steps taken to cure default?	a) Since rescheduling debts in 1970, Haiti has been current. b) No
FAA Sec. 620(s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military equipment? How much spent for the purchase of sophisticated weapons systems? (Considerations of these points are to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (PPC/RC).)	10.9% of the $81 million budget in FY75-76 is budgeted for the armed forces. No equipment breakdown is provided, but most of this sum is for administration. No sophisticated weapons are procured. We are not aware of PL480 sales or development assistance funds having been used to cover military expenses.

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14. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?

No

15. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget?

The U.N. treasurer informed the U.S. delegation to the U.N. on August 29, 1975 that Haiti had made payments which removed the possibility that the country might lose its vote in the General Assembly because of arrears in its contribution. Haiti is continuing its voting rights and being granted continued U.N. Assistance

16. FAA Sec. 620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism?

No.

17. FAA Sec. 666. Does the country object, on the basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA?

No

18. FAA Sec. 669. Has the country delivered or received nuclear reprocessing or enrichment equipment, materials or technology, without specified arrangements on safeguards, etc.?

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No

19. FAA Sec. 901. Has the country denied its citizens the right or opportunity to emigrate?

No

B. [illegible] CRITERIA FOR COUNTRY

1. [illegible] Assistance Country Criteria

a. FAA Sec. 102(a), (d). These criteria have been followed, and taken into account, in the specification and program of activity in this country in giving the highest development, on such fronts as: (1) small-farm labor intensive agriculture, (2) reduced infant mortality, (3) population growth, (4) equality of income distribution, and (5) employment.

B.1.a. With the assistance of AID & other donors the GOH is developing programs with measurable objectives in the fields of agriculture, health, nutrition & population. Most of these programs are rural based.

b. FAA Sec. 201(b)(5), (7) & (8); Sec. 281(a), 281(c)(4), (7). Describe extent to which country is:

(1) Making appropriate efforts to increase food production and improve means for food storage and distribution.

b. (1) The GOH allocated 14% of its 1977 annual development budget to agriculture and assigned a high priority to agriculture development. Within its limited resources and with external assistance the GOH is increasingly providing extension and credit services to farmers and undertaking resources to improve production & marketing.

(2) Creating a favorable climate for foreign and domestic private enterprise and investment.

(2) The GOH has taken a number of steps to create a favorable investment climate, passing legislation to provide incentives for foreign and domestic investment, establishing specific office to facilitate investment, and encourage and cooperating with private entreprise. With US assistance a study is being undertaken for expanding capital markets and domestic investment and enterprise through a proposed Development Finance Cooperation project.

(3) [illegible] the public's role in the [illegible] process.

(4) (a) Allocating available budgetary resources to development.

(b) Diverting such resources for unnecessary military expenditure and intervention in affairs of other free and independent nations.

(5) [illegible] economic, social, and political reforms such as tax collection improvements, changes in land tenure [illegible], and making progress [illegible] for the rule of law, [illegible] end of the press, recognizing the importance of [illegible] freedom, initiative, and private enterprise.

(6) [illegible] responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

c. FAA Sec. 201(b), 211(a). Is the country among the 20 countries in which development assistance loans may be made in this fiscal year, or among the 40 in which development assistance grants (other than for self-help projects) may be made?

d. [illegible] Sec. 115. Will country be [illegible], in some fiscal year, either [illegible] supporting assistance, or [illegible] Wo funds? If so, is [illegible] for population programs, [illegible] and through international [illegible] programs?

2. [illegible] instance country [illegible]

a. [illegible] Sec. 620. Is the country [illegible] of international recognized [illegible]? Is program in accordance with policy of this section?

b. [illegible] Sec. 531. Is the assistance to be furnished to a friendly country, organization, or body eligible to receive assistance?

c. FAA Sec. 609. If commodities are to be granted so that sale proceeds will accrue to the recipient country, have Special Account (counterpart) arrangements been made?

3) An objective of this project is involvement of local personnel in actual use of various technologies

4) The GOH's development budget for 1976-77 is $43.8 million. This is 8.6% larger than the amount allocated for 1975-76.

4.b) The budget for the Department of Interio and National Defense is the largest of the operating ministries. However, included in the total are police, fire protection and othe non-military costs. There has been no intervention in affairs of other nations.

5) The GOH has established its intent to undertake reforms in public administration and fiscal management and has requested assistance from AID through an Administration Improvement Project. Haiti is receiving or has requested assistance from external sources in these and in the areas. Haiti has a much more open society than it had several years ago, as evidenced the recent return of many citizens to the country.

6.c) Development assistance loans and grants were made until approximately mid-FY77, when it was determined that all future projects would be grant financed in accordance with decisions taken at UNCTAD IV concerning the least developed countries.

d) No

2 (a-c) Not applicable.

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6C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a subcategory for criteria applicable only to loans); and Security Supporting Assistance funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY. HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT.	
1. App. Unnumbered; FAA Sec. 653(b). (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international [illegible] allocation reported to Congress (or not more than $1 million over that figure plus 10%)?	a) Project was included in FY 1977 Congressional Presentation as a $480 million grant for the Intermediate Technology Project and in the 1978 CP as a 702 million grant project for Simple Technology. Both projects have been combined as an Appropriate Technology project for a total amount of $1,332 million. b) Assistance is within (Operational Year Budget) country allocation reported to Congress.
2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?	a) Yes b) The cost estimate of the project is considered sound.
3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?	No legislative actions are required to permit accomplishment of the program.
4. FAA Sec. 611(b), App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per Memorandum of the President dated Sept. 5, 1973 (replaces Memorandum of May 15, 1962; see Fed. Register, Vol 38, No. 174, Part III, Sept. 10, 1973)?	Not applicable.
5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?	Not applicable.

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ANNEX A
Exhibit 2
Page 6 of 13

A.

6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multilateral organizations or plans to the extent appropriate?

No regional organization is prepared to undertake research and development of the appropriate technology and related tasks. Multi-lateral donors are not interested in financing this Project. However, this Project will be coordinated with their work.

7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). Information and conclusion whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

Not applicable.

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

Project will utilize U.S. technical advisors on both long and short term contract. All grant financed procurement must be from U.S. source and origin.

9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.

The GOH local currency contribution is $ 346,000 specified under terms of the grant for specific features of the project. The GOH has approved a 5 Year Development Budget and counterpart contributions for other grant projects have always been met. Contributions will undoubtedly be met for the proposed project.

10. FAA Sec. 612(d). Does the U.S. owe excess foreign currency and, if so, what arrangements have been made for its release?

No

[illegible] CRITERIA FOR PROJECT

1. [illegible] Assistance Project Criteria

a. FAA Sec. 102(c); Sec. 111; Sec. [illegible]. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?

The project is designed to utilize community organizations at local government levels using technical assistance. Some of the technologies may make use of a cooperative effort extending from community councils.

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b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: [Include only applicable paragraph - e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.]

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;	Yes - for agriculture and rural development research. The goal of this project is to improve the standard living of Haiti's rural poor and better integrate them into the main stream economic activity.
(2) [104] for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor;	Not applicable.
(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;	Not applicable. BEST AVAILABLE COPY
(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:	Yes. Research and selected development problems.
(a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;	PVO's will assist in implementation of various technologies chosen for utilization in Haiti.
(b) to help alleviate energy problem;	Yes, research for alternatives to the use of charcoal.
(c) research into, and evaluation of, economic development processes and techniques;	Yes. Project will apply appropriate technology techniques to rural development problems.
(d) reconstruction after natural or man-made disaster;	Not applicable.
(e) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;	Not applicable.
(f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.	Not applicable.

(5) [107] by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries.

[illegible] FAA Sec. 110(a); Sec. 208(e). Is the [illegible] country willing to contribute [illegible] to the project, and in what manner [illegible] will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with [illegible] to which the assistance is to be [illegible] (or has the latter cost-sharing [illegible] been waived for a "relatively [illegible] developed country)?	Haiti will contribute $ 346 thousand to this project from the planned operating budget of CONADEP. This will be 20.6% for project costs.
[illegible] FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing?	Not applicable.
[illegible] FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on; (1) encouraging development democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) [illegible] availability of trained workers in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communications; planning and public administration; and development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.	U.S. assistance in Haiti and elsewhere places emphasis on encouraging economic, social and political institutions required for a viable democratic society. One purpose of the project is to develop and strengthen administrative and technical institutions in the GOH
[illegible] FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development, improve mass civic education and training in skills required for effective participation in governmental and political processes essential to self-government.	One important goal of this program is to increase the flow of resources to rural areas concerned for increased economic and social benefits. This program is looking to appropriate governmental agencies to provide trained personnel and essential services.

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g. FAA Sec. 201(b)(2)-(4) and -(8); Sec. 201(e); Sec. 211(a)(1)-(3) and -(6). Does the activity give reasonable promise of contributing to the development: of economic resources, or to the increase of productive capacities and self-sustaining economic growth; or of educational or other institutions directed toward social progress? Is it related to and consistent with other development activities, and will it contribute to realizable long-range objectives? And does project provide information and conclusion on an activity's economic and technical soundness?	Project Paper contains an economic and social analysis. While there is no accepted formula which demonstrates a direct production response to improve appropriate technology such a relationship is generally assured. Both economic (cost/Benefit) and social analytical capability will be built into the Office of Science Technology Staff (OST)
h. FAA Sec. 201(b)(6); Sec. 211(a)(5), (6). Information and conclusion on possible effects of the assistance on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving or safeguarding the U.S. balance of payments position.	The foreign exchange (U.S. dollar) component of the project is 79.4%. No adverse effects on US balance or payments positions is expected.
2. [illegible] Development Assistance Project Criteria (loans only)	Not applicable.
a. FAA Sec. 201(b)(1). Information and conclusion on availability of financing from other free-world sources, including private sources within U.S.	
b. FAA Sec. 201(b)(2), 201(d). Information and conclusion on (i) capacity of the country to repay the loan, including [illegible] of repayment prospects, and (ii) soundness and feasibility [illegible] of the country and U.S.) of the development program of the loan.	
c. FAA Sec. 201(e). If loan is not in support of a multilateral plan, [illegible] use of the loan proceeds [illegible], has country submitted to AID application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner?	
d. FAA Sec. 201(f). Does project paper describe how project will promote the country's economic development taking into account the country's human and resources requirements and [illegible] between ultimate objectives of project and overall economic development?	

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e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?

f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

4. [illegible] Criteria Solely for Security [illegible]ting Assistance

FAA Sec. 531. How will this assistance support promote economic or political stability?

Not applicable

4. Additional Criteria for Alliance for Progress

[Note: Alliance for Progress projects should add the following two items to a project checklist.]

a. FAA Sec. 251(b)(1), -(8). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?

The positive steps taken by the GOH in increasing its annual Development Budget for economic and social benefits for the Haitian population through increased emphasis on public health, nutrition and assisting small farmer development and poor rural population is encouraging.

b. FAA Sec. 251(b)(3); 251(h). Are [illegible] taken into account [illegible] by recipient nation to [illegible] capital invested in other countries by their own citizens? Is [illegible] consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress ("CIAP," the Permanent Executive Committee of the OAS) in its annual review of national development activities?

Not applicable

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6C(3) - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by exclusion (as where certain uses of funds are permitted, but other uses not).

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed? — Yes

2. FAA Sec. 604(a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him? — Yes

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3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the U.S. on commodities financed? — Yes

4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? — Not applicable

5. FAA Sec. 603(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items? — Yes

6. FAA Sec. 901(b). (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates. — Yes

7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the facilities of other Federal agencies will be utilized, — Yes

are they particularly suit[illegible] competitive with [illegible] and made available without undue interference with domestic programs?	
8. International Air Transport. Fair Competitive Practices Act, 1974	
If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?	Yes
e. Construction	
1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest?	Not applicable
2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable?	Yes
3. FAA Sec. 620(k). If for construction of a capital enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed $100 million?	Not applicable
f. Other Restrictions	
1. FAA Sec. 201(d). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter?	Not applicable
2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, [illegible] Comptroller General have audit rights?	Not applicable
FAA Sec. 620(h). Do arrangements for promoting or assisting the foreign aid projects or activities of Communist-Bloc countries, contrary to best interests of the U.S.?	Yes
FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the U.S. or guaranty of such transaction?	Procurement of vehicles will be restricted to US source.

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f. Will arrangements preclude use of financing:

a. FAA Sec. 114. to pay for performance of abortions or to motivate or coerce persons to practice abortions?	Yes
b. FAA Sec. 620(g). to compensate owners for expropriated nationalized property?	Yes
c. FAA Sec. 660. to finance police training or other law enforcement assistance, except for narcotics purposes?	Yes
d. FAA Sec. 662. for CIA activities?	Yes
e. App. Sec. 103. to pay pensions, etc., for military personnel?	Yes
f. App. Sec. 106. to pay U.N. assessments?	Yes
g. App. Sec. 107. to carry out provisions of FAA Sections 209(d) and 251(h)? (transfer to multilateral organization for lending).	Yes
h. App. Sec. 501. to be used for publicity or propaganda purposes within U.S. not authorized by Congress?	Yes

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Appropriate Technology
Draft Project Description
(Annex I to Project Agreement)

A. Description of Project

This three-year project will be administered by the Office of Science and Technology (OST) of the National Planning once established as a separate Division of the National Planning Council (CONADEP). The OST will establish an Appropriate Technology Center (ATC) at an appropriate location (tentatively identified as St. Marc) to provide workshop facilities and equipment, and otherwise serve as the locus for technical execution of the project.

The OST will use agreed-upon selection criteria to identify up to 12-14 technologies already tested or in use elsewhere in the developing world, which (a) might prove adaptable on a broad basis to the Haitian rural environment, (b) address one of the acknowledged primary constraints to development in rural Haiti (inadequate nutrition, lack of access to water, need for alternate fuels, and lack of alternative sources of income); (c) have a beneficial impact on the quality of life for Haiti's rural residents. A number of technologies have been identified in the Project Paper as meeting initial selection criteria:

Arid Land Crop Development
Small Craft Fishing
Fresh Water Fish Ponds
Solar Cookers and Water Heaters
Solar Desalinization
Methane Gas Generator
Pyrolysis
Combustible Organic Briquettes
Water Delivery Mechanisms
Artisan Activities
Simple Hand Tools Production

Under this project, the OST will undertake to test and site adapt each of these prototypes, and produce a model(s) suitable for broader dissemination in Haiti's rural areas. The testing will be done at the ATC and/or other appropriate rural locations.

Each prototype will be tested for technical, economic, social and environmental feasibility. Testing of prototypes which do not appear able to meet the basic feasibility tests, and/or have little prospect of being adopted by a significant number of rural residents may be terminated before completion and other promising prototypes substituted by written mutual agreement with AID.

An especially important part of the project will be to design a program for disseminating prototypes once the testing is completed. In order to assure that such dissemination occurs, the OST will make early contacts with potential disseminating agents (other Government Ministries, private voluntary organizations, etc.), and to the extent practicable will involve such agents in the testing and site adaptation process.

The OST will solicit the active involvement of other GOH entities (and certain non-governmental entities such as HACHO and private voluntary agencies) in the development of prototypes. The OST will execute Memoranda of Understanding with such entities for the provision of personnel on temporary duty, equipment, and/or field facilities to the project by those entities.

A short-term technical consultant will be brought to Haiti under a grant-financed contract to develop each of the prototypes. Each of these technicians should have at least one counterpart person from a participating Ministry or entity to work with, in addition to the full-time counterpart personnel assigned to the OST and ATC. Each short-term technician will be responsible for on-the-job training of the participating counterpart, in addition to producing the final model and report described above. Where an individual short-term consultant is not qualified to, analyze the economic or social impact, or factors affecting of, a prototype, an appropriate local expert will be contracted by OST to work with the technician, and provide the necessary information.

Joint GOH-AID evaluation will be held at the end of the first and second year and end of the project to identify problems and assess results.

B. Resources

The AID contribution to the project will total $1,332 million over the three year life of the project with contributions after Fiscal Year 1978 being subject to availability of funds. The project budget is set forth in the financial tables which are

attached to, and form part of this Annex 1. AID grant funds will finance up to 36 months of the technical services of a Senior Technical Advisor to the OST who will assist the OST Project Manager in administering the project, and serve as Chief of Party for all long and short-term consultants financed under the project. AID will also finance up to 30 months of the services of a Senior Field Advisor to supervise the day-to-day operations of the ATC and the short-term consultants and up to eighteen months of an agro-engineer to assist in development of individual prototypes. Should the assistance of the agro-engineer not be needed as determined by joint agreement between the GOH and AID fund for this technical assistance will be de-obligated. The grant will cover the costs of an estimated 52.5 person-months of short-term technical services to develop the individual prototypes. The remainder of the grant will finance project vehicles, equipment and training.

The GOH will contribute up to $346,000 in the form of salaries for two new professional employees assigned to OST to serve as counterparts to the Senior Technical Advisor, and an additional secretary. Another two professionals will be hired for assignment to the ATC to serve as counterparts to the Senior Field Advisor and agro-engineer. The ATC will also have a support staff of one secretary and two driver mechanics financed by the GOH. The GOH will also contribute to the cost of counterpart personnel assigned to temporary duty work with the short-term consultants, equipment and training, and will meet all local contingency costs, e.g. hiring economic or social analysts, or supplying small amounts of credit to rural dwellers wishing to adopt new prototypes.

The annual schedule of contributions is shown in the financial tables which are attached to, and form part of this Annex.

Attachment: Financial Tables

TABLE II - A. SUMMARY FINANCIAL PLAN
$ U.S. 000

		AID 1/	GOH 2/	TOTAL
Technical Assistance				
Long-term (84 PM)		1,083	--0--	1,083
Short-term (52.5 PM)		683	-----	683
		400	-----	400
Local Personnel				
Professionals		--0--	70	70
Clerical		-----	40	40
Support		-----	13	13
Other Agency Counterparts		-----	6	6
		-----	11	11
Commodities				
Vehicles		130	112	242
POL		35	-----	35
Equipment		-----	22	22
		95	90	185
ATC Renovation/Maintenance		--0--	60	60
Training		5	5	10
Evaluation		24	0	24
	Sub-Totals	1,242	247	1,489
Contingency/Inflation		90	99	189
	TOTALS	1,332	346	1,678
Percentage Contributions		79.4%	20.6%	100%

1/ All Foreign Exchange except for local support costs of technical assistance contractors

2/ All Local Currency

Annex A
Exhibit 3

TABLE IV - B. TECHNICAL SERVICES COST DETAIL
(in person-months and $ U.S. 000)

	TOTAL P - M	TOTAL COST	FY 1978 P - M	FY 1978 Cost	FY 1979 P - M	FY 1979 Cost	FY 1980 P - M	FY 1980 Cost	FY 1981 P - M	FY 1981 Cost
Long-Term Sub-Totals	85	683	10	80	36	288	30	242	9	73
(OST Chief Tech. Advisor	(36)	293,*	(6)	(48)	(12)	(97)	(12)	(99)	(6)	(49)
(ATC Chief Field Advisor)	(30)	(240)	(4)	(32)	(12)	(96)	(12)	(96)	(2)	(16)
(ATC Agro-Engineer)	(19)	(150)			(12)	(95)	(6)	(47)	(1)	(8)
Short-Term Sub-Totals	52.5	400	13	114	14.5	112	17	136	4	32
(Arid Crop Per. Spec.)	(6)	(48)	(3)	(24)	(3)	(24)				
(Small Craft Fishing Spec.)	(6)	(48)			(3)	(24)	(3)	(24)		
(Fish Pond Spec.)	(4)	(32)					(2)	(16)	(2)	(16)
(Solar Energy Spec.)	(6)	(40)	(3)	(24)	(3)	(24)				
(Pyrolysis Spec.)	(6)	(40)	(3)	(24)	(3)	(24)				
(Artisanry Spec.)	(5)	(40)			(1)	(8)	(4)	(32)		
(Hand Tools Spec.)	(5)	(40)					(3)	(24)	(2)	(16)
(Food Storage Preserv.Spec.)	(4)	(32)	(4)	(32)						
(Water Access Spec.)	(6.5)	(48)			(1.5)	(14)	(5)	(40)		
(Consulting Reserve)	(4)	(32)		(U N A T T R I B U T E D)						
Technical Assistance Totals	137.5	1,083	23	194	50.5	400	47	378	13	105

* Includes $5,000 for the services of a U.S. institution (beginning FY 1979) to monitor scientific/development literature and advise OST of new technologies with potential for adaptation in Haiti.

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Annex A
Exhibit 3

TABLE II - C. SCHEDULE OF EXPENDITURES
($ U.S. 000)

	FY 1978	FY 1979	FY 1980	FY 1981	[illegible]
AID Sub-Total	221	420	430	171	[illegible]
Technical Assistance	173	365	392	153	[illegible]
Vehicles	26	7	-	-	[illegible]
Commodities	15	40	30	10	95
Evaluation	-	8	8	8	[illegible]
Training	5	-	-	-	[illegible]
Inflation		CUMATTRIBUTED			[illegible]
GOH Sub-Total	71	81	72	23	[illegible]
Personnel	16	26	26	8	-
VTC Renov./Maintenance	10	7	7	[illegible]	[illegible]
POL	5	7	7	3	[illegible]
Commodities & Equipment	15	39	30	6	[illegible]
Training	1	2	2	-	[illegible]
Contingency/Inflation		CUMATTRIBUTED			[illegible]
TOTAL AID & GOH	292	501	502	194	[illegible]

ANNEX A
Exhibit 4

CERTIFICATION PURSUANT TO
SECTION 611 (e) OF THE
FOREIGN ASSISTANCE ACT
AS AMENDED

I, Lawrence E. Harrison, the principal officer of the Agency for International Development in Haiti, do herewith certify that in my judgement, Haiti has both the financial capability and human resources to maintain and utilize effectively goods and services procured under the grant capital assistance project entitled the Appropriate Technology Project.

This judgement is based upon the record of implementation of AID financed projects in Haiti and the results of the consultations undertaken during intensive review of this new project.

Lawrence E. Harrison
Director, USAID/Haiti

Date: 11/15/77

ANNEX A
Exhibit 5

INITIAL ENVIRONMENTAL EXAMINATION (IEE)

The IEE for an FY 1978 Intermediate Technology project was submitted to the Assistant Administrator in January 1977, along with a group of proposed projects. It was determined that the projects as designed at that time, would not have a significant effect on the natural or human environment of Haiti, and, therefore, an Environmental Impact Statement or an Environmental Assessment was not required. Since then, a proposed Simple Technology for FY 79 has been incorporated into this project thus increasing the level of activity to be undertaken. USAID has reviewed the Initial Environmental Examination submitted last January and finds that none of the additional activities will have any negative environmental effect. On the contrary, some of the technologies to be studied, such as water delivery mechanisms and alternate fuel sources, are apt to improve the environment where adopted, by making the utilization of scarce natural resources more efficient, and conserving natural resources either through re-cycling or through conversion to other, renewable raw materials. Thus, if technologies and prototypes developed under this project should ultimately gain wider acceptance by rural adopters, the environmental impact should be either non-existent or positive.

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ANNEX A
EXHIBIT 5

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Areas and Sub-Areas	Impact Identification and Evaluation 1/
A. LAND USE	
1. Changing the character of the land through	
a. Increasing the population	N
b. Extracting natural resources	N
c. Land clearing	N
d. Changing soil conservation	N
2. Altering natural defenses	N
3. Foreclosing important uses	N
4. Jeopardizing man or his works	N
B. WATER QUALITY	
1. Physical state of water	N
2. Chemical and biological states	N
3. Ecological balance	N
C. ATMOSPHERIC	
1. Air additives	L
2. Air pollution	L
3. Noise pollution	N
D. NATURAL RESOURCES	
1. Diversion, altered use of water	L
2. Irreversible, inefficient commitments	N
E. CULTURAL	
1. Altering physical symbols	N
2. Dilution of cultural traditions	N
F. SOCIO-ECONOMIC	
1. Changes in economic/employment patterns	L
2. Changes in population	N
3. Changes in cultural patterns	N

1/ Use the following symbols:
N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

Impact Areas and Sub-Areas	Impact Identification and Evaluation 1/
G. HEALTH	
1. Changing a natural environment	N
2. Eliminating an ecosystem element	N
H. GENERAL	
1. International impacts	N
2. Controversial impacts	N
3. Larger program impacts	N

DISCUSSION OF IMPACTS

As indicated above, there will be very little impact on the environment as a result of this project. A portion of the output of the project will be studies. Due to the small scale of any activities undertaken, any effect on water, air or social-economic systems will be minor in nature and very limited in area, and post-project effects should tend to be positive, if anything (i.e., actually improving the environment).

There is no planned use of insecticides, pesticides, herbicides or chemical fertilizers in this project. Activities involving aquaculture are not expected to affect water quality. Although exploitation of a natural animal resource would be increased if the salt water fishing prototype is successful, the net effect should be to spread demand more evenly over the available resources, thereby relieving current strain on the in-shore fish and crustacean supply.

The use of solar cookers or other alternate fuels should diminish the use of charcoal and thus reduce both airborne particulate matter and destruction of the remaining land vegetation cover. The bio-gas to be produced on an experimental basis contains approximately 70% methane and 30% carbon dioxide. The methane is used as a gas fuel and is burnt off. Small quantities of methane may escape into the atmosphere where it is diffused almost immediately. Methane is, however, odorless but toxic, and precautions will be taken by the testers of this prototype to confine use to well-ventilated areas.

Lawrence E. Harrison
Director, USAID/Haiti

Date: [illegible]

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number: Appropriate Technology, 521-0195

(NOTE: THIS LOGICAL FRAMEWORK FORM WHICH CAN BE USED AS AN AID TO ORGANIZING DATA FOR THE PAR REPORT. THIS MUST BE RETAINED AND SUBMITTED.)

Life of Project: From FY 1977 to FY 1981
Total U.S. Funding: ~~$1,141,600~~
Date Prepared:

Exhibit 6

PAGE 1

Narrative Summary	Objectively Verifiable Indicators	Means of Verification	Important Assumptions
Program or Sector Goal: The broader objective to which this project contributes: (A-1)	Measures of Goal Achievement (A-2)	(A-3)	Assumptions for achieving goal targets: (A-4)
To improve the quality of life for the people of rural Haiti through the introduction of low-cost technological devices and methods which will contribute to solving their food, fuel, power, and water problems.	Increases in the amount of food and water for drinking and irrigation and in alternative sources of fuel and power which are directly attributable to technological innovations.	Market surveys. Number of new devices and systems in use in rural Haiti. Haitian Government agency and PVO reports.	The introduction of appropriate technological devices and systems will contribute to solving the food, fuel, power, and water problems of rural Haiti. The Haitian peasant is receptive to new technologies which can improve his quality of life at an acceptable cost and within his cultural and skills constraints.

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Project Title & No.

Life of Project
From FY ___ to FY ___
Total U.S. Funding
Date Prepared

Project Purpose (B-1)	Conditions that will indicate purpose has been achieved: End of Project status (B-2)	MEANS OF VERIFICATION (B-3)	IMPORTANT ASSUMPTIONS Assumptions for achieving purpose (B-4)
To test, adapt for site-specific conditions, and introduce as prototypes simple technological devices and methods appropriate for use in rural Haiti.	All prototypes field tested and those appropriate for dissemination selected on basis of test results.	Haitian Government agency and PVO reports.	The Haitian Government, other donors, and PVOs are receptive to disseminating the new technologies which prove acceptable to the rural population.
	Appropriate Technology Workshop staffed and equipped for developing and testing appropriate technology devices and methods.	Personnel and production records of Appropriate Technology Workshop.	The Haitian Government will provide the necessary funds and qualified personnel to the project.
To develop within the Haitian Government an organization capable of continuing adaptive research and development of appropriate technologies.	Successful technological devices and methods integrated into programs of appropriate Haitian agencies, other donors, or PVOs.	Reports from CONADEP Office of Science and Technology.	
	A fully staffed and Haitian-Government-funded Office of Science and Technology in CONADEP overseeing the activities of the Appropriate Technology Workshop, identifying and, potentially appropriate technologies for adaptive research, and promoting dissemination of proven technologies among Government, foreign, and private entities.		The Haitian Government assigns personnel with the appropriate skills to the Office of Science and Technology.

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Project Title & Number

Life of Project
From FY ____ to FY ____
Total U.S. Funding ____
Date Prepared ____

PAGE 3

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS			MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Project Inputs (D-1)	Implementation Target (Type and Quantity) (D-2)			(D-3)	Assumptions for providing inputs: (D-4)
	FY 1978	FY 1979	FY 1980		
Rehabilitation and construction of facilities for Appropriate Technology Workshop, St. Marc	X			Contractor's reports on status of prototype development	Haitian Government provides facilities for field headquarters, St. Marc.
Prototypes produced and ready for testing:				Annual workplans	Haitian Government provides counterpart personnel.
Arid land pilot plot for agricultural production		X		Project monitoring reports by A.I.D. engineering office	U.S. technical personnel assigned and arrive as scheduled.
Salt water fishing craft	X				
Food and water storage containers					
Clay food and water containers	X				
Ferrocement food and water containers	X				
Food and water containers of experimental materials		X			
Solar energy units					
Solar cooker		X			
Solar water heater	X				
Desalinization unit			X		
Methane generator		X			
Pyrolysis unit, Appropriate Technology Workshop		X			
Fuel sources					
Organic briquettes	X				
Lignite briquettes		X			
Power devices					
Windmills	X				
Hand pumps		X			
Hydraulic ram		X			
Hand tool production					
Hoe		X			
Machete		X			
Pick		X			
Sites selected for introduction of prototypes	X	X	X		
Haitian Government agencies and PVOs selected to test prototypes	X	X	X		

ANNEX B
Exhibit 1
Page 1

PORT AU PRINCE

UNCLASSIFIED
Classification

ACTION: AID
INFO: AMB
DCM
ECON
ADM
CHRON

ACTION TAKEN

DATE:
INITIALS:

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[illegible] 77
[illegible] C
[illegible] PORT AU PRINCE PRIORITY 1600/1

[illegible] 1798

[illegible]

[illegible]: N/A
[illegible]: [illegible] OF INTERMEDIATE TECHNOLOGY PP ([illegible]).

[illegible]: (1) PORT AU PRINCE [illegible] AND (2) [illegible]

[illegible] HAVE INVESTIGATED A NUMBER OF [illegible] FOR THE [illegible] ASSISTANCE REQUESTED FOR REF A. [illegible] FIRMS [illegible] AND CAPABILITY IN THIS FIELD BUT HAVE [illegible] TIME TO PUT TOGETHER PROPOSALS RESPONSIVE TO FULL [illegible]. BELIEVE BOTH OF PROPOSALS SUMMARIZED [illegible] INVE. MISSION IS FAMILIAR WITH MULTI-[illegible] BUSINESS SYSTEMS INC. (MASI). BELIEVE THAT [illegible] C. PROPOSAL MAY BE MARGINALLY STRONGER IN [illegible] DRAFT PP. ACTION REQUESTED: MISSION COMMENT/[illegible] OF FIRM.

[illegible] INC. PROPOSES THREE-PERSON TEAM WITH ETA O/A [illegible] DAYS IN-COUNTRY PLUS PRELIMINARY RESEARCH [illegible] ATION. THE EXPERIENCE TEAM IS FAMILIAR [illegible] ATION REQUIREMENTS. TEAM MEMBERS ARE: [illegible], DEVELOPMENT ECONOMIST; ERIC E. ERICSSON, [illegible] MENT SPECIALIST; AND RAYMOND A. MAHOFF, [illegible] LOGIST AT GEORGIA INSTITUTE OF TECHNOLOGY.

[illegible] BY EXPERIENCE INC. ASSIGNED TO CARL VAN [illegible] THREE TEAM MEMBERS HAVE FRENCH FLUENCY AND [illegible] FLUENT IN SPANISH.

[illegible]

[illegible]: A DEVELOPMENT ECONOMIST WITH INTERNATIONAL [illegible] IN RESOURCE ECONOMICS AND TA PROJECT DESIGN. [illegible] CORPS ASSIGNMENTS HAVE INCLUDED SUPERVISION

OFFICE
DIR
PLN
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CONT
CAP
[illegible]
AGR
PHN
[illegible]

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Classification

OPTIONAL FORM 161
(Formerly [illegible])
[illegible]
[illegible]

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2 STATE 091798 UNCLASSIFIED
Classification

[illegible]TION OF 50 SMALL AND INTERMEDIATE SCALE RURAL [illegible] PROJECTS WITH MAJOR ASPECTS OF INTERMEDIATE [illegible].

[illegible] INDUSTRIAL DEVELOPMENT SPECIALIST WITH EXPER-[illegible] PUBLIC SECTORS IN AFRICA AND LA. [illegible]ED PP FOR BLACKSMITH OPERATIONS IN RWANDA. [illegible] IN CENTRAL AMERICA. INDUSTRIAL OFFICER [illegible]A. PH.D. UNIVERSITY OF PARIS.

[illegible]: CONCERNED WITH PROJECT DESIGN AND MANAGEMENT [illegible] PROGRAMS WHICH STRESS EMPLOYMENT GEN-[illegible] APPROPRIATE TECHNOLOGY AND [illegible] INCLUDES PRIVATE AND PUBLIC SECTOR [illegible], AFRICA, LA, AND CARIBBEAN. HAS SERVED [illegible] IN [illegible] HAS WORKED IN GOVERNMENT ADMIN-[illegible] UNIVERSITY OF PENNSYLVANIA.

[illegible], INC. BUDGET:

[illegible] AND FEE	21,561 DOLLARS
[illegible]	4,754
[illegible]NAL TRAVEL	1,248
[illegible]	2,500
[illegible] AND INCIDENTALS	2,000
[illegible]L ALLOWANCES	1,521
[illegible] COSTS	600

TOTAL 34,154 DOLLARS

[illegible] NATIONAL AGRIBUSINESS SYSTEMS INC. (NASI) PROPOSES [illegible] TEAM FOR ETA O/A MAY 1 AND WITH SIMILAR [illegible] OF WORK TO EXPERIENCE. NASI PROPOSAL OUTLINES [illegible] PLAN FOR PRELIMINARY RESEARCH AND FIELD [illegible]. TEAM COMPOSED OF: WESLEY F. BUCHELE, [illegible] ENGINEER; ROBERT B. SCHNEIDER, ECONOMIST, AND [illegible] S. SMITH, SOCIOLOGIST. NASI BACKSTOP TO BE DONALD [illegible]. ALL TEAM MEMBERS HAVE OVERSEAS EXPERIENCE AND [illegible] LANGUAGE CAPABILITY.

[illegible] BRIEF BIODATA:

[illegible]: HAS SPECIALIZED IN AGRICULTURAL ENGINEERING [illegible], FARM MECHANIZATION, APPROPRIATE TECHNOLOGY AND [illegible] SYSTEMS. OVERSEAS EXPERIENCE INCLUDES APPRO-[illegible] TECHNOLOGY ANALYSIS AND STAFF WORK FOR AID. ON

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Classification

PAGE 3 STATE 091703 UNCLASSIFIED

Classification

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[illegible] AT IOWA STATE UNIVERSITY. HOLDS PH.D. FROM IOWA [illegible].

[illegible]) [illegible]: AN AGRICULTURAL ECONOMIST SPECIALIZING IN [illegible] DEVELOPMENT, RURAL ORGANIZATION ECONOMICS, [illegible] PRODUCTION IMPROVEMENT, AGRICULTURAL MANAGEMENT AND RELATED ASPECTS OF ENVIRONMENTAL ANALYSIS. HAS [illegible] AND PEACE CORPS EXPERIENCE IN AFRICA. ON STAFF OF UNIVERSITY OF WISCONSIN. HOLDS PH.D. FROM WISCONSIN.

[illegible]) [illegible]: A RURAL SOCIOLOGIST WITH EXPERIENCE IN LATIN AMERICAN SMALL FARMER PROGRAMS. HAS SPECIALIZED IN PROGRAM ANALYSIS AND DESIGN OF APPROPRIATE TECHNOLOGY INTERVENTIONS. [illegible] A RESEARCH ASSISTANT AT CORNELL. [illegible] EXPERIENCE IN FIELD OF REGIONAL PLANNING.

[illegible] COST ESTIMATE:

SALARY AND FEES	12,[illegible] DOLLARS
PER DIEM	5,250
INTERNATIONAL TRAVEL	1,755
LOCAL TRAVEL	750
[illegible] TRANSPORTATION	425
[illegible] FEES	2,[illegible]
[illegible] DIRECT COSTS	825
----------TOTAL	32,[illegible] DOLLARS

[illegible] COMPLETE PROP/P UPON RECEIPT OF MISSION SUGGESTIONS [illegible] CONTACT MISSIONS TELEPHONE JOHN DALIS, LA/AR/AD-[illegible] (PA ONLY) IF ADDITIONAL INFORMATION REQUIRED [illegible] A DISCUSSION.

VANCE

[illegible]

UNCLASSIFIED

Classification

ANNEX B
Exhibit 2

TECHNICAL ANALYSIS OF PROTOTYPES

Nutritional Access Technologies

Arid Lands Agro-Technique
Off-shore Salt Water Fishing
Fish Ponds Development
Post-Harvest Food Storage and Drying Technologies

Alternate Energy Development Technologies

Solar Cooker; Solar Water Heater; and Solar Desalinization
Bio-Gas (Methane Generator)
Charcoal; Alternate Fuels

Water Access Technologies

Wind Power & Pumps

Off-Farm Income Technologies

Hand Tools Production

Bibliographies

ARID LANDS AGRO-TECHNIQUE

Plant growth in enclosed translucent plastic structures has the advantage of full solar utilization while giving up little moisture to the outside atmosphere. Air is circulated in the closed environment after being passed through a stream of water. The humidification process leaves contaminants behind while endowing the environment with high humidity. A minimum of pure water is required to irrigate the crops. Additionally, condensate may be collected from the plastic cover and recycled for water irrigation. (See Fig. 1)

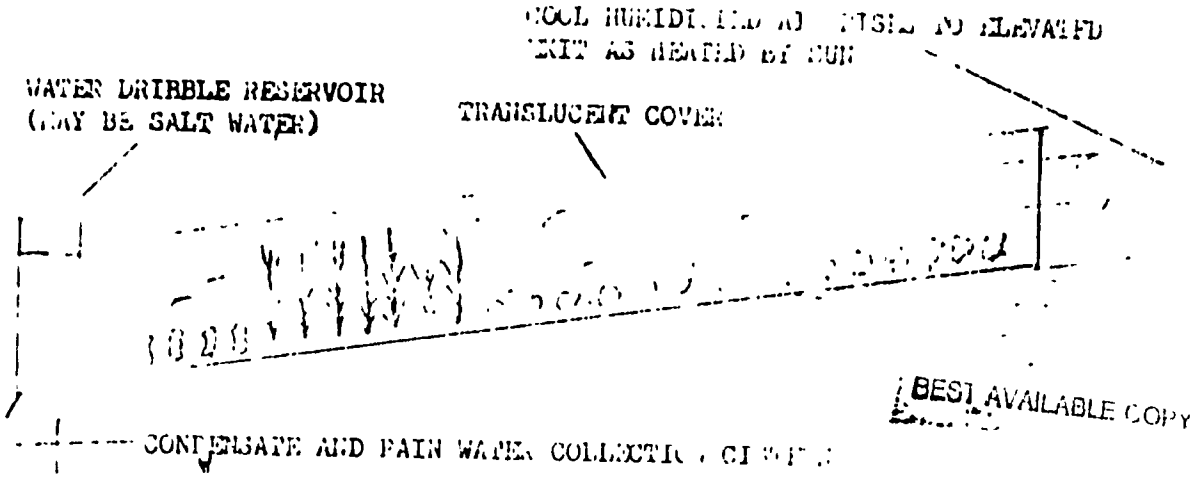
The University of Arizona and the University of Sonora, Mexico have developed a controlled-environment complex in Puerto Penasco using inflated plastic greenhouses. Because of the closed environment, plants exhaust ambient carbon dioxide which is required for photo - synthesis requiring carbon dioxide be replaced by introducing scrubbed diesel-generator-exhaust gas into the environment.

The University of Arizona has also designed and provided consulting services for commercial installations using partially open plastic tunnels humidfied with sea and ground water for the Arid Lands Research Center, Abu Dhabi; for the Ministry of Agriculture, Production and Extension Services, Israel; and for a commercial installation at Tucson, Arizona.

FIGURE 1

SEMI-CLOSED ENVIRONMENTAL [illegible]
WITH NATURAL AIR CONVECTION [illegible]

SIDE VIEW



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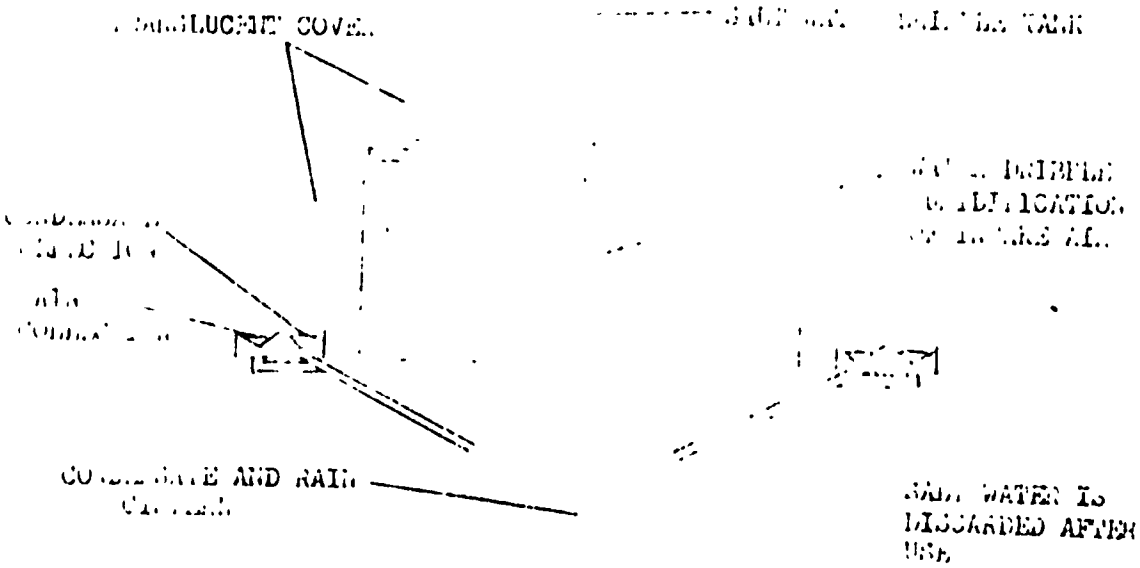
PLOT VIEW (ENLARGED)



OFF-SHORE SALT WATER FISHING

Establishing a task response for the expansion of Haiti's marine fishing activities follows from several salient observations.

1. Fishing is undertaken by individuals in small sail and oar craft who have a fishing range limited to a few miles. This inshore fishing is poor in yield.

2. There is little fish handling beyond direct sale of fresh fish, i.e., there is little curing and no cold storage.

3. The fishermen of the Northwest ports and fishing villages including Anse Rouge, Baie de Henne, Môle St. Nicolas, Jean Rabel, Port-de-Paix, St. Louis du Nord, Anse a Foleur with access to the windward passage run are unable to fish these more productive off-shore waters. This is due in large part to their boats' lack of capacity and open sea capabilities. With larger and better craft having an appropriate mix of power and sail, these ports along with those of Cap-Haitien, are within several days' range of the continental shelf runs.

This task addresses the development of longer range small craft fishing efforts as well as the problems of fish handling and storage. Expert analysis of the existing off-shore fishing conditions will present both immediate and long-range recommendations for appropriate technology adjustments.

Boat building and ownership practices appropriate to current and expanded fishing efforts will be assessed, including possible ferro-cement construction (Haiti produces cement).

An effort will be made to stimulate better on-shore handling and storage. This will include salting and drying techniques. Refrigeration storage and transfer in the form of a refrigerator truck may be developed.

FISH PONDS DEVELOPMENT

Fresh water fish culture has ha limited application in Haiti. The science is under consideration for intensive promotion by the Ministry of Agriculture. A laboratory, hatchery, and several trained extension agents are available as counterparts for future aquaculture development activities.

The problems which have rendered fish farming unproductive in the past appear to have been largely at the operator level. The taking of fingerlings for food has been a significant problem.

Both tilapia, mosambica and carp are now raised at the Port-au-Prince hatchery which is purported to be able to produce some 200,000 -

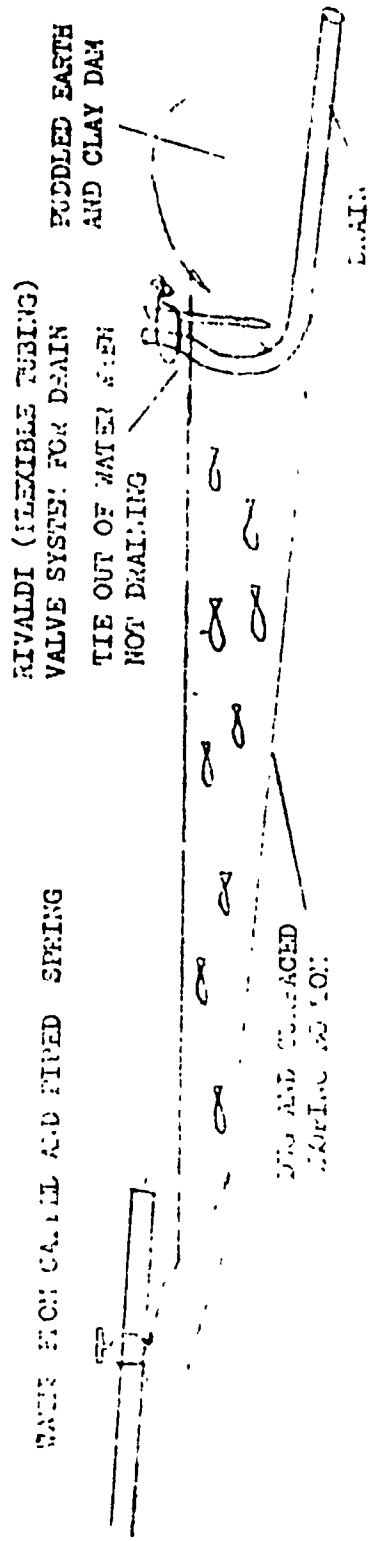
300,000 fry on a yearly basis. Field activity to establish and operate fish ponds would coordinate with GOH plans to found hatcheries in the north and in the south, as well as to augment the facilities at Port-au-Prince.

The approach envisioned by the current project is one of coordinated pond development and water management.

Once ponds are established, ongoing responsibility for proper maintenance, operation, harvest, and stock would rely on frequent visits by extension agents as well as project team members and local government officials

See Figure 2 attached.

SECTION OF DUG AND EARTH DAMMED FISH POND **FIGURE 2**



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POST HARVEST FOOD STORAGE AND DRYING TECHNOLOGIES

On-farm, post harvest food storage is virtually non-existent in the rural areas of Haiti. With the rural population increasingly dependent upon self-generated food production, a simple means of on-farm or village storage would be invaluable.

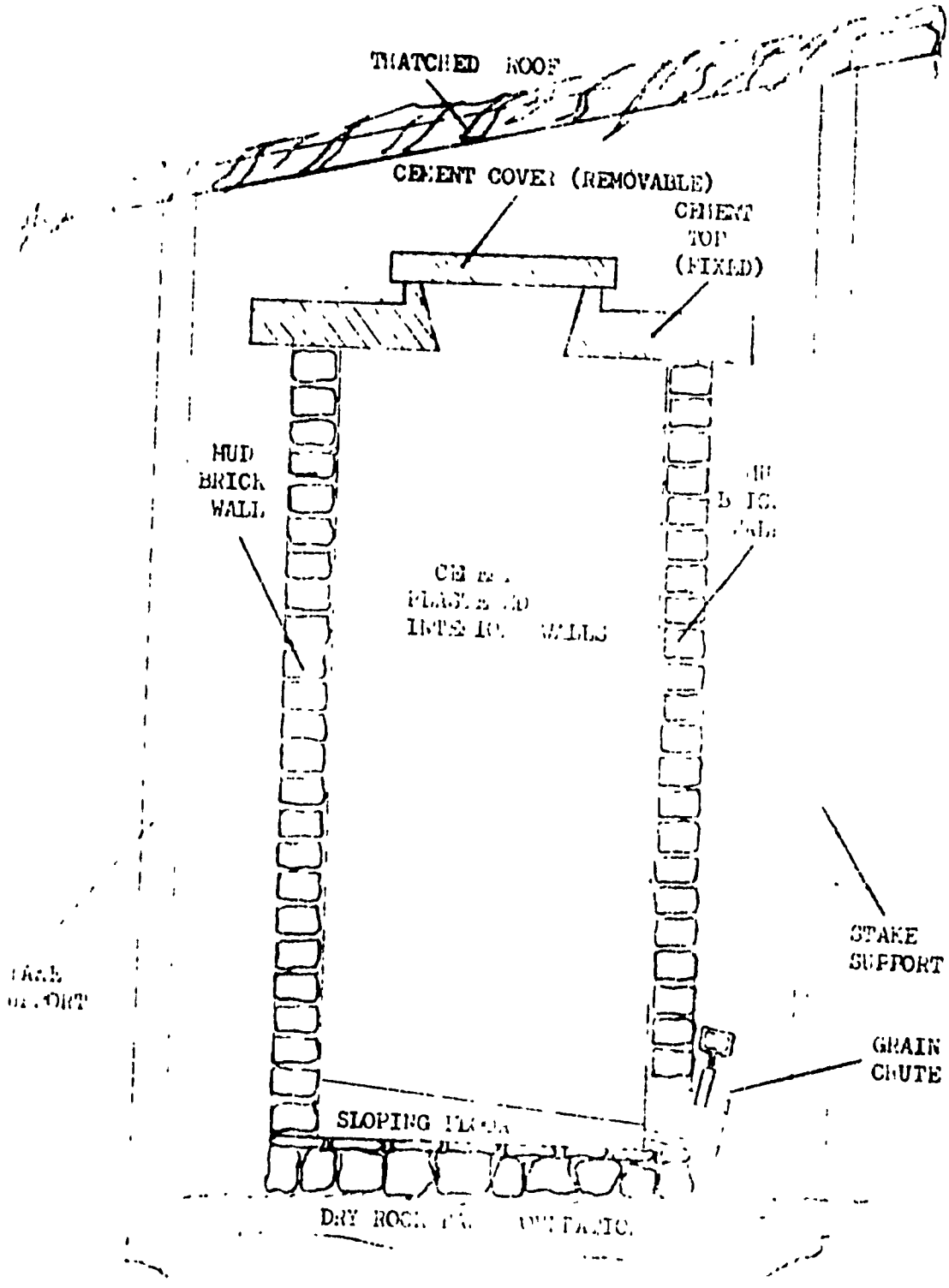
The virtual lack of any storage capacity on individual farms in Haiti results, inevitably, in food shortages. The Haitian cultivator is unfamiliar with the concept and utilization of appropriate food storage technology. The technological and social step from individual or family-controlled storage systems to a village-level system is a still further goal.

A number of appropriate food storage techniques, including drying processes, have been developed out of traditional systems. These include the utilization of basket granaries, corn cribs, sack storage, use of gourds, plastic sacks, underground pits, metal drums or bins, earthen structures, mudlock silos, sheet metal silos, ferrocement silos, concrete structures, cement stave silos and the Indian Pusa Bin (a virtually impregnable, air-tight moisture proof structure). The particular technique selected will depend upon the cost and availability of site-specific materials, the skills and energies of the local people, climatic conditions, and the nature and degree of pest infestation. (See Fig. 3)

Drying techniques include the pit oil barrel dryer, corn drying cribs, plastic sheets, solar dryers, fuel heated dryers, portable and fixed dryers. The prototypes chosen will depend upon the above considerations, as well as the particular characteristics of the food or grain concerned.

FIGURE 3

MUD BLOCK SILO UNDER [illegible]



SOLAR ENERGY

Solar Cookers and Stoves

Application of solar energy to household cooking provides a useful alternative to the burning of charcoal. Year round solar access in Haiti -- even during the rainy season -- urges consideration of solar cooking, when practicable, as a traditional fuel substitute.

A review of solar cooking techniques presents a variety of devices including reflector ovens, steam heated cookers as well as focal point burners. Many of these devices have been proven in operation. Objections to solar devices include fragility, complexity and slowness of operation, and their lack of application to cooking practices in select environments.

The rural Haitian generally relies on two types of cooking methods:

1. Pot-boiling: stewing, deep-frying
2. Griddle" grilling, frying, pan baking.

These methods are generally accomplished with a charcoal brazier fire, heating a pot or griddle.

Several types of solar cookers and stoves have been developed in recent years, and with a number of possible variations on each type to consider for these cooking methods.

a. Reflector Ovens

The reflector ovens, which can be arranged to attain temperatures of up to 300o - 400oF., are capable of baking and roasting as well as boiling water in small vessels. They are less useful for frying or grilling and tend to be cumbersome. (See Fig. 4)

Reflector ovens, because of their slow cooking time must be re-orientated to the position of the sun during cooking to retain their efficiency. As an apparatus, they also tend to represent a considerable expense for Haitian rural families.

b. Steam Cookers

The steam trace cookers rely on a closed fluid system, a length of which lies along the focal line of a reflecting parabolic trough. Directed at the sun for optimum focus on the boiler pipe, steam is developed and is coiled through a loop to a boiler pipe to continue the process. The cooking vessel achieves a temperature approaching the boiling point (212 F) but cannot be made to boil. This is, however, utilizable for slow cooking but requires re-orientation of the reflector during

the cooking period. This may be done manually, or with a timing drive mechanism, or (in one model) through the rotary action of a heat warping bi-metal spiral. This type of cooker could be assembled locally with some important elements. This cooker would tend to unacceptable cost levels for the rural family.

c. Circular Parabolic Mirror

The circular rigid parabolic mirror reflector directs the sun's energy upon a vessel held a its focal point. The reflectors for this application may range in diameter from some 36 to 50 inches with a focal length of 18 - 30 inches. They are mounted on a variety of stands and strutting which allow adjustment to track the sun and provide for suspension of a cooking vessel at their focal point. Such an arrangement develops intense heat on the cooking vessel bringing the contents to a boil in a reasonable (20 - 35 minutes) time, thus requiring little, if any, repositioning of the reflecting surface during cooking.

Important design considerations for rural applications deal with the fragility, as well as the mounting of the mirror for best solar direction and tracking. Many arrangements are easily knocked over and the mirror itself, because of its shape, has a tendency to become air-born in a wind. The inherent intense focus of these devices can easily burn through light metal or cause uneven cooking. These tendencies, however, can be dealt with by the use of more stable mirror mounting and heavier cast or wrought iron vessels and by positioning the vessel in a slightly defocused position. With care, most vessels - usually painted black for better heat absorption - may be readily used.

An example of an application of a low-cost technique for the utilization of the circular parabolic mirror, with local and reasonably in-expensive construction considered, follows.

The parabolic form may be laid up on a parabolic matrix of appropriate size and shape using either fiberglass, resin bonded natural fiber, or ferro-cement. Glass mirror fragments embedded in the form material or aluminized facing constitute the reflecting surface.

The mounting arrangement is simply a sloping bank of earth (See Fig. 5) against the south wall of the dwelling. A depression is made in the face of the earth bank using the mirror bottom as a template forming a somewhat larger parabola, north-south-east-west, than the mirror. The earth bank and depression may be worked with cement to give it a protective crust against erosion or other damage. The mirror is placed in the depression and slid into optimum solar position which it holds by friction or, as necessary, with stone supports.

It is easily re-positioned to track the sun as required.

The cooking vessels are suspended from a stancheon arm swinging from a hinge at the house wall above the mirror. The swinging beam is adjustable at the hinge for height and the vessel may be hung in or out along its length. A double beam forming a "V" at the wall hinge would support a flat griddle for frying or grilling. Thus, both forms of daily Haitian familiy cooking are possible. (See Figs. 4 & 5).

A Cautionary Note!!

Direct solar radiation or reflection can damage the eyes. Focused radiation, as from a parabolic reflector, can burn severely at the point of focus or cause instant and permaneat blindness. Training must accompany installation of such burners.

Solar Hot Water

A variety of solar water heaters from "black painted barrels" to flow-through systems exposing pipe tracing under glass backed by lack heat absorbers are in use throught the world. Many devices and systems appear in the bibliography that are applicable for use in Haiti and are successfully used in similar climates and conditions. The main utilization of hot water aside from personal hygiene and baby care is in kitchen utensil washing, clothes washing and animal sanitation. It can also serve as pre-heated water to expedite boiled cookery. (See Fig. 6)

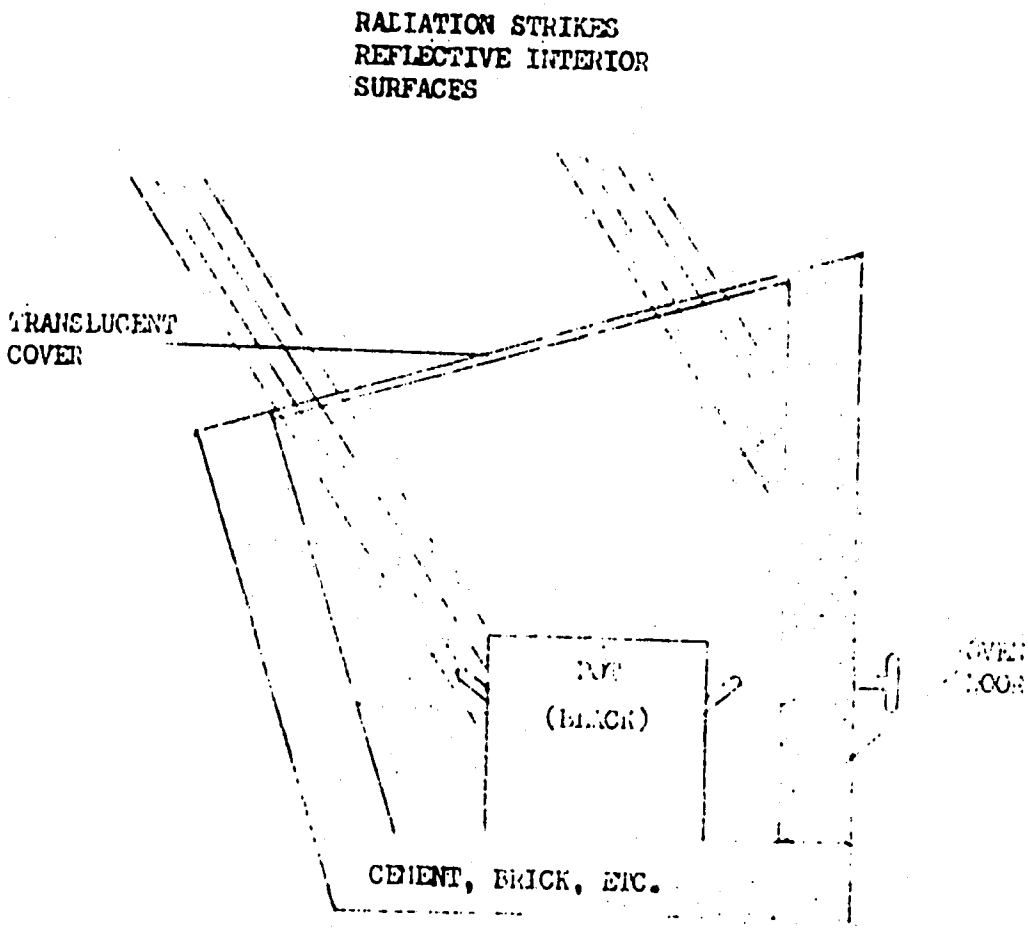
Solar De-Salinization

Several arrangements to distill sea (or brackish) water with solar energy and to collect the fresh water condensate are in use. They basically consist of a shallow sea water tracing over a black radia - tion absorbing surface upon which the sun is admitted through a sloping translucent cover. The condensate collects on the underside of the cover and drains down into a gutter separated from the sea water. (See Fig. 7)

The installation must be carefully situated to assure maximum solar impingement and to allow proper elevations for salt water feeding and fresh water collection. Location of the installation as close to the level of the water to be condensed lessens pumping or lifting requirements.

A very general calculation of one gallon of water per square yard of translucent sun-admitter/condensate-collector area per day gives at least an order of production magnitude under sunny tropical condi - tions. Roughly a 100-square yard installation might be expected to

INTERIOR REFLECTOR SOLAR OVEN

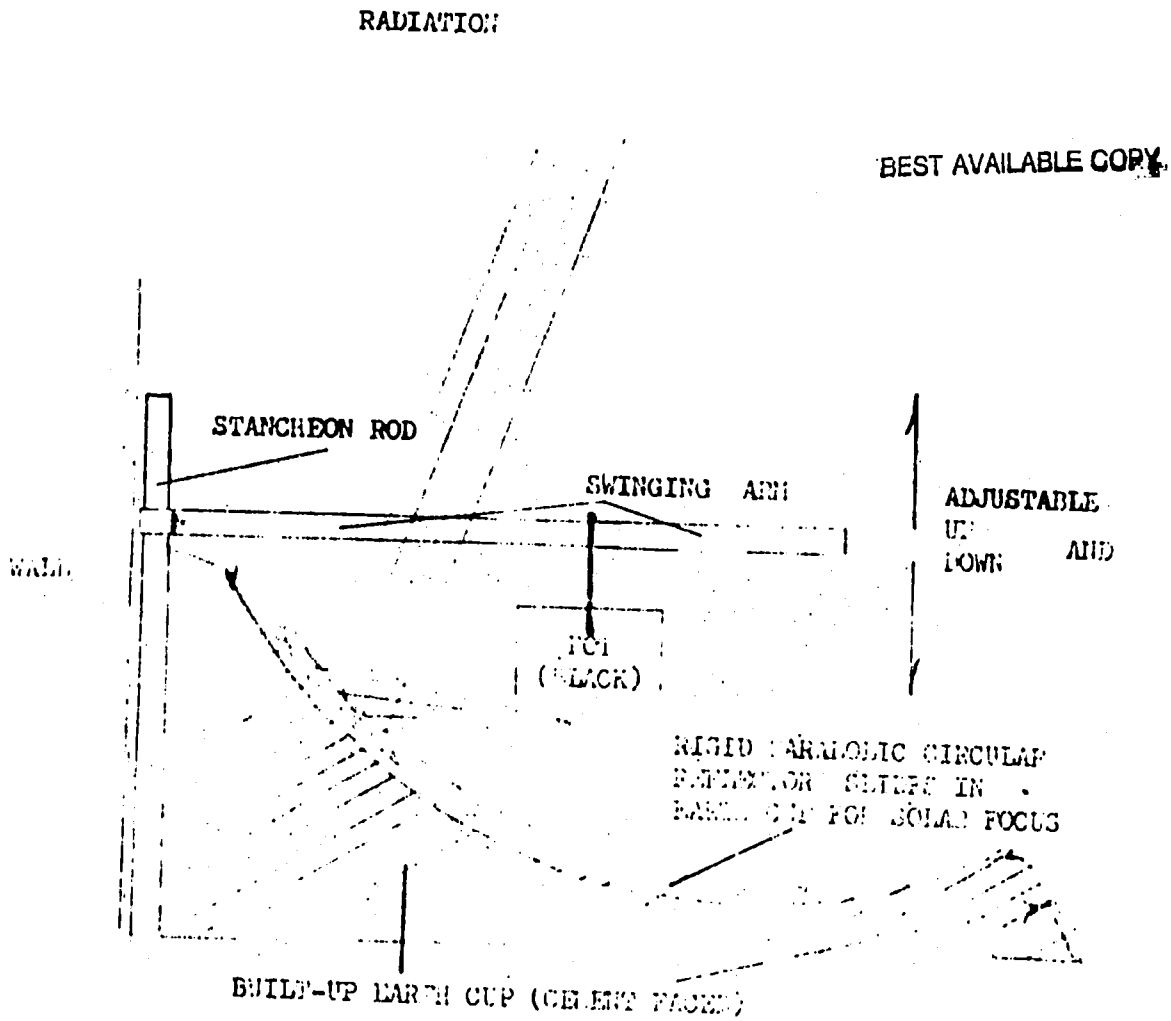


produce 100 gallons of potable water satisfying the consumption requirements of some two hundred adults.

With reasonable maintenance of the installation, the somewhat substantial original cost may be amortized over a period of time. Such an installation may be justified to provide potable water where there is little or none, or it may provide the minimum irrigation requirements in an arid lands enclosed environment project as described earlier.

Figure 5

SECTION OF RIGID PARABOLIC
CIRCULAR REFLECTOR BOILER



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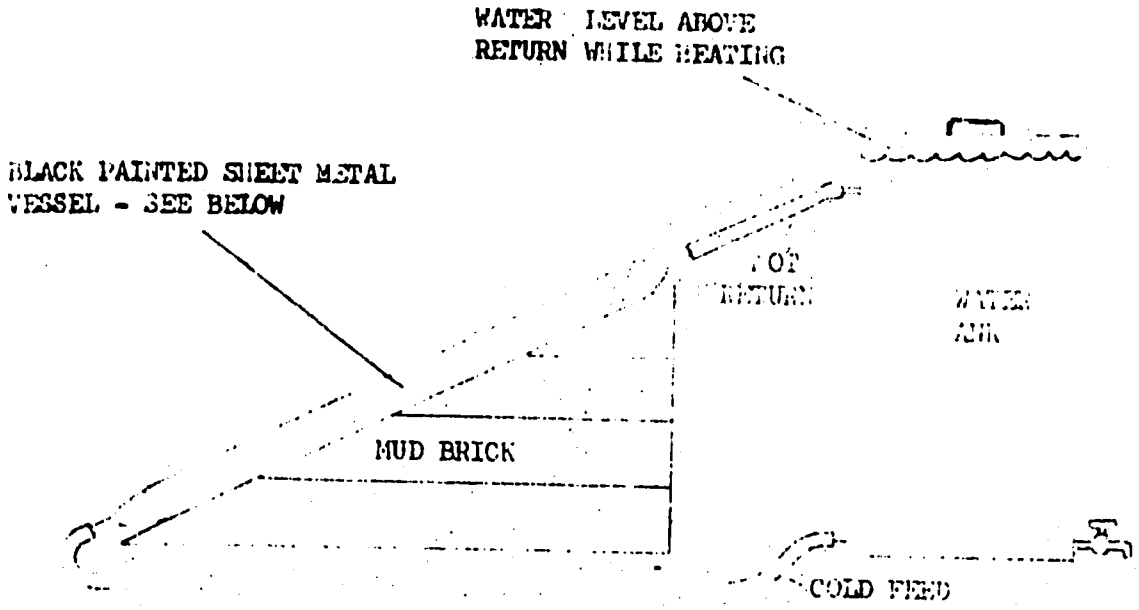
SCHEMATIC OF SOLAR HOT WATER HEATER Figure 6



TOP VIEW

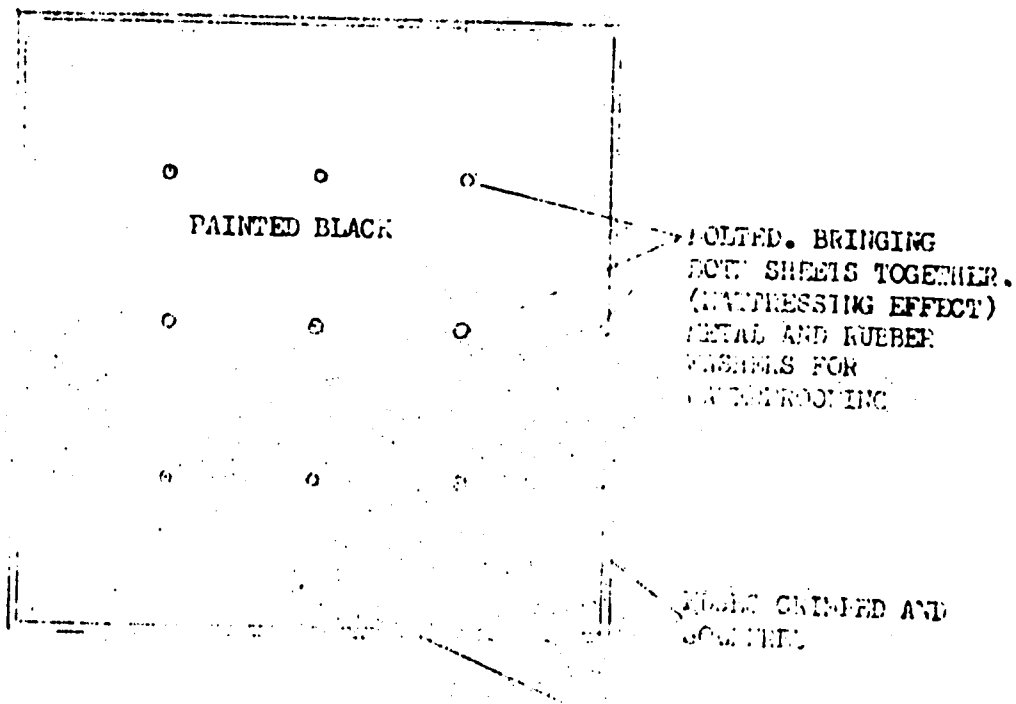
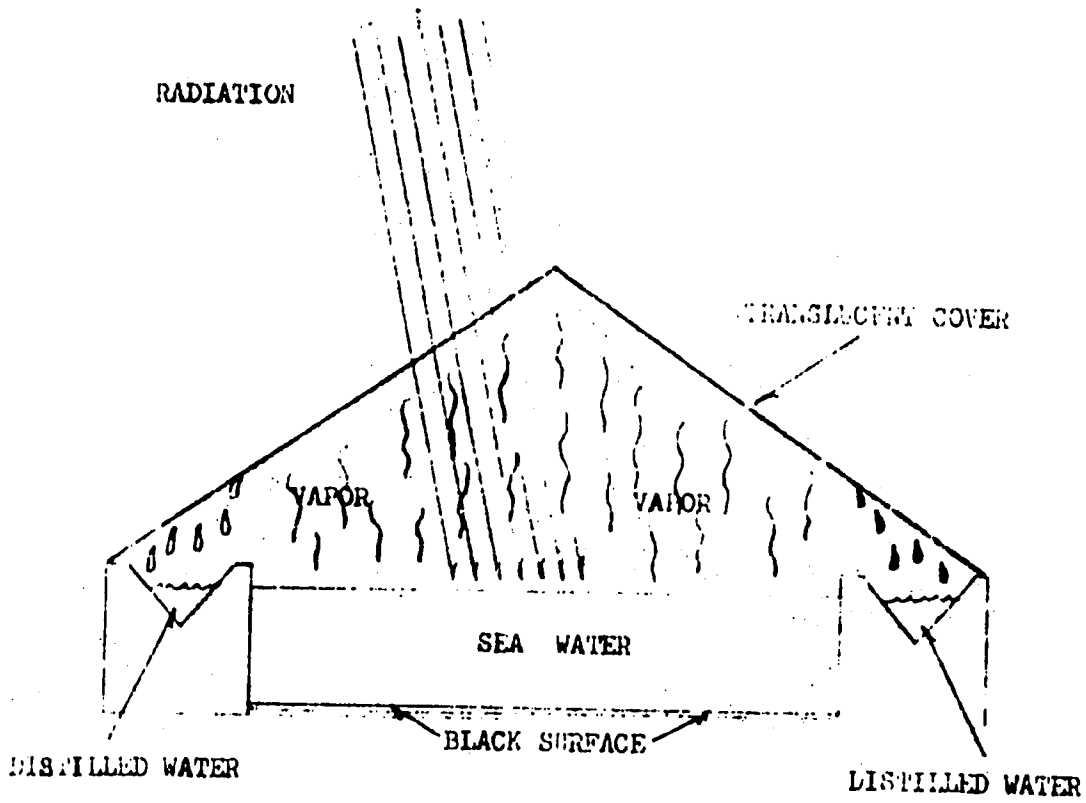


Figure 7.

TYPICAL SECTION OF SOLAR STILL



BIO-GAS

(Methane Generator)
INTRODUCTION

Bio-gas (approximately 70 percent methane and 30 percent carbon dioxide, including a small percentage of hydrogen sulfide) generated from anaerobic decomposition of organic waste is a proven and at times a useful technology. This power sources has been developed in a variety of forms, and successfully employed throughout the world, particularly in rural India.

As a power source and fertilizer producer, bio-gas generators have enjoyed considerable attention in the developing countries. The utilization of this technique is within the requerements of appropriate technology application and the development of these devices is within the competence of most rural environments.

The inputs or "charge" to these generators are:

Animal excreta
Vegetable waste
Water

The outputs are:

1. Methane (the combustible bio-gas component) as a clean combustible material. Methane, even with a 30% CO^2 component, may be burned in any of the conventional utility gas applications such as ranges, ovens, furnaces, refrigerators, gas lampsm etc. It may be used as a fuel for modified internal combustion engines. In this manner, methane has powered motor-electric generators, tractors, automobiles, etc.

CAUTIONARY NOTES

In considering domestic or communal use of methane, a comprehensive safety education program must be developed. Aside from it high combustibility, methane is both odorless and toxic, though unscrubbed bio-gas usually has sufficient sulphur content for "skunking". Nevertheless, cooking areas should be well ventilated. Training in the uses of methane generators and gas burners is important.

The operator for instance of a methane burner application upon being unable to establish flame or upon noting absence of flame in a burner being used must:

1. Turn off the gas supply immediately
2. Check the system for possible cause

3. Allow the space in which the burner is located to aerate before attempting to re-establish flame.

It is not established that the anaerobic digestion operation at about 93° F, eliminates all pathogens in human excreta. Despite some convenience in directing privy wastes into a bio-gas system, health considerations may dictate not using human waste for this process.

Haiti Bio-Gas Experience

A methane generator of Indian design is in sometime operation at the Baptist Mission near Petionville above Port-au-Prince. The digester, mounting, and access are prepared from poured reinforced concrete. The digester producing approximately 100 cu. ft. of gas per day is of a double wall design providing a water seal slot in which the movable cover is suspended. Designed as a continuous digester, it has, however, been operated most successfully as a batch process digester using a variety of animal manures. It was conceived to fuel the kitchen of a 30-bed hospital as well as an employee's kitchen. It appears to be the only operating methane generator in Haiti.

Most methane generator data stress seasonal variation in digester operation. Except for higher elevations, Haiti's seasonal averages vary from 75° F. to 85° F. For most practical considerations, methane generation in Haiti is a year around matter, without requirement of auxiliary heating of the digester.

Around the World

The experimental data produced since India's first digester operated in 1900 as well as impressive practicalapplications in India, Germany, Dutch-Indonesia, South Africa, Great Britain, Hungary and the United States have established positive uses for this technique. The Indian experience and devices are particularly adaptable to poor and remote areas.

Also, a considerable body of recent U.S. experience is particularly appropriate to small installations (See Bibliography).

Possible Methane Generator Applications in Haiti

Even the relatively modest expense and complication of bio-gas generator operation probably render them impracticable for individual rural home use in Haiti. Nevertheless, a case can be made for communal applications in remote villages.

Communal bakeries (charcoal fired) were observed which could benefit by methane burner operations.

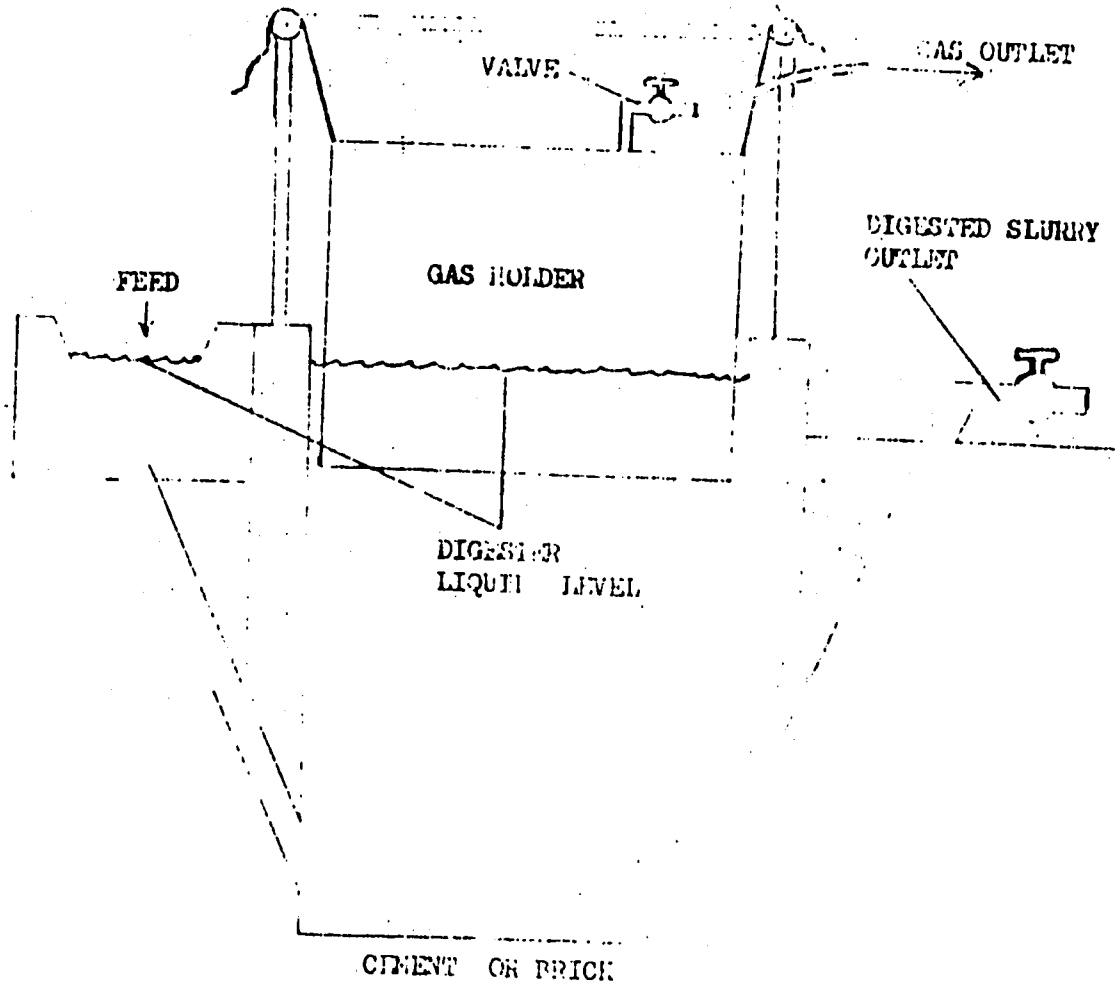
As a communal project, it is considered reasonable that 100 - 500

cu. ft. per day bio-gas generators could serve the community baking requirements. Nutrition center kitchens and infirmeries located nearby could benefit from the fuel provided.

Animal and other waste management appears practicable to provide adequate charging for bio-gas generators of the magnitude described. (See Fig. 8)

EXHIBIT A.

SECTION OF BIO-GAS GENERATOR



CHARCOAL: ALTERNATE FUELS

Organic Residue Briquettes

Local development in the compression briquetting of agricultural wastes (vetiver, bagasse, sawdust, etc.) from industrial processes is currently under way. A soap manufacturing residue (locally known as "silice") is used as binder. Prototype briquettes, 1½ x 3 x 10 inches, weighing one pound are reported as producing 15,000 BTU per pound. The briquettes examined are firm, lean, easy to handle, and may be broken by hand into smaller pieces.

An entrepreneur concerned with this activity estimates 50,000 tons per year of such waste is available throughout the country. Processing is planned to be done at Port-au-Prince. Data supporting this tonnage of waste is believed unreliable and a data review of the matter is indicated. Production of 50,000 tons per year of this type of briquette would, however, require fairly complex production machinery. If the retail prices did not greatly exceed that of Port-au-Prince, namely $0.40 per pound; the process could be viable.

Discussion of the utilization of plant residue briquettes indicated that little consumer application or acceptability testing had been conducted. Caloric tests have been made in a special burner, with "full" combustion lasting about 25 minutes. Considering the reported caloric value of these briquettes, they could be effective in brazier cooking though further responsible testing is required.

Apart from factory production of such briquettes, they could possibly be hand made in remote areas by using available waste, simple presses, and starch binder. Both rice and coffee hulls with somewhat higher caloric value could be used for such briquetting.

Pyrolitic Conversion of Agricultural Wastes (Cellulose) to Alternate Fuels

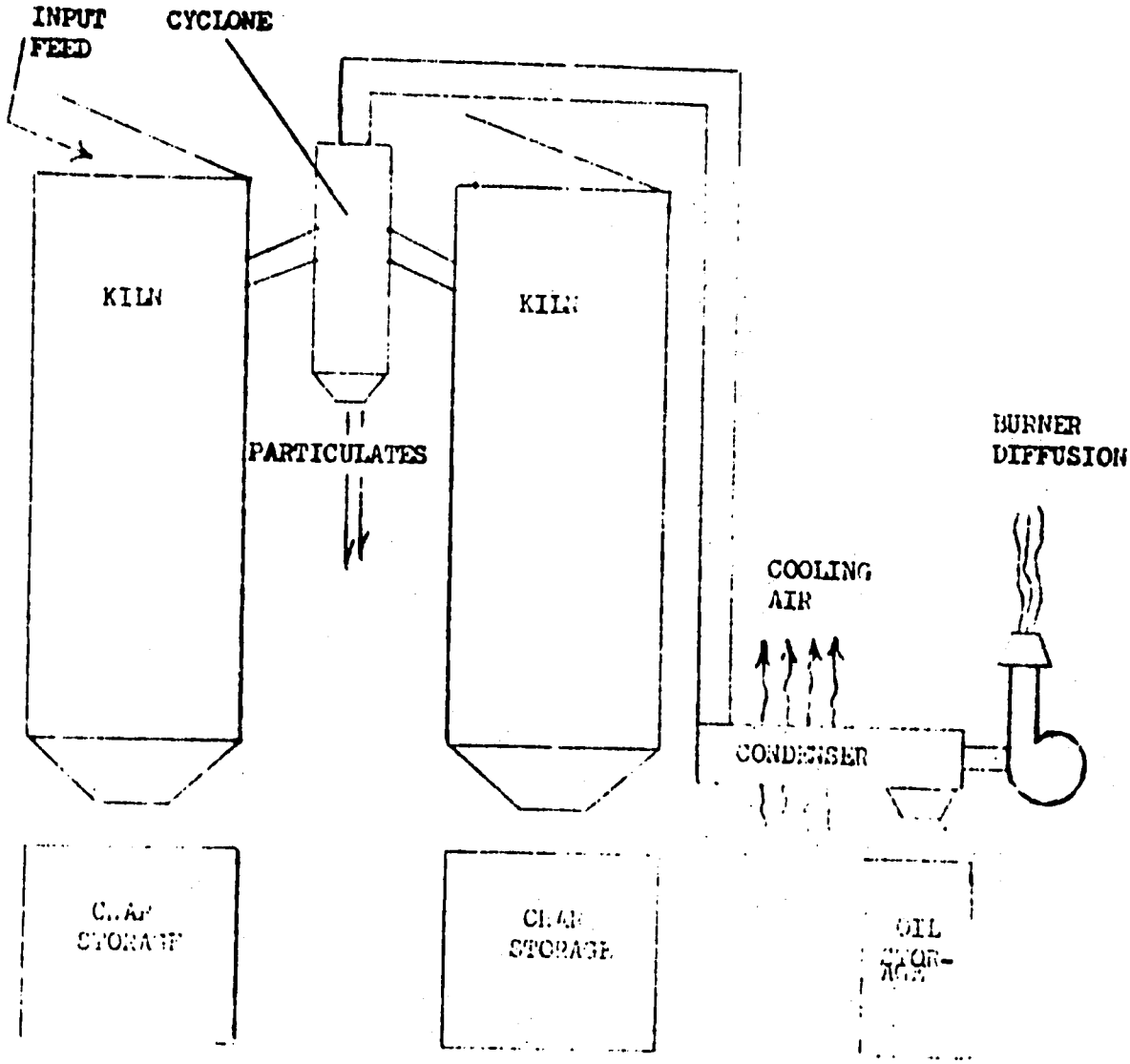
Significant technology now exists to convert a wide variety of agricultural wastes into char, oil and gas. The delivery of high quality fuel from feed products of bagasse, rice and coffee hulls, vetiver, sawdust and chips, palm and banana stems and husks, etc. could provide valuable charcoal substitute fuels. The main product of pyrolysis, char, may be efficiently burned as a boiler fuel or as briquettes for domestic consumption. The pyrolytic oil may be burned commercially as a bunker "C" equivalent or domestically in modified lamps or ranges as a kerosene substitute. Practical one ton a day pyrolytic plant designs may be economical and suggest potential locations at a number of waste producing centers. Adequate wastes availability need however to be proven. (See Figure 9)

Lignite

Lignite deposits have been identified in Maissade and are being investigated for exploitation as a source of fuel.

FIGURE 9

SCHEMATIC PYROLYTIC CONVERTER



WIND POWER AND PUMPS

I. WINDMILL PUMPS - (The Required Techniques of Well Drilling are Appropriate to this Section)

POTABLE WATER

Water from uncontaminated or purified water sources is often susceptible to contamination between source and consumption. Mechanical transfer through a closed hydraulic system from source to consumption provides an optimum of sanitary integrity, e.g., a spring capped in cement and led through piping to the outlet serving the consumer - presents less possibility of contamination than a spring flowing into it natural basin from which water is dipped and transported by the consumer.

Lacking the natural flow of a spring, a well must be pumped or bucketed to the consumer. Bucket lifts, even of improved design, are still susceptible to a contamination at the well opening. Most pump systems can be constructed to afford sanitary integrity from source to consumer outlet.

A windmill powered pump can provide water from a well or cistern to a remote outlet in a sanitarily sealed system. The water is delivered to the consumer with minimum traffic and, thus, possible contamination at the source. In cases where wind is intermittent, an intermediate reservoir may be required for continuous supply, possibly with alternate feed from a hand or motor-operated pump. An intermediate reservoir may also be required if chemical treatment or filtration of the water is required. (See Fig. 10)

Windmill pump technology is well established (American farm-types: Dempster, Baker, Aermotor, etc.) and usually drive through a standing spout-and-handle pylon, which can also be hand operated. A large choice of wind capabilities and pump capacities is available.

The Savonius rotor (two 55-gallon drum halves in an overlapped "S" rotating about a vertical axis) is an intermediate anemometer. Though less wind efficient than horizontal axis rotors, this arrangement is inherently susceptible to winds from any direction. Rugged and practically maintenance free, the S-rotor is particularly adaptable to low (0-25 feet) lifts and can directly drive an Archimedian screw or be geared or linked to other type pumps.

Irrigation and Utility Water

The same equipment is usable for irrigation as for potable water though less attention and structure need be devoted to sanitary considerations. Generally the volume requirements are greater and full-time unattended operation is usually desired.

In low lift operations the Savonius rotor is particularly suited to constant, unattended operation. It can drive a variety of pumps, including bucket chains and wheel lifters.

In cases of extreme aridity, it is useful to note some published pumping capacities of the Aermotor (standard Prarie type) windmill. With a 15-mph wind, 16-foot rotor and 1 3/4 inch cylinder, 150 gallons per hour at 1,000 foot lift are delivered. With a 15-mph wind, 6-foot rotor, and five inch cylinder, 900 gallons per hour at 17 foot lift are delivered.

With appropriate installation and wind conditions, a windmill pump can serve both potable and irrigation water needs.

Various sail-type windmills are proven for low to moderate lift operation (such as the "Polomo" mill developed in Ethiopia). These are more efficient than the S-rotor but require constant surveillance and nightly retrieval of the sails, and reefing of the sails during high winds.

Hydraulic Rams

Hydraulic ram technology is applicable in lifting grom streams, diversion dams, etc. Hand pumps (Battelle type, Chinese Chain Piston, IRRI Diaphgram, etc.) can be used in small irrigation plot or other marginal situations. (See Fig. 11)

Windmill Electric Chargers

For the prupose of utilization in remote areas, the relatively low powered, (200-1000 watts) windmill/automobile generator battery charger may find selected application in rural Haiti. Their application is low voltage (6-12 V) source for lighting in dispensaries, communal buildings and emergency areas. They may also serve as power for radio communications, charging vehicular batteries, and operating small dispensary refrigerators, pumps and appliances.

Wind conditions in Haiti are not well assessed but appear to offer considerable periods of operation time in select areas, particularly in the coastal settlements. Larger, high capacity wind-electric generators, to which several references are made in this section's bibliography, could be given future consideration based on experience and wind data obtained during the establishment of smaller installations.

For purposes of comparison, an installation of wind power devices is in successful operation at Mole St. Nicolas. Situated on top of a 15-foot high cistern, one 4-foot windmill with fiberglass blades lifts water approximately 30 feet to storage drums and an overflow

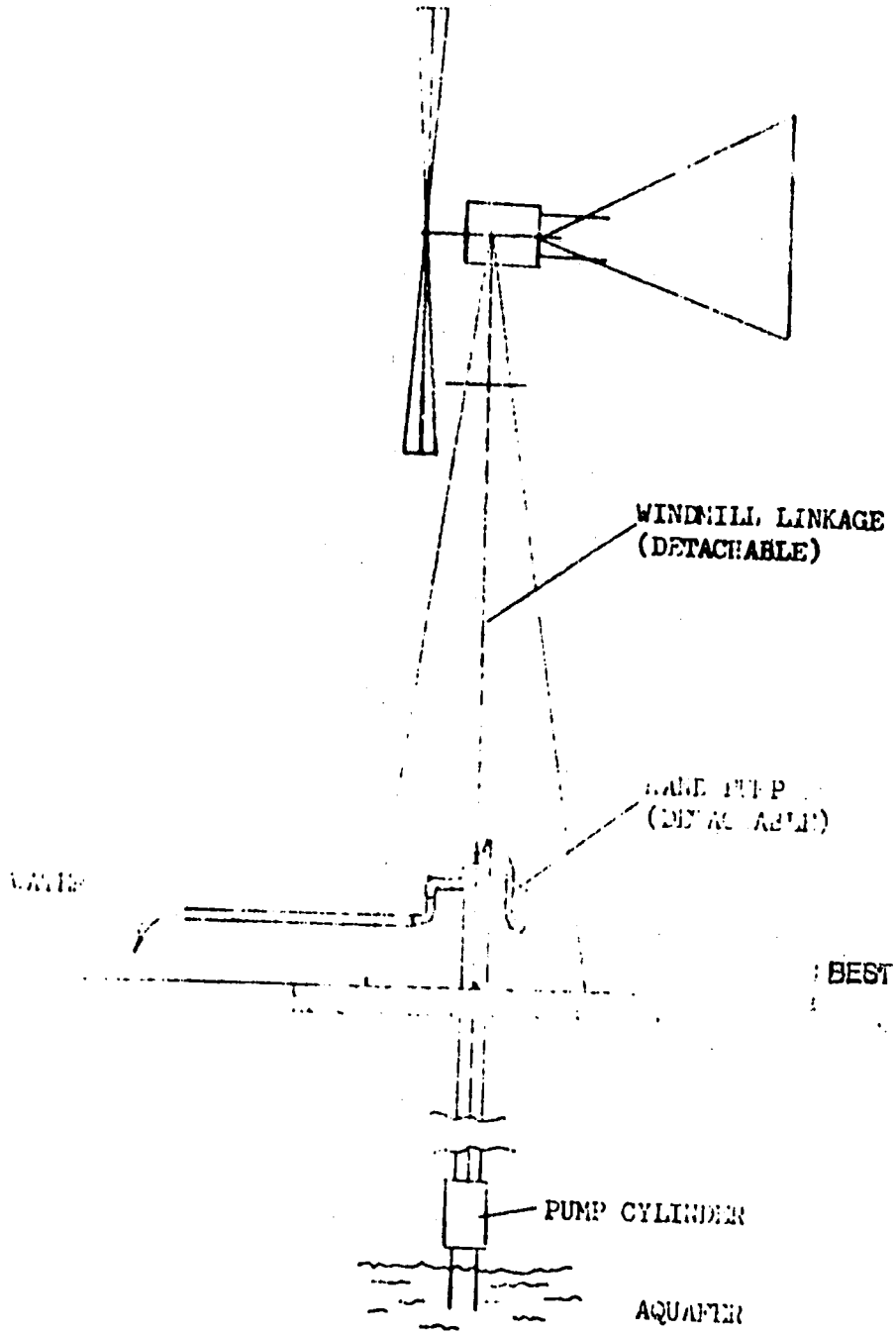
tank and provides the compound's drinking and irrigation water. Mounted beside this, with some seven years' service, is a U.S. patent (1930) "Wincharger" providing 200 watts to two parallel 12-volt truck batteries which give the building it serves all its indoor and outdoor light as well as supplying power to a refrigerator and a television set. A second "Wincharger" of the same capacity has recently been installed on the same structure to provide additional power for a nearby Mission hospital. (See photos).

The "Wincharger" type device with two, three, or four blades of 4 - 5 feet diameter with output of 200 - 1000 watts, is appropriate for the applications described above. It requires pylon mounting. Two or three parallel batteries are recommended, or more if considerable windless periods are anticipated, or if heavy intermittent power demands may be made.

Upon installation, some operator competence and training are required for "Wincharger" operations. The windmill electric charger must be "braked" or feathered to avoid destruction in heavy winds. The batteries must be regularly tested and serviced for charge and condition of the electrolyte. The electrical system to all outlets is usually 12 V DC and may be treated as standard automotive circuitry. The complexity and expense of "Winchargers" makes it a highly selective technology for application in rural Haiti. (See Figure 12).

FIGURE 10

SCHEMATIC OF WINDMILL PUMP
POTABLE OR IRRIGATION WATER



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SCHEMATIC HYDRAULIC RAM

FIGURE 1

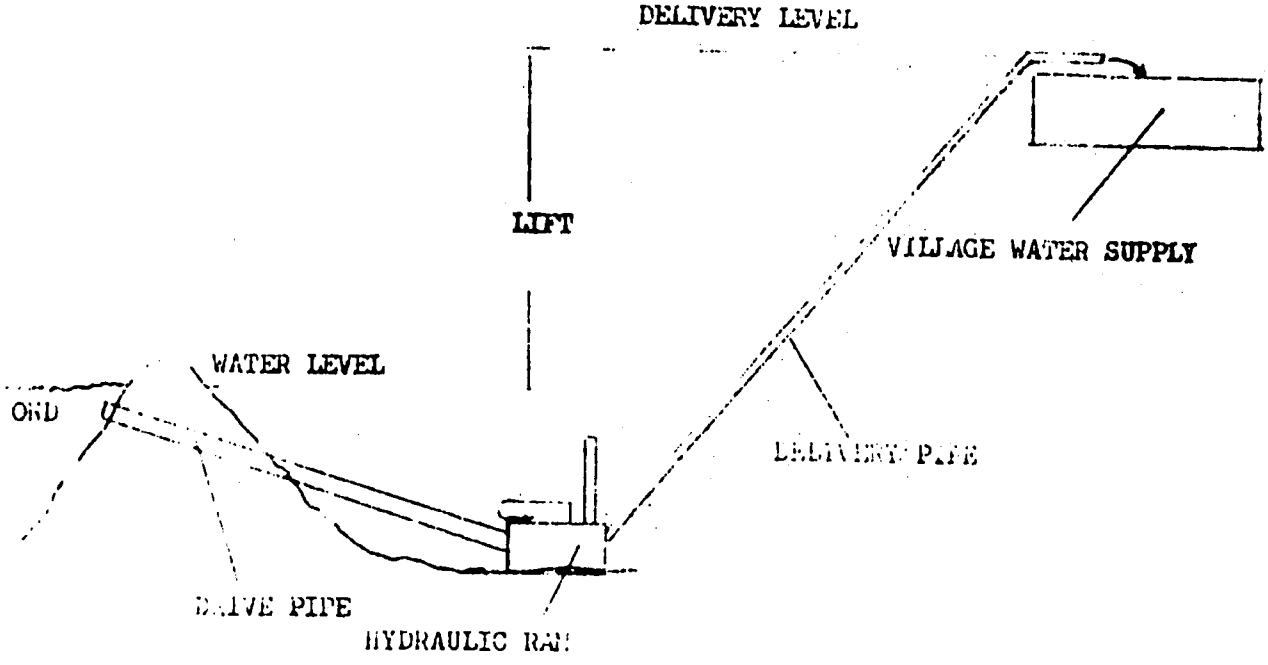
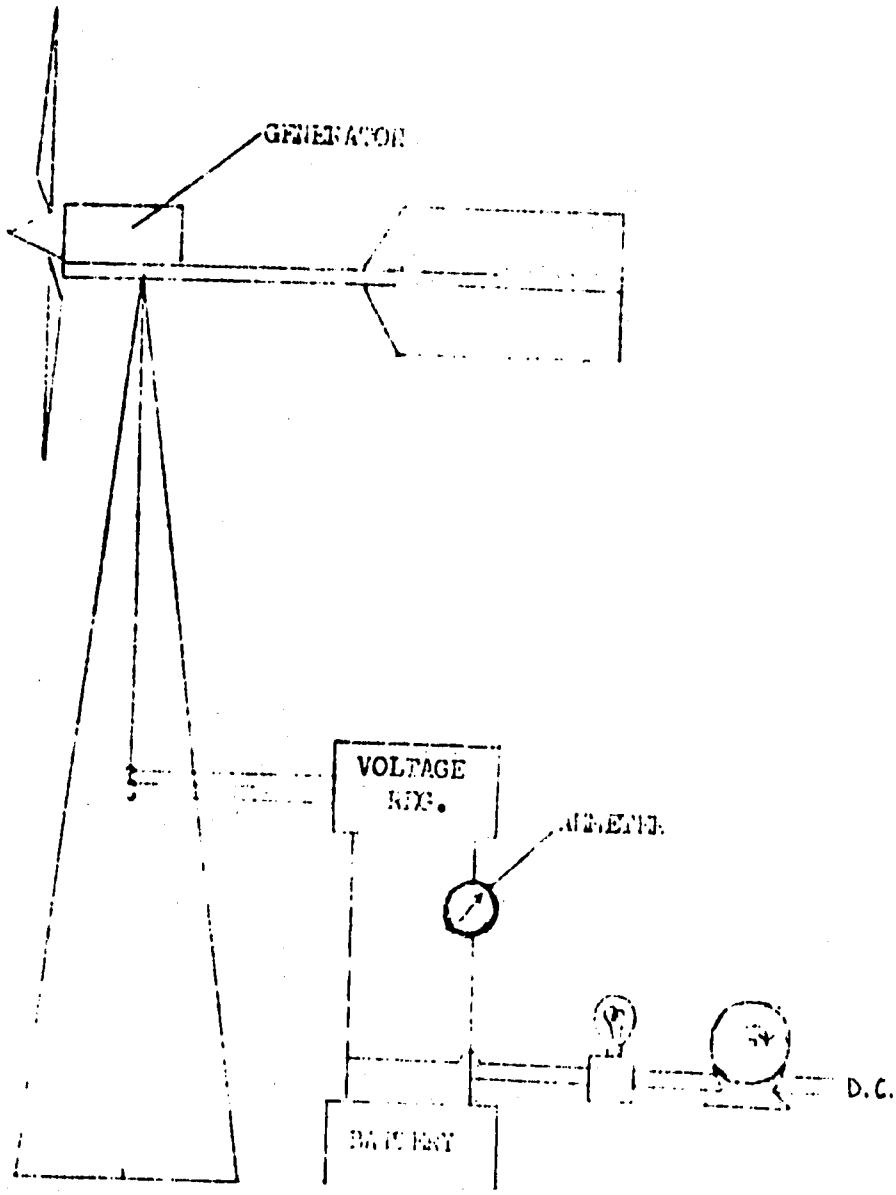


FIGURE A

WINDMILL GENERATOR
AUTOMOTIVE BATTERY CHARGE SYSTEM



HAND TOOLS PRODUCTION

A project workshop with practical field application in remote locations may undertake the following activities:

1. Forge activities to include the production and repair of traditional tool and implements, i.e., hoes, rakes, shovels, picks, machetes, harrows, small plows, etc. (See Figure 14)

2. Fabrication of solar energy components such as water heaters, reflector ovens, parabolic reflectors, etc.

3. Fabrication of water handling components such as pumps, windmills, windmill towers, hydraulic rams, etc.

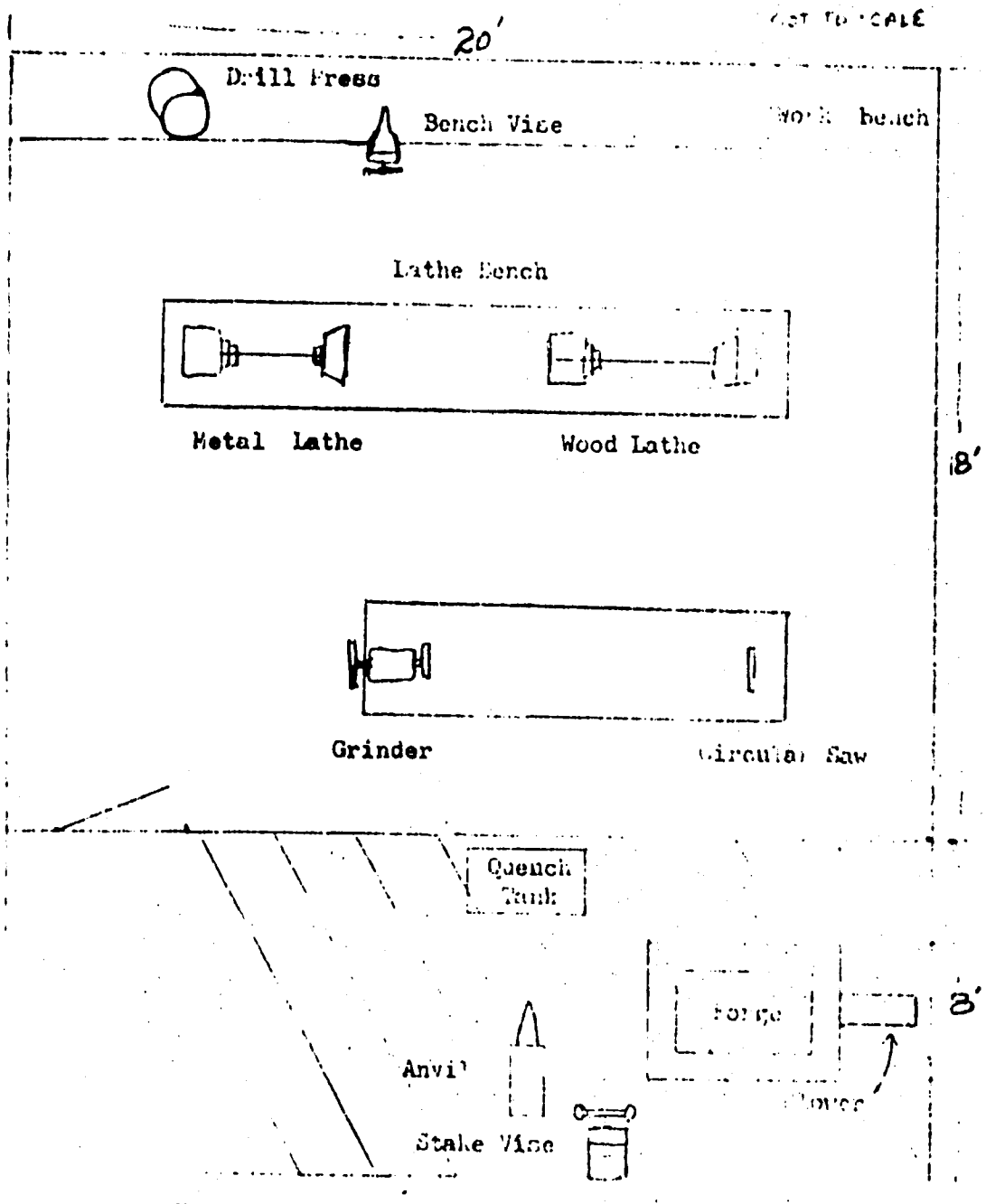
4. Fabrication of methane generator elements.

5. Development of prototype wind electric systems locally produceable from available components.

See Figure 13 for suggested layout of shop.

Suggested Layout of Shop and Forge Area

FIGURE 11



Forge area open except for roof and baffling around forge and blower.

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Annex C

Exhibit 1

Project and Legislative Background

I. Project Background

Haiti, with a population of about 4.6 million has some 3.5 million rural inhabitants. Haiti'economy is almost wholly agricultural, labor intensive, technically primitive, and dominated by very small subsistance farms. Land holdings tend to be under 2 hectares. The average population density of 420 persons per square mile makes Haiti one of the world's most densley populated nations. The birth rate (36 per 1,000) and death rate (36 per 1,000) are both considerably higher than other countries in the Western Hemisphere. The national average per capita income is $170 with identifies Haiti as one of the least developed countries in the world. However, the average annual income of the rural population is even less -- perhaps $80 per annum. For the small farmer income is estimated as $40-50/person.

There are an estimated 500,000 farm units in Haiti located on a total agricultural land area of about 1.6 million hectares, of which only about 870,000 hectares are cultivable. Of this total, 500,000 hectares are mountainous and suitable principally for production of tree crops such as coffee, mangos and plantain, or for grazing of small livestock, mainly goats. While some large-scale farming occurs in sugar and sisal production, land distribution is fairly even and only 25% of the farm units are estimated to have more than four hectares. The total land availability is so limited, however, that the remaining 75% of the farm units have only about 1.1 hectares each, and not all of that is cultivable.

Further fractionalization results from the system of multiple holdings. Individual farmers will rent, sharecrop and own different plots at the same time. Land tenure is uncertain. While in the 1950 census 80% of the farmers said they were land owners, registered titles are reported to cover less than 50% of the agricultural land area.

Population pressures and low income levels inevitably affect the Haitian farmer's use of the land. The land of rural Haiti has suffered, poor cultivation practices leading, in wide areas, to moderate to severe arable land deterioration which has been further advanced in some areas by recurring drought. Soil exhaustion, erosion, poor planting practices, and stripping of tree cover has created severe ecological damage. Repeated slosh and agriculture for food crops has exhausted much of the soil. Farmer's economies generally do not permit him to lit the land lie follow for even a season, or to replace lost nutrients by fertilizer application.

Although subject to local variation, the country is generally well watered in two distinct rainy seasons. However due to extensive deforestation of the mountains, most of the water is lost through rapid run-off causing sever erosion.

As a result, erosion is uncontrolled, reducing still further the effective agricultural land area in the mountainous regions. The erosion also reduces the productivity of the plains areas because of the floods and deposits of silt and stones which are its by-product. Thus, Haiti is faced with two simultaneous, critical problems: to increase agricultural production, and oritec and restore its land resources.

The use of tools on small farms is limited almost entirely to the hoe and the machete. Purchased inputs are rarely used, except under special programs of limited scope. Use of improved seeds and planting stocks is very limited because of a lack of research, a lack of access to agricultural credit, and lack of government and private sector effort to produce or make available seeds of improved varieties on a wide scale. (With approval of an FY 1978 Agricultural Development Support II project, the research and dissemination of improved methods and inputs should increase appreciably). Planting stock of important tree crops is produced but on a grossly inadequate scale. Pesticides; are little used other than for cotton. Fertilizer use is largely limited to a several hundred tons each on rice, sugarcane, coffee, cotton and vegetables. Existing irrigation systems serve only some 70,000 hectares but at least half of these systems are not properly maintained or utilized due to past hurricane damage, lack of maintenance and improper management.

Beyond the relatively urban centers of Port-au-Prince, Cap-Haitien, and a few small coastal communities, electric power, telephones and piped water are generally absent. Rural areas inaccessable because of bad roads and health facilities and schools are almost non existent. Rural industry is sadly lacking except for limited production handicrafts in a few areas. The primary source of off-farm income is restricted to production of charcoal. Illiteracy is 90% and rural Haitians who suffer disease, high infant and child morbidity, malnutrition and extreme material want.

Although urban communities receive the major portion of Haiti's resources and the major rural sectors continue to be denied basic services such as primary education and medical treatment, a more positive approach is being taken to resolve some of these inequities. Since the current President Jean-Claude Duvalier, came to power in 1971 there has been increasing GOH recognition of the importance of the rural areas to the national economy, and the GOH is devoting an increasing amount of its resources in support of rural development programs, indicated in the National 5 Year Development Plan.

In addition, the GOH has recognized that the benefits of development programs will only be felt over a long period of time, given the severity and complexity of existing constraints. In order to provide the rural poor with more immediate improvements in the quality of life, the GOH has requested AID and other donor assistance to establish interim programs for the research and application of appropriate technologies.

It is proposed to grant to the Government of Haiti the sum of $332.000 a three-year project to be called Appropriate Technology. These funds are to be obligated on an incremental basis begining with the first obligation in Fiscal Year 1978; and are contingent upon Congressional notification (Section II -B-1). AID funds will provide technical assistance, equipment and materials, vehicles and some training. This project is to assist the Office of Science and Technology within CONADEP to carry out a series of feasibility and development activities to test technological innovations which are deemed to have potential for producing a near-term benefit incidence for the rural poor adopting such technologies, and for being acceptable to a reasonably wide segment of the rural population.
CONADEP/OST will arrange for dissemination and explore ways and means of disseminating the tested devices to the rural areas through programs and projects of various government of Haiti entities, other donors, PVO's and possibly private organizations.

This project has been found to be technically, financially and socially sound. The project is consistent with AID's strategy as described in Haiti's most recent Development Assistance Program (approved June 1977) for assisting Haiti's rural poor, and with the National 5-Year Development Plan currently in effect for Haiti.

Annex C
Exhibit 2

II. Legislative Background

A.I.D.'s working Section 107 of the Foreign Assistance Act authorizes AID to support an expanded and coordinated effort to promote the development and dissemination of technologies appropriate for developing countries. Some of the general concepts of appropriate technology as a development tool were introduced during Congressional Hearings held by Senator Long in April, 1977. First, although there is a large variety of relatively advanced agricultural and food processing techniques available which are inappropriate to LDC's, there also are many technologies that can usefully be adapted to developing countries. Second there is a need to determine the right level and mix of technologies for any given country (or location in a country). Third, ways are needed to lower costs of such innovations, make them broadly acceptable, and develop methods for insuring wide dissemination to benefit the most needy. The hearings also touched on the importance of energy substitution and conservation to developing countries, as well as the need to provide low cost fuel and energy to the world's poor. It was the consensus of the participants that foreign aid planners should treat development of energy, employment and agriculture as a comprehensive process; and that pilot projects should be designed to help the people of less developed countries develop self reliance at the home and small form levels through self-help and small business-type enterprises.

USAID/Haiti is submitting this PP. In response to the new initiatives set forth in Section 107 of the FAA, the proposed Haiti Appropriate Technology Project, is the first of its kind in the LA region and may serve as a model for similar projects by other Missions.

This project was firs proposed (PID) in cable Port-au-Prince 2187 dated 8-13-76 as pilot Project called Intermediate Technology. It was listed as such in the 1978 Congressional Presentation for a total funding of $485,000. A Project Review Paper was not prepared as the project was less than $500,000. During the July 1st, 1977 AID/W review of USAID.Haiti's AES, it was decided to merge the proposed FY 1979 "Simple Technology" project ($701,000) with the"Intermediate Technology" project to accelerate transferral of all available technologies to the rural poor. The consultants, experience Inc. arrived in Haiti on May 30, 1977 to help collect data for the PP and as a result of the July 2nd 1977, ABS review, revised their report to merge the Simple and Intermediate Technology project.
Several concepts of the Simple Technology project involved the selection of 10-15 prototypes, such as water storage devices, simple pumping devices and low cost windmills, which would be pilot tested by village inhabitants for replication on a greater scale in the form of cottage industries. It was envisioned that community councils and GOH entities would become the catalytic agent for testing and replication efforts. The Intermediate Technology project was similar to the ST project in selecting low cost technologies to be site adapted rather than pilot tested and considered actual "tasks" to be developed, site

tested and adapted, using U.S. consultants having detailed technical knowledge of the technologies selected. The merging of the S.T. and I.T. project combined essential components of both projects and was then called Appropriate Technology for a total funding of $1.678,000.

A Congressional notification will be needed because of the increase in proposed funding which differs from the 1978 CP amount.

ANNEX D

DETAILED EQUIPMENT LIST

		Cost $ US	Cost ¢ GOH
1	4-W.Dr. (Type Chev. Blazer); 2 DR; Manual Transmission A/C; Equipped 4 (plus 2 spares) steel belt mud tread tires and wheels plus 6 replacement S.B.M.T. tires; front mounted electric winch (2,500 lbs. 300 ft.); shortwave radio X-mtr/rec compatible with HACHO channels;	9,000	
1	4-W.Dr. (Type GM 1/2 ton pickup); Manual Transmission A/C; equipped 4 (plus 2 spares) steel belt mud tread tires and wheels plus 6 replacement S.B.M.T. tires; front mounted electric winch (2,500 lbs. 300 ft.); shortwave radio X-mtr/rec compatible with HACHO channels; mounted over-cab removable camper able to sleep 3-4 (Truck and equipment - $9,000; Camper - $3,000)	12,000	
2	4-W.Dr. (Type Chev. Blazer); 2 DR; Manual Transmission A/C; equipped 4 (plus 2 spares) steel belt mud tread tires and wheels plus 6 replacement S.B.M.T. tires;	14,000	
NOTE:	The above vehicles shall have compatible wheel and tire sizes.		
6	Heavy Duty Replacement 12 V Batteries	360	
	Total	35,360	

General Field Workshop:

	-Gasoline-Electric Generator Equipment	1,500
	-Air compressors, wood and metal lathes, electroweld equipment, drills and press-stands, vices, chain saw, portable water pumps, field tools, hand tools, miscellaneous shop equipment	6,000
	Total	7,500

ANNEX D

	Cost	
	$ US	¢ GOH
Field Workshop Offices:		
-Short-wave radio X-mtr/receiver compatible with HACHO channels	500	
-Office furniture, typewriter, water cooler, refrigerator, 4 air conditioners; miscellaneous		3,000
Total	500	3,000
Field Support Equipment:		
-Camp stoves, camp coolers, pressure cookers, 2 - 4 man capacity floored nylon tents, 4 sleeping bags, etc.		
Total	1,200	
Arid Lands Crop Development:		
-Project materials; cement, metal and other structure, pumps, plastic sheet, glass, etc.		
Total	4,000	1,500
Salt Water Fishing (Small Craft):		
-General equipment (Small Craft), ship building and/or acquisition material including motors, sails, and running tackle, nets, equipment for off-shore survey, etc.	8,000	10,000
-Locally-built refrigeration unit on base of used truck acquired locally		5,000
Total	8,000	15,000

	Cost	
	$ US	¢ GOH
Fish Ponds (Small Scale):		
-Miscellaneous operating materials, cement, pipe, pumps		
Total	500	1,000
Food and Seed Storage:		
-Project material, metal sheet, plastic structural members, hardware		
Total	1,000	1,000
Solar Cooker and Water Heaters:		
-Reflectors, reflector material, sheet metal, piping, structural materials, cement, etc.		
Total	2,400	1,000
Solar Desalinization:		
-Project materials: cement, plastics, piping, structural material, glass, cement, pumps		
Total	750	750
Methane Generator:		
-Project materials: cement, formed metal, structural material, pipe, tubing, gas handling equipment		
Total	2,000	1,500
Pyrolysis/Organic Fuel Briquettes and Lignite:		
-No specific equipment estimates available		
Total	6,000	

	Cost	
	$ US	¢ GOH
Water Delivery (Pumps and Windmills):		
-U.S. prairie-type windmills, towers, pumps and cylinders, hardware, piping, cement, structural materials , hydraulic ram components, etc.		
Total	2,700	2,000
Artisan Income Generation:		
-Project materials: craft support equipment and supplies		
Total	1,000	500
Hand Tools:		
-Forge, blower, anvil, forming tools, metal and wood for prototype tools		
Total	3,000	500
Equipment-Site Testing and Adaptation:		
Total	19,450	
Materials:		
Total	60,000	60,000
GRAND TOTAL	$94,550	¢90,250

ANNEX E

PRIVATE VOLUNTARY ORGANIZATIONS (PVO) OPERATING IN HAITI

Dissemination of technologies developed will be largely carried out by PVO organizations operating in rural Haiti.

The Association of Non-Governmental Organizations in Haiti (ANGOH) was formed in January 1977 at Port-au-Prince with participation as follows:

Full Members:

1. CARE Foundation
2. CRS - Catholic Relief Service
3. CWS - Church World Service
4. COHAN - Comité de Coordination Haitiano-Néerlandaise
5. CUNA - Credit Union National Association
6. Food for the Hungry
7. Foster Parents Plan
8. Grant Foundation
9. Interamerican Foundation
10. Heiffer Project International
11. Mennonite Central Committee

Associate Members:

1. OXFAM - UK
2. OXFAM - Canada
3. Family Planning International Assistance
4. Pathfinder Fund

Observers:

1. Representatives of Haitian Government
2. UN System (UNDP, WFP, FAO, WHO, UNFPA, UNESCO, UNICEF, World Bank, etc.)
3. Inter-American Syatem (OAS, IICA, IDB, etc.)
4. France (Fonds d'Aide et de Coopération)
5. Canada (CIDA)
6. Federal Republic of Germany
7. USAID

The Council of Evangelical Churches in Haiti (CEEH) includes the following foreign donor organizations working in particular areas of rural Haiti:

1. Missionary Church Association (Plateau Central)
2. Haiti Baptist Convention (North)
3. Project Help (Artibonite)
4. Pentecostal Church of God (Nation-wide)
5. OMS International (North and West)
6. Free Methodist Church (Port-au-Prince)
7. Church of the Nazarene (Nation-wide)
8. Assemblies of God (Nation-wide)
9. Conservative Baptist Haiti Mission (Nation-wide)
10. Unevangelized Field Mission (UFM) - Mission des Eglises Baptistes d'Haiti (Port-au-Prince, Artibonite, Northwest)
11. West Indies Mission (WIM) - Mission des Eglises Baptistes du Sud-Haiti (SUD)
12. American Wesleyan Church (Petit Goave, La Gonave)

At present, many of the above members of CEEH receive assistance in their relief and development work from a number of different service organizations:

1. MAP International
2. TEAR Fund (UK)
3. Compassion International (US/Canada)
4. World Vision (US/Canada)
5. Christian Relief World Relief Committee
6. World Relief Commission of the National Association of Evangeliticals (US)
7. World Concern

Catholic Groups: The extent to which Catholic groups are coordinating their development activities is not clear. It is understood that CARITAS is assisting the Bishop of Cap Haitian in the coordination and promotion of development activities undertaken by Catholic organizations in the North. However, it is not essential for any potential PVO participant in this project (or in later dissemination efforts) to belong to a coordinating group. The primary Catholic-affiliated service and/or development organizations which appear to be good candidates for cooperation with the GOH in implementing this project are:

1. Clercs de Saints Viateurs (Port-au-Prince, North, Gonaives)
2. Montfortains (North-west)
3. Scheut Fathers (Plateau Central)
4. Oblate Fathers (North-east, South-west)
5. Holy Cross Fathers (North)

6. Salesian Fathers (Port-au-Prince, North)
7. Brothers of Christian Instruction (Nation-wide)
8. Brothers of the Sacred Heart (Port-au-Prince, North)
9. Prêtres de St. Jacques (South)

To these should be added the many orders of Catholic Sisters which work in close collaboration with the above groups, as well as Catholic Service organizations:

1. Association Medicale Internationale (AMI) - Canada
2. Catholic Medical Mission Board (CMMB)
3. Catholic Relief Service (CRS)
4. Organisation Catholique de Dévelopment et Paix (OCDP) - Canada
5. Misereor (FRG)
6. Office Centrale Catholique pour l'Aide au Dévelopment (FRG)
7. Secours Catholique Français

ANNEX F

STATE OF THE ARTS

Preliminary research was conducted prior to selection of prototypes based on the level of knowledge/experience of these technologies initially leading to their selection as the best among others suited for solving problems of the local Haitian environments.

A. Water Related Technologies

The completed prototypes will be expected to increase potable water access as well as access for irrigation and general utility.

1. Prototypes will include water pumps, windmills and water rams. These devices are being used in LDC's the world over. Water pumps and rams are currently being used in Haiti for irrigation systems and for some villages (assisted by PVO's) for water supply.

Installation and experience with these devices in Haiti shows the rural villages are eager to accept and have requested assistance for these technologies.

2. Solar desalinization to obtain fresh water is a highly technical process not yet adapted to LDC's and is still experimental. Haiti's prototype will be developed without motors, metal structures or metal trays, with the aim of permitting duplicates of the equipment to be hand-built. In view of the relatively high initial investment, even for a hand-built prototype, dissemination will probably have to occur through GOH and/or other donor projects.

3. Water lifting from a stream bed to a village sand filter may be "best" accomplished by a "simple" motorized pump. The cost, however of such pumps must be considered for use at hundreds of sites as well as with the need for motorized pumping. Such pumps may simply not be practical given the high implementation cost and the very high continuing operation costs as well as demanding maintenance requirements. The selection of such technology would likely be premature. The benefits of water lift and filtration may be gained, however, with reasonable dependability, by the use of simple very low cost hydraulic rams, or by wind or hand-power pumps using pipe (even hollowed bamboo) feeding stone and sand filters. The benefits gained by these techniques in rural Haiti are likely to be optimum for existing conditions. More sophisticated water access solutions would have to await the development of conditions that could support both the operations and ongoing costs of more complex technology. The basic problem is one of upkeep and maintenance and spare parts, as experience shows that once the equipment is installed, preventive maintenance is neglected unless members of the PVO or donating organization are on site to continually provide assistance.

Resolving these problems will be part of the teaching process by OST consultants when site adapting these prototypes. This will also be a major concern for all prototype development and especially during the country-wide dissemination stage for Appropriate Technology II, the follow-on project.

B. Nutrition Technologies

The completed prototypes will have been designed to increase food production, create access to a wider range of nutrition food stuffs, and/or extend the effective period of time nutrition food stuffs are available to rural adopters.

1. Arid lands technology is highly experimental and involves a somewhat higher initial cost factor (for materials) than other technologies being tested under this project. With research it is anticipated that a low cost system for the Northwest can be developed. The technology has been successfully tested at the University of Arizona and the University of Sonora, Mexico, using plastic greenhouses. Site adaptation will focus on lowering the costs of this technology. At present, however, it is likely that the technique will be found more suitable for incorporation into future GOH watershed development projects where financial assistance for installation may be available.

2. Small crafts technology is currently being used in sea coast countries of Africa and has been highly [illegible] in the Philippines, Vietnam, Puerto Rico and the Dominican Republic. Emphasis is on building the capability of fishing villages to increase catches and become more self-sufficient. The primary focus under this project will be on identifying appropriate craft and equipment for Haiti's off-shore fishing conditions, and devising feasible means for small fishermen or fishing communities to make the necessary initial investment.

3. Fish ponds have been a successful venture in most countries of the Orient for many years. The prime example is Taiwan; probably the most successful country in developing this technology to a high degree. In Haiti, the key to success is likely to lie in establishing an appropriate community mechanism for managing and protecting the fish ponds.

4. Seed and food storage has been practiced for years by countries such as India and in Africa. Various proven storage materials, such as glass, pottery, ceramic jars and plastic containers, will be researched for practical applicability in Haiti. The Mennonites in Haiti have found cement silos workable as storage facilities. Therefore, this possibility will also be explored for wide dissemination. Some existing forms of storage used in Haiti's rural areas will also be examined to identify possible low-cost, easy to make improvements. Relatively little difficulty is anticipated in persuading rural residents

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to adopt new storage technologies or methods. The key will be to find methods and materials that are available locally at relatively low cost.

Energy Technologies

The completed prototypes will reduce dependence upon wood as the primary fuel source with the aim of preventing further depletion of natural resources. These prototypes will also be developed as potential alternate income sources to replace charcoal-making as a means of livelihood.

1. Solar cookers - solar heaters. The University of Florida investigated the possible use of solar cookers in Haiti using inexpensive materials. India, Africa and Asia are currently using such devices successfully. The device is also in operation in the Bahamas. Solar cookers tend to require a certain mechanical skill; therefore, site adaptation will focus particularly on simplifying means of utilization, as well as on ways and means of lowering the cost of purchase and/or manufacture.

2. Methane generators are currently in operation in India, Pakistan, Nigeria, and the Philippines. This project will concentrate on adaptation of this technology to the village bakery (the most efficient use so far found for the methane generator) and on other uses for which a combustion source is required.

3. Alternative fuels have been developed in Ghana, Indonesia and Haiti using respectively pyrolysis, combustible brickets and lignite. A new experiment currently being conducted by a PVO in Haiti is processing agricultural wastes into charcoal made from sawdust and sugarcane bagasse. This project will pursue this, as well as the possibility of mixing agricultural wastes with lignite to form longer burning briquettes. The UN is exploring the possibility of using lignite as an alternate energy source in Haiti.

D. Income Generation Technologies

Certain completed prototypes will be aimed specifically at creating off-farm income alternatives (such as small fishing development, alternate energy sources, artisan industries and cash crop production). The prototypes will also make maximum use of local resources and local agricultural production in order to generate income increases among the rural poor beyond the groups of adopters themselves.

1. Artisan industries are being developed by HACHO, PVO's and the United Nations in specific areas of Haiti. The potential is considered great for developing cratts centers for wide dissemination in Haiti as a

source of income from tourists and exports. A major consideration under this project will be identifying appropriate reliable marketing channels and mechanisms to insure maximum return to the small artisan.

Hand tool production projects are currently being conducted by the Mennonites (PVO) in Haiti with considerable success. The United Nations has conducted a feasibility study on production of low cost tools and has established a workshop in the Les Cayes area to train technicians in the techniques of blacksmithing and forging. AID also has a successful project in Ruanda where a farm implement forge and blacksmith school has been established for low cost production of farm implements.