

Peace Corps

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MEMORANDUM

TO: Eric Melby
AID/Office of Energy

FROM: *Paul W. Jankura*
Paul Jankura, Energy Specialist
Office of Programming & Training Coordination

RE: Status of PC/AID PASA Efforts

In an effort to achieve some degree of closure before you depart for Paris and establish areas which will need follow-up with your successor, we have prepared an in-depth Quarterly Report for your examination. Included in this report is a review of all activities supported by the PC/AID PASA pertaining to the Energy Survey, and Peace Corps Energy programming and training efforts conducted since February FY '80, as well as, projected expenditures and activities for the remaining Quarter.

I hope this report will provide you with a clearer picture of where we have been focusing our energies during this Quarter, and where we hope to be by the close of FY '80.

PC/AID ENERGY PASA
(#79-046-1012)

QUARTERLY REPORT

June 23, 1980

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 - training manual
2. Stove Construction:
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 - training manual
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EXECUTIVE SUMMARY

PC/AID PASA FY 80 ACTIVITIES

Status of PC Energy Survey

The PC/AID PASA states that during FY 80, Peace Corps will continue testing the energy survey methodology in Micronesia, the Philippines, Senegal and Paraguay. When 1st quarter survey results are in from Micronesia and the Philippines, AID and Peace Corps will review the survey activities to date. This review, expected to take place in March or April 1980, will be the basis for determining the nature and extent of survey activities in Phase II (i.e., those survey activities funded out of FY 80 monies).

Three quarters of a year have now passed and there have been some changes made to this statement of work. First the Dominican Republic was included in the Phase I survey work, though the workshop was postponed because of hurricane David until May of this year. Secondly Paraguay was cancelled as a participating country because of inadequate in-country preparations for the survey. Thirdly the survey from Senegal was included in the data to be analyzed. Finally the review has not taken place yet, due to the problems of collecting the questionnaire and the time involved in letting the contract for analyzing the data.

To date we have initiated the survey in Micronesia, Philippines, Senegal, and the Dominican Republic. (see introduction and overview to the survey in Body) A survey workshop has been designed and implemented in each country to orient and instruct the survey teams doing the data collection in each village selected. These workshops were conducted in English in Micronesia and the Philippines, French and parts in local dialects in Senegal, and Spanish in the Dominican Republic. The workshops have been intensive, five day affairs. The focus of the workshops have been on

1. Introducing the survey - what it is, what tools (Questionnaire) are used
2. Instructions on how to do the survey-how to prepare the Questionnaire how to perform fuel measurement and the sampling procedures for selecting families
3. Administration of the survey- how to organize teams' time and efforts to implement the survey, training in problem solving for issues the teams face/will face in implementing the survey
4. Motivating the participants (the survey is a voluntary activity for all members of the survey teams) (See workshop report and Instruction Manual for workshops in Body of Report)

The intensity of the workshops, the amount of material and knowledge that must be transferred, and the shortness of time problems for the workshop which had not been anticipated at the outset. The workshop model that we have developed has confronted those issues and the current model succeeds in presenting a "realistic" picture of what's involved in doing the survey. The concerns from the people involved (local and Washington based) in the latest implementation was that most teams were qualified and motivated to do the survey. We are confident that this will yield a higher rate of survey returns and team participation than had been our experience in the earlier workshops.

The data from the first three survey countries was collected at the end of the first Quarter. A target date was set for starting the survey in each country; however, that date could vary in each village based upon set-up time to prepare the village for the survey. The first quarters data is based upon when the survey actually got initiated in the village - that is after its been introduced (and sanctioned by HC sponsoring agency)

to the village, families selected and recruited; the survey begins with the actual fuel measurements of those families. Because of the variations in start-up dates in each village, the first quarters data has been slowly coming in. This data will be analyzed for testing the computable part of the instrument and for programmatic information. The computable sections will have tests ran to validate the instrument and present a listing of weighted frequencies by total and by country for each item in the survey instrument. The contract for this work has been initiated (with Small Business Administration) and the data analysis should be completed by fall. In addition, preparations are being made for an analysis of the narrative data for each country; this also will be completed by Fall.

In February 1980, the Overseas Development Council informed Peace Corps that they were unable to obtain funds for the analysis of the data and that they were therefore dropping out of their participation in the study. This has caused us some consternation and forced us to seek funding for this part of the survey which was not a part of the original plan. The AID/Office of Energy is informed of this situation and we are attempting to manage the data analysis from out of the PASA.

We have looked at this situation with the objective of identifying the problems connected with conducting the survey. This survey is long, complicated and time-consuming, and it needs a fair degree of organization at the local level to administer it. This in turn necessitates an active and responsive supervisory structure to monitor the progress of the survey and to consult with teams on survey procedures. The communication level between the in-country coordinator/supervisors and Washington has been weak - the difficulties being in the areas of timely response and getting/giving a full picture of the events in the field.

From communications with the survey coordinators, the following were reasons teams (and/or individual members) gave for dropping out of the study:

The survey took too much time to do.

Team members dropped out in the early stages and it was too much work to do for those remaining.

Local disruptions (political excitement, vacations) delayed the starting of the survey to the point where motivation waned or it was thought too late to begin.

Steps that we will take to deal with this situation are as follows:

- Find out more about why the low rate of return.
- Increase the managerial involvement with obtaining the data.
- Attempt to get some of the dropout teams back in the survey.
- Consult with AID and other statistical people on the minimum number of villages that are necessary for a reliable survey.
- Identify additional villages if needed.
- In the meantime proceed with the data analysis with the questionnaires we have.
- Identify the support needed to ensure the continuation of the villages we do have.

There were no '80 PC/AID PASA objectives specified for the programming component of this Energy program. However programming efforts are necessary for the development of Volunteer assignments in the field, and the following indicates the decision made and the activities undertaken in this area.

Status of Programming Efforts

Because of the newness of the energy program and the unfamiliarity, for the most part, of field staff with the concepts/ramifications of energy projects we have pursued a three-fold programming strategy:

- 1) conduct workshops for field staff and host country personnel in programming opportunities for RET's and give technical overviews/hands-on experience with selected RET's,
- 2) assist field in developing projects by sending technical assistance to requesting countries to do a) identification/feasibility work in potential projects, b) assist in organizing agency support for such projects, c) educate field staff on range of potential for energy projects,
- 3) develop RET resource materials and programming guidelines.

The focus of these programming efforts has been on a selected number of RETs. We have started with the more technologically simple systems and have moved slowly into the more complicated ones. This has been so because of the levels of difficulty of the programming involved in these various types of projects and the complicated, expansive nature of the training programs necessitated by the various devices.

To date we have focused on four types of RETs: 1) A.T. devices including mud stoves, pedal power, charcoal retorts, tool and pumping mechanism improvements; 2) simple solar devices for grain drying and water heating; 3) water technologies using a source of running water--hydraulic rams, water wheels, micro-hydro systems; 4) biogas digesters.

Programming Conferences

One way we have tried to assist the field in developing RET projects has been convening workshops for field staff and host country personnel. Two workshops have been held to date--one in Mali and one in Ecuador:

Mali Workshop

A four day workshop was held in Bamako, Mali, 22-25 January. Thirty Volunteer Leaders and/or Associate Peace Corps Directors attended from Cameroon, the Central African Republic, Ghana, The Gambia, Ivory Coast, Liberia, Mauritania, Niger, Togo, Upper Volta and Mali.

The objectives of the workshop were:

- to examine A.T. issues and potential applications to Peace Corps programming.
- to develop a replicable programming model.
- to provide hands on experience in selection, construction, and application of technologies.
- to develop a replicable programming workshop model.

PCD/Mali, Henry Homeyer hosted the workshop. He and a group of six Volunteer Leaders and Volunteers designed and conducted the workshop. PC/Mali has a demonstration center at the office in Bamako which has been a focal point for research and development. The technologies at the center were the basis of the construction activities.

The workshop focused on an overview of various A.T. devices, the programming implications of introducing these devices and a series of "hands-on" sessions.

The 'hands on' sessions were useful, especially the initial session to define appropriate technology, and the session on the village profile and extension. Unfortunately, clear and sufficient linkages between sessions were not provided, and not enough time was available for development of country strategies.

In addition the sessions generated alot of enthusiasm and self-confidence among the participants. Arrangements had been made to build mud stoves in four homes in Bamako, and that was an exciting idea.

General Conclusions from Participants:

- the workshop was productive, resulting in lots of ideas, and the confidence that in fact the technologies could be replicated and adapted in their countries.
- A.T. efforts should be incorporated in on-going projects, with emphasis on re-programming and in-service training.
- Community analysis and extension skills are critical to a Volunteer's success in the use of A.T., per the definition that was developed.
- A question remains about the usefulness of Peace Corps establishing demonstration centers, and the appropriateness of that as a full-time Volunteer assignment.

The workshop generated lots of requests for technical information, which hopefully can be provided by our Information Collection and Exchange Unit, or VITA, and for assistance in the development of in-service training programs for PCVs and programming assistance.

Recommendations for Future Workshops:

- develop stronger programming sessions and more clearly define outputs.
- introduce programming issues, community analysis, and strategy planning prior to actual construction, and refocus at end.
- limit the number of devices and structure sessions so that participants can tie together the science, cost benefits, actual building, and applications for a few technologies.
- provide clear and direct linkage between sessions.

Ecuador Workshop

A two and a half day conference was held in Iberia, Ecuador, June 5-7. The conference was sponsored by Peace Corps/Ecuador and was attended by twenty-three Ecuadorians representing 7 agencies and a few other people including a representative of the USAID/Ecuador mission.

The objectives of the workshop were:

- to present a range of RET potential applications to rural settings.
- to develop strategies and procedures for establishing such projects.
- to present the Peace Corps energy survey for the identification of potential agency sponsorship and implementation of the survey.

The following technological devices were presented at the conference: mud stoves, solar water heating and solar grain drying; biogas digesters, windmills, water wheels, wind generators, and micro-hydro systems. The format for presentation of these technologies was a description of general functions to be performed around the home and farm and generic devices that can provide those services, variations of the types/designs of those generic devices, the materials, tools, and skills necessary to construct each of the types, and a range of costs for the various devices.

Discussions on the process of project development included the identification of local needs, the materials and skills locally available, the development of local organizational support and "ownership" of the project, H.C. agency sponsorship and support, the scheduling of activities, administration, and monitoring the project, and funding of the project.

The P.C. survey was then distributed among small groups of conferees to discuss selected sections of the survey in specific, the overall design and methodology in general, and to come out with modifications and recommendations for follow-up.

The conference was a highly spirited, openly and frankly discussed affair. There was a high level of participation by the conferees, and at times the discussions tended to get heated. (The full report on the conference is not included in this report; the consultant responsible for the report is still in Ecuador doing follow-up programming and hands-on training work.)

The basic recommendations from the participants were:

- there is a need and a desire to conduct the survey;
- the Nat'l. Institute for Energy should sponsor and implement the survey;

- A list of modifications to the methodology and the instrument need to be worked on by INE before implementation;
- There is a desire for a follow-up conference for a more detailed/"hands-on" experience for some selected technologies--particularly the water and wind ones.

A last note on the survey, USAID was appraised of the financial status of future P.C. surveys and they expressed an interest in funding it through INE with a grant that is currently being negotiated.

Programmers Assessment Workshop

To assist the energy sector in sending qualified programmers to the field and in expanding the file of such programmers, we recruited a number of technologists with overseas development experience to attend a one day assessment workshop. A list of water programmers from VITA was used as were other sources of people that we had. The focus of this particular workshop was on water technologies--though the format is usable for assessing programmers in other technical areas--e.g. wind systems, and other sectors, e.g., health, forestry.

The Energy Sector designed and developed the following assessment workshop to identify consultants with specific skills appropriate to Peace Corps programming philosophy and the energy sector's desire to develop water technology projects suitable for PCV's to work in. The goals of the workshop were:

- to develop whether participants' skills and interests match our needs
- to provide an orientation to the kind of programming work we have

The assessment dimensions used in the workshop were: technical competence for specific water technologies (hydraulic rams, water wheels, micro-hydro systems, site surveying/feasibility); programming competence (project, organizational support necessary, logistical and administrative structure, schedule of activities); and consultancy values and skills (communication skills, interpersonal skills, sensitivity to cultural, political and developmental issues.)

The orientation component of the workshop was designed to present a "typical" Peace Corps programming environment. This simulation started with a Washington briefing indicating the nature of the field request, the amount of information available (or missing), the cast of characters involved, and the types of demands on consultants from the different parties. This was followed by a series of case studies depicting the entry/initial work in-country (Case A); identification and development of specific projects (Case B); and follow-up work/recommendations for continued development of the project(s) (Case C).

After discussion of the cases, the projects identified were analyzed to generate a list of tasks and skills necessary for implementation of the project, and to breakdown the skills as to which ones are trainable and which ones are needed as prerequisites in PCV's.

Interviews were held privately with each participant to gain both a greater insight into the competencies of the individual and to resolve any issues brought up by the day's activities. The workshop closed with a group discussion of the events of the day and some remarks about the nature of this water programming initiative.

Eleven water technologists/consultants from around the U.S. were invited to the workshop. Three were recommended unconditionally and two conditionally for use in this programming initiative.

Programmers sent to the Field

A number of requests have come from the field asking for assistance in developing various RET programs. The following is a list, to date, of consultants sent to the field.

- Appropriate Technology: Mauritania--consultant was sent March 16 to May 6 to participate in both an In-Service Training and to assist in developing an agriculture program established there. His assistance was in the form of instruction to the staff and Volunteers in various A.T. devices that could improve the Sonador rice-growing project and other agriculture projects. These devices revolved around animal traction, simple solar systems, surveying and irrigation, and water pumps.

- Senegal, Mali, Upper Volta--VITA/AID sent programmers to these countries to develop mud stove projects. Peace Corps held extensive discussions with these consultants both in Washington, and the specific countries to tie in these efforts with Peace Corps programming thrust in the same area.
- BIOGAS--Mali--A consultant was sent January 14 to February 20 to construct a demonstration digester at an Agriculture station outside of Bamako, instruct folks in the operation and maintenance of the system and work on the organizational support of biogas projects. This digester compliments the range of A.T. devices in PC/Mali.

Ecuador--A consultant was sent June 4 to July 7 to participate in the programming workshop conducted there and to develop programming guidelines on biogas projects. Ecuador has had a fair amount of experience with biogas projects (both P.C. initiated and Host Country Agency initiated) and it is our attempt to tie in that experience to a programming strategy. This report is not available yet because the consultant is still in the field.
- WIND--Thailand--VITA has stationed a programmer there who has particular expertise in small wind systems. Extensive discussions were held with him in Washington before his departure to inform him of current wind work Volunteers are doing in Thailand and the surrounding area. There are 11 Volunteers working with wind systems in Thailand some of them in need of technical assistance in their project. In addition, we wish to develop a formal program with wind devices and as such to use the expertise of this programmer and the experiences to date in Thailand to give guidelines for such program development.
- WATER--Fiji, Western Samoa, Tonga--A consultant was sent June 1 to July 12 to do a feasibility study on a number of potential water sites, to identify and develop water projects, and to generate a list of guidelines for programming such water projects. The report is not available yet because the consultant is still in the field.

In addition to these consultants sent, a number of countries have been scheduled this summer for programming assistance. They are:

A.T. - Paraguay
 Ghana

Solar - Tunisia

Wind & Water - Morocco

Water - Guatemala
 Liberia
 Swaziland
 Dominican Republic
 Zaire
 Paraguay

The training objectives for the '80 PC/AID PASA were to continue developing the RE/AT model, develop another "energy" Training model, and train an additional 50 PCV's in RET's. These objectives have been met and surpassed. The Farallones AT program is scheduled for August- 25Ts, a biogas Training program is currently being conducted-12 Ts -Ecuador and Morocco, a hydraulic ram component added to a water/sanitation program was designed and implemented - 11 Ts for Nepal. In addition a series of In-service training has been done:

Kenya - 18 Vs + HCNs - hydraulic rams
Mauritania - 17 Vs - RET/AT
Micronesia - 14 Vs + HCNs AT - wind

A new energy model (wind) is designed, being piloted, and a new full term water/energy training program is being developed for late summer.

Status of Training Efforts

The Energy Sector has responded to field needs for Volunteer training in two ways: through the development of In-Service Training (IST) models and through the development of full term State Side Training models. We are focusing a large portion of our training efforts in developing and delivering I.S.T.'s to volunteers. This seems to be a strategy with good impact because volunteers already have field and project experience and are able to more clearly articulate the type of specific training that will be of benefit to them in performing/expanding their project assignments. Five different models have been sent to four countries to date.

Mauritania--March 20 - March 31--This IST was for volunteers working in agricultural projects and rural development; its focus was on mud stoves, water pumps, diesel mechanics, and solar applications for grain drying and water heating.

Kenya--May 26 - May 28--An IST in hydraulic rams was conducted for 13 trainees assigned to water and sanitation programs in Kenya, Zaire, and Oman as well as for 5 volunteers presently working in water in Kenya and Zaire. Kenya has experience with rams--some have been working for 30 years and is interested in expanding the extent of their application. This workshop focused both on the "how-to" construct, operate, and maintain the rams and on the site feasibility/layout dimension of the system. Following the training program the consultant visited existing ram sites in the Rift Valley Province and advised Minister of Water personnel and PCV on how to repair and upgrade 5 faulty rams. The report from the consultant has not yet arrived in the Washington office.

Ecuador-- June 4 - July 7--The consultant sent to work with the programming conference and biogas programming issues is additionally conducting, a 3-day workshop in Lorena Stove construction for PCV's and selected folks from the University. There is an interest in developing a mud stoves program and this workshop will give some people in-country the hands-on skill to do demonstration projects. The report will not be available until the consultant returns from the field.

Micronesia--Two training programs are currently being conducted in country. The first delivers hands-on skills in the area of Solar-grain dryers, water heaters, and some selected A.T. devices. Components of the Farallones Training model are being used in the

delivery of this training. This is a good field test of the model.

The second training program is designed to deliver hands-on skills in design/constructing/maintaining an appropriate windmill system for the island. This program is both for newly arrived volunteers and those already in the field. Again these reports will not be available until the consultants return to the States.

This summer we have scheduled and IST for Swaziland in hydraulic rams and are looking to accomodate interests by Ecuador and the Dominican Republic in specific IST models.

There are two full-term, State-Side training models developed. The first is the Farallones A.T. model that was developed last fall. The revised manual is included in this report. The second cycle of this model was scheduled to be held May 15-July 15. However, due to the fact that over half the trainees in that program were scheduled to go to Liberia and that a coup took place in Liberia in May has led to a postponement of that cycle until late summer.

A state-side training program in biogas digesters is currently being conducted in Missouri for 11 volunteers going to Ecuador and 1 volunteer to Morocco. The energy sector contribution to his program has been in doing the technical part of the statement of work and in the technical monitoring of the program. Our purposes for contributing to this training are to develop a replicable training modle and to ensure the quality of the training materials and delivery design.

The report will be submitted when the program is completed.

A third full-term model that we're developing is in water technologies--some combination of hydraulic rams, water wheels, and micro-hydro systems. We are planning to go out with an RFP this August for developing such a program. The content of this RFP is based upon the results the water programmers sent to the field bring back with them.

PEACE CORPS ENERGY SECTOR OBLIGATIONS

FY80 Summary and Projections

Funds Available for FY 80

FY 79 Carry Over		79,578
FY 80 Appropriation		<u>600,000</u>
	Total	679,578
FY 80 Expenditures to 6/30/80		453,932
Remaining FY 80 Funds		225,068

Projected Expenditures for 4th Quarter:*

Salaries	35,000
Misc. Admin Costs	1,500
Shared Admin. Services (to ACTION)	50,000
Programming	37,000
Prog. Mat'l Development	12,000
Training	19,000
Trg. Mat'l Development	4,000
Phase I Survey corrective actions	<u>66,568</u>
Total Projected Expenditures for 4th Quarter	225,068

* We are proposing a delay of all Phase II Survey activities and a release of earmarked funds (a) to adjust for serious underestimates of survey workshop costs in the five Phase I counties, and (b) to begin necessary corrective actions related to the recently identified difficulties with Phase I survey return rates.

PEACE CORPS ENERGY SECTOR
OBLIGATIONS 10/1/79 - 6/30/80

	Administration	Survey	Programming	Training
Staff Salaries	85,051			
Misc. Admin Costs	1,000			
Staff Development	1,100			
<u>Survey</u>				
. Consultant Fees		52,075		
. Workshop costs		38,500		
. Travel		26,868		
. Data Analysis		40,000		
. Supplies		1,624		
. Translations		3,980		
<u>Programming</u>				
. Consultant Fees			31,325	
. Travel			23,793	
. Conference Costs			12,500	
. Materials Development			498	
<u>Training</u>				
. Consultant Fees				8,237
. Training Costs				101,000
. Travel				23,381
. Materials Development				3,000
TOTAL	87,151	163,047	68,116	135,618
GRAND TOTAL	87,151	163,047	68,116	135,618

THE PEACE CORPS RURAL ENERGY SURVEY

- * Introduction and Overview
- * Structure of the Energy Survey
- * Description of Survey Workshops
- * Instruction Manual for Workshops
- * Statement of Work for Analysis
of Energy Survey Data

PEACE CORPS RURAL ENERGY SURVEY

INTRODUCTION AND OVERVIEW

Developing countries are becoming increasingly concerned over the growing scarcity and depletion of traditional energy sources for village level domestic, agricultural, and small business uses, especially in light of the spiraling costs and the consequent real scarcity of petroleum-based fuels which have affected most sharply those nations of the Third World which are dependent on imported oil. It has become apparent that the world energy crisis goes far beyond the large scale political and economic problems related to the escalating price of oil. In many rural villages in the developing world, it has become a matter of survival.

The now severe shortage of firewood in rural areas has become a crisis of energy and of survival for a large majority of the world's population. Rural families in many countries whose daily lives depend on the availability of easily obtainable firewood must travel up to forty miles for fuel to be used for cooking, heating, lighting and other basic needs. One of the fundamental conditions for rural survival is disappearing for people who cannot afford or do not have access to commercial or alternative forms of energy.

For those rural households, farms and small businesses which have come to depend on commercial fuels as the basis for domestic functions and income production, the sharply increasing costs and scarcity of kerosene, gasoline, diesel fuel, and electricity have meant either crippling outlays of money, time and energy to obtain these fuels, or the spectre of a return to old ways and new poverty. Villagers living on the thousands of small atolls of many Pacific island groups are confronted with severe shortages of kerosene because of reduced diesel fuel allocations for the supply ships which not only bring fuel and other goods to them but are their only access to markets for their copra. They have become radically dependent on a source of energy which is neither renewable nor locally obtainable.

Caught between these scarcities, the people of rural villages face either impoverishment on the land or the necessity of leaving the land to migrate as landless, unemployed and mostly unemployable workers to cities and towns which are already bursting. This migration of rural folk forced off the land into the cities has been recognized as, itself, a problem of crisis proportions for developing countries struggling for social stability and economic improvement. There is a desperate need for alternatives to the rural energy crisis and to the social and economic dislocations which result from it.

One of the keys to this complex problem lies in the development of energy self-sufficiency on the part of rural villages and their people; that is, the ability to obtain, maintain and use locally available energy resources efficiently in all aspects of village life and work. This requires that the energy resources be renewable, that they be conserved, and that they be used in new, more efficient ways through the development of new techniques and technologies or through the rediscovery and modification of traditional modes of energy use. The need, therefore, is to identify and develop renewable energy resources and those energy conservation techniques and technologies which are appropriate to village energy uses and needs and to the social and cultural values and life patterns of village people.

In an initial response to this need, Peace Corps, in collaboration with U.S. AID and the Overseas Development Council, has developed a three-year survey/programming/training project to assist Third World countries in identifying needs and implementing alternative, renewable energy programs at the community level and to develop the in-country capability to continue the effort.

Energy planners in Third World countries and the international energy community have had no accurate source of data on consumption patterns for "traditional" fuels, on the scope of energy needs of rural people, or on the production potential of renewable energy resources in rural areas. The survey, which has been designed as a Peace Corps volunteer/host country counterpart activity, will furnish data at the village level regarding current energy uses and needs; the current costs of that energy use; social and cultural practices associated with energy use; and renewable energy sources available in the village area. The analysis of the data will identify the type, amount and value of fuel used for specified domestic and business activities; villagers expressed need for energy sources; social, cultural practices that may be crucial to the acceptance of a new energy technology; and a basic assessment of potential renewable energy sources in the village area.

The programming component is designed to complement and build upon the energy survey. The Peace Corps volunteer/host country counterpart team conducting the survey will focus local attention upon existing needs and generate discussions to identify potential programming approaches to meet these needs. The data collected will be analyzed and used as a programming tool to develop actual projects, definitions of volunteer tasks, required training, and required on-the-job resource support. These are necessary steps in the development of a planned and integrated approach to the problem of rural energy needs.

CRITERIA FOR ENERGY PLANNING

A number of questions need to be asked before introducing a new technology into a village can be considered a "good idea". These are questions relating not only to energy as such, but also to the larger process of development within which the introduction of new ideas or technologies takes place.

1. How well will a given technology or device perform technically within the physical limitations of the village? For example, is there sufficient, reliable wind velocity to produce wind-powered production of electricity or mechanical energy?
2. How do its costs compare with alternative energy technologies? Can the amount of energy required be produced less expensively by a wind machine or by a pedal-powered or bio-gas fueled apparatus?
3. How does it fit with local social mores, prohibitions and preferences? Will a new, energy-efficient stove conflict with local fire-making and tending roles and practices?
4. Is it compatible with existing or prospective village institutions which could own, operate and maintain it? Can pigs and chickens owned by families and currently running free be kept penned in a community-run biomass collector to provide material for a community-owned bio-gas digester?
5. What can be learned about the "do's and don't's" of introducing a technology into a village? What is the nature of the social and political structure of the village? What is the history of efforts to introduce new ideas or technologies?
6. What is the effect of the increase in available energy upon such indicators of community well-being as literacy, infant mortality, life expectancy, disposable income, migration? Can we predict negative as well as positive effects? What side effects do we need to account for?

The survey is designed to try to find answers to some of these questions. However, the answers will not appear magically once the survey has been completed. They will only be arrived at after a careful analysis of the data and the testing of potential strategies the data suggest. This could be considered Stage II of the overall process, with Stage III being implementation. The kind of data generated by the survey will give country energy planners and potential aid-giving countries and agencies a better idea of energy needs at the village level. It will also provide baseline information on the "before" energy conditions of a village to help determine the effectiveness of introducing a new technology to meet perceived energy needs. In addition, the data can provide a systematic "picture" of the village useful not only to planners and funding sources, but to the village itself as an important tool for integrated village-level development efforts.

The survey and methodology for carrying it out are designed to assist all involved parties to understand the ways in which the village is a system where the sum of individual actions and practices relating to energy can and do have an enormous impact on the prosperity of the village and each member within it. Moreover, the survey can help pinpoint which energy practices are thought to produce the principal energy problems and what needs are felt to be particularly acute by village leaders, individual survey participants, and village-level development workers. In this way, the villagers identify their problems, determine what "good ideas" make sense to them given the local skills, materials and systems available for implementing new projects, and develop the information necessary for the proposals of projects by the village to appropriate funding sources.

GOALS OF THE ENERGY SURVEY

1. Knowledge - The survey aims at the production of detailed and valid information on the current uses of traditional and commercial energy sources by rural villagers in their daily lives: What kinds of energy are used? How are they used? How much is used? What are they used for? What are the social, cultural, and economic contexts in which they are used?

The survey also seeks to identify the energy needs of people in rural areas -- in their homes, their small shops, their fields: What do people feel are their energy-related needs? How do they obtain energy? What does it cost them in money, work, and time? How would they like it to be?

Finally, the survey aims at identifying and locating renewable, low-cost energy resources -- water, wind, agricultural and animal residues, and the sun -- available in rural villages and their surrounding areas which may be used as effective alternatives to costly and increasingly scarce commercial fuels.

2. Development of awareness and participation - We see participation in this survey as an important learning experience for the Peace Corps volunteers, the host country development workers who will form teams with the volunteers to initiate and carry out the data collecting, and the people of the villages in which they live and work. Learning about energy and its impact on the quality of life, focusing on its uses and costs, and learning about the environment and its potential develops an awareness of alternative energy sources, ways of using them, and ways to develop individual and collective self-sufficiency.

The survey is a participative activity among the members of the data collecting teams and the people with whom they live and work in the villages. The survey requires the development of relationships with the people who participate in the survey, making possible a detailed, ongoing description of energy uses within individual homes and small food shops, as well as a broader, periodic analysis of agricultural energy uses and of the village itself as a social, cultural and economic unit.

These relationships, based on the development of trust and credibility, will involve not only people opening their homes, shops, and practices to the surveyors, but also their involvement in the exploration of possibilities for improved energy conservation, production, and use in their own lives and in the life of their village. The goals of awareness and participation are both required by the survey and provide an important basis for the development of energy-related programs and for new kinds of work by volunteers and host country development workers in rural areas.

The survey is therefore a vital link between efforts to develop energy resources and self-sufficiency in rural areas and ongoing development efforts by host country agencies and Peace Corps toward improving agricultural production, reduction of energy-related costs, resource conservation, health education and practices, and the evolution of socially, culturally, and economically appropriate technologies.

SUPPORT FOR THE SURVEY

The development and implementation of the survey is supported by a wide range of organizations and governments concerned with the energy needs and resources of developing nations. Of primary importance is the active support and involvement of the governments and development agencies of the countries participating in the survey. Indeed, the survey cannot take place in any country without the sponsorship of one or more national development agencies.

The major financial support for the survey design and implementation comes from U.S. AID and Peace Corps and individual host country governments and agencies. Computable data collected in the survey will be programmed for aggregate analysis on a worldwide basis by the Institute for Energy Research of the State University of New York at Stony Brook. This analysis will be undertaken by the Institute and by the Overseas Development Council in order to develop an aggregate description and projection of energy uses and needs throughout the Third World. The Overseas Development Council is a privately funded international development organization based in Washington, D.C., which spurred the initial development of the survey project and design.

Even with widespread institutional and governmental support, the survey cannot achieve its goals without the support of the people of the communities in which it is carried out -- especially those families, shopkeepers, and farmers whose information and participation are the foundation of the survey. It is this support that constitutes a necessary condition for the survey's implementation and success and for the educational and development work to be undertaken in rural communities after the data have been gathered and analyzed. An important concern, therefore, is the uses to which the survey data and activity can be put, especially in the village itself, and the potential benefits for those villages and persons who participate in the survey.

UTILIZATION OF SURVEY DATA

The village, the host country government and the international community have complementary needs for the kind of information that will be generated by this survey.

The Village Level:

The energy survey is designed to raise the consciousness of both the Peace Corps volunteers and the villagers with whom they live about the nature of the local energy problems and the combined capacity to solve these problems.

The premise of these village-level surveys is that successful energy projects must directly involve villagers, especially in the initial survey period. They are most likely to know which tasks need improved energy use, what resources are available and usable, the economic and cultural obstacles to using them, and what institutional means are available for making a cooperative energy project successful and sustainable. For the host country government, involving villagers in their energy future by means of the energy survey may partially relieve them of the administrative and budgetary burden of trying to undertake a nationwide, grass roots energy effort solely "from above".

For the villages themselves and their people, involvement in a national -- and international -- energy effort may be an important motivation, but it is the relatively direct and immediate uses and benefits of the survey for the village that are critical in making villagers' involvement in their own "grass roots" efforts real and meaningful. We have suggested ways in which the survey data can be used by villagers and their leaders in developing a basis for problem identification, decision making, proposal development, and the seeking of funds. In addition, the development of a focus on energy needs and problems can be the basis for thinking about and planning for integrated development efforts within the village, since energy affects all areas of village life and all sectors of development. In the following section, Energy Programming and Energy Consciousness, we attempt to outline some specific benefits which can result from the survey and related programming for the villages involved.

The Country Level:

Some of the benefits to host country governments of a village level survey have been described above, including a more accurate determination of energy needs and existing use of resources and the involvement of local villagers in their own energy future.

For planning purposes, a village level comprehensive survey of one year's length offers a useful data baseline against which to measure in microcosm the success or failure of national energy projects. It can also help country planners identify regions or districts that have particularly acute needs and enable them to allocate their scarce investment capital more carefully and efficiently. An energy survey that identifies the existing infrastructural levels of a village -- proximity to roads, the electric grid, markets, etc. -- is useful to host country governments in general rural development project planning.

The International Level:

The advantages of a comprehensive energy survey at the village level for international energy and development analysts, aid donors, and technical people vary according to specific interests in this area. The major reason for neglecting village scale energy problems in developing countries had been the absence of information. International energy analysts, for example, were unaware until a few years ago of the firewood crisis, a problem apparent to anyone living in rural areas and some urban areas of developing countries. Knowledge of the energy economics of rural areas in developing countries -- areas that have traditionally been viewed as an undifferentiated whole but which vary widely in terms of climate, culture, and level of economic development -- may provide energy analysts with a better idea of trends in fuel substitution and barriers to technological change in agriculture, household practices, and marketing. It will also identify those areas that are in need of immediate assistance.

In the aggregate, the kind of information that emerges from this survey can be useful to the international energy community for obtaining greater foreign assistance funding levels for energy and rural development. It can provide technicians with a better understanding of the relevant needs toward which they should be directing their research and development efforts in energy.

Mechanics Governing Access to Data:

Computerized data compiled by the Institute for Energy Research will be made available to legitimate interested parties under the following conditions:

- a. Data related to specific countries will be made available only to that country and to the villages involved in the survey, except in cases where that country gives explicit permission to the Institute to release the data to a specific recipient.
- b. No data from the survey will be released to any country or organization other than those in which the survey is carried out, except by permission of the governing board of the Institute. This condition applies especially to agencies and representatives of the industrialized nations. It is anticipated that the following organizations will receive permission from the Institute's board to receive aggregate, non-country specific data for analysis and use:
 - 1) Overseas Development Council, for worldwide energy analysis based on country level and aggregate survey data obtained from the Institute.
 - 2) World Bank, for the development of studies on Third World economies and energy needs, with the specific consent of those countries participating in the study.

- 3) U.S. AID, for use in the allocation of support for energy-related projects identified through the survey with specific consent of the individual countries concerned.
- 4) Peace Corps, for use in the development of energy conservation and appropriate technology programs in collaboration with host country governments and agencies within the conditions stipulated above.

ENERGY PROGRAMMING AND ENERGY CONSCIOUSNESS

We have suggested in various ways the role of the survey in development. To extend this idea in more specific ways, it is important to look at the relation between the survey and Peace Corps programming and the potential benefits of that relationship in all areas of development. Understanding the survey as both an information gathering device and an important programming tool is vital to its successful implementation and to its most effective utilization.

The development of energy consciousness among rural villagers through the survey, and of more productive, less costly ways of using available and renewable energy can, we believe, have profound effects in all programs focused on basic human needs by:

1. Reducing people's reliance on expensive and scarce energy resources.
2. Developing less costly, energy efficient, and culturally appropriate methods for cooking, cleaning, heating of homes and water, lighting, and the raising and grinding of crops.
3. Reducing the time and effort needed to gather traditional fuels.
4. Effecting a resultant increase in disposable income.
5. Reducing environmentally related diseases through the introduction of economically viable ways of heating water for the washing of utensils, persons, and clothing.
6. Developing both primary and secondary school curricula in the sciences based on the learning of the ways in which various forms of energy work, of their uses in the betterment of people's lives, and of the energy needs and resources of the local area, the region, and the country as a whole.

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The following examples of potential energy related programming and work will illustrate the potential in the development of energy consciousness:

- a. The introduction of an inexpensive, water-powered hydraulic ram to pump irrigation water from lower-lying sources of running water to fields at a higher elevation.
- b. The exploration of the multiple uses of inexpensive pedal power mechanisms for winnowing and grinding grains.
- c. The stimulation of collective efforts to develop, use, and conserve community woodlots for the increased availability of firewood.
- d. The introduction of energy efficient, heat conserving stoves fueled by wood, dung, and methane gas derived from agricultural residues and uncultivated vegetation.
- e. The provision of information at various levels of sophistication on appropriate uses of energy from wind, water, vegetation, animal residues, and the sun toward the development of educational materials for the schools and for the organization of communal efforts and investments in the initiation of appropriate technology for collective use.

The initiation of such efforts as part of a realistic development process depends in large measure on the level of knowledge and awareness about rural energy uses and needs that can be obtained from and stimulated by this survey, and by the process through which that knowledge is obtained and that awareness stimulated. This is an underlying and central focus of the energy survey training workshop and of your work in carrying out the survey during the coming year.

STRUCTURE OF THE ENERGY SURVEY

The energy survey is designed to do three things: 1) to collect data about specific energy uses in rural villages; 2) to serve as a community development tool identifying village realities and needs and raising awareness in the village about energy issues; 3) to provide programming information to help identify energy projects that can help meet specific needs and concerns of villagers and there are two types of questions asked in the instrument - "computable" and "narrative."

"Computable" questions are those that require a short simple response - a fill-in-the-box answer. They ask for factual information.

"Narrative" questions are open ended in that a detailed answer is given - the level of detail is based upon the amount of information available and/or developed. They ask for descriptions of practices, procedures, and equipment.

There are five sections to the instrument; each section deals with a particular part of village life. The five sections are:

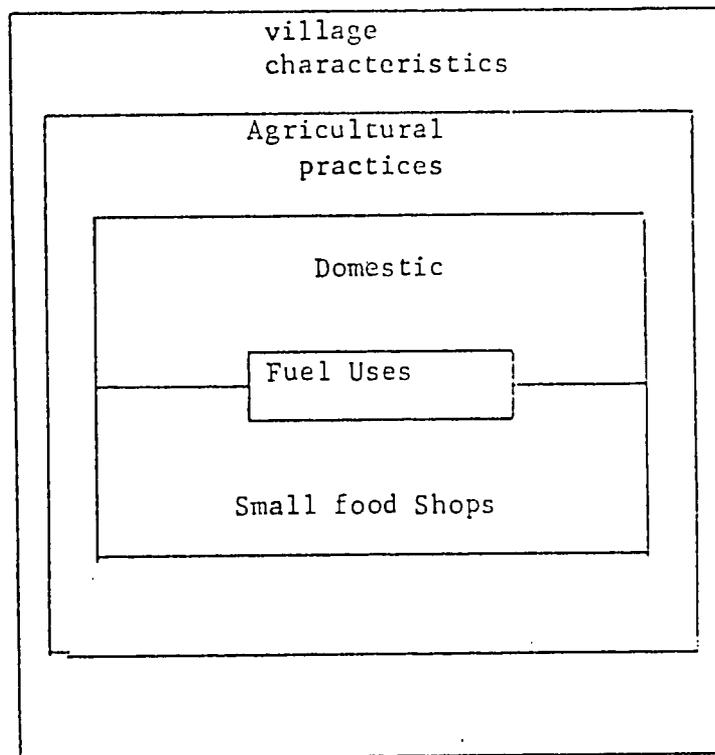
- Village characteristics
- Domestic Energy Uses
- Small Food Shop Energy Uses
- Agricultural practices
- Renewable Energy sources

Some of the sections ask for general information about the area; other sections ask for information specific to individual practices. Each section has a "computable" part and a "narrative" part. (except the renewable energy section). Two sections have a part where specific measurement are taken. The overall breakdown is as follows:

Sections	Information about individual practices (families, farmers, shops)	
	General information	Information specific to individual's
Village	Computable narrative	
Domestic		computable narrative measurement
Small Food		computable narrative measurement
Agriculture		computable narrative
Renewable Energy	narrative	

As expressed above, the purposes for each type of question is related to how the information will be used. The computable (and measurement) part(s) will be key punched into a machine, analyzed and combined together to give:

- 1) a list of fuels used for specific village activities;
- 2) the amounts (and values) of each fuel used by activities;
- 3) an "profile" of that energy use looked out within the particular characteristics of the village; and
- 4) a cross tabulation (comparison) of energy uses by villages grouped as to their similar characteristics and by their income levels differences.



The narrative parts will be analyzed and compiled by hand to give a fuller picture of the energy uses along with the social and cultural practices that surround those uses and the equipment and materials used. The analysis of these parts is designed to provide:

- 1) information that identifies villagers' expressed energy needs and concerns;
- 2) the identification of areas that appear to be most ready for an energy technology;
- 3) preliminary information that can be helpful in finding out how suitable a technology might be for a particular village or area.

Additional information gathered later in the survey about the specific village and technology being considered will complete the data for Evaluation;

- 4) compiled energy profiles useful for planning and programming projects at the village level.

FINAL DRAFT

PEACE CORPS ENERGY SURVEY WORKSHOPS:
A DESCRIPTION AND ASSESSMENT

Report Submitted to:

PEACE CORPS
OFFICE OF PROGRAMMING
AND TRAINING COORDINATION

June, 1980

by:

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PEACE CORPS ENERGY SURVEY WORKSHOPS:

A DESCRIPTION AND ASSESSMENT

ABSTRACT
OF
PEACE CORPS RURAL ENERGY SURVEY TRAINING
WORKSHOP REPORT

A pilot series of workshops were held in 1979 to field test and implement a worldwide AID funded village level energy survey undertaken by Peace Corps in countries of the developing world. Five countries were selected for participation in the survey. These were: Micronesia, the Philippines, the Dominican Republic, Paraguay and Senegal. They were selected to provide a wide range of different cultures and field situations in which to test the survey and to develop an effective, generic training model which could be adapted to local conditions and resources.

There were two phases of this pilot series. The first involved developing and field testing the core workshop design. This took place in Micronesia and the Philippines. The second phase involved developing and field testing a bilingual model based on the core design. Phase two occurred in Paraguay, Senegal and the Dominican Republic.

The following facts highlight the most pertinent information about each workshop and depict the evolutionary nature of this pilot series.

MICRONESIA

- (1) Workshop dates: August 27-31, 1979
- (2) Number of sites: 20
- (3) Total number of participants: 56
Counterparts: 35
Volunteers: 21
- (4) Workshop language: English
- (5) Major focus:
 - . 1st field test of survey instrument, procedures and strategy
 - . Development of initial design and training materials
 - . 1st field test of training model
- (6) Major problems:
 - . Lack of training materials
 - . Unanticipated responses to survey questionnaire based on cultural realities

- . Incomplete training design process
- . Little team building or design review
- .
- (7) Major events:
 - . Shift in training priorities
 - . Definition of key terms used in questionnaire and procedures instructions
 - . Workshop followed by Micronesia Energy Conference
- (8) Major learnings:
 - . More time needed for:
 - . Design review
 - . Staff training
 - . Materials development
 - . Logistical organization
 - . Preparatory meetings in country with PC and sponsoring agency staff

PHILIPPINES

- (1) Workshop dates: September 9-14, 1979
- (2) Number of sites: 27
- (3) Total number of participants:
 - Counterparts: 23
 - Volunteers: 24
- (4) Workshop language: English
- (5) Major focus:
 - . Development of new training design
 - . Organization of team roles and responsibilities
 - . Development of cooperative working relationships with PC and host country agencies
- (6) Major problems:
 - . Questions and issues raised by participants, PC staff and host country agency representatives re:
 - . Statistical validity of questionnaire

- . Uses of survey data given small sample
 - . How would survey benefit villages involved
 - . What resources, funds and institutional supports were necessary
- (7) Major events:
- . Late arrival of fisheries volunteers
 - . Building in focus on survey as a development tool and sessions on survey strategy
 - . Participation of host country agency representatives
- (8) Major learnings:
- . Identified basic core training design
 - . Identified tasks and strategies for workshop preparation
 - . Sharpened our understanding of:
 - . our purposes in conducting the workshops
 - . what we could reasonably expect the survey and teams to accomplish
 - . our responsibility to explain the survey as realistically as possible

PARAGUAY

- (1) Workshop dates: Planned November 5-9, 1979
Cancelled November 5th
- (2) Number of sites: 6
- (3) Total number of participants: 28
Counterparts: 16
Volunteers: 12
- (4) Workshop language: Spanish
- (5) Major focus: . To adapt training model developed in the Philippines for conduct of workshop in non-English speaking countries: bilingual model

- . To develop and train a bilingual workshop staff
 - . To revise the survey questionnaire and training materials
 - . To translate all materials into Spanish
 - . To utilize in-country training assistants
 - . To involve in-country staff and training assistants in workshop planning and implementation
- (6) Major events:
- . Preparation/organization of bilingual training materials
 - . Contingency planning
 - . Cancellation of workshop based on lack of required number of viable survey sites
- (7) Major learnings:
- . The need to do advance work with in-country staff to ensure clarity of goals, tasks, requirements
 - . The critical nature of the role played by in-country PC staff in the success of the survey over-time
 - . The need to pay attention to goals, needs, and potential problems as perceived locally
 - . The need to complete materials preparation before arrival in country

SENEGAL

- (1) Workshop dates: November 25-30, 1979
- (2) Number of sites: 26
- (3) Total number of participants: 54
 Counterparts: 28
 Volunteers: 26
- (4) Workshop language: . French with Wolouf and Mandinka when necessary

- (5) Major focus:
- . Pre-workshop organization and preparation
 - . First field test of bilingual model
 - . Developing a collaborative working relationship with PC/Senegal
 - . Building a workshop team
- (6) Major events:
- . Delivery of in-country staff training to entire team
 - . Pre and post workshop sessions with survey coordinators to define roles
 - . Revisions in training priorities and delivery mechanisms to accommodate learning needs of participants. (For example: splitting the participants into groups of PCWS and counterparts for separate concurrent sessions.)
 - . Participation of 7 regional inspectors in first day and a half of workshop
- (7) Major learnings:
- . Structured verbatim translations in large and small groups work less well than an informal approach that allows for a variety of communication strategies to develop
 - . It is not necessary to understand everything that is being said at any given moment in time as long as accurate information about the survey is communicated
 - . Simple training designs and interventions are often the most effective
 - . The value of modeling good team behavior versus talking about it
 - . Team building goals can be enhanced by emphasizing the effective use

of each member's skills, knowledge and resources, as demonstrated by split group sessions

Working on a co-equal basis, with both PCV and counterpart dealing with new information together for the first time fosters new cultural awareness and learning about our assumptions.

DOMINICAN REPUBLIC

- (1) Workshop dates: April 28 to May 2, 1980
- (2) Number of sites: 27
- (3) Total number of participants: 74
Counterparts: 54
Volunteers: 20
- (4) Workshop language: Spanish
- (5) Major focus:
 - . Pre-workshop organization and preparation with PC/Dominican Republic
 - . Development of collaborative working relationship with PC/DR and host country agencies
 - . Refinement of Spanish language questionnaire
 - . Field test of bilingual model
 - . Increased focus on host country decision making and involvement in all aspects of the survey.

For example:

 - . Selection of survey sites and counterparts
 - . Involvement of host country sponsor outreach workers as members of the survey teams.
- (6) Major events:
 - . Pre-workshop arrival of survey designers for consultation and collaboration with PC/DR and host country agencies

- . 2-day stateside staff orientation for lead trainers
- . On-going and in-depth involvement on the part of the Peace Corps Director and staff
- . Delivery of in-country staff training to entire team including host country trainers and some Peace Corps staff
- . Introduction of a team consultation and assessment component in training design
- . Largest workshop help with greatest participation of representatives from sponsoring host country agencies. Almost 2/3 of participants were host country nationals
- . Formal role of workshop coordinator instituted
- . Post-workshop evaluation by trainers

(7) Major learnings:

- . Importance of ownership by local sponsoring agencies
- . Importance of extensive communication between PC/Washington and PC country staff prior to the workshop
- . An additional day in the training design would relieve the time pressures
- . Appropriateness of using co-trainers familiar with the local culture

January, 1980

PEACE CORPS RURAL ENERGY SURVEY

TRAINING WORKSHOP REPORT

1979 - 1980

INTRODUCTION

This report presents a description and assessment of the development of a pilot series of energy survey training workshops conducted in 1979 and 1980 toward the field-testing and implementation of a worldwide AID-funded village-level energy survey undertaken by Peace Corps in countries of the developing world.

The principal objectives of this series of workshops were:

1. to develop and test a training design and training materials that could be used in and adapted for the training of Peace Corps Volunteers and Host Country Nationals as energy surveyors in a wide range of developing countries and cultures.
2. to identify and develop, in practice, guidelines for the preparation and organization of survey programs, training workshops, and training teams as cooperative efforts by the Peace Corps Energy Project, Peace Corps country programs, and sponsoring Host Country agencies in these countries.
3. to begin the implementation of the energy survey, initially in five countries, to provide survey data and data-gathering experience under a variety of conditions as a basis for evaluating the validity and reliability of the survey, and the appropriateness of the data-gathering strategy to the information requirements of the agencies initiating the survey and the needs of Host Country participants: on the one hand, Peace Corps, USAID, the Overseas Development Council, and the Institute for Energy Research; on the other, the participating villages, development agencies, Peace Corps country programs, and the governments of the countries involved.
4. to integrate the planning and implementation of the survey into an overall approach to energy conservation

and appropriate technology programming by Peace Corps in cooperation with Host Country agencies, as an important element in the development in general of worldwide Peace Corps Energy Projects and specifically of appropriate village level projects.

In light of this complex of objectives, five countries representing the three major Peace Corps operational regions were selected for participation in the survey: Micronesia, the Philippines, the Dominican Republic, Paraguay, and Senegal. They were selected to provide a wide range of different cultures and field situations in which to test the survey and to develop an effective, generic training model which could be adapted to local conditions and resources.

Among the important conditions for their selection were: 1) a demonstrated interest in implementing the workshop and the survey on the part of Peace Corps country programs and identified Host Country agency sponsors; 2) the availability of Volunteers and Host Country counterparts for the workshop and the survey in a minimum number of representative and viable village survey sites for the one-year duration of the survey.

Of the five projected workshops, four were successfully implemented in Micronesia, the Philippines, Senegal, the Dominican Republic (postponed because of hurricane, but later implemented as the last in the series) and the one in Paraguay was cancelled after our arrival at the workshop site on the discovery of an insufficient number of workshop participants and viable survey sites for implementing the workshop or the survey. This report focuses on our preparation and implementation of the workshops in Micronesia, the Philippines, Senegal, and the Dominican Republic since these provided the essential basis for the development of the training model and strategies for its adaptation and implementation. We will also, however, outline and assess our attempt to implement the workshop in Paraguay in an effort to emphasize the cooperative preparation and organization necessary for an effective workshop and the clarity of communications between the workshop staff and the sponsoring Peace Corps and Host Country programs required during both preparation and implementation of a workshop.

In order to reflect the evolution of the training model and implementation strategies, we will discuss each workshop in chronological order and will link them through a discussion of lessons learned and the impact of those lessons on our design

and preparation for succeeding workshops. In each workshop analysis, we shall, a) outline the essential features of the workshop design and the factors impacting on that design; b) describe the preparation and implementation of the workshop and the factors impacting on these; and c) indicate the lessons learned and changes in design and strategy resulting from that experience. Finally, we shall provide an overall assessment of the workshop series and recommendations for future workshops.

THE WORKSHOPS: DESCRIPTION AND ASSESSMENT

The evolution of the workshop training model and implementation strategy can be appropriately divided into two major phases:

1. the design, preparation, and implementation of the workshops for Micronesia and the Philippines.
2. the development of a bilingual training model and strategy for Paraguay, Senegal and the Dominican Republic and the attempt to implement these in Paraguay, and their adaptation and successful implementation in Senegal and the Dominican Republic.

In the first phase, the workshops were conducted entirely in English in countries whose cultures, social structures, and economies embodied a history of political involvement with the United States. Moreover, they were based on the same initial preparation period and were part of a single, extended overseas trip involving the same training team in both workshops. Finally, as parts of the first continuous workshop sequence, and as a consequence of our ability to work in English, these workshops enabled us to develop and reality-test a basic training model in two different field situations without having to deal with the problems of staffing and developing materials for work in another language.

Based on the evolution of a basic training model in these initial workshops, and the development of field-tested materials and activities, the task of the second phase involving Paraguay, Senegal and the Dominican Republic became the development and testing of a bilingual training model; the translation of the survey questionnaire and training materials into Spanish and French; and the building and staff training of bilingual training teams who could adapt and test the translated materials, and could implement the workshops in linguistically and culturally appropriate ways, through cooperative planning with Peace Corps regional and country staffs.

PHASE ONE: MICRONESIA AND THE PHILIPPINES

A. Preparation for Micronesia

The initial preparation for the first workshops prior to departure for the Pacific was an exercise in improvisation.

The necessity of responding to Micronesia's need for integrating the survey workshop with their planned Energy conference and problems of hiring a workshop staff allowed for a preparation period of less than three weeks for the development of a workshop design and training materials, the completion and orientation of a training staff, the printing of a newly-revised survey questionnaire, and the organization of the training staff, materials and supplies for both the Micronesia and Philippines workshops.

B. The Initial Training Design

The training design for Micronesia focused on the following major learning objectives:

1. To help participants understand the goals, benefits, and utilization of the survey and be able to articulate them in a culturally appropriate manner.
2. To help participants "de-mystify" surveys by discovering what they already know about their villages and therefore about certain data required by the survey.
3. To lead participants through a section by section analysis of the questionnaire so they become familiar with the content, requirements of the questions, and definition of terms and interpret these in culturally appropriate ways.
4. To teach participants the survey procedures of sampling and fuel measurement so they are able to solve simulated problems.
5. To ensure participants realize the requirements of the survey over the course of a year and can realistically carry them out.
6. To assist participants in identifying culturally appropriate ways of gathering data.
7. To assist participants in discovering ways of operating effectively as survey teams.

8. To explore together with participants the concept and problem of using the survey as a development tool and assist them in developing hypotheses about the conditions necessary for such development.
9. To engage participants in an active dialogue leading to the identification of potential problems in implementing the survey in their village and the sharing of possible solutions.
10. To introduce to participants basic elements of planning so that each team is able to draw up an action plan for implementing the survey over the first quarter.

To achieve these objectives, the design called for work in three kinds of training groups:

1. Large Group:
 - o for introduction to the workshop and to the goals, structure, content, procedures and requirements of the survey;
 - o review of concepts, procedures, and issues dealt with in small groups and survey teams;
 - o workshop evaluation and closing.
2. Small Groups: There would be four small groups each led by a trainer and composed of volunteers and counterparts from 4-5 survey sites;
 - o for discussion of large group presentation;
 - o eliciting and discussing participants questions and concerns;
 - o the analysis and critique of training exercises done in the group setting or in the field situations by the survey teams.

3. Survey Teams: composed of a Volunteer and one or more counterparts from a village site, the team would be the principal context for:
 - o participants' work on survey techniques and procedures,
 - o the analysis of the survey content;
 - o the development of survey strategies;
 - o the planning for survey implementation;

Given the importance of survey team-building, the design concentrated on the provisions of training activities that would require and reinforce teamwork and cooperative problem-solving among the members of survey teams. These activities were to be largely experiential and focused heavily on the learning and practice of data-gathering skills, survey procedures, and team-planning skills. Among the planned activities were: attempting to answer questions in the village section of the survey to ascertain participants' available knowledge of their village and to help them demystify the survey; observation exercises in local field situations; practice exercises on estimation, measurement of fuels, and sampling a population; role-play exercises on interviewing; and a culminating planning task focused on the introduction and implementation of the survey.

This design, though coherent and relevant to important needs of the survey and the participants did not sufficiently address the participants need for a clear and detailed understanding of the survey's questions, requirements, and procedures, and the interpretation of these in the context of Micronesian cultures and social structures. As we discovered during the workshop, this critical and creative focus on the survey's content became the basis for their ownership of the survey and for their development of appropriate and realistic strategies for implementing it: The original design, had to refocus its approach a) for ensuring the validity of the survey through the participants' understanding of the meaning and intent of the survey's questions, and of the requirements and procedures necessary for the gathering of valid as well as reliable data; b) the participants' needs to actively interpret the survey in the context of their own experience toward a clear understanding of the survey's potential and limitations, the implications of these for them and their villages, their ability and motivation for the survey tasks, and how they might implement it.

The design reflected a concern by the trainers for the development of well-understood perception and process skills necessary for carrying out a reliable survey. Moreover, it was felt that such training experiences could provide the context for raising and discussing issues related to using such skills in doing the survey in the participants' villages. Our efforts to respond to the realities facing us in Micronesia forced a reshaping of the overall training plan and schedule, and the improvisation of training activities in accordance with our determination to make the design fit the needs of the participants and the training situation.

C. The Workshop in Micronesia: August 27-31, 1979

The workshop for Micronesia - had been scheduled so that the Micronesian Volunteers and counterparts participating in it could also take part in a subsequent three-day, conference on energy and appropriate technology sponsored jointly by Peace Corps Micronesia and the Trust Territories Office of Energy and Planning. This conference brought together energy and A.T. experts from the islands and the mainland, political leaders from the six Micronesian Districts, and the workshop participants to discuss the energy problems of Micronesia and to develop resources and strategies for meeting them through appropriate energy technologies.

This context provided us with a group of 21 Volunteers and 35 counterparts from all of the Districts who were interested, in participating in an energy conference, on Guam but who had little idea of the nature of the energy survey itself or of the roles they would be trained to play in it.

The first afternoon and evening were organized as a combination of large group sessions for presentation of the survey and workshop goals and trainer expectations, and small group sessions for icebreaking, getting acquainted, and discussion of the survey and workshop goals in the light of the participants' expectations.

In response to the issues raised, the second morning was organized as a large group session in which the survey designer gave a detailed overview of the survey and answered questions related to its background, uses, and benefits - information which had been included in the introductory section of the training workbook.

Still following the original training design, the team organized the second afternoon and evening sessions to provide a large group overview of the Village section, and, in small groups, to review this with the participants and to engage the members of each survey team in checking-out and comparing their individual perceptions of their village through trying to answer the Village section questions for their own village and comparing the differences and similarities of their answers. This exercise was to provide the basis for the participants' assessment of what they knew or did not know about their village with respect to the survey's questions, and for an initial small group discussion on the need for reliable information and the various ways of obtaining it.

It became apparent during the course of the exercise and discussion that participants were having problems in interpreting the meanings of key words and phrases in the questions, the intent and requirements of questions, and the criteria for accuracy in their answers. Questions were raised in several groups about how to define a village in Micronesia for purposes of the survey as a basis for answering any of the questions. Likewise, questions about the meanings of "occupation", "surrounding area", "public services", "taxi" and other terms, and the need for clarification of the questions, made it clear by the end of the afternoon session that the issue of the survey's information requirements and their interpretation in the Micronesian context would have to be dealt with before any attention could be paid to survey techniques.

In response to this issue, the training team cancelled the planned evening session in order to meet and develop revised training strategy. Four important decisions were made in that meeting:

1. to abandon the original training schedule and the activities planned for survey skill training and team-building per se, given the problems of interpreting the survey's questions and concerns about each section of the questionnaire, and with the entire training group, to allow the survey's designer to review and respond to questions raised in the small group; to focus also in the same manner on ensuring participants' understanding of the survey's procedures for identifying and recruiting a valid population sample for the survey of domestic, small-shop, and agricultural energy uses, and to provide practice in these procedures; to ensure understanding of the procedures for measuring and recording the uses of fuels in selected homes and small-shops; and to engage the participants in planning as survey teams for the introduction of the survey and the gathering of first-quarter data for evaluation.
2. to utilize this focus on content and procedures as the context for working with the participants in a cooperative, problem-solving way to work out approaches to understanding and implementing the survey in Micronesia that would be appropriate and beneficial to their villages and their own needs.
3. To structure the training activities so that the survey's designer could provide detailed, uniformly understood information on the survey's content, procedures, and requirements as the major technical resource in the workshop; and to allow the other trainers who could not do so to work with the participants in small groups to elicit their questions and concerns, to help them process information, and to help them in the practice of survey procedures and in team planning.

On the basis of these decisions and through ongoing session-by session planning by the trainers with the Micronesia staff, the remaining three workshop days were organized around these new training priorities, and involved the participants in an intensive analysis of the survey's content and procedures through small and large group work, a planning exercise in teams for the survey's implementation, a discussion of the structure and reporting requirements of the survey, and an evaluation of the workshop.

In addition, to prepare the participants to take part in the Micronesia Energy Conference to follow, the survey's designer demonstrated the construction and use of small-scale solar technology models which might be used by survey teams as motivational devices in their villages.

D. The Lessons Learned

The participation of the Volunteers and counterparts in the survey workshop provided them with a deeper understanding of the energy crisis in Micronesia, enabled them to work in the Micronesia Energy Conference with energy planners and political leaders on ways to deal with this crisis, and established the role and importance of the energy survey as a critical step in this process. In the light of evaluations by the Participants, and assessments by Peace Corps and Host Country agency staff, the workshop was a successful preparation for a pilot survey program in Micronesian villages, and laid the basis for the Volunteers and counterparts to work in their villages and with energy planners to raise the level of energy awareness throughout the islands of Micronesia. Its success as a first attempt to train energy surveyors was, however, largely a learning experience for the trainers who began to identify the correct questions to ask of ourselves, of the participants, of the Peace Corps and host Country agency staff working with us.

The principal lessons learned in preparing for and doing the Micronesia workshop have already been suggested in the preceding discussion. With respect to workshop preparation, the lessons are obvious: a good deal more time for design, design review, staff training, materials development and logistical organization prior to departure, and more time in-country prior to the workshop for work with Peace Corps and sponsoring agency staff on review of the design, briefing of the training team on problems affecting the workshop, organization of the workshop site, and the establishment of common goals and collaborative working relationships by all actors in the situation. Perhaps the most critical lesson we learned in this was the vital importance of having a training staff in place early enough to make possible effective staff training in which the staff has an opportunity to critique and practice the design.

Our experience in Micronesia taught us that the essential ingredients of a core design for these workshops must focus learning on the survey itself in ways that will enable participants to act on the survey: to interpret it accurately in terms of the cultured social and political realities of the country; and to use this active involvement and their own knowledge and experience as a basis for the development of strategies and techniques for introducing and implementing the survey.

With respect to the training process, the successes achieved in Micronesia can be attributed in part to the willingness and ability of the trainers and the Peace Corps/Micronesia Staff to respond to the needs of the participants and to the exigencies of the training situation in shaping the design and plan in appropriate ways. In large measure, however, the critical ingredient was the ability of trainers, participants and resident staff to view the workshop as a set of problems to be identified and solved in cooperation with one another. The achievement of this workshop was in the carrying out of this approach on all aspects of the workshop.

E. REDESIGN AND PREPARATION FOR THE PHILIPPINES

On September 4th at 5 a.m., the training team left Guam for Manila after participating in the three-day Micronesia Energy Conference at the suggestion of the Conference organizers, with the survey's designer playing a major role in discussions of small-scale solar technology.

In five days available before the opening of the Philippines workshop, we developed a new, coherent design and workshop strategy based on the discoveries made in Micronesia, established good working relationships with the Peace Corps/Philippines staff and sponsoring agency leaders, procured supplies and administrative support, and worked through issues of role and responsibility within the training team.

During this preparation period, the training team was able to meet with the Deputy Director of the National Food and Agriculture Council (N.A.F.A.) a potential sponsoring agency; with a representative of USAID/Philippines; and, extensively, with the Peace Corps/Philippines Deputy Director and his staff on both theoretical and practical issues relating to survey and workshop implementation.

In addition, the survey's designer met with the Director of the National Bureau of Energy Development (B.E.D.), the agency which became the survey's primary sponsor, and did the statistical work necessary for establishing the per capita income data base for the selection of households to be surveyed in each village. The meetings with the Host Country agency leaders resulted in participant-observation by two N.A.F.A. staff members in most of the workshop sessions and an important workshop visit and presentation by Dr. Ernest Terrado, Director of B.E.D.

This preparation phase of the Philippines workshop established a model for the planning and organization of in-country workshop preparation. The Philippines workshop was both well-planned and organized around a design and strategy responsive to the needs of the participants, the sponsoring agencies, and the training team. In large measure, the effective preparation for the workshop was a product of the excellent resources, organization and cooperation of the Peace Corps/Philippines staff, both in laying the groundwork for Host Country agency involvement and in meeting the training team's needs for a superb workshop facility and for logistical and administrative support.

In this context, the work of redesigning the workshop was focused on an attempt to systematically articulate valid and feasible learning objectives, priorities and activities based on an assessment of the Micronesia workshop and responsive to the particular conditions and constraints confronting us in the Philippines: In particular, the design and training strategy had to account for three major constraints:

1. Participants had been told to expect a three-day rather than a five-day workshop. We could not know prior to the workshop itself how many participants - especially the counterparts - would be able to remain for the entire workshop. Our design, therefore, had to schedule work on the highest priority objectives for the first three workshop days as a necessary hedge against early departures.
2. As a result of the rescheduling of the Philippines workshop to make possible a single, cost-efficient Pacific trip organized around the scheduling of the Micronesia Energy Conference, six PCVS selected from the Peace Corps Fisheries Program could not arrive at the workshop until the afternoon of the third day.

Since their participation was vital for developing sufficient number of viable survey sites, and since their counterparts would be attending the earlier sessions of the workshop, it was necessary to build a distinct training module into the design which would give them intensive training on the content of the first three days so that they could participate in the later work of team planning for the survey.

3. Although all of the trainers were now familiar with the survey's questions and with the kinds of problems of interpretation participants would encounter in reviewing them, the survey's designer remained the primary technical resource on matters of the survey's content, procedures, and requirements. The design would have to focus on making his expertise available to all participants, while at the same time making possible a sufficient variety of different kinds of training activities that would stimulate the participants' active engagement with the survey materials to encourage a cooperative problem-solving attitude and their ownership of the survey.

In response to these constraints, the team worked out a design and schedule for a basic training model which focused all work on the survey's content, structure, and procedures in the first three days. The final two days would be devoted to work on strategies, techniques and planning which did not require the expertise of the survey's designer and which would emphasize the participants' own creative work based on their understanding of social and cultural constraints and of local conditions. This organization would make it possible for the survey's designer to work with the Fisheries Volunteers on the evening of the third day and continuing in the morning and evening of the fourth day in order to prepare activities and culminating discussion and evaluation scheduled for the final day.

The problem-solving task for both the participants and the trainers during the first workshop phase would be, therefore, the discovery of ways in which the survey could be validly interpreted to fit the conceptual and social organization and the values of the culture. Given, for example, a basic, generic definition of the term "village" which evolved out of the Micronesia workshop and further research, what would that definition refer to in the Philippines? How would the definition be refined or amended so that a "village" could be identified which would be consistent with the intent of the survey and at the same time fit the modes of political and social organization in this culture? The task of arriving at such a definition is necessarily a cooperative

task involving both participants and trainers. Indeed, the satisfactory working through of such tasks constitutes an important condition of conceptual adequacy of the survey's question: If the questions cannot be unambiguously interpreted in different cultures, then the questions themselves are not well constructed and cannot yield unambiguous data based on uniform criteria of interpretation.

The same is true for the survey's procedures for drawing a sample of households in a village, or for measuring fuels in those households. If, in the view of participants in the workshop, such procedures would be impossible or difficult to implement, then the procedure needs to be adapted, simplified or replaced with other, more appropriate procedures consistent with the informational requirements of the survey. The task of the training team in this and other workshops of this initial series was, therefore, not only training participants to understand and implement the survey, but also discovering the problems of clarity and feasibility which the survey itself presents to those who will carry it out, and working with them to solve those problems through the cooperative working out of appropriate guidelines of interpretation and techniques for carrying out the procedures. As in Micronesia, the primary focus of the second workshop phase would be the participants' identification of issues and problems related to carrying out and utilizing the survey as a development tool, and their development of strategies and plans in the light of those problems.

Within this two-phase plan, the workshop design retained the use of large groups, small groups and survey teams as the basic training settings. This grouping strategy had been one of the fundamental features of the original design, and had proved its value in the Micronesia workshop. However, while the basic functions of the groups remained the same in relation to one another, less emphasis was placed on using the survey teams as the sole mechanism for problem-solving exercises and tasks, and new approaches to using the small group as more than a discussion format were evolved. This resulted from our effort to introduce variety into a somewhat repetitive process of analyzing the questions in all of the survey's sections.

In addition, the participants' involvement in strategy development for doing the survey had, in Micronesia, been encouraged only as a preface to the team task of action planning. In this design, the task of strategy development was viewed as a culmination of the

participants' confronting and dealing with the issue of the survey as part of a development process, its implications for that process, and the potential expectations and problems its implementation would create in the villages. To make possible the widest possible discussion of these issues, a new form of grouping was developed: the Action Committees.

These Committees dealt with strategy issues which arose in small group discussions, such as the problems of explaining the survey in the villages and to the families selected for participation; integrating the work of the survey into the other work and responsibilities of the surveyors; and utilizing the survey information and process toward village energy consciousness and development. These Committees would cut across team and small group structures and involved participants in terms of their concern with one or another thematic problem.

Given this design of an overall workshop structure and schedule, the Philippines workshop presented a challenge to the training team to develop and carry out specific training activities during the course of the workshop which would enable us to implement the objectives and priorities we had articulated for the workshop; to test and refine the design as a core training model; and to provide guidelines and materials for future workshops that would enable trainers in other countries to develop appropriate variations on the workshop design and strategy. As we shall indicate later, the meeting of this challenge in the Philippines workshop presented the trainers with a larger, more fundamental challenge; coming to terms with the limits of the survey with respect to its methodology, the scope and utility of the information it could produce, and the expectations claimed for it as a resource for rural village development--issues which were all raised in the workshop by participants, Peace Corps staff and Host Country agency representatives.

F. The Philippines Workshop: September 9-14, 1979

With the cooperation of the Peace Corps/Philippines staff and of the facility manager, the workshop opened the evening before its scheduled starting date in an effort to assess the needs and plans of participants for potential early departure, and to focus on an introduction to the workshop goals and expectations, to the trainers, and briefly, to the survey's goals in a large group session. The group was then divided into three small groups composed of clusters of survey teams. These groups engaged in an ice-breaking, getting acquainted activity in which groups of 3-4 participants presented and explained pictures which they had collaboratively drawn to reflect who

they were and/or why they had come to the workshop. This was followed by an exercise in which participants formulated and shared their expectations of the workshop and discussed their appropriateness with the trainers. These exercises proved highly effective both in setting an active, participatory tone in the groups and in providing important information about the participants to the trainers.

On the following morning the survey's designer presented the background, rationale, and structure of the survey for reaction and discussion.

The afternoon session began with a large group lecturette by the survey's designer orienting the group to the content and structure of the Village section, and providing a generic definition of "village" for use in the small group sessions which followed. These groups discussed this definition and attempted to work out its applicability to the Philippine rural social structure of barrios, barangays and municipalities. This was followed by an exercise involving survey team members in answering the questions in the Village Computable section and comparing their answers in order to reinforce the participants sense of their own knowledge and of their confidence in the survey questions. The session ended with an analysis of the questions for problems of understanding and interpretation which were recorded and discussed by the participant's group leader.

The evening session focused on small group analysis of the Village Narrative section in a similar fashion, followed by a discussion of the survey's requirements for valid, reliable and appropriately accurate answers which presented a relatively detailed picture of the village. The concept of "triangulation" of information techniques and sources was introduced as an approach to obtaining reliable and accurate information, and ways were suggested by which members of teams could cross-check their observations and their perceptions of responses to questions they devise and ask to gather information.

Following a policy of rotating the trainers among the different training groups, throughout the workshop these evening groups had different leaders from those they had worked with in the afternoon and during the previous evening. This made possible the exposure of all participants to each of the trainers, and the freeing of one trainer during each small group session for planning and preparation of the next training sessions, thereby reducing trainer fatigue and making possible a distribution of design, logistic, and training responsibilities among all members of the team.

The introduction and analysis of the Domestic section on the following morning was based on applying a generic definition

of "family" to the structure of Philippine households, and followed the same pattern of small group question and analysis, with the addition of a new exercise related to the Domestic Narrative. As a follow-up on the previous evening's work on information gathering, each group was divided into two sub-groups, one of which discussed and presented ways to gather information for the answers to three selected questions. The other assessed what cultural or social problems might be encountered in attempting to gather information for those questions. The two groups then shared their findings and discussed how the problems might be dealt with and the questions answered adequately. This exercise focused the participants on the issue of developing and using a variety of alternative, reliable, and culturally appropriate techniques for information gathering in the context of their active analysis of the content of the survey.

The afternoon session began with an overview by the survey's designer of the methodology and rationale for the survey's strategy of determining the number of families to be surveyed in each village and an introduction to the procedures for deriving a valid sample of randomly-selected families for recruitment as survey participants. Questions were raised and responded to about the validity of using per-capita income as the data base for the sampling strategy, since current figures on income were not available.

This was followed by a small group exercise in which each survey team practiced sampling procedures working with an estimate of the total number of families in their village. Each team's procedures were then reviewed, and a discussion was held on problems which arose in following the procedures and on ways in which a list of the families in a village might be compiled or obtained from village leaders or agencies.

The evening session was devoted to an explanation and demonstration of procedures for the weekly measurement of fuels in selected households, including a detailed discussion of the measurement of bulk fuels and electricity. This was followed by a team exercise in recording fuel measurements for a "simple" and a "complex" household differentiated by the number of different uses of different fuels occurring in each household.

The morning session of the third day was focused on small group analysis of the Small Shop and Agriculture sections using the same pattern and exercise initiated in the work on the Domestic section. The afternoon was spent on a large group presentation of the Renewable Energy section of the survey and a review of the entire survey questionnaire.

With the arrival of the Fisheries Volunteers, the survey's designers conducted an intensive introductory evening session with the aid of their Philippine counterparts. All other participants had a free evening while the other trainers planned, for the following day, the design for the participants' development and presentation of strategies for implementing the survey based on an analysis of five problem areas:

(1) Using the Survey as a Development Tool; (2) Introducing the Survey to the Village; (3) Introducing the Survey to Individual Families; (4) Implementing the Survey for One Year; and (5) Motivation and Support for Doing the Survey. These areas were selected by the trainers on the basis of an analysis of problems and concerns raised by the participants and recorded during the course of the first three days.

For this activity, each participant was asked to sign up for work on one of these issues as a member of an Action Committee which would use the morning for discussion of the issue and the development of strategies for dealing with it in the field as members of survey teams. In the afternoon, each Committee presented their work using outlines and visuals displayed on newsprint, and the ideas and analyses presented were discussed by the entire training groups. The newsprint displays were then transcribed and duplicated so that all participants received copies on the following day. This extended exercise was highly productive in focusing the participants on utilizing their knowledge of the survey and of Philippine Society and integrating these in a collaborative and creative way in the production of stimulating and useful ideas.

In the course of the group's discussion, several important issues were raised relating to the danger of overselling the survey and creating unreal expectations on the part of villagers and village leaders; the ability of Volunteers and counterparts to introduce and conduct the survey in the context of already existing jobs and responsibilities; the lack of an overall approach to development as a guide to implementing and utilizing the survey as a development tool; and the problem of providing an effective support system for the survey teams by Peace Corps/Philippines, the Peace Corps Energy Project, and the sponsoring Host Country agency. The need for acting on these issues was largely focused on the development of effective mechanisms for information exchange among survey teams; for financial and material resources and organizational assistance; and for the legitimization of the survey activities in the villages through the appropriate organs of the Philippines and United States Governments.

In part, these problems would constitute a large part of the work of the Peace Corps survey coordinator who participated in the workshop. Efforts were made by the trainers after the end of the workshop to help the coordinator define his role

and responsibilities, and to provide him with strategies for task analysis and organization.

In his presentation and discussion of his agency's interest in the survey on Friday afternoon, Dr. Terrado, B.E.D. Director, suggested ways B.E.D. might utilize the survey teams as part of an effort to develop alternative energy demonstration projects in rural areas throughout the country.

The final morning was organized for the survey teams to develop a working plan for implementing the survey during the first three months, focusing on the organization of objectives, resources, tasks and a timetable of targets. For this activity, a simple planning format was provided by the trainers who made themselves available to answer questions and provide guidance. A planned structured critique of these plans in small groups did not take place due to participants need for time to complete the task. In the afternoon, the reporting requirements of the survey for the transmission of first quarter data were reviewed, field copies of the survey questionnaire were distributed, the progress of the workshop was briefly reviewed, and a workshop evaluation form was completed by the participants. Dr. Terrado delivered his presentation and the workshop ended in the evening with a banquet and folk dance entertainment.

G. The Lessons Learned

The Philippines workshop presented us with the challenge of delivering a well thought-out, well-organized and significant workshop to an articulate, serious and thoughtful group of Volunteers and counterparts who were prepared to raise questions throughout the workshop. We measured our success here on the basis of our ability not only to stimulate understanding and realistic commitment, but also to respond to the questions and issues raised in the course of our work with the participants, the Peace Corps staff, and Host Country agency representatives at the workshop.

These questions related to:

1. The statistical validity of using regional per-capita income data as a basis for determining the size of a village household sample.
2. What uses the survey's data could have for country energy and development planners, given the very small sample of villages and households surveyed.
3. Would the survey data be available to the villages themselves, and how could it be used to the benefit of the villages? In particular, how could it be used to make possible the development and funding of energy-related projects in the villages involved?

4. What resources, funds and institutional support would be available to the survey teams to promote and legitimize the survey and, especially, the participation of counterparts in its implementation?
5. What could be done by Peace Corps/Philippines and by Peace Corps/Washington to maintain the motivation and the reliability of survey teams over the course of a year?
6. How can survey teams introduce and promote the survey in their villages effectively without raising unreal expectations among the villagers.

These questions are difficult ones and go to the heart of the survey program, its claims and its limitations. For the training team they provided a stimulus to sharpen our own understanding of what we were training for, what we could reasonably expect the survey and the survey teams to accomplish and our own responsibility to explain the survey as realistically as possible and to help participants to do so. Led by the survey's designer, the training team responded honestly to these questions, involved the participants in helping deal with them as genuine problems to be solved, and answered, "we don't know" when we didn't.

The significant lesson in this for us had to do with the complexity of the issues surrounding the training of surveyors. As indicated in the next section, they constituted an important part of our evaluation of this workshop in preparation for Paraguay.

In contrast to this level of complexity, we learned to simplify the structure of the workshop and the specific training activities, and identified the essential ingredients of a core workshop model which could be appropriately varied to respond to local conditions in different countries and cultures. On the basis of this core, we were able to evolve ways to enrich and vary the training activities to develop a momentum in the workshop and involve the participants in the kind of critical engagement that bespeaks ownership of the process.

Finally, we learned the need to establish good, cooperative working relationships with the Peace Corps staff with whom we worked to make the workshop and survey a reality; to find ways to meet our mutual needs, priorities and agendas; and to be as clear as possible about these in the spirit of cooperative problem-solving which characterized the workshop.

PHASE TWO: PARAGUAY AND SENEGAL

A. Redesign and preparation for Paraguay

The major objective for this phase was the adaptation of the training model developed in the Philippines for the conduct of workshops in non English-speaking countries, and the organization of appropriate training resources in collaboration with the Latin American Region and Paraguay Peace Corps leadership. To accomplish this objective, we identified the following four tasks:

1. to assess the design and implementation of the Philippines workshop, and the ways in which that model would have to be adapted for Paraguay.
2. to design a bi-lingual training model in response to this assessment.
3. to develop and train a workshop staff appropriate for the implementation of this model.
4. to revise the survey questionnaire and training materials in the light of our experience in phase one; to translate these into Spanish; and to organize our own and in-country workshop preparations in collaboration with the Paraguay Peace Corps leadership.

1. Assessment

The lessons learned from the Philippines workshop suggested that the core training model developed provided the basis for an overall design for Paraguay in terms of the basic requirements of the survey design and strategy, and the ability of the survey teams to undertake the necessary tasks of gathering and recording data.

In particular, the workshop strategy of cooperative analysis of the survey's goals, content, and procedures based on participants' knowledge of cultural realities, effectively laid the groundwork for the participants' own development of culturally appropriate strategies for introducing and implementing the survey. Our major concerns developed around issues related to: a) the creation of institutional support for the survey teams through careful programming work with in-country Peace Corps programs and Host-Country agencies sponsoring the survey; b) clarifying the relationships between the survey and the potential development of Peace Corps and Host Country energy and Appropriate Technology projects based on the survey's information on and activities in the participating villages.

These programming issues and their resolution were seen as vital to setting a realistic climate and institutional frame of reference for the survey and for the motivation and preparation of both the Volunteers and the counterparts for undertaking it. This assessment indicated that the training design for Paraguay would have to focus on the following:

1. Enhancing the ability of non English-speaking participants to understand the goals, contents and procedures of the survey through cooperative work with Volunteers and trainers in all aspects of the training, and to take leading roles in the development of culturally appropriate interpretations of the survey questions and procedures and of strategies for its introduction and implementation in their villages.
2. the organization of a bi-lingual team and training materials that would facilitate this process and encourage the free flow of dialogue among the participants and trainers through ongoing work in both English and Spanish.
3. meeting our need for the survey's designer both to contribute effectively as the primary technical resource in the workshop process, and to work extensively with Peace Corps and Host Country agency representatives on programming for the survey and for potential energy projects - before, during, and after the workshop.

To this end, a training model was developed which incorporated the major training content and activities developed in the Philippines, and utilized the cooperative problem-solving approach evolved in the Phase One workshops as the basic strategy for dealing with the language problem and building an effective team, both for training and for vital programming work.

2. The Bi-Lingual Cooperative Problem-Solving Model

The language model described here cannot be looked at in isolation from a series of variables that impact upon its design. These variables are as follows:

- The givens we had to work with concerning the language ability of the core training staff, the skills and resources present in the entire training team, and the language abilities of the participants.
- The philosophy and general approach of the workshop.
- The goals of the workshop.

a) The Givens

The givens will vary from country to country and therefore demand variations in the model described here. However we expect differences to be primarily differences of degree. For the most part it appeared safe to assume the following:

- Peace Corps Volunteers will have a basic working knowledge of the "official" language of the host country and also the language of the region, tribe or village in which they work. In some cases this may be the same as the official language. There will most likely be a small minority who are less fluent and may experience some difficulties in comprehension, particularly given the technical nature of the field.
- Host Country Nationals will be operating in either one or two languages. In Paraguay, for example, all WCNs speak Spanish although the "everyday" language that they communicate in may be Guarani. In some countries, however this may indicate the need for a tri-lingual workshop.
- At the current time, the expertise with the survey instrument as well as training design, and delivery experience with the participant centered learning model lies with the English-speaking core training team. Although our goal is to enlarge the number of individuals we can draw upon with both training and survey expertise, this is a process that takes time. We also recognize that realistically we cannot expect the pool to contain individuals who speak all languages we will encounter with the expansion of the program to other countries.

b) The Approach to Training

The philosophy and general approach to the workshop sets the tone and the learning climate in which all activities take place. Its influence cannot be underestimated. It makes possible the implementation of the model described below. Quite simply it calls for a collaborative problem-solving approach that involves participants from the first day in a proactive manner. This approach was found to be not only effective but realistic and necessary for implementing the survey in both Micronesia and the Philippines.

Because the program, the survey process and the instrument itself are all firsts, we find ourselves on the "cutting-edge." This necessitates constant feedback, problem identification and problem solving. We cannot proceed with the work to be

accomplished unless we attempt to develop in the workshop a true partnership with the survey teams who in the final analysis are the single most important cogs in the wheel of this effort.

The language "problem" becomes simply another instance in which participants and trainers must put their heads together pooling their information, skills and resources to evolve a strategy that will achieve those goals that we share. This is no different from the mode we must operate in order to consider issues of survey implementation that only workshop participants can raise for our joint consideration and analysis. Their concerns and problems must be ours also if the survey is to be effective both as a data gathering tool and as a development process.

Given the overall strategy and resources embodied in the bi-lingual model, we will encourage informal solutions to the language barrier, particularly in the small group work. It is anticipated that there will be much informal translating going on between participants during and between sessions. We also intend to continually emphasize the wealth of resources the workshop has in its participants and to provide ways in which those resources can be tapped.

c) The Goals

The goals of the workshop fall primarily into three categories:

- o Helping participants learn about the content, procedures, and structure of the survey instrument and eliciting from them the cultural variables that must be considered in the data gathering. Linguistic and cultural accuracy is of prime importance in this exchange of information, ideas and concerns.
- o Exploring with participants the overall implementation of the survey, its impact as a development tool, and participants' varying roles in that process. The achievement of a free flow of dialogue among participants and trainers requires training resources who can facilitate a bi-lingual dialogue in this exploration.
- o Helping participants look at some team building strategies, issues of how to use each other well, and ways of working together effectively to accomplish the task and learn about team work. This will require the guidance of this process by an intercultural team of trainers who can effectively model cooperative team planning and work.

The first two categories cannot be achieved without the third being in place as an operating principle and norm. For the workshop at least, the team concept is expanded to include all participants and staff working together learning how to learn in the most effective manner possible.

d) The Model

In order to implement a bi-lingual workshop within the training approach and constraints just described, we evolved the following structures, resources and processes for the Paraguay workshop.

The workshop participants work in three different kinds of training groups: the large group made up of all participants, four small groups of approximately 5 survey teams of three members each, and the survey team themselves. The model calls for the delivery of all large-group lecture material in English with an ongoing translation into the host country language and a question and answer period during which questions are formulated and answered in both languages.

In order to facilitate translation, the translator will be part of the ongoing workshop process and will work with the large-group deliverer before each presentation so that not only the content but also the process and desired climate can be communicated.

A great deal of the work done during the workshop occurs in small groups and in teams. Of the four small groups, two will be led by the English-speaking workshop designers; two will be led by bi-lingual lead trainers. Each of the small groups that have a monolingual English speaking lead trainer will also have an assistant (either a Peace Corps Volunteer or a host country national) who is bilingual and can work with the lead trainer in a small-group training team.

At the beginning of each session in these bilingual groups, an overview to the session and all instructions for what the group is to accomplish are given in English and translated by the assistant. The actual work is completed in whatever language participants feel most comfortable. Both lead trainer and assistant are available during this phase to informally communicate with participants giving help where needed.

The actual processing of the work done is accomplished mainly through discussion. This discussion will take place in the language of the participants with frequent summaries in English by the assistant trainer or one of the participants. This role may be rotated among participants, someone taking on that responsibility for a particular session, or it may happen more informally and spontaneously without the need for structure.

The lead trainer will respond to the summaries in English as well as intervene in the process with a question or response whenever appropriate. The monolingual lead trainer may also decide to adopt a language "guide" in the form of a bi-lingual participant/observer who is not a regular workshop participant. This person would keep the lead trainer "tuned in" to what is happening in the group. Finally, the wrap up and closure of each session will be done by the lead trainer and translated by the assistant.

The other two small groups will operate almost entirely in the native language with occasional translation into English for those Peace Corps Volunteers who may not have a high degree of fluency. Both lead trainers will be completely bi-lingual, but will also have training assistants highly familiar with the culture and cultural idioms.

Developing a training team and training resources for implementing this model became the major focus for our workshop preparations both before and after arrival in Paraguay, and required close communication and cooperation between the Washington team and the Peace Corps Paraguay leadership. This cooperation would be specially important for the identification and recruitment of the culturally-aware, bi-lingual training assistants necessary for effective communication and cooperative work in the small groups.

3. Building the Training Team

To meet the requirements of the model, a two-stage team building strategy was developed. The first stage involved the recruitment and training of two-bilingual lead trainers prior to departure for Paraguay. These trainers would lead small groups in Spanish and would assist in the translation of large group presentations. Their early involvement and training would enable us to integrate the Paraguay-based assistant trainers into a functioning core team already familiar with the survey and the training model and enable the survey's designer to focus on the development of large group presentations in the workshop and programming work with Peace Corps and agency leaders. It would also enable him to function as an on-call technical problem-solving resource in all of the small groups.

This first stage was effectively accomplished through the cooperation of the Latin American Region which released the Paraguay Desk Officer for work with us and the Office of Staging which released an experienced bilingual staging officer with good training experience. On the basis of an analysis of and practice with the survey materials and workshop design, these trainers became quickly integrated into the training team, and played valuable roles in our preparation for the workshop.

This second stage took place in Asuncion with the orientation and involvement of four Peace Corps/Paraguay Volunteer Leaders. Working with the core team on the planning of the workshop strategy and on the organization of bilingual training workbooks, these training assistants brought the critical element of cultural reality into the final planning of the workshop. In addition, through arrangements with Peace Corps/Ecuador, the team was able to obtain the involvement of an Ecuadorean national who, as a PC/Ecuador staff member, would explore the possibilities of a survey program in Ecuador while working as an assistant trainer in the workshop. Joining us in Asuncion, he participated in the pre-workshop preparations and orientation.

The completed training team now reflected an organization of resources, roles and responsibilities which would make possible the integration of technical and cultural knowledge and experience as well as the linguistic competence required by the training model.

4. Preparing for the Workshop

In tandem with the two-stage team building process, the preparation of materials and the logistic organization of the workshop was organized in two stages. Prior to departure for Paraguay, the core team focused on three major tasks:

- a. clarification, annotation and revision of the survey questionnaire and procedures by the survey's designer in response to work with USAID statistical experts, and to participants' questions and suggestions from the Philippine and Micronesia workshops.
- b. translation into Spanish of the questionnaire, and the organization of survey and training materials and supplies for transport to Paraguay with the trainers.
- c. communication by phone and cable with the Paraguay Peace Corps leadership toward our mutual understanding of the survey and workshop requirements; our needs for training and logistical assistance; and the organization of arrangements for programming work by the survey's designer and for the statistical data needed for training in sampling procedures and their implementation in the villages.

Information obtained in these communications from the Peace Corps/Paraguay APCD in charge of the Workshop indicated that we could expect 20-25 Volunteers with counterparts; that all participants could work in Spanish; that a hotel training site had been arranged which satisfied our needs for large and small group training spaces; and that needed training and logistical

assistance would be available. All seemed in order for our arrival in Asuncion and the second stage of workshop preparation.

In order for pre-workshop programming and statistical work to be accomplished by the survey's designer, he left Washington for Asuncion before the other members of the core training team who remained to complete the organization of the materials in both English and Spanish for transport. This was not completed in time for the team's scheduled departure and required the completion of materials preparation as part of our work with the Paraguay-based training assistants before the workshop.

With the workshop planned to begin on Sunday evening November 4th, the workshop designers arrived in Asuncion on November 1st and began a series of meetings and work sessions organized toward mutual orientation around the implementation of the training model, the identification and distribution of roles, responsibilities and tasks, and the completion of the materials preparation necessary for the organization of training workbooks in Spanish and English for the participants.

Given the shortage of time for our in-country preparations and the orientation of the training assistants, the training team was not able to engage in a detailed analysis of the planned training activities or to practice as small-group training teams before leaving for the site.

As in the Philippines workshop, we planned for ongoing staff and small group team meetings each day on specific training activities and on assessment of participants needs as these arose.

B. The Paraguay Workshop: Planned November 5-9; Cancelled November 5

The training team arrived at the workshop site on Sunday, November 4th prepared to conduct the opening session that evening for the expected 50-60 participants. This plan had been carefully reviewed with the Paraguay APCD. By dinner time it was apparent that there were very few participants at the site, and we revised our plan to include only a welcoming speech by the PC/Paraguayan Director and a brief introduction to the trainers and the Workshop. The presence of only six Volunteers and five counterparts at the session raised serious questions about the viability of the workshop and of a survey in Paraguay.

These were discussed with the PC/Paraguay Director and APCD after the session, and we were assured that the majority of the participants would be arriving in the morning. In addition,

one of the training assistants, a Coop Volunteer, raised the possibility of involving his Central Coop organization in the survey, and wanted to explore this during the following morning in Asuncion.

We decided to postpone the morning session and begin the workshop after lunch based on a mid-day assessment of the number of viable survey sites represented at the workshop. We agreed to go ahead with the workshop if there were a minimum of 18 viable survey sites represented by participants attending the workshop, including six potential sites organized by the Central Coop.

We planned to survey the Volunteer participants present during the morning as to their interest in and availability for the survey tasks, their estimate of counterpart availability, and the viability of their sites for the survey. We also agreed to design a three-track contingency training plan for training Volunteers with counterparts, Volunteers without counterparts, and a group of Central Coop Volunteers and HCNs.

During the following morning, 6 more Volunteers and 11 counterparts arrived. While the workshop designers worked on the contingency plan, three of the Volunteer training assistants had already met with the Volunteer participants to assess their interest and availability. The results indicated only six viable survey sites were represented, and required a reassessment of the situation. With no word from the Paraguay APCD or from the Coop Volunteer by lunchtime, we cancelled the afternoon session, but prepared a second contingency plan in a last-ditch effort to salvage the workshop and the survey. This plan called for an intensive workshop during the rest of the week for a group of 4-5 Volunteer Leaders who would be able to function as a core group responsible for identifying and recruiting Volunteers and counterparts in the number of sites required for the survey, and implementing a survey training workshop in the near future for recruited participants. We discussed the situation with the Peace Corps Director and decided to cancel the workshop as planned. We offered our alternative strategy to the PC/Paraguay and Host Country agency staff, and the development of a well-designed system of institutional supervision and support. Although this plan was accepted initially as workable by the Peace Corps Director and APCD, the Volunteer leaders present requested time to consider the feasibility of their participation.

Later discussion among members of the core training team revealed major concerns related to the roles projected for the Volunteer core group and the commitment and capability of the PC/Paraguay staff to provide the necessary supervision and support for the effort.

In the light of these concerns, the Washington team came to a consensus decision that the conditions for a viable survey in Paraguay were not present. We presented this to the PC/Paraguay cancelled the energy workshop, and prepared to leave Paraguay.

C. The Lessons Learned

The decision to cancel the Paraguay workshop was based on three major factors:

1. The lack of the required number of viable survey sites.
2. The lack of prior preparation of potential participants on the nature of the survey and the workshop to insure the informed presence at the workshop of a cadre of Volunteers and counterparts for survey teams.
3. The lack of administrative support for workshop and survey implementation.

These factors reflect conditions necessary for a viable workshop and survey. They were largely satisfied in both Micronesia and the Philippines and made possible successful workshops, even though far less prior communication had taken place with these countries. The Paraguay experience taught us, however, that we could not take them for granted in the preparation for any workshop.

The core training team had come to Paraguay with no indication that the necessary conditions were not present for the carrying out of the workshop or the survey. Peace Corps/Paraguay had indicated its interest in participating in the program, ostensibly on the basis of an analysis of the survey's requirements included in a concept paper and memo sent during the Spring. In response to the assurance that these requirements could be met, Paraguay was selected as one of the 1979 participants, and did not indicate any problems in meeting these requirements despite several changes of workshop dates requested by us during the Summer and Fall. Finally, at no time during our phone and cable communication with Peace Corps/Paraguay prior to the workshop was there any suggestion given that the required number of survey sites and workshop participants had not been confirmed.

In particular, there are several things we learned from this experience:

1. The need to do advance work with in-country staff to ensure clarity of goals, tasks, requirements, etc.

2. The critical nature of the role played by in-country PC staff in the success of the program over time and the need to pay attention to goals, needs and potential problems as perceived locally. This includes helping in-country staff realistically assess the tasks and arrive at strategies to make them feasible.
3. The need to communicate clearly and repeatedly information local PC Staff needs to have in order to:
 - a. Understand and "buy into" the goals of the program
 - b. Prepare adequately for the workshop
 - c. Implement the survey
4. The need to remain realistic about what we can and cannot provide given certain realities. In our effort to accommodate Paraguay, we went through several sessions to develop alternative approaches to the workshop and the survey alternatives, however, these turned out to require time, manpower, resources and support beyond our and PC/Paraguay's capacity to provide, and could not provide a basis for a survey in Paraguay.

In order to help prevent the situation in Paraguay from reocuring, we planned to do the following:

IMMEDIATE

- 1) call and cable Senegal staff prior to our arrival to correct any misinformation.
- 2) split up the training team so that at least 2 members spend a week in-country before the start of the workshop and arrive with the bulk of our materials preparation work completed. This would allow more time and energy to be focused on:
 - a. Orientation of in-country staff (including Country Director) to the goals and purposes of the workshop/survey.
 - b. Developing a clear understanding as quickly as possible of:
 - needs/goals of in-country program
 - tasks involved in doing the survey
 - current status of preparation for workshop and survey
 - potential problem areas requiring our collaborative efforts to solve

FUTURE

- 1) -Develop a checklist for in-country staff to use in assessing the viability of implementing the survey in their country, including the time, resources and manpower required.
- 2) Write a follow-up to the May 17th memo further clarifying such items as:
 - criteria for a viable site
 - definition of a counterpart (for survey purposes)
 - tasks of implementing the survey
 - preparation required prior to workshop start
 - development of an in-country PC/Ministry support and supervision system for survey teams.

On the positive side, we learned:

1. That the basic workshop design created for the Paraguay workshop could provide a basis for the development of models and strategies for the training of in-country training teams of Volunteers and/or Host Country Nationals, given the satisfaction of the conditions described above.
2. That our strategy for building in-country trainers into the workshop training team could produce successful and valuable results with respect to the design and planning of a culturally appropriate and realistic workshop - again, given satisfactory administrative preparations.
3. That we could carry with us to Senegal the bilingual cooperative problem-solving workshop model, with the expectation that it could serve as a basis both for workshop training and the development of cooperative design and planning work with in-country staff and trainers.

Re-Design and Preparation for Senegal

On November 18th two members of the Washington team left for Senegal--a full week before the workshop was to begin. Senegal's workshop was to be a culmination of learning from three previous experiences. It represents an evolutionary process in the creation of a core training model appropriate for multi-lingual as well as mono-lingual training populations and adaptable to a wide variety of country specific situations.

As we approached this workshop the Washington team had several goals in mind, all evolving from the lessons learned in our previous three workshop events. They were:

- o To organize before arrival all bi-lingual training materials.
- o To field test the bi-lingual model based on the core developed in the Philippines and brought to, but not delivered, in Paraguay.
- o To focus our attention more directly on establishing a collaborative problem solving relationship with the Senegal Peace Corps staff in order to explore approaches to managing the survey and maximizing its benefits.
- o To bring survey teams to a high level of readiness to undertake the year long effort of data gathering.

The preparation began immediately upon our return from the cancelled Paraguay survey and can be basically viewed as two major thrusts: materials preparation and staff orientation. This was to be our second attempt at implementing a bi-lingual model and it had an impact on both tasks.

All materials were translated into French. We prepared bound copies of the survey workbook and copies of the questionnaire to use in the field. An important decision we made based on the Paraguay experience was to divide our labor in such a way that two team members remained in Washington to take care of final materials preparation while the other two flew to Senegal to begin in-country preparation.

As in Paraguay, staffing decisions were based on our need to deliver a bi-lingual workshop. Because we did not have the opportunity to field test our bi-lingual model with workshop participants in Paraguay, we approached the Senegal workshop with the same model in mind which dictated locating two bi-lingual individuals with process training skills as well as bi-lingual training assistants. In Washington we began an orientation for the two lead trainers. A phone call to Senegal assured us of the services of at least three bi-lingual training

assistants, and alerted us to the fact that we might be facing a multi-lingual situation.

Fortunately one of the two lead trainers had been with us in Paraguay. Although she did not reap the benefit of having experienced her role in the actual workshop implementation, she had in fact been through an orientation prior to the Paraguay trip and was able to glean additional information while there. The other lead trainer was able to attend only a brief session; however, he would be available upon our arrival for additional briefing.

This trainer was the Director of a regional training office for all of Africa mandated to provide in-country follow-up training and technical assistance to Peace Corps Volunteers and staff on an as needed basis. His role and experience provided the training team with a distinct advantage in that he had access to the PC/Senegal staff by virtue of the fact that his office was located in Dakar on the same premises as the Senegal Peace Corps Office and that relationships had been formed between himself and the staff. He was, therefore, able to bring the survey questionnaire and other material to the staff and to prepare the ground for the arrival of the first contingent of the Washington team several weeks later. In addition, his familiarity with Dakar, with the inner workings of the Peace Corps office, and with the culture with which we were to interface all provided invaluable to our own enculturation. Upon arrival in Dakar the two team members with the designated responsibility for in-country preparation turned their attention to three major areas:

- o Setting a collaborative problem solving tone with Peace Corps staff so that a series of tasks described below could be accomplished in a manner that met both in-country realities and workshop needs.
- o Becoming acclimated to our surroundings and developing an instinctive feel for the world our workshop participants inhabit.
- o Delivering staff training to the entire workshop team.

We were able to accomplish a great deal with the cooperation and active participation of Peace Corps staff and Volunteer leaders. Our meetings revolved around preparing for the workshop itself--taking care of logistics, defining roles, reviewing the design and around discussions relative to the survey itself--maintenance needs over the course of a year, and ministry/agency tie-ins.

One of these meetings was organized principally for orienting the two host country national survey coordinators to the survey and for exploring with them an appropriate role in the workshop

(for it was their intention to attend the entire week) and a potential role with the survey over the course of the next year. Both coordinators were representatives of the two Senegalese ministries sponsoring the survey with Peace Corps. An outcome of the meeting was that the two would function as participant observers and once having gone through the workshop and gained a more complete understanding of the survey and its implementation in Senegal, a second meeting would be held to work out the dimensions of a longer term role and collective action between all three sponsors.

This pre-workshop collaboration with Peace Corps staff proved to be the most rational approach to preparing for a workshop and a year long survey yet undertaken. Regardless of the quality and amount of paper and phone communication, these avenues cannot compare with the effectiveness of direct face-to-face encounters in a relatively stress free atmosphere. Misunderstandings can be righted, assumptions checked, needs on both sides listened to and ideas shared.

This is of critical importance as we painfully learned in Paraguay. Perhaps the single most significant contributing factor to the successful implementation of the workshop and the management of the survey over time is the sense of ownership Peace Corps in-country staff feel for the entire effort. It cannot work if its perceived as a Washington project. Spending adequate time listening, attempting to understand and work with local realities strengthens local ownership.

Acclimation to our environment happened both indirectly as we engaged in our preparation work, and directly for the survey designer who, at the encouragement of Peace Corps staff, spent a day in a rural village several miles north of Dakar.

Another outcome of these meetings was a decision to make a trip to the workshop site in order to assess the facilities, develop a strategy of utilization, confirm with hotel staff meal and space arrangements, and generally create good public relations. The trip proved valuable for in fact, space requirements had not been completely understood and it was necessary to do some further negotiating.

Building the Training Team

The most important goal of staff training centered around the need to quickly enlarge our staff to include four new members in such a manner that a team could be welded out of two disparate groups of people (the Washington Staff and the Senegal Staff) who, with one exception, had never met before. Each group had a different set of understandings that had to be shared as efficiently as possible in order for the task at hand to be

accomplished. Initially the most pressing information needed was that which the Washington Staff brought with them about the workshop and the survey. Later, and throughout the week, the information the Senegal Staff had about the culture, the reactions of the Senegalese to the design, and the appropriateness of questionnaire items and survey procedures (to name just a few topics), assisted us all in adjusting our plans and staying on course.

The training was organized into four sessions that ran over two days. The third Washington member arrived in time to participate, however, the fourth encountered airline delays and was not able to be present until the evening before the day of the workshop start up. The seven participants in the staff training were:

- * 2 Lead Trainers (Washington)
- * 1 Survey Designer (Washington)
- * 1 Lead Trainer (PC Senegal)
- * 2 Assistant Trainers (Senegalese)
- * 1 Assistant Trainer (PCV/Senegal)

Also during certain sessions the Peace Corps staff member and volunteer leader most directly involved with the workshop were present.

Our opening session focused on an explanation of our assumptions about how people learn best which provide the base of our training methodology, the workshop goals, getting acquainted with each other and providing new team members with a preliminary exposure to process training and sample exercises used in the Design. Two activities, described in the Philippines report (ice breaker picture and expectations exercise) were tried on for size by the group. As in the Philippines, both proved effective and met our goals of providing a quick initial assessment of group climate and individual orientation as well as allowing new team members to experience a portion of the workshop design they would later help deliver.

An important aspect of the training was the actual practice of portions of the workshop with a bi-lingual training assistant. This gave us a much needed "audition," so to speak, before the final event and helped English speaking trainer and French speaking assistant begin to get a feel for how they would work together in the small group setting.

As the bi-lingual model described earlier in this report suggests, we wanted to avoid as much as possible the repetitious and

cumbersome word-for-word translation process within the small group. The practice sessions opened up the opportunity for feedback and ideas about techniques of working in two languages. Finally, we briefly introduced the survey questionnaire; familiarizing new members with its content; discussed strategies of how the team could operate most effectively at the site; defined our roles and responsibilities; worked out logistics of transportation, organization of materials, etc.; and made final assignments of who was to work with whom in the actual training delivery. The final assignments paired each of the two mono-lingual lead trainers each with a Senegalese assistant and one bi-lingual lead trainer with a bi-lingual Peace Corps Volunteer, while the fourth bi-lingual trainer initially worked alone and later used as appropriate our floating Senegalese translator hired for the entire workshop week on an as needed basis.

In addition to the training staff, during the workshop week we were assisted by both a full-time secretary and translator, a volunteer leader given the responsibility of administrative coordinator, and Key Peace Corps Staff who were involved in various sessions and took on leadership roles as appropriate. The workshop staff traveled to Mbour well prepared to deal with every contingency. This readiness eased our decision making at the end of the initial session when it became evident that in order to proceed with the workshop, some major revisions in both content priorities and training process were in order. The multi-lingual nature of the group and the cultural differences among us all called forth our best creative and problem solving responses.

The Senegal Workshop: November 25-30, 1979

The workshop opened the evening of the 25th with 54 participants present from 26 rural villages throughout Senegal. Each counterpart present actually lived and many worked in their village. The session, conducted in a large group in both French and English, included a welcome from PC/Senegal, an introduction to the staff, an overview of the energy program and survey, and a presentation of workshop goals. Newsprint materials were written in both French and English (For ex.: workshop goals), and a basic verbal translation process took place in which a presenter spoke in English for one or two minutes after which an assistant trainer gave a more or less word for word translation into French.

During the session, a lively discussion took place about the level of understanding, particularly among counterparts due both to language barriers and unfamiliar concepts. We became aware, once again, of the inordinate amount of jargon and professional terms each of us were using.

In reponse to the concerns raised, we attempted to clarify the way in which we envisioned participants and trainers would have to work together. We reasoned that in order to test out the survey with participants to see how it fit and/or can be adapted to take into account cultural realities, good communication must occur. Active problem solving requires everyone being able to communicate his/her ideas as well as understand those being communicated by others. We asked participants to help us find ways of working together to make this kind of give and take possible.

It's appropriate here to speak briefly of participant characteristics. Some counterparts were not comfortable operating in French and used Wolouf or Mandinka as their everyday language. Volunteers had varying degrees of difficulty understanding all three languages. Some counterparts had difficulty reading and writing. There was also the possibility of an initial disorientation on the part of the Senegalese participant who had not previously made a trip of this distance nor experienced workshop facilities of the type in M'Bour. Many PCVs had only lived in their assigned village for four months and were still attempting to understand the reality in which they found themselves.

After an informal feedback session with a handful of PCVs concerned that their counterparts had not understood the session, the staff met to assess the situation facing us. It was evident that we were dealing with two separate problems-- language and lack of familiarity with certain concepts (For ex.: technology and energy). Some participants seemed to be

experiencing difficulty tethering the evening's presentation on survey goals with anything within their experience. Some volunteers, for a variety of reasons--one being their own lack of comfort with the language being used--might misrepresent what is actually taking place with the majority.

The staff was also aware of the fact that volunteers had been required to come to the workshop versus having chosen to do so on their own. Therefore, there was an initial resistance from a small minority. In addition, in spite of our preparation, we discovered volunteers had still not received adequate information about the survey. They had been instructed to find a counterpart in their village who was able to speak French. In some cases this meant one or two villagers and often not the most appropriate individual to become a member of the survey team. In fact, we were prepared if necessary to develop strategies for running a multi-lingual workshop (which is what finally occurred after a fashion). Lastly, some participants had expected the workshop to focus on appropriate technology. Some miscommunication between Washington and Dakar, and lack of explanatory materials provided for in-country staff in a timely fashion resulted in the above, relatively minor constraints all of which were operating during the initial two sessions of the workshop.

We decided that we would delete both a getting acquainted ice breaker and an expectations session. Instead immediately after a scheduled key note address by the head of one of the two sponsoring ministries, we would move into small groups and begin work on the village section of the questionnaire. It was hoped that by focusing on the concrete, i.e., the questionnaire itself rather than the abstract world of goals and expectations, we would help participants get acclimated to the task at hand. We also agreed to monitor ourselves for the use of jargon and colloquialisms in order to keep our language simple.

The next morning began in a large group with a very brief overview of the village section presented in both French and English. After a key note address, small group assignments were posted and the morning was spent filling out the village computable section and eliciting reactions and questions to each item. The same approach was used in the afternoon session with the village narrative section, and in the evening with the Domestic Computable. The entire day was designed to give participants an initial grounding in the questionnaire. Through the actual reading together of each item, the survey began to become less mysterious and teams came to an initial recognition that what was being asked of them was within the realm of the ability to delivery.

For training teams and survey teams it was a day of experimenting with different working modes. In some survey teams questions were read out loud by one member and then discussed in the operating language of the team (French, Woulouf, or Mandinka). In other cases survey teams formed a small cluster and helped each other understand and discuss the questions.

Trainers and assistants began to adjust to each other's style. Each training team had individualized work styles. The methods used which continued to evolve over the course of the five days were dependent upon the language ability of the trainers and the degree of comfort each assistant felt with the training approach used. Gradually, as the week progressed, the formal word for word translation mode was used less and less with the increasing confidence of the Senegalese assistants.

The morning session of the second day was again spent in small groups going over the Domestic Narrative Section. Some groups also asked participants to draw a picture of a dwelling in their village so that someone who had never been there before could capture the essential ingredients. This activity stimulated much active participation among members and generated good discussion as each picture was presented to the small group.

The morning also included a meeting for the Regional Inspectors who were preparing to leave the workshop. Present also were the two HCN survey coordinators, a PC/Senegal staff and the survey designer. The Regional Inspectors questioned the survey designer on many different topics. Some level of skepticism had been noted from the one or two very verbal Inspectors during the previous day, and was again in evidence during this meeting. However, issues were clarified and the Regional Inspectors "bought into" the survey. A culmination discussion ensued as to how the Inspectors could lend their support. It was decided that each would make a trip to the selected villages in his area and formally introduce the survey. They left seemingly satisfied with the results of the meeting.

In the afternoon we instituted another major change in the workshop design. In our staff meeting the previous evening we anticipated that some counterparts might have difficulty understanding the two "technical" sessions of the workshop--sampling and fuel measurement. We were also concerned about our own ability to explain the concepts and tasks clearly, hampered by the constraint of language. We decided to experiment with a split group session--volunteers in one group, counterparts in another.

The volunteers received a thorough briefing in fuel measurement procedures and practiced filling out the form given a simulated set of fuel consumption figures. The counterparts worked in

small groups discussing and assessing the information they had about the survey so far. Each small group was asked to give a report of their understanding of the survey plus any problems they had identified. This procedure allowed us to assess how much information had been absorbed and what issues were on the counterparts' minds. The entire session was conducted in French (with Woulouf and Mandinka used as necessary). This helped the flow of the session considerably and stimulated active involvement on the part of everyone.

The counterparts were also given an overview of the fuel measurement procedures. At the end of the session, PCVs and their counterparts met together as teams in their assigned small groups to share with each other the information learned and issues raised. This process worked exceedingly well. It also came at an appropriate time. Survey teams had already begun to gel due to the four previous sessions of intensive work together. The split allowed us to demonstrate in a very practical way that an effective team is one which makes the most appropriate use of the different skills and resources each member brings and operates with the division of labor principle as appropriate. Therefore, not all tasks will be performed jointly. However, a high level of information sharing between members must occur.

The evening session originally planned was cancelled because it was our consensus that we would be able to cover the necessary material in the remaining morning and afternoon sessions over the next three days. The morning of day three was again organized around the split group method. This time volunteers received in-depth information on sampling procedures and briefly reviewed the agriculture section of the questionnaire. This content emphasis was reversed in the counterpart group which analyzed the agriculture section closely and listened to a general description of the sampling procedures. This was followed by information sharing between survey team members in their small groups.

The afternoon session was the final split group experience of the workshop. Each group reviewed the renewable energy section of the questionnaire; however, the volunteers were given technical information about measuring renewable energy resources. In a large group the requirements for the first quarter data were presented and the groundwork was laid for the formation of action committees in much the same manner as in the Philippines.

The morning of the fourth day was devoted to the participants' development and presentation of strategies for implementing the survey based on an analysis of the same five problem areas identified in the Philippines: (1) Using the survey as a development tool; (2) Introducing the survey to the village; (3) Introducing the survey to individual families; (4) Implementing the survey for one year; and (5) Motivation and support for doing the survey.

As in the Philippines, the exercise was productive for it allowed participants to combine what they had learned about the survey with the knowledge and information about their culture they had brought with them in the production of effective ideas for survey implementation. All newsprint used by the presenting groups was transcribed and translated into both French and English and made available to everyone.

A central issue that had been brewing earlier but came to a head during the afternoon presentations was the motivational and support needs of the survey teams. Counterparts had arrived with an expectation of being compensated in some way for doing the survey. Although they had been told earlier by the head of one of the sponsoring ministries and by PC/Washington and PC/Senegal that no compensation was forthcoming, they were not willing to lay the issue to rest. Feelings ran high and speeches were made by the informal leaders of the counterpart group both clarifying their position and also assuring all present that the counterparts as a whole were committed to the survey. A few saw it as their duty to participate but most seemed to feel some form of compensation was in order. The issue was temporarily resolved when PC/Senegal agreed to investigate the possibility of providing grain as token payment.

On the morning of the fifth day, the final action committee made its report. Survey teams also spent some time developing answers to a series of questions generated by an action committee the day before. The questions were thought to be likely ones asked by the villagers upon the return of the teams (For example: Will the survey mean we will get electricity in the village?) The answers were shared in a large group and helped clarify any lingering uncertainties about survey goals and benefits. A positive report was made by PC/Senegal on the attempts to secure grain for counterparts. The plan looked feasible.

The rest of the morning was devoted to planning. As in each of the other workshops, survey teams developed an action plan to cover activities of the first quarter. The afternoon was spent finishing the plans. Some groups asked survey teams to present their plans and receive feedback. Others used the trainers as technical resources in the reviewing of each plan. The workshop ended with an evaluation and later that evening with a performance by village dancers.

What We Learned

According to all sources as well as our own initial assessment, the Senegal workshop was a success. In a very real way it was an opportunity to put into practice everything we had learned

to date. Some valuable new learning occurred relative to implementing a bi-lingual training model. Our original thoughts about how this process would actually play itself out in practice were focused on a more structured verbatim translation both in large and small groups. In reality we found that an information approach allowed for a variety of communication strategies to develop between participants and trainers and among the participants themselves. When given the flexibility, adults demonstrate an excellent capacity for creative problem solving.

We also learned that it is not necessary to understand everything that is being said at any given moment in time as long as there are built-in safeguards in the form of assistant or bi-lingual trainers with an adequate grounding in the content area being discussed to at the very least be able to alert the other trainers if there is a possibility some misinformation may be communicated. On-going translation is cumbersome and interruptive of the training flow. However, it is also crucial to ensure that accurate information is heard and understood by all.

Relative to cross-cultural training in general, we were reminded of the importance of communicating positive personal regard and respect for each individual. We also became aware of the need to cross check any feedback we are receiving from participants as to how they are experiencing the workshop so that we have as clear an assessment of the situation as possible. Particularly in the initial stages of a workshop, there is a tendency to react immediately to feedback out of the desire to "get on track" as quickly as possible. Finally, we learned that simple training designs and interventions are often the most effective.

Relative to team building we re-learned the value of modeling good team behavior versus talking about it. Trainers as well as participants had to learn how to work with counterparts. In addition our experience with the split group sessions demonstrated that team building goals can be enhanced by emphasizing the effective use of each member's skills, knowledge and resources.

Finally, we came away from the Semegal experience struck by the potential that this model of training Peace Corps Volunteers together with counterparts has for Peace Corps training in general as well as for training done by other development agencies. Working on a co-equal basis, with both PCV and counterpart learning new information together for the first time, may be a unique experience for many PCVs and HCNs that can foster powerful learning about the cultural baggage we accumulate over our lifetime, how it impacts our behavior, how that behavior is received by others, and how that behavior can be modified through engagement in a cooperative problem-solving process involving necessarily the contributions of both cultures.

REDESIGN AND PREPARATION FOR THE DOMINICAN REPUBLIC

The major objectives for the workshop in the Dominican Republic were the further refinement and adaptation of the training model developed in the previous workshops and the implementation of the bilingual model developed for Spanish-speaking countries. To accomplish these objectives the following tasks were identified:

1. to assess the design and implementation of the four workshops to date incorporating the lessons learned from these workshops into a pre-workshop strategy.
2. to assess the bilingual training model and make the necessary adaptations to the design and the questionnaire anticipated for their implementation in the Dominican Republic.
3. to develop and train a workshop staff appropriate for the implementation of the bilingual Spanish model.

PRE-WORKSHOP STRATEGY

The lessons learned from the previous workshops suggested that the core training model was successful in the transference of knowledge and development of skills necessary for preparing the survey teams to undertake the required tasks for gathering and recording data. However, experience had shown us that in order to devote full time to the transference of knowledge and skills during the five-day workshop, it was advantageous to develop a pre-workshop strategy in order to lay the groundwork for a successful workshop. The strategy developed for the Dominican Republic addressed the following needs:

1. clear communication with PC/Dominican Republic about all aspects of the survey and its implementation;
2. recruitment and orientation of Spanish-speaking trainers; and pre-workshop preparation of materials.

A. Communication with PC/DR

Several months prior to the workshop in the DR, one of the survey designers sent a detailed overview of the needs and

requirements for the implementation of the workshop. This communication outlined the ideal make up of a survey team, the role of counterparts, an estimation of the amount of time required of each participant to complete the survey over a year, the number and type of villages to be surveyed, the role of the host country sponsoring agency, the role of the survey coordinators in-country and the possible impact the survey may have on future planning and programming. In addition, this communication described the overall workshop design, highlighting the goals of the workshop, the structure of the model and the additional trainers, training facilities and supplies required to implement the workshop.

This communication was hand carried to the Dominican Republic by the Washington country desk officer after a briefing meeting was held. Also included in this pre-workshop strategy was the arrival in-country of the survey and workshop designers a full week prior to the start of the workshop. This allowed time for further clarification of the requirements of the survey and the workshop with PC/DR, an assessment of the degree of preparation and support available for the workshop and the survey, and the identification of outstanding tasks. This lead time also enabled the survey designers to meet with the Director and staff of the sponsoring agency and other interested government officials.

B. Recruitment of Bilingual Trainers

Based on our experience in Paraguay and Senegal we had learned of the importance of identifying bilingual trainers who could function both as leaders of small groups and translators for the large group presentations. To this end we were able to recruit two native Spanish-speakers each with considerable experience in process training. Their participation as lead trainers proved to be very helpful in integrating the assistant trainers who joined the core training staff in the DR. The training staff of nine included six Spanish speakers.

C. Materials Preparation

In order to lighten the load of the training staff in-country, extensive preparations were made to develop and duplicate as many of the written materials needed for the workshop prior to departure. This included translation of the survey questionnaire into Spanish, preparation of both English and Spanish workbooks, duplication

and collation of field copies and purchasing of necessary supplies such as newsprint, markers, tape, field measurement equipment, etc.

D. Assessment of Bilingual Training Model

Based on the success of the bilingual training model implemented in Senegal, the survey designers decided to replicate this model with minor adaptations for use in the Dominican Republic. To this end the questionnaire was retranslated into Spanish incorporating the changes to specific questions which had evolved from the previous workshops and also with the intention of refining the translation so that it would be appropriate to the language spoken in the Dominican Republic.

E. Staff Training

In an effort to strengthen the capabilities of the bilingual lead trainers and the assistant trainers a two part staff training program was developed. The first stage of the training was conducted in Washington on April 7-8. In attendance at this two-day session were the two lead trainers and the survey designer who had participated in all of the previous workshops, the two newly-recruited Spanish-speaking head trainers and the new Washington Survey Coordinator. The goals for this stateside training were as follows:

1. To help the lead trainers understand the goals, activities, general schedule and methodology of the energy workshop to be conducted in the DR;
2. To get to know and establish a comfortable working relationship among the core training staff;
3. To clarify follow-up responsibilities and assign roles and tasks for the workshop;
4. To complete bureaucratic and administrative details related to travel to the DR;
5. To familiarize the bilingual trainers with the content, purposes, uses and benefits of the energy survey;
6. To discuss and clarify some of the political and cultural realities which might impact on implementation of the workshop and survey in the DR.

The participants in this phase of the training agreed that the goals for the training were, indeed, accomplished. The content areas which were felt to be the most helpful were:

1. A delineation of the trainer's task during the workshop both in terms of content and process;
2. A bird's eye view of the survey which introduced the new staff to the goals, history, rationale and constraints of the survey; and
3. An exercise designed to identify the varying training styles of the participants.

This phase of the staff training was considered to be an effective way of preparing the new lead trainers for their tasks and roles in the DR and it also served as an excellent vehicle for initiating the work of this group as a future training team.

The second part of the staff training was conducted on April 24-26 in the Dominican Republic just prior to the workshop and included the four lead trainers, survey designer, Washington Survey Coordinator, PC/DR staff and the four assistant trainers. The goals for this phase of the staff training were:

1. To help staff understand the goals, activities, schedule and methodology of the energy workshop to be conducted in the DR.
2. To get to know and establish a working relationship among all staff, and especially between co-training teams.
3. To understand and clarify with all staff the content, purposes, uses and benefits of the energy survey, especially as it applies to the DR.
4. To clarify and/or establish staff roles and general procedures such as decision making, of all staff to be involved in the workshop.
5. To identify and discuss the political, cultural, historical, language and other factors affecting the workshop and survey implementation.
6. To give staff an opportunity to actually practice

delivering parts of workshop sessions and receive feedback from their colleagues.

The staff training design was similar to the one used in Senegal (pages 36 and 37). The final assignments paired each of the two mono-lingual lead trainers with a native Spanish speaker (one from Ecuador and one from the Dominican Republic), one bi-lingual lead trainer with a Peace Corps Volunteer serving in the Dominican Republic, and the other bi-lingual trainer with a Dominican. We were fortunate to have one the training team Dominicans who were well familiar with participant centered methods.

Following the two days of staff training a brief evaluation was administered. The following issues were raised as being most helpful in developing an effective training team:

1. Having the opportunity to interact and get to know the other staff resources;
2. Clarifying roles, responsibilities and decisions making process for all staff;
3. Practice session of a small segment of the design with the co-trainer and feedback from the rest of the group;
4. Opportunity to define roles, responsibilities, styles, etc., among the co-training teams; and
5. Identifying and discussing local customs, language usage, historical events, attitudes, etc. of Dominicans which could effect workshop implementation and future survey implementation.

In addition to the lead training team, during the workshop week we were assisted by the Washington survey coordinator, the Peace Corps director, an associate Peace Corps director, two secretaries, and the Peace Corps driver. All of these people were available to us on practically a 24 hour basis during the workshop.

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The workshop was officially begun at an evening meeting of participants and staff in order to introduce the various agencies sponsoring the program, the directors, coordinators and training staff to the participants. The speeches presented stressed the importance of the energy survey as a first step in dealing with the energy crisis in the DR and its use as an instrument for community development in the DR. The session served to establish a tone of shared responsibility and commitment between sponsoring and supportive agencies working together on the energy survey in the DR. It also provided an opportunity for participants and staff to meet each other in an informal atmosphere.

This activity reflected the political considerations in the DR regarding the sponsorship and structure of the energy survey as it was planned and would be implemented on the island.

Basically, responsibilities for the planning and the implementation of the survey would be shared between the following major agencies:

- Peace Corps, Dominican Republic, Stephen Honore, Director;
- Oficina Desarrollo de la Comunidad (ODC), Lic Amparo Vittini, Director;
- Commission de Politica Energetica (CPE).

The support and involvement of these agencies was vital due to their roles and responsibilities regarding formulation of energy policies and programs at the national level. PC/DR had advised the Washington Staff that without the expressed support and involvement of these agencies the Energy Survey could not be implemented successfully in the DR.

At the suggestion of the sponsoring agency, ODC, and in collaboration with PC/DR it was decided that the make up of the survey teams would vary from past workshops. Instead of each team including a PCV and a village counterpart, the DR survey teams would ideally include a PVC, a village leader designated by ODC and a promoter. The promoters

were extension agents assigned to each region for the purpose of overseeing the development efforts of ODC. Thus, for the first time during the survey the participation of the sponsoring agency was institutionalized through its representatives on each survey team.

The next morning began in a large group session with a brief overview of the goals and schedule for the workshop followed by an introduction to the survey. This session was conducted in English with an intermittent Spanish translation of the material being presented. Following the presentation small group assignments were made and participants were asked to meet in their assigned rooms.

Each small group was assigned a training team and it was explained that the small group assignments would remain constant throughout the workshop, however, the training teams would rotate from group to group at appropriate points during the week. This would allow for the participants to benefit from the varying styles of the training teams and allow the trainers to get to know all of the participants.

The first small group session consisted of a getting acquainted exercise and was followed by a clarification of participant and staff expectations for the workshop. At the end of the morning the entire group came together once more for an introduction to the survey questionnaire. The afternoon was spent again in small groups and was devoted to a section-by-section introduction to the village computable section. One task of the afternoon was to establish a working definition of "village" for the purposes of the survey and then to record problems of understanding or terminology which this section presented to the participants. In groups where there was enough time, trainers facilitated a discussion on the value of differences among team members in pooling information.

The major issue emerging from the day's work was management of time within the framework of language and cultural differences and the unfamiliarity of participants with the participatory approach of the workshop. Trainers made continuous adjustments in the schedule when activities took more time than planned for as participants familiarized themselves with the process and became used to actively participating in discussions.

The evening session was conducted in small groups for the purpose of examining the village narrative section. Each small group then divided into two smaller groups to prepare a short presentation on how to get answers to questions and possible cultural problems which might arise in eliciting responses to the questions in the survey. A short presentation from each team followed and the session ended with a general discussion and review of culturally appropriate ways of gathering information. At this point concern emerged around the issue of the role of the PCV as an information gatherer.

The morning session of the second day was again spent in a large group for the purpose of introducing the Domestic Energy Use section. The remainder of the morning was spent in small groups analyzing the section page by page and noting problems and questions about specific meanings of items on the survey questionnaire. Additional time was devoted to clarifying the definition of "household" followed by a small group task in which each team prepared a drawing of a typical household in its village with particular emphasis on places, equipment and facilities which contribute to energy use.

The afternoon session began in a large group with an introduction to the Small Food Shop and Agricultural sections followed by a small group session during which the participants divided into two sub-groups to examine in detail either the Small Food Shop Section or the Agricultural section. Each group then presented a list of problems it had encountered during the review. Some groups had additional time available after completing the task and participated in one of the following activities: (a) role playing of how to get information and introduce the survey to small food shop owners; (b) developing a list of behaviors that allow teams to work more effectively; and (c) evaluating the work of the day. These sessions served to help the participants facilitate the analysis and review of a section for other participants and provided an opportunity for trainers to assess the analytical skills of the participants and their understanding of a survey section, its questions and requirements.

The entire morning of the third day was spent in a large group so that the energy resource person could present an overview of the fuel measurement and sampling procedures. The participants were then asked to perform a practice sampling and fuel measurement exercise in their survey teams. Trainers rotated among the teams in order to clarify the procedures involved in

the exercises. This afforded the participants an opportunity to practice and apply their understanding of sampling and fuel measurement procedures in a given hypothetical situation.

The afternoon began with a short lecturette presented to the large group on the role and rationale of the Renewable Energy section. The group participants then divided into small groups in order to examine the section more closely noting areas which needed further clarification. A brief group discussion followed during which the participants offered suggestions for renewable energy projects which might speak to the needs of their villages. Following this discussion the participants came together for another large group session in which the Energy Resource person delivered a lecturette focusing on examples of energy projects and the steps a village must take in their communities in order to initiate them. The remainder of the day was devoted to questions and answers as a basis for further clarification and discussion of village options and projects in renewable energy and the role of the survey as a development tool.

The major issue addressed by this session was that of motivation. The DR staff placed great emphasis on utilizing this session as a way of motivating the participants to complete the survey, especially the village leaders, by helping them see the possible benefits and uses of the survey and survey information for their villages. Emphasis on the role of the survey as a development tool was seen as a way of meeting the expectations the participants had brought to the workshop regarding information about energy resources and options. The survey designers felt that it was important to actively involve the participants in this session and, therefore, ample time was provided for questions from the participants.

The fourth day began with a review and clarification of survey issues in small groups. The trainers helped the participants clarify issues, questions or doubts which participants had regarding the survey, its content and procedures. This discussion was followed by a team task analysis exercise in which the survey teams were asked to develop a list of tasks they needed to perform in order to complete the first trimester requirements of the survey. Each team's list was reviewed and clarified in their small groups and similarities and

differences between teams were noted. This exercise enabled the trainers to further assess the participant's understanding of the survey content and the procedures and their readiness to move away from survey understanding into a planning and problem solving phase in preparation for survey implementation. At this point the designers felt it would be useful to present a task which would give the participants an opportunity to work together as a team to define problems and develop problem-solving strategies. Participants were asked to sign up for one of the following Action Committees:

1. How does the team work together?
 - Resources
 - Problem-solving
 - Decision making
 - Roles
2. How to introduce the survey to the community?
 - Community support and motivation
 - Identifying community resources
3. How to introduce survey to families?
4. How to implement the survey throughout the year?
 - Team members commitment
 - Organizing and managing tasks
5. Support and responsibilities of the team.
 - Types of support to implement the survey.
 - From whom? When?
 - Who supervises? How? When?

Each Action Committee was asked to work together to prepare a 15-minute presentation to the large group including an analysis of and solutions for its topic. The role of the facilitators during this exercise was to serve as a resource person and help the group accomplish its task. Work in the committees continued

after lunch until mid-afternoon when the large group reconvened and each Action Committee made its presentation followed by a short question and answer period. The staff felt that this was an extremely valuable step in preparing the participants for working together in the field, however, it became obvious that they could have benefited more from this activity if there had been more time for extensive critiquing of their presentations. At this point the issue of time emerged again. Both participants and staff had little time to sit back and absorb the enormous transference of information and techniques which had been taking place over the past four days. Pressure to slow down the pace was also due to the fact that this was a national holiday in the DR. The designers decided to shorten the day's activities by one hour.

The last day of the workshop began with another team-building exercise in small groups. Based on the work in the Action Committees the teams were asked to identify the resources each member brings to the team in terms of skills, interests, obstacles, etc. which relate directly to the survey implementation. They were also asked to develop the best ways in which they could identify these resources and obstacles in order to develop a team process for solving problems. This activity was processed in the small groups by the listing on newsprint of the resources and processes identified by the teams. Each team was then asked to develop a Plan of Action for the first trimester of survey implementation using as a basis their task analyses and the results of their team building activity.

The major issue these sessions tried to deal with was the need to provide a more structured activity and time for team building to occur within the context of the survey implementation.

Because of the political and historical realities in the DR, it was stressed by the DR staff that the structure of the teams (1 PCV, 1 promoter and 1 community leader) might become a hindering factor in survey implementation if special efforts were not made during the workshop to strengthen the relationships between the members of each team. Some of the realities pointed out were:

1. General skepticism in the Dominican Republic about

PCV's and the Peace Corps.

2. PCV's might or might not know their other two team members and might have varying degrees of difficulty in relating to them.
3. Community members of the teams (promoter and village) might have previous party or political, personal or work relationships which could lead to their exclusion of the PCV from the team and team survey activities.
4. General lack of acceptance of US citizens in the DR and US involvement in the DR in the past and fear of PCV's about community's nonacceptance of their role and involvement in the survey.
5. Lack of familiarity with the concept of team and team work and fear on the part of PCV's that the team approach would not work for cultural reasons.

The staff saw this session as a major intervention in facilitating team work and team relationships within the context of the survey tasks.

The afternoon was devoted to Individual Team Consultations during which each team met with a team of two to three trainers for 45 minutes each to review and critique Action Plans developed by the teams and to make an informal assessment of the team's capability to implement the survey. The representatives from ODC, the sponsoring agency, were asked to join the training teams and their participation in the assessment process reflected the spirit of cooperation which would be a necessary ingredient for successful survey implementation. In addition, since these representatives would be providing supervision and technical assistance to the survey teams, this provided an opportunity for them to begin that process.

The following were used as guidelines for the discussion with teams:

1. Action Plan Critique:

- Does the plan include a basic list of tasks?
- Does the plan include an assignment for each team member?

-Does the plan reflect a schedule with a logical sequence of events and realistic time limits?

-Does the plan reflect a process for dealing with team issues, recording information, involving agency or other support to carry out the survey?

2. Assessing Commitment of Team Members:

-Interest: What motivates you to do the survey? How will you maintain your motivation throughout the year and in your village?

-Time availability: What other time commitments do you have in your village? How will you distribute time for the survey?

-Willingness to work together: What advantages do you see in working with your team members? What problems do you see? How comfortable do you feel working together?

-Understanding of the survey, its process, and what must be done to complete it.

During this session, other general issues were addressed by the trainers in order to tie up loose ends and to be able to give an impression/recommendation of the teams capability to implement the survey to the survey coordinator. The trainers asked each team for:

1. A definition of their village.
2. Team composition (who is on the team and what their role is)
3. Team members distance from the village to be surveyed.
4. Any survey materials that the teams were lacking.
5. Final clarifications on fuel measurement and sampling.
6. Needs and recommendations for follow-up and technical assistance.
7. An assessment of how ready the team felt to undertake the survey task.

The last session of the workshop was spent in tying up loose ends and an evaluation of the workshop by the participants. This session was dedicated to a final review of issues that needed general clarification of the whole group.

Staff meetings were held every night after the day's activities, on Sunday, 27, afternoon, before the opening session and on Sunday, May 4th afternoon, after the workshop ended.

1. The goals of the staff meetings were:

- a. To review and monitor the accomplishment of workshop goals for large group sessions, small groups and other workshop activities.
- b. To identify content and process areas of the program which were presenting problems to participants and/or staff and identify and decide on ways to solve them.
- c. To review and clarify methodology, time frames and roles for the next day's session.
- d. To provide feedback to staff regarding their participation, style, interventions, etc., during workshop activities.
- e. To identify, problem solve, and assign to the proper person, any tasks, i.e. administrative, design, participant related, etc., which arose and needed to be attended to throughout workshop implementation.

2. Format of Staff Meetings:

The following format was used to guide staff meetings. In all, it was a helpful guideline, though meetings usually lasted 1/2 hour to 1 hour over the planned time. Feedback to staff was also an area which did not receive much attention during staff meetings.

<u>Agenda</u>	<u>Who</u>	<u>Time</u>
Did we accomplish goals?	Co-teams report	20 min.
Identifying flags or problem areas	Co-teams report	20 min.

Large group - goals and flags	Staff in charge	10 min.
Next day's review	Pre-assigned & shared among lead staff	45 min.
Step by step presentation of next day's design	"	
Point out difficult survey questions or areas that needed special attention.	Lead Staff	
What do we need to do differently?	All staff and special teams or committees	30 min.
Identification	"	
Problem Solving	"	

What we learned

At the close of the workshop there was a common feeling among participants and staff that expectations for the training had been met and an incredible amount of work had been accomplished in a short period of time. In fact, insufficient time to process information proved again to be the major weakness in the design. Despite the general feeling of fatigue all around, the majority of participants felt prepared to return to their villages and begin the real task of introducing the survey to their villages.

The workshop in the DR was our first chance to actually test the bilingual training model in an Spanish-speaking country and, just as in Senegal, we found it to be an effective vehicle for training in a bilingual, cross-cultural setting. It was especially useful to have co-trainers who could operate not only as translators, but as interpreters of the Dominican culture.

We also discovered that our attempts at establishing clear communication with PC/DR well in advance of the workshop had paid off. The PC staff in the DR had had

adequate time to lay the groundwork for ownership of the survey by the local sponsoring agency. And its visible support of the project during the training reinforced the fact that this was a joint venture between the Peace Corps and the Dominican Republic.

We also learned that taking the team building exercise one step further in the form of Individual Team Consultations was an effective way for both participants and Staff to assess the level of commitment and preparedness of each member of the survey teams. These informal discussions also enabled the trainers to pinpoint areas which would require follow-up by the in-country survey coordinators following the workshop. Since some of the teams lacked a third member, it was decided that PC/DR would recruit additional participants and hold a mini-workshop. (See Appendix)

Finally, we left the Dominican Republic satisfied that the bilingual training model and the overall workshop design are effective vehicles for communicating a large body of information in a short period of time and in another culture, and they also function effectively in laying the foundation for cooperative problem-solving among team members. The challenge which remains for the validation of the design is to test its effectiveness in a setting which does not include Peace Corps volunteers on the survey teams.

CONCLUSION

Overall, the pilot Energy Survey Workshop series has accomplished the major programmatic and development goals outlined at the beginning of this report. Specifically, it has:

1. Enabled us to initiate the rural energy survey in four countries: Micronesia, the Phillipines, Senegal, and the Dominican Republic.
2. Made possible the development and field-testing of both a core training model together with appropriate training materials, and a bi-lingual adaptation of that model with related materials in both Spanish and French.
3. Provided the experience and insights for the development of an effective workshop and survey programming strategy in cooperation with in-country Peace Corps programs and host country agencies.
4. Enabled us to identify and respond to problems related to the clarification of the survey's questions, procedures and requirements, and to the feasibility of its data-collection strategy.
5. Made possible the identification and analysis of issues and problems related to the use of the survey as a development and programming tool.
6. Provided the basis for an initial analysis of first-quarter survey data from three countries as a basis for the planning evaluation of the survey's validity and reliability.
7. Enabled us to identify the characteristics and preparation required for an effective workshop training team which integrates technical and process training expertise with the linguistic competence and cultural awareness provided by in-country training resources.
8. Provided the basis for the development of an instructional manual and training workbook in English, French and Spanish for use in future survey workshops by Peace Corps and/or host country training teams, and for the training

of trainers in a variety of developing countries.

9. Provided "cutting-edge" experience in the training of integrated groups of Peace Corps Volunteers and Host Country Nationals for collaborative survey and development work in rural settings.

The complex goals of this pilot series required that we approach the problem of workshop development as one involving both training and programming tasks. This approach demanded a strategy of working with the workshop participants and the in-country Peace Corps and host country agency representatives in the cooperative identification and solution of problems relating to the survey's implementation and its relationship to rural energy programming by Peace Corps and host country agencies. The evolution of the workshop series described in this report reflects a progressive effort to integrate the orientation and technical training of survey teams toward effective data-gathering with an exploration of the role of the survey and of the survey teams in a rural development process as essential elements of the training process itself.

To this end, it became necessary that we formulate learning objectives that would focus the workshop on the development of pro-active participation by the Volunteers and counterparts in the development of the survey as a useful and culturally appropriate tool for both data-gathering and village-level development work. It also became necessary to progressively identify and develop a design strategy, workshop resources, an approach to workshop preparation, and working relationships with in-country programs, which would enable us to tailor a workshop to the realities of the workshop participants and their villages and of the sponsoring Peace Corps and host country agency goals, programs and resources.

On the basis of our experiences, in five countries, we have identified the following important contextual variables which play a vital role in determining the nature and effectiveness of any survey workshop. These are:

1. Participant characteristics
2. Available resources

3. Institutional relationships and constraints

Some important features of each of these variables can be controlled for or learned prior to the workshop itself; some can only be learned and/or developed during the course of the workshop itself through a cooperative problem-solving process.

A. Participant Characteristics

Perhaps the most important things we found useful to know about expected participants have been:

1. the language(s) in which counterparts can work most effectively and a sense of their oral, reading and writing competence in these languages;
2. the levels of competence of volunteers in the host country language(s) and their ability to communicate with their counterparts;
3. the information given volunteers and counterparts about the workshops and survey; how and when this was communicated;
4. the expectations of volunteers and counterparts about the workshop and survey;
5. the confirmed number of volunteers and counterparts selected for participation and the viability of their villages as survey sites;
6. an indication of how volunteers and counterparts were selected and the basis of selection;
7. in general, the backgrounds of the counterparts, re: status in the village, educational levels, relationship to the volunteers, involvement work;
8. the volunteer's program(s) and jobs, length of time in their villages and their availability for a year-long survey.

B. Available Resources

The most important resource needed for an effective workshop is a well-oriented and compatible team of trainers who can facilitate the approach to learning on which the workshop design is based. The team should have the following

attributes:

1. Resources to communicate the overall purposes, design and requirements of the survey, to clarify ambiguities and problems related to the questionnaire in a uniform way, to teach the technical procedures of sampling and fuel measurement, and to provide sponsoring agencies with assistance on developing and administrative and support structure.
2. Resources to facilitate an active learning process in small groups and survey teams, to elicit and encourage participants sharing of expectations, questions, concerns, problems and ideas and to stimulate an approach to cooperative problem-solving and team-building among the participants.
3. Resources to facilitate communication across two or more languages in bilingual or multilingual training situations. More generally, resources who understand and can interpret participants' behavior and concerns in culturally appropriate ways, and can aid other trainers in doing this.

The training teams developed for Senegal and the DR reflected these attributes, and were able to integrate excellent in-country training resources with the cooperation of the Peace Corps staff. Given a core group of lead process trainers, of survey programming technical resource persons, and the availability of in-country training assistants we can realistically build training teams for future workshops that can respond creatively to participants' needs and workshop contingencies in culturally appropriate ways.

C. Institutional Relationships and Constraints

Such teams require administrative and logistical support, and a training facility that will allow work in a variety of groupings and training modes. The building of good working relationships between the training team and the in-country workshop organizers is critical in making this possible. Perhaps more important is the need for cooperative work by all entities - - the Energy Project, the Peace Corps country program, and sponsoring host country agencies - - in planning and organizing administrative and support systems for the survey itself.

As in any inter-institutional effort, the initiation of the energy survey in a given country will respond to the programmatic plans and constraints of the entities involved, and reflect, perhaps, both convergent and divergent agendas.

Our experience has shown that, with the exception of Paraguay, the interest in survey participation by a PC country program has been accomplished by the kind of institutional groundwork with H.C. agencies called for by the survey design.

This was remarkably true in Micronesia where the survey workshop became part of the PC/Micronesia Office of Energy and Planning Energy Conference. In the Philippines, the involvement of the Bureau of Energy Development was a product of programming efforts by both the PC/Philippines APCD and the survey's designer. In Senegal and the Dominican Republic, the participation of two agencies as survey sponsors was organized by PC/Senegal and PC/DR and was reflected in the H.C. survey coordinator's full participation in the workshop.

In each case, the credibility and feasibility of the survey was enhanced through both good prior programming work and the involvement of training team members - - before, during and after the workshops - - in facilitating the establishment of structures for survey administration and support.

The training model and the strategy for cooperative inter-institutional planning will, we believe, be easily adapted to the task of training both in-country Peace Corps as well as host country agency personnel to implement effective survey workshops and the administrative and support systems necessary for the survey operation.

This will make possible the diffusion of the survey to a variety of countries in the developing world which may be interested in participation in the survey program.

A P P E N D I X

Note: The material in the Appendix resulted from the workshop conducted in the Dominican Republic.

FINAL WORKSHOP DESIGN - DOMINICAN REPUBLIC

Sunday, April 20th:

- 3:00 p.m. .Registration
- 8:00 p.m. .Welcome Speeches/Gathering

Monday, April 21st:

- Morning:
 - .Workshop Overview
 - .Lecturette: Introduction to Survey
 - .Small Group Task:
 - .Getting acquainted
 - .Expectations
 - .Lecturette: Introduction to Questionnaire
- Afternoon:
 - .Introduction to Village Computable Section
 - .Small Group Task
 - .Detailed analysis of section
 - .Processing of task
- Evening:
 - .Introduction to Village Narrative
 - .Small group task
 - .Analysis of section
 - .Processing of task
 - .How to obtain answers in culturally appropriate ways

Tuesday, April 22nd:

- Morning:
 - .Lecturette: Introduction to Domestic Section
 - .Small group task:
 - .Analysis of section

.Processing

.Draw a picture of living quarters

Afternoon: .Lecturette: Introduction to Small Shop and
.Agriculture Sections
.Small Group Tasks
.Sub-group 1: Small Shop Analysis
.Sub-group 2: Agriculture Analysis
.Processing: Group discussion

Evening: FREE

Wednesday, April 23rd:

Morning: .Lecturette: Sampling Procedures
.Team's task - Mock sampling
.Lecturette: Fuel Measurement Procedures
.Individual Task - fuel measurement problem

Afternoon: .Lecturette: Renewable Energy Overview
.Small Group Task:
.Analysis of different sections and
generating questions
.Lecturette: Survey as a Development Tool
.Question and Answer Session

Evening: FREE - Trainers available for consultation

Thursday, April 24th:

Morning: .Small Group Task:
.Clarification of survey, questions and
procedures and review

.Task Analysis

.Action Committees

.Introduction

.Problem solving work

Afternoon: .Continuation of Action Committee's
Problem Solving

.Action Committee Presentations

Evening: FREE - Trainers available for consultation

Friday, April 25th:

Morning: .Small Group Task:

.Team building exercises

.Preparation of Team Action Plans for
1st trimester

Afternoon: .Individual Team consultation - Presentation
and Critique of Action Plans

.Tying up Loose Ends

.Evaluation of Workshop

Evening: Goodbye Party

WORKSHOP EVALUATION

During the closing session of the workshop the participants were asked to fill out and return a short evaluation questionnaire which would aid the survey designers and trainers in assessing the strengths and weaknesses of the workshop as perceived by the participants. The evaluation form (see attached) was constructed to elicit responses from the participants which would demonstrate the effectiveness of the workshop in accomplishing three goals:

1. To leave the participants with a basic understanding of the survey, including a familiarity with the specific questions to be answered in the survey and the procedures necessary for the reporting of information;
2. to assist the survey teams in acquiring problem solving skills, in developing a plan of action, and in formulating overall team building strategies; and
3. to develop an awareness among the participants of possible problems they may confront in implementing the survey in their villages over a year's time.

Analysis of the participant responses to the evaluator reveals that a majority of the participants felt that the overall goals of the workshop were accomplished. Most people said that they had gained a familiarity with the content of the survey and understood the procedures involved in fuel measurement, sampling and the recording of information. Participants also felt that the workshop design was useful in facilitating a good working relationship among team members and in allowing them to discover new ways in which to work together as a team. The major problems which were anticipated around the implementation of the survey in the villages focused on time, money and support. Several participants expressed concern about not having enough time to fulfill all the requirements of the survey due to their other job commitments. Others were worried about the transportation expenses which they would incur while doing the survey. Most participants felt that it would be extremely important to have the continued support of the local sponsoring agency, ODC, and the Peace Corps throughout the duration of the survey. On the whole, the response to the workshop was quite positive and the major goals of the workshop appear to have been realized.

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SUMMARY OF RESPONSES

Q. 1. From what parts of the workshop did you learn the most?

Of the 67 participants who filled out the evaluation form, 20 felt that they had learned the most from the session during which fuel measurement procedures were explained. Thirteen participants said that they learned the most during the first three days of the workshop which included an introduction to the actual questions to be answered by the survey. Seven people responded that they felt the workshop gave them a good general understanding of the survey and its requirements. The remaining participants reported that they learned the most from the sessions on sampling procedures, developing a plan of action and team building.

Q. 2. From what parts of the workshop did you learn the least?

Only 38 of the 67 participants who completed the evaluation form responded to this question. Nine of these respondents felt that they learned the least from the session on renewable energy, and five people felt they learned the least during the large group sessions in general. Other participants noted problems with the sampling of families, the measurement of electricity and the session on problem solving.

Q. 3. With what part of the survey questionnaire did you feel the most comfortable?

This question elicited a wide range of responses with the majority (8) indicating that they felt the most comfortable with the fuel measurement requirements of the survey. Five participants said they felt comfortable with the content of the survey as a whole, while four people indicated that they felt most comfortable with the procedures for measuring electricity use. Other responses indicated a positive feeling about sampling procedures, the agricultural section, and general reporting procedures.

Q. 4. With what part of the survey questionnaire did you feel the least comfortable?

As with the preceding question, the evaluation elicited a wide range of responses. Six participants indicated that they felt the least comfortable with the procedures for measuring fuels, especially electricity. Five people said they were least comfortable with the renewable energy section and, five, with the narrative sections of the survey. Other participants felt uncomfortable with the small food shop section, sampling of families and how to present the survey to the families. This question also elicited a number of responses which related more to the workshop setting than the survey, such as, criticisms about the meals, and too much talking by the other participants.

The next item of the evaluation form asked the participants to rate, on a scale from one to five, the degree to which selected goals of the workshop were accomplished and, then, to give an example.

Q. 5. How much did the workshop help you learn about the survey?

Over the half of the respondents (35) said that the workshop helped them a lot in gaining an understanding of the survey. An additional 21 participants marked the next highest rating and only one person felt that the workshop did not accomplish its goals. The most frequent example offered for this question was that they knew nothing about energy or surveys before the workshop, but that now they felt they had a basic understanding of both. Others said that they now knew how to measure fuels and introduce the study to their villages and that they had learned a lot from the trainers. Those who gave a low rating to this question felt that the pace of the workshop was too fast or that it was too repetitive or they were still unclear on several points.

Q. 5b. How much did the workshop help you to work with your team?

The majority of respondents (25) marked either a 4 or 5 on this item, while only one person chose the lowest rating. Several participants said that they now had a good working relationship with their counterparts and other explained they had learned new ways to work in a team. One person, however, felt that team work could not be taught in a seminar.

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Q. 5c. How much did the workshop help you in clarifying and resolving problems?

Again, the majority of respondents (44) marked either a 4 or 5 for this item, indicating that the workshop had been successful in accomplishing this goal. By the way of explanations several participants said that they had resolved a lot of problems and others felt the workshop was responsive to the needs of the survey. Two participants marked a 1 on this item, commenting that some questions went unanswered because of lack of time or they felt the workshop was not culturally specific enough.

Q. 6. What do you feel will be your major problem in implementing the survey in your village?

This question elicited almost as many responses as respondents. The answer shared by the highest number of participants (12) was the issue of time. They felt that a major problem in implementing the survey would be lack of time, considering their other work commitments. Seven others said that it would be difficult to get their communities to understand and accept the survey. Additional problems anticipated were lack of funds and transport, the amount of work required by the survey, lack of interest on the part of the families and distrust of the local government and Peace Corps

Q. 7. What kind of support do you need in implementing the survey in your village?

By far the majority of participants (23) felt that support from the local sponsoring agency, ODC, and Peace Corps was necessary for the implementation of the survey in their villages. Six mentioned the need for support from the community, and another six felt that support from other team members was important. Four people mentioned the need for financial support to cover their expenses.

MINI WORKSHOP DESIGN

DECISIONS:

1. Who is to be trained/How many?
2. By whom
3. Where
4. When
5. How

ASSUMPTIONS:

1. Who? = Primarily village leaders with existing teams: 9 to 13 teams = 30 to 40 persons
2. By whom = PC Staff and ODC Resource (3 trainers)
3. Where = Central or regional sites
4. When = By June 15th

GOALS:

1. To have new team member understand and accept his/her role in the survey.
2. To help the newly completed team engage in active planning together.
3. To assess needs of individual teams and give TA around those needs.
4. To help newly completed teams review their understanding of survey.

TASK ANALYSIS/PC/DR

1. Define: Who/How many
By whom
Where
When
 - A. Check status of teams in field.
 - B. Coordinate decisions w/ODC by May 15th
2. Communicate with incomplete teams by May 20th re:
 - A. Tell teams to:
 - a. Review team resources
 - b. Recruit new member by May 30 - (Teams only have a recruitment function if the missing team member is a leader.)
 - B. Criteria for recruiting new members:
 - If village leader is the missing team member, try to recruit youth leader who lives at survey site; also has
 - Time
 - Interest
 - Capability
 - Resources needed by team
 - C. Goals of mini workshop.
 - D. Logistics: Time
Place
Transport

■ If they need a village leader

PRE-WORKSHOP WORK

1. Goals and benefits of survey:

Review with new person and write statement answering:

- A. Why should our community participate in the survey?
- B. Why should a family participate?

Bring to Workshop:

2. Questionnaire

New team member complete village section and domestic computable. Review with team these sections plus the rest of the questionnaire. Old members attempt to answer questions re: questionnaire items. Identify unresolved items and bring to workshop.

3. Review with new member workshop experience and status of work in the village.

4. Team prepares a list of identified problems and needs re: doing the survey

- | | |
|--|--------------------------------------|
| What are the problems | a. Acceptance of survey by community |
| What will you need to resolve these problems | b. Working with families |
| | c. Survey procedures |

Bring to Workshop

5. Teams bring work plan to workshop.

DAY 1

DAY 2

DAY 3

8:00 - 10:00		- Expectations: Using Pre-Work (75-90)	- Con't participant identified sessions (120)
10:00 - 10:30		- Processing of goals and benefits statements (90)	
10:30 - 12:00		- Review survey structure (see manual) (15)	- Review & revise work plan - Revise team resource list with new member - Decide on tasks (60)
2:00 - 3:30	PARTICIPANTS	- Processing of unresolved questionnaire issues (90)	- Individual team consultations (1.5-2 hours)
3:30 - 3:45	ARRIVE	- Fuel measurement (45-60)	- Cabos sueltos (30)
3:45 5:30		- Participant identified sessions led by trainers & participants (60)	- Evaluation: - Admin. support thus far (30) - Future needs based on workshop
	WELCOME PARTY	Planning participant identified sessions	

EXPECTATIONS (90 mins.)

Goal:--To identify workshop expectations based on team identification of problems and needs for implementing survey.

--To identify needed workshop sessions.

Procedures:--Ask participants to identify:

(Based on pre-work list of problems and needs)

1. individual needs in doing survey (3)
2. individual expectations of workshop to meet needs. (3) (10-15)

--Participants share needs and expectations in teams and 3 team needs and 3 expectations (new member needs a priority). (15-20)

--Teams write needs and expectations on newsprint and post on wall. (10)

--Trainers identify shared needs and expectations w/group and presents workshop schedule and trainer expectations. (30)

--Trainers develop topics for participant identified sessions. (15)

--Trainers identify participants who will help plan and lead participant identified sessions. (Those who have knowledge, skills, experience, confidence, they would like to share and use). (15)

--Trainers announce posting of sessions at lunch.

PROCESSING OF GOAL STATEMENTS

- Goals:
- To help participants review their understanding of the survey's goals and potential benefits for community.
 - To help participants practice introduce the survey to families.
 - To share team goal statements (Pre-work).

Procedures:

N.B.- Benefits to
family? Reasons
for information?
What is being asked
of family?
....

1. Trainers ask participants to review goals statement for their community in their teams and plan script and introduction of survey to a family.
2. Ask two teams to work together on role-play introduction to family.
 - Team A - Survey team, Team B - family
 - Team B - Survey team, Team A - family
3. Each group of teams to discuss role-plays: highlights, problems, how to deal with problems encountered. Select recorder and organize presentation to group.
4. Each group of teams presents to group:
 - good ideas
 - problems and issues encountered
 - proposed solutions
5. Trainers record important ideas, problems, solutions and review with group. Review topics for participant - identified sessions- Add or revise topics if necessary.

PROCESSING OF UNRESOLVED QUESTIONNAIRE ISSUES

Goals:

1. To make sure new and old team members are clear on the
 - definition of terms
 - requirements of questionsfor every questionnaire item.
2. To involve participants in helping other teams and in sharing what they know about the questionnaire.

Procedures:

1. Ask each team to review its list of unresolved questionnaire items and add/delete if necessary. Put on newsprint. (15-20)
2. Each team pairs itself with another team and lists are exchanged. Teams attempt to answer as many of the questions on the other teams list as possible. (20-30)
3. Each team makes a brief presentation of its answers to the entire group. Questions that could not be answered are flagged. (30)
4. Trainer with assistance of entire group answers any left over questions.

FUEL MEASUREMENT REVIEW
(60 Min.)

Goals:

1. To make sure participants understand fuel measurement:
 - A. How to record
 - B. Computations
 - C. Time schedule
 - D. Actual use of measuring instruments in
 - Renewable section
 - Domestic/small shop
2. To check out questions participants have.

Procedures:

1. Trainers ask participants to move into teams, and work on a fuel measurement problem. (20 min.)
2. Trainer asks for a team to present their answer and procedure used to get answer.
3. Problem/answer is reviewed. (10)
4. Trainer involves participants in a role play/ demonstration of measuring fuels in a home. (30)

(Measuring cups/scales)

TEAM WORK PLAN REVISION
(75-90 Min.)

Goals:

- Help teams make needed revisions in plan re: work done, problems, resources of new member.
- Help teams organize time-line chart of plan for presentation and use.

Procedures:

(Teams begin work on time-line in session and work further if necessary until consultation.)

- Trainers present task:
 - Teams identify tasks done, problems encountered: list problems, how resolved, plan for resolution.
- Trainers present time-line chart: explain use.
- Teams develop time-line chart for 1st trimestre.
 - Tasks accomplished.
 - Tasks to be done.
 - Who has done and will do tasks.
 - Resources used in community.

E.G. Team

5/15 Held meeting w/leaders: Planned comm. meeting.

5/20 Obtained household list.

5/25 Held community meeting: Introduced survey, selected families at meeting.

SURVEY COORDINATOR

Roles/Functions:

- I. Technical Assistance: Clarification fo survey procedures
Clarification of survey questions
Clarification of reporting requirements
- II. Support: Assist teams in developing strategies
Recruit outside support where necessary
Facilitate team working together
Encourage and motivate
Facilitate project identification
- III. Supervisory: Regular site visits
Check progress of teams
Check teams survey materials for completeness
Check that procedures are being followed
Assist teams in developing and implementing plans
Collect questionnaires
- IV. Administrative: Distribute survey material and equipment
Prepare for and schedule mini conferences
Establish checks for village visits
Distribute certificates, letters
Duplicate and distribute spanish field copies
Admin. to incidental expenses
Coordinate efforts between interested agencies and village in starting projects

FINAL DRAFT

THE RURAL ENERGY SURVEY WORKSHOPS:
A MANUAL FOR TRAINERS

SUBMITTED TO:

PEACE CORPS
OFFICE OF PROGRAMMING
AND TRAINING COORDINATION

JUNE, 1980

BY:

JACK REITZES
AND
CLAUDIA LIEBLER

INTRODUCTION

Over the course of the last nine months a series of unique workshops have been held in different corners of the world. The uniqueness derives from their purpose, the people who attended, the trainers who guided the process, and the training approach used.

The purpose of these workshops was to prepare teams to implement a survey with two primary objectives:

- The collection of data on rural energy practices and consumption centered around the family.
- The initiation of a community development process.

This survey is hardly a traditional one designed to be undertaken by outside professionals with little interest beyond the data collection itself. It is designed with "bottom up" planning in mind, for the village to be surveyed must become actively involved in the process.

The workshop participants in each country came from all regions and backgrounds. They included village leaders, out-reach workers, ministry officials, and American Peace Corps Volunteers. They shared freely with us and each other their ideas and concerns. Their commitment to the task ahead was obvious by the excitement generated through their active participation.

The workshop staff members who came from the United States and from the countries to be surveyed formed a creative training team which was successful in working together and demonstrating the benefits of using each others resources well.

Finally, the training approach used encouraged and built on the skills, knowledge and experience of each participant. This made possible a learning environment that supported the philosophy that by working together, by exchanging ideas and sharing resources, by joining hand to hand, we are equal to the challenge of our environment.

USE OF THE MANUAL

The manual is divided into day-by-day components. Each component is made up of from one to three sessions. Each session represents an entire morning, afternoon, or evening time block. The sessions contain written procedures which should serve as a guide. At the end of each session you will find a section labeled Lecturettes and another labeled Hand-outs.

The Lecturette section contains either notes or short papers that address the concepts a particular lecturette is designed to convey. You will need to read through the material and develop your own lecturette by combining ideas, adding your own, and tailoring the presentation to your audience.

The Hand-outs section will include short papers that you may want to distribute to participants during that session. You will have to exercise your own timing and make use of the hand-outs in what ever manner you feel most appropriate. Some sessions contain no hand-out material at all.

There is a final section at the end of the manual entitled: Trainer Resource Material. This section contains background papers about training in general, about the survey, or about the workshops conducted that we hope you will find helpful.

We intended this manual to be used by groups that are interested in undertaking the survey with technical assistance from Peace Corps, those that intend to attempt it on their own, and still others who may want to experiment with some modification of the survey and of the workshop as they are presented here. Finally this manual may also be of interest to groups who are trying to institute participant centered experiential learning techniques into the work they are now doing.

The manual is intended as a guide only. You may want to develop it further, modify and change it to meet your needs and the needs of the people with whom you are working. In an article entitled The Training of Formal Community Leaders by H. Griffiths he states:

"...However, it places upon us as designers and organizers of training the responsibility of ensuring that the training offered shall meet the needs of

the leaders as they themselves see them. It has to offer encouragement in the form of increased self-confidence derived from a clear appreciation of the problems which lie ahead, a good understanding of the role which has to be played, and a firm belief that the outcome will yield a general benefit from which the participant is not excluded."

Best of luck in your ventures!

THE NEED

Developing countries are becoming increasingly concerned over the growing scarcity and depletion of traditional energy sources for village level domestic, agricultural, and small business uses, especially in light of the spiraling costs and the consequent real scarcity of petroleum-based fuels which have affected most sharply those nations of the Third World which are dependent on imported oil. It has become apparent that the world energy crisis goes far beyond the large scale political and economic problems related to the escalating price of oil. In many rural villages in the developing world, it has become a matter of survival.

In an initial response to this need, Peace Corps, in collaboration with U.S. AID and the Overseas Development Council, has developed a three-year survey/programming/training project to assist Third World countries in identifying needs and implementing alternative, renewable energy programs at the community level and to develop the in-country capability to continue the effort.

Energy planners in Third World countries and the international energy community have had no accurate source of data on consumption patterns for "traditional" fuels, on the scope of energy needs of rural people, or on the production potential of renewable energy resources in rural areas. The survey, which has been designed as a Peace Corps volunteer/host country counterpart activity, will furnish data at the village level regarding current energy uses and needs; the current costs of that energy use; social and cultural practices associated with energy use; and renewable energy sources available in the village area. The analysis of the data will identify the type, amount and value of fuel used for specified domestic and business activities; villagers expressed need for energy sources; social, cultural practices that may be crucial to the acceptance of a new energy technology; and a basic assessment of potential renewable energy sources in the village area.

A pilot series of workshops were held in 1979-1980 to field test and implement the survey. Four countries participated in the survey. These were: Micronesia, the Philippines, the Dominican Republic, and Senegal. They were selected to provide a wide range of different cultures and field situations in which to test the survey and to develop an effective, generic training model which could be adapted to local conditions and resources.

There were two phases of this pilot series. The first involved developing and field testing the core workshop design. This took place in Micronesia and the Philippines.

The second phase involved developing and field testing a bilingual model based on the core design. Phase two occurred in Senegal and the Dominican Republic.

The principal objectives of this series of workshops were:

1. to develop and test a training design and materials that could be used in and adapted for the training of Peace Corps Volunteers and Host Country Nationals as energy surveyors in a wide range of developing countries.
2. to develop guidelines for the preparation and organization of survey programs and training workshops as cooperative efforts by the Peace Corps Energy Project, Peace Corps country programs, and sponsoring Host country agencies in these countries.
3. to begin the implementation of the energy survey, to provide data and data-gathering experience under a variety of conditions as a basis for evaluating the validity and reliability of the survey, and the appropriateness of the data-gathering strategy to the information requirements of the agencies initiating the survey and the needs of the Host Country participants.
4. to integrate the planning and implementation of the survey into an overall approach to energy conservation and appropriate technology programming by Peace Corps in cooperation with Host Country agencies.

The total number of participants attending the workshops (spread over four countries) was 230. Of these, 95 were Peace Corps volunteers and 135 were Host Country nationals. They represent 100 villages in which the survey is now taking place.

We hope that this manual will be used by Peace Corps, in conjunction with Host Country governments and by Host Country governments, agencies and organizations operating independently of the Peace Corps.

PREPARING FOR THE SURVEY

Before spending time planning workshops to train surveyors, careful thought must be given as to whether or not implementing the survey itself is a viable effort with potential payoffs justifying the amount of time and resources necessary to make the whole thing work. If the decision is made to go forward, there are then a number of tasks that need addressing in order to accomplish your own goals for the survey, as well as ensure to the greatest degree possible the collection of accurate data. We have some guidelines to share with you based on our experiences over the past year.

Assessing Survey Viability:

One of the first steps is to read the survey material carefully so that you will be familiar with the questionnaire itself and with the goals and potential utilizations of survey data as the survey and workshop designers and funders of this effort have conceived them. The following questions can serve as a springboard for your own explorations and planning.

1. What is the current status of energy resources in your country?
 - What are the problems?
 - Who defines them and recognizes them as problems?
 - Are these people/groups potential collaborators in the effort to define them further and lay initial groundwork for the introduction of a technology through implementation of the survey?
2. What solutions are being discussed and/or implemented at this time?
 - Large scale technologies?
 - Conservation?
 - Appropriate technology efforts?
 - How does the survey fit in?

3. Who would make the most appropriate sponsor for the survey?
 - Should sponsorship be shared by several groups?
 - Could the sponsor through appointing a survey coordinator or some other mechanism provide:
 - supervision and technical assistance to survey teams
 - the sharing of information between teams themselves and all actors involved
 - good public relations
 - What resources, funds and institutional support are available to the survey teams to promote and legitimize the survey?
4. What should the roles and responsibilities of the sponsoring groups be?
 - Funding
 - Training
 - Coordination
5. What are the goals of the sponsoring groups?
 - What are some of the constraints that would impede reaching these goals?
 - political
 - cultural/social
 - economics
6. How should the survey sites be selected?
 - By whom?
7. Who would the potential surveyors be?
 - Do they live in villages to be surveyed?
 - How can they be recruited?

- What problems do you anticipate they may face? How could they be overcome?
 - Will the issue of financial support be raised? What options do you have to solve it?
8. Who would have access to the data?
- What channels should it pass through?
 - How can it be used at:
 - The national level
 - The village level
9. How can the survey be used as a development tool?
- Does it fit into current rural development efforts? How?

THE DESIGN PROBLEMS

The training design contained in this manual reflects our collective best solutions to some of the problems we present to you here. We anticipate that you may face the same or similar problems in replicating the design or coming up with your own version.

In designing a workshop of this nature, we were constantly paying attention to program realities. This approach demands a strategy of working with the workshop participants and in-country representatives in the cooperative identification and solution of problems related to the survey's implementation and its relationship to rural energy programming. Before, during, and after the workshop, we saw as vital the continual raising of programming issues. The training objectives are far broader than teaching surveyors how to collect the data.

Our workshop design had to remain flexible (and yet still meet some basic learning objectives essential to participants being able to work with the survey) as the actors involved in the overall effort became more knowledgeable about the survey - - its tasks, goals, and utilization. This was an evolving process meaning that perceptions of individuals and groups about what constitutes effective strategies in implementing this survey changed sometimes requiring a corresponding change in the workshop design.

Here are some of the other more specific design problems to consider:

1) The need to provide detailed, uniformly understood information on the survey's content, procedures, and requirements. This information was provided in a large group setting so that all participants heard it at the same time. Because a goal of ours was to work out with participants approaches to implementing the survey that would be appropriate to their own village situation, the survey designer was called on to make frequent decisions about questionnaire items or survey procedures. It was crucial therefore, that all trainers filter concerns and new issues brought up by participants in small groups to the staff as a whole so that immediate decisions could be made and shared with everyone.

2. The need to use more than one language when:

a) an integrated group of English and native

speakers make up the group of participants with varying degrees of fluency in the native language held by the English speakers.

b) some of the trainers do not speak the native language.

c) the host country participant group speaks more than one native language with varying degrees of fluency.

At one of the four workshops we implemented, all three of the above situations were present, in another, the first two. Because the expertise with the survey instrument as well as training design and delivery experience with the participant centered approach lay with the English speaking core training team, a bi-lingual model was created.

This model made use of both American trainers fluent in the host country language and of host country nationals who became an integral part of the training team working together with the English speaking core team. We envision that in the future, this workshop can be delivered entirely in the host country language with the possibility of members of the original core team providing technical assistance back-up if appropriate. Further information on the bi-lingual model is available in a report entitled Peace Corps Energy Survey Workshops: A Description and Assessment from the Office of Programming and Training Coordination, Peace Corps, Washington.

3) The need to be sensitive to participant characteristics. The participants involved in the workshops were generally individuals with greatly varying backgrounds. Because of our emphasis on including a representative from each village to be surveyed on the survey team, we had some participants who had difficulty reading and writing. Others had not previously experienced facilities of the sort used for the workshop, possibly causing some initial disorientation. Still others were not familiar with certain western concepts such as technology.

4) The need to maintain a realistic view of what the surveyors and the survey would or would not accomplish. There are dangers in overselling the survey and creating unreal expectations on the part of surveyors, villagers, and village leaders. Therefore the trainers were constantly asking participants to evaluate new ideas or

approaches raised in the workshop and were faced with maintaining a delicate balance between encouraging participants to consider the possibilities of what could be accomplished under certain conditions and maintaining some level of realism.

Trainers are also faced with the task of ensuring that all concerned understood the limitations of the instrument itself. For example: the sample of villages and households surveyed was very small, raising questions about the usefulness of the data for country planners.

THE TRAINING APPROACH AND MODEL

"Whatever we do in training depends upon what we think people are like. The goals we seek, the things we do, the judgments we make, even the experiments we are willing to try are determined by our beliefs about the nature of man and his capabilities." (Combs, 1962)

Our assumptions or beliefs about individuals and how they learn include some of the following:

- 1) "The adult learner can take responsibility for what he/she learns.
- 2) He/she is uniquely qualified to do so.
- 3) He/she will do so only if treated as an adult.
- 4) He/she will only feel treated as an adult when the learning experience:
 - Reinforces his/her self concept as an autonomous, individual being.
 - Uses his/her resources.
 - Considers his/her experiences."

(Margolis, 1971)

These beliefs translate into a training approach that is learner centered, participatory and experiential. Active learning is key here rather than the traditional passive approach with the learner receiving all information from the teacher. In this kind of learning situation all individuals are both trainers and trainees for everyone has a contribution to make to the learning process.

The philosophy and general approach to the workshop sets the tone and the learning climate in which all activities take place. Its influence cannot be underestimated. It makes possible the implementation of the model described below. Quite simply it calls for a collaborative problem-solving approach that involves participants from the first day in a proactive manner. This approach was found to be not only effective but realistic and necessary for implementing the survey.

Because the program, the survey process and the instrument

itself are all firsts, we find ourselves on the "cutting-edge." This necessitates constant feedback, problems identification and problem solving. We cannot proceed with the work to be accomplished unless we attempt to develop in the workshop a true partnership with the survey teams who in the final analysis are the single most important cogs in the wheel of this effort.

Participants and trainers must put their heads together pooling their information, skills and resources to evolve a strategy that will achieve those goals that we share. The process must make the participants' problems and needs known in order to consider issues of survey implementation that only workshop participants can raise for our joint consideration and analysis. Their concerns and problems must be ours also if the survey is to be effective both as a data gathering tool and as a development process.

THE GOALS

The goals of the workshop fall primarily into three categories:

- Helping participants learn about the content, procedures, and structure of the survey instrument and eliciting from them the cultural variables that must be considered in the data gathering. Linguistic and cultural accuracy is of prime importance in this exchange of information, ideas and concerns.
- Exploring with participants the overall implementation of the survey, its impact as a development tool, and participants' varying roles in that process. The achievement of a free flow of dialogue among participants and trainers requires training resources who can facilitate a dialogue in this exploration.
- Helping participants look at some team building strategies, issues of how to use each other well, and ways of working together effectively to accomplish the task and learn about team work. This will require the guidance of this process by a team of trainers who can effectively model cooperative team planning and work.

The first two categories cannot be achieved without the third being in place as an operating principle and norm. For the workshop at least, the team concept is expanded to include all participants and staff working together learning how to learn in the most effective manner possible.

The specific learning objectives that the design is based on grow out of our understanding of the total survey task we were asking participants to take on. They were:

- 1) To help participants understand the goals, benefits and utilization of the survey and be able to articulate them in a culturally appropriate manner.

- 2) To help participants "de-mystify" surveys by discovering what they already know about their villages and therefore about certain data required by the survey.
- 3) To lead participants through a section by section analysis of the questionnaire so they become familiar with the content, requirements of the questions, and definition of terms and interpret these in culturally appropriate ways.
- 4) To teach participants the survey procedures of sampling and fuel measurement so they are able to solve simulated problems.
- 5) To ensure participants realize the requirements of the survey over the course of a year and can realistically carry them out.
- 6) To assist participants in identifying culturally appropriate ways of gathering data.
- 7) To assist participants in discovering ways of operating effectively as survey teams.
- 8) To explore together with participants the concept and problem of using the survey as a development tool and assist them in developing hypotheses about the conditions necessary for such development.
- 9) To engage participants in an active dialogue leading to the identification of potential problems in implementing the survey in their village and the sharing of possible solutions.
- 10) To introduce to participants basic elements of planning so that each team is able to draw up an action plan for implementing the survey over the first quarter.
- 11) To help participants understand the role of the survey in the country development plan.
- 12) To help participants make a realistic decision about their commitment to carry out the survey for an entire year.

To achieve these objectives, the design called for work in three kinds of training groups:

1. Large Group:
 - for introduction to the workshop and to the goals, structure, content, procedures and requirements of the survey;
 - review of concepts, procedures, and issues dealt with in small groups and survey teams;
 - workshop evaluation and closing.
2. Small Groups: There would be four small groups each led by a trainer and composed of participants from 4-5 survey sites;
 - for discussion of large group presentation;
 - eliciting and discussing participants' questions and concerns;
 - the analysis and critique of training exercises done in the group setting or in the field situations by the survey teams.
3. Survey Teams: composed of one or more participants from a village site, the team would be the principal context for:
 - participants' work on survey techniques and procedures,
 - the analysis of the survey content;
 - the development of survey strategies;
 - the planning for survey implementation;

Given the importance of survey team-building, the design concentrated on the provisions of training activities that would require and reinforce teamwork and cooperative problem-solving among the members of survey teams.

STAFFING

The most important resource needed for an effective workshop is a well-oriented and compatible team of trainers who can facilitate the approach to learning on which the workshop design is based. The team should have the following attributes:

- 1) Resources to communicate the overall purposes, design and requirements of the survey, to clarify ambiguities and problems related to the questionnaire in a uniform way, to teach the technical procedures of sampling and fuel measurement, and to provide sponsoring agencies with assistance on developing and administrative and support structure.
- 2) Resources to facilitate an active learning process in small groups and survey teams, to elicit and encourage participants sharing of expectations, questions, concerns, problems and ideas and to stimulate an approach to cooperative problem-solving and team-building among the participants.
- 3) Resources to facilitate communication across two or more languages in bilingual or multilingual training situations. More generally, resources who understand and can interpret participants' behavior and concerns in culturally appropriate ways, and can aid other trainers in doing this.

The training teams reflected these attributes and were able to integrate excellent in-country training resources with the cooperation of the Peace Corps staff. Given a core group of lead process trainers, of survey programming technical resource persons, and the availability of in-country training assistants we can realistically build training teams for future workshops that can respond creatively to participants' needs and workshop contingencies in culturally appropriate ways.

PREPARING FOR THE WORKSHOP

There are a number of tasks that need to be accomplished in order to implement a smoothly running effective workshop with all major actors clear on the goals and their role in helping to achieve them. We have discovered how critical clear communication at this stage can be. The time needed for workshop preparation will vary somewhat with the circumstances surrounding each situation; however it is likely that a minimum of one month and as many as three months may be necessary.

The survey sponsoring groups as well as other interested and appropriate organizations will need to spend time in on-going planning meetings before the workshop is implemented in order to decide on roles and responsibilities for pre-workshop preparation tasks, workshop implementation tasks, and survey implementation tasks.

The following is a list of some of the pre-workshop tasks that we identified in our four implementation experiences:

- 1) Selection of survey sites
 - Establish criteria
 - population of 5000 or less
 - good geographical distribution to insure representativeness of the survey
 - other local criteria
- 2) Recruit survey teams
 - Establish criteria
 - what is an appropriate number? (3 seems to work well)
 - who should be on the team? (we suggest at least one representative from the village to be surveyed)
 - Identify recruiting mechanism
 - Communicate to potential surveyors:
 - this is a voluntary effort. candidates should be interested in doing this kind of work

- the work will take an average of 8 to 10 hours a week during the first quarter and 4 to 8 hours per week over a year
- 3) Identify a training facility
- a facility that can provide food and lodging as well as training space is ideal
 - one large room to hold all participants, four smaller rooms to hold up to 15 participants and office space, all available on an on-going basis throughout the workshop met our space needs
 - hold meetings with the manager of the facility to work out such things as:
 - meal times
 - coffee breaks
 - registration procedures
 - availability and upkeep of training rooms
- 4) Communicate with workshop participants
- arrange transportation
 - give details of workshop
 - length of time/starting session
 - goals
 - active participation
- 5) Recruit a workshop staff
- develop criteria for trainer selection. For example, likely to have:
 - good rapport with participants
 - experience with participant-centered learning model

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- identify and communicate nature of job, for example:
 - involvement in staff training
 - willingness to spend intensive hours
 - identify needs for support staff and locate, for example:
 - secretary
 - translator
 - workshop coordinator
- 6) Hold staff training/ build workshop team
- design staff training. may include:
 - getting acquainted
 - goals of staff training
 - survey overview
 - expectations
 - roles/responsibilities of staff
 - approach and goals of workshop
 - workshop design overview
 - review of survey questionnaire
 - practice of some workshop sessions
 - procedures for working together during the week (for example: how to hold staff meetings)

next steps (tasks to accomplish before participants arrive)
 - locate facility for staff training
 - decide on trainers for staff training

- 7) Identify public relations strategies. For example:
 - key note speakers
 - media coverage
 - participant observers during workshop
- 8) Derive sample size
 - locate statistical data
 - do required computations
- 9) Identify Workshop Logistics/Assign Tasks
 - o set up workshop office:
 - o typewriter
 - o duplicating machine
 - o general office supplies
 - o locate training materials:
 - o name tags
 - o newsprint
 - o magic markers
 - o note pads/pencils
 - o survey workbooks
 - o prepare survey materials:
 - o survey field copies
 - o fuel measurement items
 - o prepare registration process
 - o set up welcoming session
- 10) Final Design Review in Light of Assessment of Current Status Quo such as:
 - o numbers of participants
 - o characteristics of participants
 - o political considerations
 - o available resources
 - o workshop goals

RESOURCES

Over the past year a number of reports and concept papers have been written about the rural energy survey and the workshop experiences that begin to form the nucleus of a resource library for individuals and groups interested in undertaking similar efforts. All of these materials can be obtained by writing to:

Ada Jo Mann
Washington Survey Coordinator
Office of Programming and Training
Coordination
U.S. Peace Corps
806 Connecticut Ave., N.W.
Washington, D.C. 20012

- 1) Peace Corps Energy Survey Workshops: A Description and Assessment
- 2) Energy Survey Training Workbook
- 3) Concept Paper for Peace Corps Energy Program
- 4) May 17, 1979 memo: Peace Corps - Aid Energy Program Participation

SCHEDULE OF WORKSHOP SESSIONS

Each of the following workshop sessions is organized and timed to correspond to the overall schedule outlined above. However, trainers should be prepared to respond to contingencies of scheduling, participant needs, problems of fatigue and pacing, etc. in the particular training situation; to this end, we have indicated below some possible variations in the scheduling of some of the sessions and in the kinds of groupings sessions might employ. It is important, nevertheless, to maintain the principle that the workshop is organized as a two-phase process:

1. involving participants in an active process of interpreting and analyzing the survey's purposes, content, procedures, and requirements in culturally appropriate ways.
2. involving participants in a process of problem and resource identification, strategy development, and survey team planning for the implementation of the survey in their communities.

This process reflects a development in the workshop in which the participants move from learning the survey as a tool for gathering information, to the task of developing ways to use the survey questionnaire and procedures in appropriate ways as a tool for learning and teaching and participating in the development of their communities. The final step in this process is the organization, by each survey team, of a systematic plan for introducing and implementing the survey during the first three months. The workshop is aimed at helping participants develop the knowledge, skills, and attitudes that will enable them to accomplish this task with both realism and commitment.

DAY ONE

Participants will arrive and register during the afternoon and will be informed of dinner arrangements and the evening's schedule.

Session #1: Welcome to the Workshop Time: 7:30-9:30 P.M.

Goals: To enable representatives of the Peace Corps and participating Host Country agencies to welcome participation in the survey.

To introduce the workshop staff.

To give a brief introduction to the goals and purposes of the survey.

To provide an initial social occasion for getting acquainted.

Procedures:

1. All participants and staff gather in large conference room for greetings and statements of support by Peace Corps/ Country and Host Country agency representatives.
2. Energy Project representative welcomes participants and introduces workshop staff. Then gives a brief overview of the goals, background and potential benefits of the survey.
3. Workshop coordinator gives time and place of following morning session, and invites all to an informal social hour.

Notes: This session will be more or less formal depending on the customs of the country. Its primary purpose is to begin the workshop in a climate of institutional commitment and support, and to give participants a sense of the scope and significance of the survey and of the importance of their involvement in it.

The survey overview should emphasize that the survey is the first systematic effort to understand rural energy uses and needs, that it is worldwide, that it is a potential tool for development by rural communities, and that the participants have a vital role to play in the process.

DAY TWO

Session #2: Introductions and Expectations Time: 8-12 A.M.

This session is designed to establish a climate of active participation and collaborative problem-solving in the workshop, and to provide an overview of the survey questionnaire and its organization as the context for the first phase of the workshop. The session is organized into four parts which, together, lay the groundwork for the participants first active engagement with the survey itself in the following session.

Part I: Overview of the Workshop (30 min)

Goals: To introduce the goals, norms and structures of the workshop.

If a bilingual or multilingual training model will be used, to provide an overview of the model and the need to work out collaborative ways to share information and ideas.

Materials: Handout: Workshop goals; newsprint, markers, tape

- Procedures:
1. In a large group, workshop coordinator states purpose of session, distributes Workshop Goals, and asks participants to read them. Reviews goals listed on newsprint.
 2. Reviews workshop norms listed on newsprint:
 - a. active participation; trainer roles
 - b. starting on time
 - c. problem-solving approach
 3. Outlines workshop strategy and groupings:
 - a. two-phase workshop process
 - b. bi-lingual model (if appropriate)
 - c. organization and purpose of groupings: survey team, small group, large group, action committee.
 4. Outlines the morning's activities and divides group into four small groups with trainer teams.

Notes: The information given here should be delivered briefly without extended discussion. Trainer should

indicate opportunities for sharing questions and expectations in later sessions and throughout workshop

The explanation of the bi-lingual model should be given in both English and the Host Country language in order to demonstrate the process and the problem. It should emphasize that a variety of creative solutions to the problem are possible, and that cooperative effort by trainers and participants can produce appropriate solutions.

Part II: Getting Acquainted (75 min)

Goals: To introduce the small-group process, and to get participants actively involved early in the workshop.

To help participants and trainers to learn about one another in a creative, collaborative way.

To emphasize the importance of each person's experiences and resources in the workshop.

To have an enjoyable experience together as a group, and lay the basis for working as a group throughout the workshop.

Materials: Newsprint, different colored markers, tape.

- Procedures:
1. Trainers introduce themselves as a team who will be working together throughout workshop, and ask participants to say their names and the names of their communities. Explain the grouping of survey teams in the small groups.
 2. Trainers explain how they will be working as bilingual or monlingual team (if appropriate) (15)
 3. Trainers introduce getting acquainted exercise as a challenge in communication, and an opportunity to learn about one another in an enjoyable way. Ask participants to form 5-6 person groups with people who they don't know and give each group newsprint and markers. Ask each group to get acquainted

then to draw a picture together that will represent them as individuals and as a group and to decide how to introduce themselves using their picture. The only rule is that no words are allowed in the picture and that they will have about 5-7 minutes for their introduction. (30-40)

4. Ask each group to introduce itself, encouraging others to comment or ask questions. Trainers should note the variety of creative responses to the problem, and the variety of experiences and resources represented, emphasizing the need to use and share these resources in the workshop. Call a 20 minute break. (20-30)

Notes: It is important that different kinds of participants (e.g. Volunteers, community leaders, agency workers) be represented in each group. Trainers may want to participate in two of the groups.

Trainers should suggest that the pictures might represent the concerns each person has about energy, if personal sharing seems difficult. It is important, however, that each person be encouraged to contribute to the picture.

Part III: Clarifying Expectations Time: 75-85 minutes

Goals: To help participants identify and clarify their expectations of the workshop, and to share those of the staff.

To match these expectations with the goals and projected activities of the workshop, and to identify what expectations can and cannot be met.

To stimulate questions and discussions about the survey, their role in implementing it, and the kinds of knowledge, skills and attitudes they will need to do this.

To begin the process of helping participants build survey teams.

Materials: Handout: Workshop Schedule; newsprint, markers, tape

Procedures: 1. Trainers reconvene the small groups, briefly review the outcomes of the previous exercise,

and ask each participant to think of three things he or she hopes to be able to do or to learn in the workshop in the light of their information and experience thus far. Suggest that they be as specific as possible. (10)

2. Ask participants to gather in their survey teams to discuss and compare their individual expectations, and to arrive at a pooled list of expectations which represents the team. These are to be recorded on newsprint for discussion by the entire group. (Trainers will have recorded their expectations on newsprint for sharing with the group). (20)
3. Trainers respond to the expectations by:
 - a. noting and listing generalized expectations presented by the teams, and relating these to the workshop goals.
 - b. attempting to clarify ambiguous expectations.
 - c. indicating which expectations are beyond the scope of the workshop and why.
 - d. sharing their expectations and how these relate to those of the participants.
 - e. distributing the workshop schedule and identifying where certain major expectations may be met. (30-35)
4. Trainers ask participants if there were any major expectations they had of the workshop which have changed and how these have changed. What questions about the energy survey and their role in it have been raised by their experience in the workshop thus far? Trainers should list these on newsprint and indicate how these might be resolved in the course of the workshop (20-25)

Notes: In discussing trainer expectations and the workshop goals and activities, trainers should emphasize the importance of team-building in the workshop process. It should be pointed out that the team exercise in this session was a first step in that process.

In introducing the team exercise, it should be emphasized that it is important for each person's hopes and expectations to be represented whether shared by others or not.

The primary purpose of this session is not only the

clarification of expectations, but also the development of open, "on the table" communication and relationships. Eliciting participants' questions and concerns should be presented as an important part of the workshop process of identifying issues and problems and working together cooperatively to deal with them.

Part IV: Over view of the Survey Questionnaire (30 minutes)

Goals: To help participants understand the overall organization of the questionnaire and the purpose underlying its organization.

To explain the nature and purpose of each section of the questionnaire.

To explain the uses of computable and narrative information and their relationship.

To introduce procedures for recording information.

To introduce the Survey Workbook.

Materials: Survey Workbook, newsprint, markers, tape.

- Procedures:
1. In large group, Energy Project representative introduces session and distributes survey workbook to all participants. Asks participants to gather in their teams.
 2. Asks participants to examine workbooks in their teams as he/she explains its use as a tool for analysis of and practice with the survey's questions and procedures.
 3. Referring to the workbook section, "Structure of the Energy Survey", with participants, he/she explains the organization of the questionnaire relating this to the kinds of information the survey is designed to obtain and the reasons for this (computable, narrative and measurement)
 4. Using visuals on newsprint, he/she explains the focus and content of the five survey sections, their relationship to one another, and their function in providing an integrated picture of a community's energy uses, needs and resources.
 5. Explains the year-long, active nature of the survey, and the reasons for the use of community-based survey teams in gathering meaningful information that they can help the community understand and use.

Notes: This overview is primarily designed to provide a perspective for the section-by-section work with the questionnaire in the following sessions, and to emphasize the critical role of the survey team as people who live and work in their survey site. This overview and emphasis needs to be reinforced and built up in all of the work sessions on the questionnaire and procedures.

Session #3: The Village Computable Section Time: 2-5 p.m.

Goals: To help participants demystify the survey through awareness of how much they already know about their own communities.

To promote understanding of the rationale for information about the community as a whole social unit.

To introduce a procedure for clarifying the meaning and information requirements of the survey's questions.

To begin to identify the survey task and the resources in the survey teams.

To begin the process of collaborative teamwork on the survey task.

Materials: Workbook: Village Computable Section, Clarification of Survey Questions; newsprint, markers, tape.

- Procedures:
1. Trainers explain the goals of the session, and review briefly the purpose and content of the Village section, and the procedures for answering computable questions. (25)
 2. Ask group to gather in their teams and, ask each team to define the community they will survey using the following criteria:
 - a. The community is a center of population and services of no more than 5000 inhabitants.
 - b. It is the place where at least one member of the team lives and/or works and it is easily accessible to other team members. (15)
 3. With their communities defined, ask the members of each team to pool their knowledge of their community to answer as many questions as they can in the Village Computable section. Ask them to make note of questions on which:
 - a. they had problems understanding how to answer.
 - b. they had problems agreeing on an answer.

Explain the need and importance of working together toward a clear understanding of the questions that makes sense to them. Suggest that teams use clarifications as an aid in interpreting particular questions. (35)

Session #3 (Cont.)

(Trainers may wish to introduce an additional procedure prior to the team pooling. In this procedure, trainers first ask team members to answer the questions individually, then to compare their answers with other team members. This has the advantage of ensuring that each member will contribute his/her own perceptions to the team product, and that differences in perceptions will have been clearly identified. This procedure should be used only when trainers are confident that all participants can read the questions and will not be presented with a task they cannot perform. In addition, the session will run 15-20 minutes longer.)

4. With entire group, review questions page by page, eliciting any problems teams had in understanding how to answer the questions. Record these on newsprint and attempt to clarify questions, asking participants for appropriate interpretations of terms which do not fit local usages. Indicate that any problems which cannot be dealt with will be referred to the workshop technical consultant and will be resolved before the end of the workshop. (45)
5. Ask participants if there were any questions on which their teams found it difficult to agree. Ask for examples, and discuss with group the problem of differences in perception among people and the reasons for this (different experiences, interests, sources of information, etc.).
6. Ask participants how this problem can be resolved in order to get reliable answers to the questions:
 - a. Discuss and list on newsprint different ways in which teams can obtain and confirm reliable answers.
 - b. Discuss how different team members can bring different resources to this task(40)
7. Review the work accomplished in the session, asking for any questions or concerns about the session as a way of learning. (10)

Notes: In discussing ways of getting information, trainers should suggest ways not thought of by participants. Emphasis should be given to the need for working together as a team to plan how to gather information and to compare results.

Session #3 (Cont.)

During team exercise, trainers should move among teams to check on progress and to respond to any needs. Trainers should also observe how each team seems to be working together, and the level of involvement of each member.

If examples of disagreement on answers cannot be elicited from the group, trainers should select a question to use; e.g. #s 3, 9, 31, 34 might be used.

It should be made clear that the completion exercise is not a test or a part of the survey itself. It is practice in using the questionnaire, and a demonstration of how much participants know already.

Session #4: The Village Narrative Section Time: 7:30-9:30 P.M.

Goals: To help participants understand the nature and purpose of the Narrative questions and their relationship to the Computable section.

To continue the process of question clarification.

To help participants utilize information they have about their own communities and culture.

To engage them in formulating strategies for gathering information and in assessing potential problems in obtaining that information.

Materials: Workbook: Village Narrative Section; newsprint, markers, tape, list of clarifications.

Procedures: Trainers explain goals of session, and review purpose of narrative questions. Compare 2-3 narrative questions with corresponding computable questions to emphasize narrative as tool for interpreting computable information and for describing important aspects of community life related to energy use. (10)

2. Trainers ask participants in teams to read through and analyze the questions in previous session. (30)

3. Review questions page by page with group, adding to the list of problem questions on newsprint. Note if any of the problems presented were dealt with in the previous session; if so, review these. (30)

4. Trainers divide group into two sub-groups with members of each team in both groups, select 2-3 narrative questions, and introduce the following exercise:

Group A is to determine what they think are effective ways of gathering information to answer these questions, record these on newsprint and plan together a presentation to the other group. Suggest the following questions as guidelines:

- a. what kinds of things would you do?
- b. what kinds of information sources would you use?

Session #4 (Cont.)

Group B. is to identify what cultural, social or technical problems might arise for survey teams in gathering information on these questions, record these on newsprint and plan an presentation to the other group. (30)

5. Trainers reconvene entire group, asking Group A to present the first question followed by Group B, with trainers facilitating discussion on best strategy. Group A presents second question, and so on.

(If the groups are large - over eight people - trainers might divide them into smaller groups, each one working on a single question.) (30)

6. Trainers summarize results of exercise, pointing out need for teams to work out strategies appropriate to the different questions in the survey which account for cultural or social problems which might arise. Ask for questions and comments on the session and close by indicating that the group will be working on the Domestic section in the morning with another trainer team. Explain again the reasons for rotation of trainers. (10)

Notes: The group is likely to be fatigued; trainers should move the session as briskly as possible.

Depending on the level at which the group members interact, trainers might want to use the following variation on the above strategy exercise:

Trainers divide group into three sub-groups, asking each to determine and present best strategy for one of the questions.

After each presentation, ask entire group to:

- a. comment on strategy re: its appropriateness to the question and its effectiveness in gathering reliable information.
- b. identify cultural and social problems and how they might be dealt with.

DAY THREE

Session #5: The Domestic Section

Time: 8-12 A.M.

Goals: To introduce the purposes and requirements of the Domestic section.

To help participants define a household for purposes of the survey in ways appropriate to the culture and social structure.

To continue the process of question clarification.

To engage them in visualizing a household in their communities and its energy-using facilities and equipment.

To identify and discuss problems in gathering information about domestic practices.

Materials: Workbook: The Domestic Section; clarifications, newsprint, markers, tape.

Procedures: 1. In large group, trainer explains the purposes and requirements of the Domestic Section.

This lecturette will focus on:

- a. the need for accurate and reliable information about domestic energy-using practices and fuel consumption, and the reasons for this.
- b. the Domestic computable and narrative information as a context for understanding a household's energy uses and requirements.
- c. the measurement of household fuel use as the core of the survey.
- d. the importance of the active participation of the families in the survey.

(15)

2. Participants and trainer teams break into their small groups.
3. Trainers attempt to elicit questions and comments on lecturette, record these on newsprint and discuss with group.
4. Trainers present definition of a household for purposes of the survey:
 - a. a family occupying a single dwelling unit located by itself or within a compound
 - b. the family includes all persons, related or not, who regularly sleep in the house.
5. Trainers elicit any questions or problems participants have in defining a household in their communities using these criteria. (20)

Session #5 (Cont.)

6. Trainers ask participants to gather in teams to read through and analyze the computable and narrative questions as in previous session, and to identify and record any problems they might have in gathering information in the household. (30)
7. Review questions page by page for understanding of meaning and information requirements, recording and responding to questions and problems. (40)
8. Elicit from group problems in gathering information, and discuss these asking group to suggest ways in which these might be resolved. (30)
9. Review briefly purposes and quarterly requirements of computable and narrative sections, and the need to understand domestic energy use in the context of a family's daily life and activities.
10. Ask each team to visualize a typical household in their community, and to draw a picture of the household showing its physical layout and the area around it which the family uses. Include locations of cooking, heating and cooling, lighting and any other energy-using facilities and equipment. Supply newsprint and markers. (30)
11. Ask each team to display and briefly explain their picture. Discuss pictures with group, noting different kinds of household structures and energy uses. Ask group to identify the different kinds of fuels used for the various kinds of energy-using facilities and equipment. (40)
12. Review the session briefly, emphasizing the understanding of household energy uses as the core of the survey. Indicate the next session's focus on ways of measuring and recording these uses. (5)

Notes: This session continues the process of cooperative problem-identification and problem-solving. However, care should be taken to move the participants from dwelling on problems to working together on possible solutions.

Goals: To help participants understand the procedures for gathering and recording accurate information on a household's energy uses and fuel consumption.

To help them understand the fuel measurement task as a cooperative one requiring the active participation of the families involved.

To give them an opportunity to practice fuel measurement recording procedures in their teams.

Materials: Workbook: Fuel Measurement Procedures, Clarifications, Fuel Measurement Recording Forms (Part II); newsprint, markers, tape.

- Procedures:
1. In large group, trainer introduces session, giving an overview of the fuel measurement task: frequency, need for accuracy, need for family involvement.
 2. Reviews with group different kinds of fuels used in communities, and groups these into categories for measurement: solid, liquid, bulk.
 3. Explains the fuel measurement process: pre-measurement, storage of measured fuels, post-measurement, 24-hour period of use.
 4. Explains and demonstrates procedures for measuring each category of fuels, using equipment and visuals, for different kinds of energy devices.
 5. Reviews different kinds of household energy uses, and demonstrates the recording of fuel uses on the recording form, using as examples two different household-pictures from the morning exercise. (90)
 6. Asks participants to gather in their teams, and distributes a fuel measurement problem in which are described a family's energy-using activities, the kinds of equipment and the fuels used, the amounts of fuels used, and the unit cost of each fuel. The task is to compute the family's expenditures for fuel for each type of energy-using function. During this exercise, trainers will move among the teams, observing how teams are working together and responding to questions. (45)
 7. Trainer reviews exercise, asking participants to share their results with the group and how they arrived at them. Trainer reviews with group any problems that arise in recording or calculation. (20)

Session #6 (Cont.)

8. Trainer summarises, and suggests that participants with unresolved questions or concerns talk with one of the trainers at the end of the session. (10)

Notes: A break should be taken before the exercise to allow for movement after the long lecturette, and for informal questions to trainers.

The trainer delivering the lecturette should check frequently for questions or problems from the participants, especially if the lecturette is being translated.

Although the exercise has worked effectively in a large group, trainers may wish to break into small groups at this point for variation, and for ease of communication and interchange.

Another variation, used in Senegal, called for dividing Volunteers and community participants into two separate groups. The Volunteers were given a lecturette on the technical aspects of fuel measurement and a computational exercise. The community participants discussed their perceptions of the survey and any problems or concerns about it in small groups, sharing these in the large group. They were also given an overview of the fuel measurement procedures. Following this, the two groups were combined and participants were asked to gather in their teams to share their different experiences and learning.

This strategy was used in a multilingual training situation in which the trainers were concerned about the feasibility of attempting to deliver technical information in translation into several languages, and about the difficulties community participants might have in dealing with the technical material with little prior experience or education. Given the characteristics of the participant group in that kind of situation, the strategy was effective. In the absence of those kinds of constraints, however, we recommend that the entire group work together.

DAY FOUR

Session #7: Small Food Shop, Agriculture,
Sampling Procedures

Time: 8-12 A.M.

This session is organized into three parts. The first involves an overview of the Small Food Shop section which, in content, is largely the same as the Domestic section. The second involves simultaneous but differently focused sessions on the Agriculture section and the Sampling procedures for two different groups. The first composed of Volunteers and/or development agency workers will receive an over-view of the Agriculture section and a thorough briefing and practice on sampling procedures. The second, composed of community participants and those agency workers and/or Volunteers particularly interested in agriculture, will receive an overview of the sampling strategy and will discuss its implementation in the community. They will focus, however, on a thorough analysis of the Agriculture section and its implementation.

In the third part, the survey teams will reform in their small groups to share their information and experience in teams, and to discuss questions and concerns with the group which were raised in this process.

Part I: Small Food Shop (30 minutes)

Goals: To give an overview of the purposes and requirements of the section, reviewing the definition of a small food shop and the application of fuel measurement procedures.

To review briefly the questions, focusing on computable questions 1-7 and narrative question #1 which are different from those in the Domestic section.

To introduce the split-group sessions on the Agriculture section and Sampling, and organize the two groups.

Materials: Workbook: Small Food Shop

Procedures: Trainer gives overview and reviews definition, asking for examples of shops fitting the definition: a small (3-4 tables or less) shop which cooks and sells food for public consumption. Indicates application of fuel measurement procedures.

2. Asks teams to read through computable and narrative parts with him/her, focusing on the business-related questions and quickly reviewing the others. Elicits questions or problems.
3. Trainer introduces split-group sessions to follow, giving rationale. Organizes the two groups, indicating that at least one member of each team should participate in Group A for the technical work on sampling.

Notes: The rationale for the split-group process should emphasize

Session #7 (Cont.)

The building and sharing of different resources in the teams.

Part II: Agriculture and Sampling (120 minutes)

Group A

Goals: To help participants understand the purposes and requirements of the Agriculture section.

To introduce and explain the technical procedures for selecting households, food shops and farmers to participate in the survey.

To engage participants in working through a problem using the sampling procedures.

To help participants develop ways of sharing their learning in their teams.

Materials: Workbook: Agriculture section, Sampling Procedures and Worksheet; newsprint, markers, tape.

- Procedures:
1. Trainer explains goals of session, emphasizing need for sharing learning in teams.
 2. Trainer gives overview of Agriculture section, explaining the different parts of the section and the rationale for the kinds of information asked for. Indicates this is to be recorded quarterly from a sample of three farmers. Provides definition of a farmer: one who earns his/her primary income from growing or catching and selling products from the land or the water.
 3. Trainer introduces and explains sampling strategy of survey and its use of countrywide statistical data as a basis for determining sample size in a community.
 4. Referring to Sampling Procedures, trainer explains and demonstrates sampling procedure, working with group through example given.
 5. Trainer indicates sample size for each community in survey, and asks each participant to estimate the number of households in his/her community. Asks participants to use these figures to derive selected households for recruitment and possible participation in the survey.
 6. Asks participants to gather in groups of two to check out each other's use of procedures and calculations, and to clarify problems.

Session #7 (Cont.)

7. Elicits questions or problems, and discusses with group ways of sharing their learning with other members of their teams.

Group B

Goals: To help participants understand the purposes and requirements of the survey's sampling strategy and procedures.

To help them understand the purposes and requirements of the Agriculture section.

To continue the process of question analysis and problem-solving on the Agriculture section.

To help them develop ways of sharing their learning in their teams.

Materials: Workbook: Agriculture section, clarifications, Sampling Procedures; newsprint, markers, tape.

- Procedures:
1. Trainer explains goals of session, emphasizing need for sharing learning in their teams.
 2. Trainer gives overview of sampling strategy and procedures, emphasizing:
 - a. requirement of random selection
 - b. the problem of obtaining a list of households
 - c. the strategy of mapping the community to generate a list.
 3. Asks participants to suggest ways of obtaining a list of households. Record these and discuss problems in doing this. Ask for suggestions on how teams could generate their own lists.
 4. Discuss with participants possible problems in implementing sampling strategy in their communities, and how they could resolve these.
 5. Trainer gives overview of Agriculture section, explaining its parts and discussing definition of a farmer.
 6. Divides group randomly into 4-5 small groups, each with a Host Country of fluent trainer. Asks groups to read and review the Agriculture section questions together as in previous sessions.
 7. Asks small groups to share any unresolved questions or problems.
 8. Reviews session and discusses with group ways of sharing their learning in their teams.

Session #7 (Cont.)

Part III: Team Sharing, Team Building (60 minutes)

Goals: To help teams pool their learning in the split-group sessions.

To help team members to practice giving information about the survey and gathering information important to them.

To continue the process of cooperative problem-solving by survey teams, and the realization of different resources and roles within the teams.

To assess the effectiveness of the split-group sessions.

Materials: newsprint, markers, tape.

- Procedures:
1. In small groups, trainers explain goals of session, and review the activities in the split-group sessions.
 2. Trainers ask each participant to think for a few minutes about:
 - a. what are the important facts, ideas and issues his/her teammates should learn about from his/her split-group session.
 - b. what he/she needs to learn from the other team members.

Trainer explains the team exercise, emphasizing the need for clarity and attention to the listeners needs by the communicator, and the need for the listener to play an active role through questions and indications of understanding or problems.

3. Ask participants to gather in their teams to share their learning.
4. Discuss with group some of the ways in which learning was shared and any problems in doing this.
5. Ask participants how they felt as teachers and as learners. Summarize session, pointing out the kinds of teaching and learning roles teams will play in their communities.

Session #8: Renewable Energy Section;
Survey Reporting Requirements

Time: 2-5 P.M.

Goals: To help participants understand the purposes and requirements of the Renewable Energy Section.

To continue analysis of survey questions.

To help them understand the potential uses of information on renewable energy sources in the community.

To clarify the requirements for recording and reporting survey information.

Materials: Workbook: Renewable Energy Section, Glossary, Data Needed by the End of the First Quarter, Alternative Energy Uses and Devices; newsprint, markers, tape.

- Procedures:
1. In small groups, trainers introduce Renewable Energy section, explaining its purposes and its structure (solar, biomass, wind, water), and the concept of renewable energy (including human energy). (10)
 2. Trainers review each part with participants, explaining reasons and requirements of questions, and technical terms using Glossary. Point out reference articles on renewable energy in Workbook as resources for understanding energy ideas. (45)
 3. Trainers elicit questions, and ask participants to think of ways in which renewable energy sources are now being used in their communities, or have been in the past. List these. Then ask them to think of ways such sources might be used in more and different ways. List these. (20)
 4. Trainers move group into large conference room with other groups for lecturette on the potential uses of and limits on the use of renewable energy resources. Bring lists of participants ideas and post for lecturers use.
 5. Lecturette will focus on the functions for which renewable energy can be used, the devices available for using it, their limits and cost, and what improvements they can make possible. (75)
 6. Trainer (lecturer) indicates that analysis of the survey questions and procedures is now complete, and introduces the first quarter reporting requirements, reviewing these and indicating a shift in the work-shop's focus to the problem of implementing the survey in the community and to the task of planning for this. (15)

DAY FIVE

Session #9: Review of the Survey; The Survey
as a Community Development Tool

Time: 8-12 A.M.

Part I: Review of the Survey (60 minutes)

Goals: To help participants realize how much they have accomplished in a short period of time.

To elicit from participants their understanding of the survey's questions, procedures and requirements. To identify any problems they might have, and to respond to these.

To assess their understanding of the goals and purposes of the survey.

To identify and discuss what they believe the potential benefits of the survey might be for their communities.

Materials: Workbook, newsprint, markers, tape.

- Procedures:
1. In small groups, trainers congratulate participants on the having completed their learning of the survey, and review the active process of collaborative work they have engaged in during the past three days. (5)
 2. Trainers ask participants a series of spot questions on the survey's sections, procedures and requirements to assess their understanding, and clarify misunderstandings which appear. Special emphasis should be placed on the fuel measurement and sampling procedures, on procedures for recording answers to the survey questions, on the time-frame of the survey, and on reporting requirements.
 3. Trainers elicit any unanswered questions or concerns, record these and respond.
 4. Trainers elicit from participants their understanding of the goals and purposes of the survey, and discuss these, emphasizing the planned and potential uses of the survey information, especially for the communities in the survey. List ideas on newsprint. (45)
 5. Trainers then ask participants to gather in their teams, and to pool their ideas on what might be the potential benefits for themselves and their communities in their carrying out the survey over a years time. Ask them to record these on newsprint to share with the whole group. (20)
 6. Trainers review and pool lists with participants,

Session #9 (Cont.)

noting commonalities, and especially interesting and unusual ideas. In discussion, ask participants how they think their ideas could be realized. (20)

Part II: The Survey as a Community Development Tool (120 minutes)

Goals: To identify the critical role played by energy in all aspects of community life and work.

To help participants understand the major factors in initiating and implementing a development process in communities.

To outline and explain how the survey information and the activities of survey teams in gathering information can play a critical role in helping communities identify and initiate energy development projects appropriate to their needs.

To help participants develop ideas about how survey teams can play a role in the development process.

Materials: Workbook: Some Necessary Steps for Communities to Initiate Energy Projects, How the Survey Can Be Useful in Project Development; small-group lists of survey goals and benefits, newsprint, markers, tape.

- Procedures:
1. In large group, trainers post small-group lists on wall and ask participants to look at ideas of other groups, comparing them with their own. (10)
 2. Trainer (Energy Project Resource or H. C. agency representative) introduces session, and responds to lists, generalizing on the kinds of survey goals and potential benefits presented. (15)
 3. Using examples from the lists, trainer delivers a lecturette focusing on the survey's role as an important step in the identification and initiation of appropriate and feasible energy development projects. Referring to Workbook materials with participants, trainer outlines steps in development process, emphasizing the importance of baseline energy data, needs assessment and the participation of the community based on heightened awareness of needs and possible alternatives to current energy practices.
 4. Trainer elicits questions and comments during course of lecturette. These are recorded by another trainer, and lecturer responds. (60)

Session #9 (Cont.)

5. Trainer asks participants to gather in their teams to pool ideas on how their survey team can play a role in their community's development through their work in the survey. (15)
6. Asks teams to suggest ideas they have developed, records these on newsprint and responds, indicating the need for commitment and planning for implementing the survey as a tool for the development of their communities. (20)

Session #10: Implementing the Survey: Identification Time 2-5 P.M. of Tasks, Resources, Issues and Problems.

Goals: To develop with participants a planning strategy for implementing the survey.

To engage participants in the identification of team tasks for implementing the survey during the first quarter, the resources available in the team and in the community for accomplishing these, and the issues and problems confronting teams in introducing and implementing the survey.

To continue and intensify the team-building process.

Materials: Workbook, a Strategy for Planning, Team-Role Analysis Exercise, List of Issues and Problems for Action Committees; newsprint, markers, tape.

- Procedures:
1. In small groups, trainers explain goals of session, relating these to the ideas of the previous session.
 2. Trainers ask participants to gather in teams to read together A Strategy for Planning, explain the steps outlined, and, with the workshop schedule, explain how the workshop activities are organized as steps in a planning process. Emphasize that the survey is now theirs to plan for and initiate using their strengths and their understanding of the realities of their communities.
 3. Trainers ask teams to "brainstorm" their own lists of tasks they will need to accomplish to introduce and implement the survey during the first quarter. Explain the process of brainstorming as a useful way to get out as many ideas as possible. Ask teams to record ideas on newsprint for sharing and analysis by the whole group.
 4. Post team lists and ask participants to read them and compare task ideas. Trainers suggest important tasks not included on lists, and ask participants how the listed tasks might be grouped into major tasks. Discuss and record suggested groupings. During discussion, suggest that team members make notes on tasks they might want to add to their lists, or any.

revisions they might want to make.

5. Trainers ask teams to work together in expanding or revising their lists and in grouping their tasks, suggesting that the teams keep their revised lists for use in the next planning steps.
6. After a short break, ask teams to reform and introduce the Team-Role Analysis, asking teams to read the exercise together. Explain the instructions and ask teams to record their work on newsprint for sharing with the group.
7. Discuss with group what resources and obstacles have been identified. Ask group to suggest ways in which the major obstacles could be overcome. Ask teams to revise their own lists as appropriate to their own situation.
8. Trainers ask participants to consider what issues and problems they may have to confront in introducing and implementing the survey in their communities. Elicit suggestions and record on newsprint. Introduce tentative Action Committee topics and suggest ways of grouping participants concerns within the suggested topics. If there are major concerns which cannot be grouped under existing topics, suggest additional groupings.
9. Introduce Action Committee exercise for the next day as an approach to the development of strategies for dealing with the issues and problems identified. Indicate that trainers will use the concerns developed in the small groups to formulate Action Committee topics and questions, and that participants may choose to work on the Committee topic which concerns them most.
10. Summarize the session, and suggest that teams keep their task and resources lists for use in further planning work.

DAY SIX

Session #11: Action Committees: Strategies for Time: 8-12 a.m.
Introducing and Implementing the Survey

Goals: To help participants analyze issues and problems in introducing and implementing the survey.

To stimulate them to develop strategies for dealing with these.

To reinforce cooperative problem-solving attitudes and behavior.

To develop ideas useful to teams in their planning.

Materials: Action Committee topics and questions on newsprint, Committee sign-up sheets on newsprint; newsprint, markers and tape for each Committee.

- Procedures:
1. In large group, trainer gives instructions for Action Committee sign-up and work process:
 - a. sign up for the Committee of your choice if there is space left on the sign-up sheet. If not, then choose another Committee. Work-rooms are on the sign-up sheets.
 - b. Committees will work on their own, and have the responsibility to structure and maintain their own working procedures.
 - c. The first task is to analyze the topic and the suggested questions related to it, adding to and/or revising these as appropriate.
 - d. The second task is to formulate strategies to deal with the identified issues and problems: what resources can be used? What activities undertaken? What preparation necessary? What care to be taken?
 - e. The third task is to design a presentation to participants and trainers of the issues and problems identified and the strategies developed. This should run no longer than 15 minutes with 15 minutes for discussion and critique. Visuals or other available aids may be used. Committees may choose any form

of presentation they wish within reason.
Presentations will begin here at 2 P.M. in
numbered order.

2. Trainer asks participants to sign-up and begin work as soon as their group is formed. Indicates that trainers will be available for consultation but will not take active roles in the process.

Session #12: Action Committee Reports Time: 2-5 P.M.

Goals: To enable Action Committees to present reports on their chosen topics.

To enable participants and trainers to discuss and critique the Committee reports.

To stimulate collaborative and creative activity among participants.

To provide ideas and strategies for team use in their planning.

To recognize the resources and initiative of the participants in the workshop process.

Materials: Action Committee presentation.

- Procedures:
1. Trainer introduces session, giving order of presentation, and indicating that written and visual materials on newsprint developed by each Committee will be transcribed and copies distributed to each participant at the beginning of the next morning's session.
 2. Trainer indicates that each Committee will be responsible for maintaining time limits and for facilitating questions and discussion.
 3. Action Committees deliver reports.
 4. Trainer congratulates each Committee, and summarizes the major issues, strategies and critiques brought out in the session.

DAY SEVEN

Session #13: Survey Team Planning

Time: 8-12 A.M.

Goals: To present a planning model and guidelines that will facilitate teams formulation and recording of their plans.

To enable teams to formulate and record plans for presentation and critique in team consultation sessions with trainers.

To continue the process of team-building.

To provide data for trainers on each team's understanding of the survey task, their ability to work together as a team, and their ability to implement the survey realistically.

Materials: Workbook: Team Planning Model and Guidelines; Copies of Action Committee presentations, team lists of tasks and resources, newsprint, markers, tape.

- Procedures:
1. In small-groups, trainers explain goals of session, distribute copies of Action Committee reports, and present the Team Planning Model and Guidelines.
 2. Trainers explain team planning task:
 - a. produce a schedule of tasks and activities team plans to accomplish during the first quarter of the survey with approximate beginning and ending dates for each activity.
 - b. indicate which member or members of the team will be responsible for each task.
 - c. indicate what other resources will be needed for the accomplishment of each task.
 3. Trainers demonstrate on newsprint planning model how to record tasks, time, assignment, resources.
 4. Trainers suggest:
 - a. review and revise task and resource list as needed in light of Action Committee reports.

- b. determine which tasks are related, and which need to be accomplished first in order to accomplish others. Make a sequence of tasks.
 - c. determine which team members should do which tasks, taking into account the resources and obstacles identified.
 - d. given constraints on team members time, determine a realistic amount of time to accomplish each task.
 - e. if other persons or resources can be recruited and utilized, indicate who or what these are. Recruiting and possibly training other resources are important tasks, take time, and should be included in the schedule of tasks.
 - f. It is important to plan for team meetings to assess progress, plan, process information gathered, and record and transmit survey data.
- 5. Trainers explain the purposes and procedures of the team consultations with trainers in the afternoon, and communicate to each team the time and place of its appointment.
 - 6. Trainers distribute newsprint and markers and tape and ask participants to begin the task.
 - 7. Trainers float among teams to observe progress and to provide assistance when needed.

Session #14: Team Consultations, Taking Care of Loose Ends, Workshop Evaluation Time: 1-5 P.M.

Part I: Team Consultations: (180 minutes)

Goals: To critique team planning and assist them in developing it.

To assess team's ability to work together and to implement the survey.

To identify the community to be surveyed, the members of the team, and their accessibility to that community.

To make sure that teams have all necessary materials to implement the survey and to record and transmit first quarter data.

To make sure that the team members understand the procedures and requirements of the survey.

To identify any problems for which the teams may need assistance in the field.

Materials: Team plans, Trainer Consultation Guidelines, Field Copy of survey for each team, Assessment Recording form.

- Procedures:
1. Each team will have a 45 minute consultation session with at least two trainers possibly assisted by H.C. agency representative.
 2. Trainers review and critique team plan and, if necessary, ask team to complete or revise plan and schedule another appointment.
 3. Trainers gather necessary information from team.
 4. Trainers give survey field copy to team and review first quarter reporting requirements.
 5. Trainers discuss and record team data and assessment.

Part II: Loose Ends and Workshop Evaluation (60 minutes)

Goals: To clear up any unresolved administrative and logistical problems.

To obtain from each participant a written evaluation of the workshop.

Materials: Workshop Evaluation Form

Procedures: 1. In large group, workshop coordinator clears up problems; distributes, explains and collects evaluation form; closes workshop.

EVALUATION

It is important to design and administer a simple participant evaluation of the workshop upon its completion. We have included a sample in the Trainer Resource Material Section. Although the format we have used elicits participants current feelings about the workshop, rather than attempts to measure any long-term effects, it does provide written data for the trainers that can assist in assessing and modifying the design for the next go-around.

There are, of course, more vigorous evaluation methods that could be applied such as pre- and post-tests that measure more directly what participants have actually learned. Another measure of workshop effectiveness is the quality and quantity of survey data that is returned. In choosing more methods such as pre- and post-tests one must be extremely careful to make sure they are appropriate to use with any given group of participants. Many such evaluation instruments are culture bound. And using long range measures such as returns on survey data, may give a limited picture of workshop effectiveness. There are too many variables that will impact on the surveyors and the program itself that may be beyond the control of the workshop implementors.

Some combination of evaluation methods seems most appropriate. Included in the Trainer Resource Materials Section is some additional information you may find helpful.

Peace Corps Energy Survey Project

Analysis of Data

Statement Of Work

A. Scope of the Work: The contractor will prepare and organize the numerical data resulting from the first quarter phase of the Peace Corps Energy Survey to facilitate the use of this information by Peace Corps, host country officials, and appropriate developing country analysts. The contractor will also analyze the survey instrument in order to validate the survey responses and to test the degree of its statistical usefulness. The tasks to be performed to do this work will include but not be limited to:

1. Preparation of numerical data for analysis.

This includes for all numerical data:

--coding the answer sheets.

--keypunching the data.

--preparation of computer programs for testing, validation, and analysis of the data.

2. Analysis of the survey results for the purposes of reviewing the survey instrument for the preparation of Peace Corps projects and for further analysis of the data including energy planning and trends analysis.

This includes for all data:

--Data validation: cross-checks of data and related tasks!

--Statistical compilation: actual comparison of cross-data samples resulting in cross-tabulation, distribution, variances, and other statistical parameters.

--Presentation of the results: a listing of weighted frequencies by total and by country for each item in the survey instrument.

3. Preparation of the report. A summary report will be prepared for the data from the surveys done in Micronesia, the Philippines, and Senegal which will present the results of the analysis of the survey data and assess the statistical usefulness of the survey instrument. The report will also include recommendations for the revision and improvement of the survey instrument and a description of the methodology developed to analyze the data.

The data and results are the property of the U.S. Peace Corps which will have final jurisdiction over its dissemination.

The contractor will provide copies of these reports to the appropriate officials of U.S. AID and Peace Corps.

- B. Management of the Work: the contractor will assume responsibility for hiring and supervising the personnel required for the execution of the tasks described in this statement of work. The contractor will submit to U.S. AID and Peace Corps, a budget to accomplish these tasks before the work begins. The contractor is expected to informally consult with appropriate U.S. AID and Peace Corps officials on the progress of the work on a regular basis.
- C. The project manager for this contract is Paul Rankura of the U.S. Peace Corps.

PEACE CORPS ENERGY PROGRAMMING

* Programming Assessment Workshop

* Mali Programming Report

* Mauritania Programming Report

SELECTION AND ORIENTATION WORKSHOP FOR PROGRAMMING CONSULTANTS

The Energy Sector designed and developed the following assessment workshop to identify consultants with specific skills appropriate to Peace Corp's programming philosophy and the energy sector's desire to develop water technology projects suitable for PCV's to work in. The goals of the workshop were:

- to determine whether participants' skills and interests match our needs
- to provide an orientation to the kind of programming work we have

The workshop was so designed as to give assessment information about each of the participants and to simulate the Peace Corps programming environment for consultants from the PC/W briefing through the specification of training requirements for Volunteers.

The assessment dimensions used in the workshop were: technical competence for specific water technologies (hydraulic rams, water wheels, micro-hydro systems, site surveying/feasibility); programming competence (project identification, tasks and materials analysis for project, organizational support necessary, logistical and administrative structure, schedule of activities); and consultancy values and skills (communication skills, interpersonal skills, sensitivity to cultural, political and developmental issues).

The orientation component of the workshop was designed to present a "typical" Peace Corps programming environment. This simulation started with a Washington briefing indicating the nature of the field request, the amount of information available (or missing), the cast of characters involved, and the types of demands on consultants from the different parties. This was followed by a series of case studies depicting the entry/initial work in-country (Case A); identification and development of specific projects (Case B); and follow-up work/recommendations for continued development of the project(s) (Case C).

After discussion of the cases, the projects identified were analyzed to generate a list of tasks and skills necessary for implementation of the project, and to breakdown the skills as to which ones are trainable and which ones are needed as prerequisites in PCV's.

Interviews were then held privately with each participant to gain both a greater insight into the competencies of the individual and to resolve any issues brought up by the day's activities. The workshop closed with a group discussion of the events of the day and some remarks about the nature of this water programming initiative.

This workshop design is rather intensive and requires a staff: participant ratio of 1:2, with at least 2 trainer types and 2 technical types included in the staff.

Eleven water technologists/consultants from around the U. S. were invited to the workshop. Three were recommended unconditionally and two conditionally for use in this programming initiative.

WORKSHOP SCHEDULE

8:30 Getting Acquainted
9:00 Introduction/Goals/Schedule
9:30 Simulation: Washington Briefing
10:30 Break
10:45 Case Study A: In the Capital City
11:45 Case Study B: Site Visits
LUNCH
2:00 Case Study C: Return to Capital
3:15 Volunteer Basic Skills and Training
4:15 Break
4:30 Individual Interviews
6:00 Discussion and Closing

WORKSHOP ACTIVITIES

Getting Acquainted Exercise

1. Ask staff and participants to group themselves according to area they have worked in or prefer working in, i.e. (Latin America, Asia, Africa) and to discuss for 6-8 minutes what they like most about the area. Quick report out on any common themes.
2. Form groups according to kind of working experience in overseas projects: planner, manager, technician; discuss biggest difficulty encountered (6-8 minutes). Quick report back.
3. Form groups according to birth order: first born, middle, last born. Discuss effect of birth order on personal development (6-8 minutes). Quick report back.

Introduction/Goals/Schedule

Briefly indicate staff, share day's goals and schedule. Indicate on the schedule that the simulation begins with PC/W briefing and runs through volunteer training session. Check to see if participants have outstanding questions/expectations.

Simulation: Washington Briefing

Purposes:

- to determine participants skills in identifying necessary information, given resource and time constraints (PC/W)
- to provide basic information a consultant can expect

Briefly introduce some basics that one can expect to be handled in PC/W. List these (there may be others) on a flip chart:

- length of consultancy, 4-6 weeks
- travel itinerary
- PC country packet
- travel advance
- sign contract
- PC Programming System
- Briefings: Country Desk Officer, OPTC Sector Specialists
- Possible visiting or phone conversations with Private Voluntary Organizations/AID/Bank

Participants are to break into pre-assigned working teams and spend 10 minutes determining what information they want to gather, prioritize 2-3 most important. They will have three resource people: CDO, Energy and Water Specialists. (Roles played by staff.)

Group reconvenes, and each group takes a turn asking question of a resource person.

Stop after 2-3 questions/group, explaining that it's real!

Case Study A (Approx. 1 hour - 1-1/4 hours)

Distribute Case Study and identify staff who will be playing resource roles. Teams have 30-40 minutes to complete task. At the end of time, bring two teams together to share completed plan. Each team presents before discussion/critiques. Simulate role plays as fit.

Case Study B

Proceed as above. Note that resources change. This case is designed to determine technical as well as other skills.

Case Study C

Distribute the final instructions, and indicate the resource people. Allow 30-40 minutes to complete the task. This time, the teams will present their plans to staff playing the roles of PCD and APCDs, and will respond to staff questions. Each group will present/interact with PC staff players, and then discuss.

Volunteer Basic Skills and Training

This session in lieu of a simulated PC/W debriefing.

Working in same groups as for reports on Case C: Given the projects designed, which technical skills can Volunteer be trained in? What are entry level requirements? (30-40 minutes).

Individual Interviews

To gather more information around the assessment dimensions, on a 1-1 basis.

Possible questions:

- How did your group approach the task today?
- What was done well? What might have been done better?
- What would you have done differently?
- How do you see the application of your technical expertise in the development of programs/projects overseas?
- What kinds of consulting experiences have you had recently that allowed you to use those skills? What were the primary consulting skills you used?
- Having been through this experience, how do you now feel about being a programming consultant for PC, in terms of your own skills and interest? Our programming approach/criteria?

Discussion and Closing

Briefly, reactions to the day, any outstanding questions?

Explain when participants will be notified of decisions and time frame for upcoming consultancies.

Some Notes on Management:

- time is tight
- role players and observers need to be assigned so that each staff member can observe everyone
- an interview schedule needs to be made, and sufficient spaces for interviewing need to be found.

Attachments:

Assessment Dimensions
Case Studies A, B, C
Role Assignments
Sample Observation Schedule

ASSESSMENT DIMENSIONS

I. Technical Competence

Operational Definition

Program consultants should demonstrate ability to assess the feasibility of a site specific water project given available information, and if information is insufficient, how they would get needed information. They should show they can:

- . ascertain proper water end use
- . layout and design a complete water system from source take-off through end use
- . describe skills PCVs will need to do the project
- . specify resources needed for project and assess availability of local resources
- . outline operation and maintenance requirements for system
- . assess availability of in-country skills and resources

Description of Rating Scale

1. Low Skill: Individual shows uncertainty about what questions should be asked, and if information is not adequate, does not make more than one or two efforts to find other sources of information. Person may dwell on one part of the system in discussions of system design, indicating a lack of grasp of the total water system from end use back to source take-off. He/she may describe technical skills required in academic terms, rather than short-course training terms. Person does not indicate understanding of the importance of specifying maintenance requirements during feasibility study, to ensure project can be maintained after project is concluded. Individual may not consider importance of in-country resources and skills while conceptualizing the project technically.
2. Moderate Skill: Individual freely admits some technical shortcomings in one or two areas, but indicates through questioning and other behavior during assessment activities a willingness and skill to learn quickly. May be able to layout a design for either a hydraulic ram, or a

micro-hydro station, but not both. Person may be able to specify PCV skills required but may voice uncertainty about whether short training can provide those skills. Person may describe importance of local resources and skill, but may not demonstrate experience with using local resources from past technical experience in development situations.

3. High Skill: Individual demonstrates high degree of familiarity with feasibility studies in development situations. Person shows total system familiarity, including ability to layout a design for either a hydraulic ram or a micro-hydro station with equal (or nearly equal) skill and experience. Person can specify and demonstrate through experience short term training requirements such as PCVs would need to implement such a project. Person demonstrates comfort and experience in maximizing use of local resources, and in specifying maintenance requirements for keeping such project systems.

II. Programming Competence

Operational Definition

Program consultants should be able to demonstrate to Peace Corps staff that they have an approach to programming and project design which is a wholistic one, and which is consistent with Peace Corps criteria for program design. Specifically, they should demonstrate that they can:

- . conceptualize a complete program design
- . design a program congruent with Peace Corps philosophy and programming criteria
- . articulate any differences they might have between their own values and values behind Peace Corps programming criteria
- . demonstrate sensitivity to and respect for third world development problems and third world people working on those problems

Description of Rating Scales

1. Low Skill: Individual focuses on technical detail rather than being able to link technical considerations to total program design. Person may approach planning in fragmented way, or may not believe in planning in developing world situations. He/she may not have read carefully Peace Corps programming criteria; or may take strong exception to appropriateness of them. Statements may be heard frequently from this individual which reflect a negative or derogatory attitude toward third world people. Likes to tell "war stories" with stereotyping and derogatory statements or anecdotes.
2. Moderate Skill: Person is able to link technical requirements to planning, but may demonstrate less skill or experience in total system planning. Individual may have difficulty being as specific as necessary during planning activities. Person may have some difficulties with some of Peace Corps programming criteria, but is able to openly discuss them, and indicates ability to re-examine own values and try to adjust. May tell war stories but does not consistently stereotype, and in the process exhibits a balanced view of third world people and resources.
3. High Skill: Individual who demonstrates quickness and experience in conceptualizing a total system plan, with specific outcomes, and with contingency planning which demonstrates a realistic approach to develop planning. He/she illustrates careful consideration of, and enthusiastic embrace of the values behind Peace Corps programming criteria. In discussing his/her experiences in the developing world, a high level of respect of third world people and resources is obvious.

III. Developmental and Consulting Values and Skills

Operational Definition

Program consultants should be able to demonstrate high congruence between their personal values and their demonstrated skills to:

- . make available their own knowledge and skill to others
- . enter into unfamiliar situations and actively question to gather information
- . join in collaborative planning in which others feel utilized

- . share in decision-making with others less knowledgeable
- . describe the processes as well as the content of how things happen

Description of Rating Scale

1. Low Skill: Individual withholds knowledge of skills. He/she enters situations looking for right and wrong answers. Person may talk about collaboration but behaviorally competes. Shows belief that the most knowledgeable person should control decision-making. May be "stuck" on the technical content of his/her field. Given a specific, this person may have trouble generalizing from it. Or, given a general concept, this person may have trouble getting back to the specific application.
2. Moderate Skill: Shows willingness to share knowledge, but may not be skillful at doing so. Good at asking questions, but often falls into right and wrong traps. Sometimes collaborates and sometimes competes. Shows an awareness of importance of process issues, but has limited skill in getting at process issues. May be good at either moving from the specific to general concepts, or from the general to the specific, but not good at both.
3. High Skill: Individual is highly congruent in stated values and observed behaviors in consulting/helping situations. Clearly enjoys sharing skills with others, and leaves others feeling stronger for the experience. Skillful in getting others involved in planning and decision-making. Recognizes and helps others recognize importance of balance between process and content. Able to move from the general to the specific, and back again, with equal comfort and skill.

CASE A

Peace Corps/Xania has cabled Washington requesting a water programmer to come and assist in project development. The cable states that:

- o 30-40 streams are potentially available to be tapped
- o The President's Office of Energy is enthused about potential and wants to see projects developed
- o Ministry of Agriculture's Water Resources Division has been contacted about the initiative

When you arrive in country, you find that:

- o The responsible PC staff member is the Associate Peace Corps Director (APCD) for rural development, with a general ag. background, but little knowledge of irrigation and none of water power.
- o The Country Director (CD) seems friendly at first, but has some reservations about new programming -- his resources are scarce, his staff overloaded, he is pressed by Washington to increase the number of PCVs in the country.
- o The APCD is working on getting a meeting with the Director of Water Resources (Min Ag) but senses some footdragging there.
- o A meeting is set with the Chief of the Energy Office, who seems (to the APCD) to be enthused.
- o The APCD will help you get around in the capital, but can't get away for field visits. A Peace Corps Volunteer Leader (PCVL) has been assigned to accompany you, translate, and give some cultural hints.
- o The young energy chief has a capital-based staff of nine (9) people, but because of the President's weekly speeches about energy issues, he expects that his program will soon get more funding.
- o The Water Resources Director, when you get to him, is cautious, questions your credentials, and seems to have a number of concerns.
- o All parties feel that you should make an in-depth trip to the field, but none have a spare vehicle they can assign to you.
- o Water Resources provides you with a copy of the 1974 hydrological survey, dealing with major rivers and a few of the larger streams. The weather service has some rainfall data for the past 10 years.

INSTRUCTIONS

Given this information, and any more you need to collect from the available resources people, develop a work plan for organizing your efforts, and a strategy for dealing with the interests of the parties involved.

Resource People:

APCD/RD

Irrigation Specialist - Min. Ag.

Planner - Energy Office

CASE A

Resource Person-
APCD/RD

You're the source for all PC info (people, intentions, etc.) at this point.

APCD's skills and experience are in small animal husbandry, some field crops, not in water power or irrigation. Has good contacts with agricultural coop federation, middle management people in MinAg. and with Regional Ag and CD Directors.

Responded to initiative after some informal talks with contacts at Ministry, PCV leaders, knowledge of number of small streams in the country, pressure to increase numbers in RD programs. Has not had time to collect much technical data, has few prior dealings with the Water Resources Division at Ministry of Ag.

APCD has very tight schedule coming up, with 12 coop trainees arriving, need to finalize training, site surveys. Will be able to help you get started in capital, but can't go to field.

Vehicle situation with PC is very tight.

Country Director is friendly, but skeptical about this initiative, and about "instant programming" by short-term consultants. Is willing to listen to what might be done, but staff is overloaded now, and CD resents numbers pressure from Washington. Talks about problems of supporting, technically as well as administratively, RD vols.

PCV Leader is third year volunteer who will help consultant. He's been a coop volunteer in southern region. Speaks local dialect as well as national language. Works well with villagers on coop projects. Has doubts about introducing outside technologies in villages, whether they will be appropriate, add costs to already poor people, create needs for parts, maintenance, that will be new burdens and probably benefit only richer people.

PC wants you to visit 4-5 sites scattered around the country where PCVs are currently stationed.

CASE A

Energy Planner

You have been back from MIT for less than a year with a degree in economic planning. You believe that petroleum is strangling your country's development, and that the President is looking for some fast results in finding alternatives. You are prepared to see alternative technologies of any kind used.

You have a staff of nine, all in the capital. Most are economists or planners, only two are engineers and one of them is ill, the other at a seminar in Paris on water and wind generation.

You would like to see a demonstration project just outside the capital city, and would also like the consultant to survey northern and coastal communities (about 50 of them) to see about future potentials for all kinds of alternative energy applications.

All things are possible, the sooner the better, and everyone will see the value of what's to be done. Cultural constraints are not your bag.

CASE A

Resource Person-
Irrigation Speci-
alist Min Ag

You're with the Water Resources Division. You are not an irrigation engineer, but a liaison person, with some knowledge of how international donor agencies work, how to develop water user organizations among farmers, and you do a lot of coordinating with Regional offices and provincial governors.

You know that the Director of Water Resources would like more hydrologists or hydrogeologists working for him, and hopes PC might supply them. Director wants cost-benefit analyses of proposed projects so he can get funding from AID, IBRD. Insists that consultants have in-depth overseas and regional experience.

He (Director) is developing irrigation for a large monoculture project in Southern Region for 200 farmers, and plans on using diesel pumps. Needs not only technicians, but more funds, and wonders if PC consultant can help arrange funds. He wants the job done right, has no vehicles to offer, limited staff, and is generally cool and more a source of news about obstacles than help. He will make available data from hydrological surveys.

Wants you to concentrate on the southern Region.

- o A PCV health/nutrition worker posted here thinks that a micro-hydro would be just great.
- o A swift flowing stream on the edge of the village runs all year long. It has eroded banks. You have some flow data which shows:

o head in ft.	flow in cu. ft/sec.
25	6.0
- o You recall hearing about a very active Community Development worker who got the clinic built, got the PCV assigned, organized two coops, and started an adult education program in the school. He's from the area, and very output-oriented.

INSTRUCTIONS

Given this information (and any more you need from the sources), develop a project proposal or summary, including:

- o problem being dealt with
- o goal of project (benefits, beneficiaries, timing for completion)
- o major objectives
- o resources
- o technology - sketch design, specs.

Sources:

Energy person

Ag ministry person

PCVL

CASE B

Resource Person-
PCVL

You've been travelling with the consultant for some time now, but you're still concerned about introducing technologies that might be costly, burdensome to villages. You're digging back into your notes and memory about the trip to help the consultant recall additional information and impressions. Your experience is mainly with coops organizing.

In village ONE you recall:

- PCV vegetable ag extensionist was well integrated socially with her community, but frustrated with slowness of getting things done, problems with small things like getting vegetable seeds, hindrance of having to carry water for everything (water veggies, bathe, pote, etc.)
- PCV was skill-trained in the States, and speaks well of how she was prepared, though she had only grown marigolds before coming to Xania training and service.

In village TWO you recall:

- PCV at post for six months working on nutrition, is still enthusiastic though has little that's tangible to show for his time here so far. Was in the capital for minor medical treatment when the cable about the programming initiative came in, and picked up the idea of a mini-hydro as a way of making cheaper the milling of grain, introducing a sawmill, perhaps starting a stone-crushing operation. He wants to do something the hyperactive local CD worker can't do, and leave something of his own behind since he's not sure he'll be replaced.

CASE B

Ag Ministry person

You've travelled with the consultant and the PCVL. You have some general idea what to look for, but you're not really a hydrologist. You're helping the consultant recall sites by digging into your notes.

You reflect the MinAg views that larger farms are the key to the country's agricultural growth, though you also acknowledge rural poverty as a real problem. You think that the new energy office is a waste of money, that MinAg and MinPublic Works could handle the problems created by oil dependence, and that it's probably exaggerated anyway as a source of economic strangulation.

In village ONE you noted:

- cattle and hogs being raised
- hand-watered vegetable gardens near the stream, recently introduced as a source of supplemental income for people (PCV) involved
- frequent bus service to the capital city

In village TWO you recall:

- mountains almost 2000 meters high around village
- hearing about the good cooperative tradition of working on problems among people in this area
- mostly subsistence cropping (small rice paddies, corn, some root crops) some chickens, rabbits, no larger livestock
- some lumber extraction is going on in the area, with logs being trucked out for milling in the Regional capital

CASE B

Energy Person

You're enthusiastic, hipped on new technologies (though not a technologist) as way to release the petroleum strangle on your country's development.

You think (and tell consultant) that Min Ag is slow, unimaginative, still trying to import Kansas to Xania in terms of approaches to agriculture. You don't think they've done much for little people in the last ten years. You are travelling with the consultant, helping remember facts.

In village ONE you noticed that the town is just above sea level (200 feet), that tallest hills were about 1000 meters (3000 ft), and that stream banks were 15 feet high in some places, eroded to four feet in others. It swells to 15 feet wide, 6 feet deep in rainy season, 2 feet deep in dry.

In village TWO you noted that the stream was three-fourths of a mile from the village, banks 15-20 feet but badly eroded. It runs swiftly all year long.

You talked with the CD worker in village TWO and found him very active, but also heard some comments from villagers that indicated some resentment of the CD man's go-go way of doing things, and concerns about how they can maintain all these projects he's started. The PCV seemed to be respected by the villagers.

INSTRUCTIONS

You are back in the capital city. You have to prepare a presentation to the Peace Corps staff, which should include:

- plan for follow-up to finalize/get projects started.
- critical issues to be resolved.

You may use the following resource people:

- Peace Corps Country Director
- Energy Chief
- Water Resources Director

CASE C

Country Director

You've heard good things about the consultants' work and relations with people, and that folks in both agencies (Energy, Agric.) have been impressed. You have some concerns, but you're warming to the idea of some of this new programming. You wonder about:

- What will be the overall project impact?
- Can we use several PCVs? If not, might just increase TEFLers. Don't want isolated, unconnected placements.
- Can't ask for scarce skills. Can PC train the people needed?
- Can consultant put in some strong arguments in Washington for another RD staff slot?

CASE C

Energy Chief

You've heard good things through your staff about the consultant, and have read some of the material about mini-hydro which consultant left in your office. You would like to see 20 installations next year, but can't really offer staff support. Hope that next year's development budget will provide more money for such things, but also wants to hit foreign aid donors to bring in money and technicians.

Staff Assignments during Workshop

Activities/Group		I	II	III	IV
PC/W Briefing -	Role Players: A, B, C				
	Observers:	D	E	F	G
Case A	Role Players: A, F, G				
	Observers:	C	D	E	B
	Group Reports:	<u>A, C, D, F</u>		<u>B, F, G</u>	
Case B	Role Players: B, D, G				
	Observers:	E	A	C	F
	Group Reports:	<u>B, E, F, G</u>		<u>A, C, D</u>	
Case C	Role Players: B, E, G				
	Observers:	F	C	D	A
	Group Reports:	<u>B, C, E</u>		<u>A, D, F, G</u>	
Training		<u>A, D, F, G</u>		<u>B, C, E</u>	

C O N S U L T A N C Y R E P O R T F R O M
B I O G A S P R O G R A M M I N G I N M A L I

Robert A. Hamburg

On January 10, 1980, I contracted with Peace Corps, OPTC, to provide the following services:

- A. To provide technical assistance to Peace Corps/Mali in the first phase of developing a biogas demonstration project. The assistance was to include the design and construction of a biogas digester; with Peace Corps staff, to visit potential sites for digesters and determine their technical feasibility; with Peace Corps staff, to develop a framework for a demonstration biogas project in Mali including goals, site selection criteria, and the identifications of major factors for and against successful project implementation.
- B. To participate as a trainer/resource person at an appropriate technology conference for Peace Corps staff from 12 African countries. This was to include delivery of a session on digester operation, site selection, potential benefits to rural areas, and other variables to be considered.

The overall goals of this programming effort were to demonstrate the appropriateness of biogas digesters for partial solutions to energy supply and food production problems.

Biogas digester integration with the Malian Government's development goals are considered on the following pages.

The specific goals of this project were:

- I. To demonstrate a method by which:
 - A. Dependence on firewood can be cut.
 - B. Dependence on fossil fuels can be cut.
 - C. Dependence on chemical fertilizers can be cut.
 - D. Food production can be increased.
 - E. Sanitation and health can be improved.
 - F. Desertification and erosion can be decreased.
- II. To develop a data base to document the various effects of digesters.
- III. Through small-scale experimentation, to develop inexpensive but durable materials and techniques for digester construction.

Mali is currently facing energy problems common to many developing countries. Wood, the traditional cooking fuel, is being used faster than new growth is occurring. This is demonstrated by its increased costs and greater efforts required in collection. Fossil fuels used for lighting and industry are also becoming unacceptably expensive.

Mali is also facing food supply problems common to many developing countries. Chemical fertilizers are increasingly expensive, distribution is difficult, and proper use requires a certain expertise. Animal manures are often poorly kept and have lost much of their fertilizer value before land application. Erosion due to deforestation is carrying away crop lands.

MAJOR FACTORS AFFECTING PROJECT IMPLEMENTATION

In the Malian governments Five-Year Plan for 1974-78, six principal objectives are sited:

- 1) To meet the basic human needs of the population, particularly in areas of cereal production and water.
- 2) To build up livestock population.
- 3) To increase production of agricultural produce and light industry.
- 4) To develop a transportation infrastructure.
- 5) To become more economically independent by a) trying to reduce balance of payments deficit, b) increasing production of state run enterprises, c) placing Malians in control of all aspects of national development and the economy.
- 6) To satisfy other needs, particularly in regards to nutrition, health and education.

A biogas project would integrate into such a plan in the following ways:

- 1) The basic human needs affected by a biogas project would be freedom from disease through the sanitary aspects of digestion, increased food production due to higher levels of organic matter returned to the soil, cleaner food preparation due to gas use, and increased control over the environment.

The Chinese Biogas Manual (Intermediate Technology, Ltd.) p. 17, reports the production of 28% more Maize, 10% more rice, and 12.5% more wheat using digester effluent instead of unfermented excreta.

Increased development of water resources will make it easier to obtain water for a digester. Also, the soil amendment qualities of the digester effluent/fertilizer will increase the water holding capacity of the soil.

- 2) The building up of the livestock population will provide more feed for digesters. Increasing attention to livestock raising practices will lead to increased confinement of animals and ease of collection of digester feed.

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- 3) Through conservation of plant nutrients for fertilizer, the use of digesters will increase all agricultural production. Use of the pond (integrated into the system constructed at Sotuba) should demonstrate an unexploited method for increasing protein production for livestock feed.
- 4) The production of biogas compression make digesters somewhat inappropriate for dealing with transportation problems.
- 5) Higher local food production and better quality organic fertilizer should decrease imports. In the future, enterprises could be established around the construction of digesters and the production of simple biogas appliances and gas fittings. Biogas digesters are simple enough that Malians with experience in agriculture and the raising of livestock can handle their operation with a minimum of specific instruction.
- 6) Nutrition is aided by the increased food grown with the increased fertilizer returned to the field. The algae pond in the Sotuba digester will offer an additional source for high-protein livestock feed. Health will be improved by the increased sanitation caused by digester use and by smokeless cooking with biogas instead of wood. Education will be affected by the concrete demonstration of the cyclical nature of organic matter.

(Data for the following is taken from Mali-Agricultural Sector Assessment, Final Report, Center for Research on Economic Development, University of Michigan, December 15, 1976. It should be well noted that this data was compiled near the end of the drought. The livestock population has increased substantially in the last four years.)

In Mali, 90% of the total population lives in rural areas and is supported at least in some part by agriculture (p. 14). While animal husbandry provides 48% of this income, less than one-half of all farms have any cattle (p. xiii).

(p. 17) Distribution of Livestock (N.B. - 1976 figures at end-of-drought.)

Livestock Ownership	Cattle		Sheep		Goats	
	% of Farms	% of Cattle	% of Farms	% of Sheep	% of Farms	% of Goats
0	55.2	0	67.2	0	61.0	0
1-5	24.8	14.6	16.8	16	19.2	12.9
6-20	14.4	24.3	13.1	47.5	15.4	41.4
20+	5.6	51.2	2.9	36.5	4.5	45.7

The above table shows that over 80% of livestock are held by 15-20% of the farmers. Depending on husbandry practices digesters would be appropriate to the farms in the table which are boxed-in and might be appropriate to those dashed-in.

It can be seen that digester development would not immediately apply to the poorest segments of rural Mali. However, decreased demand for firewood and increased food production and sanitation caused by digester development by the larger holders would have uplifting affect overall.

Malian farmers seem to be fairly receptive to innovation as exemplified by the rapid movement in animal traction (p. xvi) and the sharp increases in use of chemical fertilizers (p. xvii).

Mali has a tradition of extended family compounds and coalitions to meet group labor needs (p. 24). The labor coalitions could be of great help in digester construction and the extended family compounds would be excellent for caring for a digester. (The developments in China are likely due in part to their communal system.)

Personal observations and discussions with various people while in Mali lead me to believe that biogas digesters have a limited but real and growing appropriateness.

Aides to Implementation

Wood is increasingly expensive and requires more time to gather.

The soil is generally poor and could use the fertilization and tilth digester effluent would give.

Sanitation is currently almost non-existent: digestion offers this as a "by-product".

The construction crew was quick to pick-up on what was required for a functioning digester.

The Minister of Industrial Development, in a recent meeting with the United States Ambassador, stated that the Malian Government's primary thrust in the field of energy would be toward solar and biogas development.

Officials from the Ministry of Rural Development have visited the project site. The Rural Animation Centers offer an excellent opportunity to test the acceptance of digesters.

The US/AID Program, Embouche Paysan, offering loans for cattle purchase, might offer a source of innovative farmers to work with biogas development.

PC/Mali staff seems very interested in a biogas program. However, a volunteer in this program would need to have a very firm understanding of the processes and concepts involved in biogas digester construction and care.

In my short time in Mali, I was able to obtain, with the help of Fred Armand, nearly every part necessary for construction. Gas fittings were most difficult but I feel most of those problems could be solved by more time to search out and fabricate the pieces.

Hinderances to Implementation

Livestock roam during the day. However, it is becoming more common to fence them in at night. This change allows for easy collection of digester feed.

In Mali, and much of the Sahel Region, water for the digester will likely pose as much a problem as manure and plant waste collection. It should be realized, however, that water fed to the digester will be reused when the effluent is employed as fertilizer.

I found materials acquisition to be rather difficult in Mali. Much of this was due to the short period of my involvement. A volunteer would have a much longer time span and thus probably not face many of my problems.

As biogas systems require some working with manure, there are the "usual" cultural restraints. These did not seem as rigid in Mali as I experienced in Nepal. In both areas, education and demonstration of the benefits of digesters can probably overcome these restraints.

APPROACH USED

There were two main considerations in approaching digester construction in this project.

- A. This was to be the first digester to be built in Mali. Thus, top priority was the construction of a system which people could work with for many years.
- B. The most successful application of biogas digesters in rural areas to date has occurred in the People's

Republic of China. This has been due to the development of designs for durable digesters which require minimal purchase of materials. Thus, I determined to construct a system demonstrating Chinese digester design concepts.

Before actual building, many different materials and methods of construction were considered, with an eye towards local availability and durability. The first construction actually attempted was with a sand and clay mixture tamped in a slip form. The walls built by this method quickly cracked and slumped. It was at this point that durability and time requirements seemed to dictate the use of cement block.

In approaching programming for the Demonstration Biogas Project, it was determined that initial application and investigation of these systems might most appropriately take place at Rural Amination Centers around the country. This would avoid out-of-hand development of digesters without adequate supporting personnel. (As exemplified by Indian development in the 60's and 70's.)

A major consideration in the development of demonstration biogas digesters was site selection.

The site for demonstration biogas digesters should have the following characteristics:

- 1) For a family size system, at least three cattle need to be contained nearby at least at night to make adequate quantities of digester feed available.
- 2) Water for the digester should not require a great deal of extra labor.
- 3) The land should never flood. It would be best if the water table never rose to the level of the foundation of the digester.
- 4) An innovative agricultural research station or farmer should be selected in a fairly accessible area. It should be realized that the site will be visited often.
- 5) Where possible, gravity assistance in loading and emptying the digester should be considered.

Materials and techniques of construction will also be somewhat site specific. A Chinese Biogas Manual, Chapter 4, pp. 32-82, describes over a dozen different types of construction techniques with various materials. The area where digester construction will occur should be investigated very thoroughly in an attempt to determine the most appropriate materials.

My specific assignment in Mali was to design and see to construction of the first digester at the Centre National de Recherches Zootechniques at Sotuba, 5 km outside of Bamako. I was to designate the digester site and watch over excavation. I was to develop a budget for digester construction and to present PC with a materials list to be acquired by PCV's. I was to coordinate the assembly of these materials into a functioning digester.

With PC accompaniment I was to visit other possible sites for digester installation and work-up an action plan for PC/Mali biogas programming.

PC/Mali was to provide introduction to Malian nationals responsible for the project. PC was to provide acquisition and transportation of materials to the site. PC was to provide assistance in communication with manual technicians and other interested parties. PC would recommend sites for visitation in regard to further digester development in Mali.

The attached "Sotuba Digester Project" report describes the construction that did occur and provides a framework for further PC biogas programming efforts.

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Recommendations for Peace Corps Use of the Sotuba Digester
as a Demonstration Project

1. Most importantly, as soon as possible, a PCV and counterpart should be made responsible for the care and maintenance of the digester.
2. A regular schedule of digester feeding, gas use, effluent use, and pond harvest should be established and recorded.

A. One mixing tank load of slurry per day will give close to a 50-day retention time. Somewhat higher gas production could be obtained by decreasing the retention time (adding more slurry). Care must be taken not to add too quickly or pH will drop. Shorter retention time also means less well decomposed effluent and a higher level of viable pathogens in the effluent. This should be worked out by experience.

B. Gas use should be recorded. I suspect other uses for the gas will need to be found.

C. To demonstrate the fertilizer value of the effluent, vegetable plots could be layed out near the digester. For experimental purposes, different plots should be fertilized with:

1. nothing
2. fresh manure
3. digested manure; and
4. chemicals.

D. Pond growth should be analyzed and measured. Use of the harvest as animal or digester feed whould be noted and the effects recorded.

3. A substantial data base should be generated to document the various effects of digester use. This should include quantitative data in the following areas:

A. Regarding energy production:

1. Current fuel use and costs- wood and fossil fuels.
2. Gas production from various substrates including pond growth.
3. Conventional fuels replaced and costs.
4. Labor involved in conventional methods and in biogas maintenance.

B. Regarding food production:

1. Current use of manure.
2. Current use of chemical fertilizers and costs.
3. Extra nitrogen returned to the soil in effluent.
4. Increase food production through effluent use and costs.
5. Improved tilth of the soil through effluent use.
6. Use of pond production as feed- nothing protein content, animal growth, and other feed replaced and costs.
7. Effects of digestion on deforestation and erosion control.

C. Regarding Health:

1. Current sanitation practices.
2. Current human and animal diseases and methods of transfer.
3. Pathogen levels of influent and effluent.
4. Effects of smoke-filled kitchens vs. clean burning biogas.
5. Reduction in flies as effluent does not support their growth.

D. Regarding Malian Acceptance and Interest:

1. At Ministerial level
2. At Agricultural Extension and Development level
3. At Farmer level
4. PC/Mali should encourage visitation by interested Malian Ministerial and Agricultural personnel as well as other individuals involved with development efforts.
5. Discussion of other possible sites for demonstration systems can occur at these times. I would recommend that the number be limited to 1-5 full-scale systems to be situated at agricultural research situations or rural animation centers over the next two years.

The interest of current PC/Mali staff should suffice for supporting this project.

Volunteers for this program should have biology or agricultural backgrounds as well as some construction experience.

Volunteers should receive complete skill training before arriving in Mali. This should include concepts and processes of digestion, possible construction materials and techniques, relevant data collection techniques, and digester care and maintenance techniques.

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Volunteer responsibilities would include:

- Establishing a strong counterpart relationship.
- Specific site selection.
- Site specific decisions on construction materials and techniques.
- Overseeing and assisting in construction, use, and maintenance.
- Administration of a project budget.
- Collection, organization and analysis of relevant data.
- Publicity for and demonstration of the project to interested host country nationals.
- Reports on all phases of the project.

As data from the above projects accumulate, more educated decisions can be made as to further steps to be taken in the propagation of digesters.

A P P E N D I X

THE SOTUBA DIGESTER PROJECT

I arrived in Bamako on the night of January 16, 1980 and was met by PC/Mali APCD Daque Clark. He informed me at this time that the Director of the Agricultural Research Station at Sotuba had agreed to the construction of a biogas digester at the farm.

The next morning I met with the PC/Mali PCD Henry Homeyer. It was decided at this time to use a Chinese design rather than a Gobar Gas Plant. A domed digester seemed like it would be too difficult to construct so the rectangular design with a flat cover was chosen.

I went with Henry and Daque to Sotuba where I met Dr. Mustafa Koulabali who would be the host country national in charge of the project. I was presented with a site between two large hog houses. This site seemed quite adequate since much fresh manure would be available and a minimum of effort would be required for digester feeding. A water faucet was located about 15 m. from the site. Gas was to be used to replace wood for cooking pig feed in a small room about 25 m. from the digester.

In late morning I accompanied Rob Martin, Steve McCarthy and others back to the site where we drilled a test hole to check the water table. At about 3 m., all water pumped into the hole began to disappear indicating perhaps a sand layer. The entire area of the research station was very flat, thus the original site was as good as any as far as the water table was concerned. Arrangements were made to meet workers the next day.

The rest of the day was spent in discussion with various people in an attempt to learn as much as possible about local building materials and techniques. I learned that a form of cement block was available but I felt that employing more indigenous materials would be more appropriate. The most common building material is banco block, a 10x20x40 cm mud slab which is mortared with mud. I spoke with George Tompson, chief engineer with US/AID in Mali, who suggested that banco block faced with chicken wire and plaster would hold up well.

From those discussions I decided to build the digester walls out of banco block, chicken wire and cement and the top slab out of reinforced concrete. On the morning of January 18, I presented Henry with plans for such a digester. I gave Daque a materials list which he gave to David Benefel. (Over the next several days David managed to purchase 8 bags of cement, chicken wire, and about 10% of the block required.)

In the afternoon, with the assistance of Fred Castor, seven men were hired for excavation of the digester pit. I spent this afternoon and the next morning directing and assisting in digging. The arrival of Fred Armand about midday on January 19 allowed me to communicate my desire for the completion of excavation by the next evening.

In the afternoon I was assisted in getting about 3 cu. m. of gravel to the site.

The morning of January 20 was devoted to excavation assistance. I was informed that the soil layers indicated that the water table reached about one meter from the surface during the rainy season. This should pose no problem as long as the digester is kept full during that period.

In the afternoon I met with George Thompson and Fred Armand. I learned from Fred about the sand/clay mixture used for lorena stoves. From the discussion, it appeared that a poured and tamped lorena mix would give a stronger wall than banco block. Digester plans were changed to include lorena mix covered with chicken wire and plaster for beneath-ground walls. (The Chinese use a similar mix to which they add a large portion of lime. Unfortunately, lime is very expensive in Bamako.) George said he would do the engineering calculations for the walls and slab.

The upcoming conference put transportation at a premium but time was found on January 21 for Fred Armand to assist me in locating a large diameter (13 cm) plastic pipe for the inlet.

On the evening of January 22, I was informed by George Tompson that lorena mix (or banco block) walls would have to be 70-80 cm. thick at the bottom to avoid collapse when emptied even during the dry season. This required an expansion of the pit. This work was contracted for the next morning but due to a ministerial visit to Sotuba, work could not be completed for several days. This was the state of the project throughout the Appropriate Technology Workshop.

During the conference I discussed construction techniques with many attendees. Most helpful was Dean Christ, APCD, Senegal, who has done much work with low-cost construction techniques. We considered attaching chicken wire directly to the sides of the pit and then plastering, but cracks which quickly formed in the clay indicated that such walls would not hold up.

The week of January 27 - February 2 was perhaps the most frustrating of the project, the only bright spot being the beginning of Fred Armand's full-time participation. Two days were spent in search of sand, additional banco block, and rebar and methods of delivery of these materials to the site.

On January 30, we began pouring and tamping a fairly dry lorena mixture of 2 sand/1 clay into 40x150 cm. slip forms. (See Plate 4-3, p. 53 in Chinese Biogas Manual.) The forms were left in place for 1/2 hour after tamping and then moved to the next section. By mid-afternoon, slumping and cracking of the first sections indicated that this method would not be sufficient for strong walls. If we had had adequate supplies of lime for adding to the mixture or larger forms which could have been left in place for several days, I believe walls of this type could have been well made.

This experience led to the decision to build the underground walls out of cement block, again faced with chicken wire and plaster for gas tightness. Thus, the concepts and workings of a biogas digester would be demonstrated by a very durable, but expensive system. Development of inexpensive construction techniques and materials appropriate to Mali would be left for further investigation.

The next several days were devoted primarily to searching for a truck to deliver the block. This was finally accomplished on February 3 with use of a U.S. Embassy vehicle.

Also during this period, the bottom of the pit was leveled, deeper trenches were dug for footers, and rebar and chicken wire were set in place. Andre Longmier began assisting on the project and devoted about one-third of his time throughout the next three weeks.

On February 5, the footers and bottom slab were poured using a mixture of 1 cement; 2-1/2 sand; 3 gravel; 1/3 lime. On this and the next seven days two sections for the top slab were also poured.

On February 7, the block walls of the tank were begun. The inlet pipe was set in place and block cut to fit around it. On February 8, after six courses of block, a form was constructed and a steel-reinforced concrete lentil was poured across the entrance to the effluent end tanks. The bottom of the algae support tank was also poured using rebar and chicken wire for reinforcement.

On February 10, block work was continued and a second lentil was formed and poured over the entrance to the algae support tank. Block work below ground level was completed on February 12. Wire ties had been set in the mortar joints and these were used to attach chicken wire to the walls. The next three days were devoted to plastering the walls. A suitable plastic pipe was finally found for use as a gas line and this was set in a trench with two low points at which condensation traps would be placed. Also during this period, the space between the block walls and sides of the pit was filled with mud.

On February 15 the slab sections were set in place on a bed of mortar. Spaces between the slabs were packed with mortar from both top and bottom. To give a flat surface to the slab, a fairly dry mixture of 4 sand to 1 cement was smoothed over the top. A wet cement/lime slurry was then poured on and troweled flat.

Above ground cement block was used for only the effluent end wall of the pond, the filtrate return module through which the tank could be entered, and the inlet tank. The rest of the pond and algae support tank walls were constructed of banco block which was faced on the inside and top with chicken wire and plaster. All banco walls were backed up with dirt to about 20 cm from the top.

The inlet pipe was cut at what was anticipated to be the maximum height of the pond. Concrete block was used to build a tank around the pipe. A banco mud mixture was tamped into the tank to about 3 inches below the top of the pipe. Concrete was then poured so as to slope toward the opening. A plug with a rubber gasket and handle was made to hold the digester feed in this tank for mixing.

The inside walls of the digester were coated 5 times with a thin cement/lime slip to insure gas tightness. The ceiling of the digester was first plastered with a cement/sand mortar and then with a thick cement slip.

A manometer of Chinese design was fabricated and attached to the wall of the building where feed would be cooked. A small hole was cut in the wall and a gas line run through and attached to an Indian made biogas burner.

Finding various connectors and fittings for the manometer and condensation traps proved very difficult. Several days search resulted in much frustration. With enough time these pieces could no doubt be fabricated in Mali but I arranged with Fred Armand to buy the needed pieces in America and send them to him for installation. A temporary arrangement was set up for display purposes.

On February 22, two ministers from the Department of Rural Development accompanied Henry Homeyer to the site and seemed to display mild interest in the project. Later, Drs. Kouma and Koulabali of the research station spent about an hour learning the intended use of the system.

Recommendations for Continuation of the Project

1. If the Project is to continue in a positive fashion, I feel it is essential for a PCV and a counterpart to be assigned to care for the digester. Anyone assigned to the project should first read completely The Complete Biogas Handbook and the Chinese Biogas Manual. Information in these books should be applied to the Sotuba Digester in the most biological, as opposed to technical manner.
2. To be totally sure of gas tightness I would recommend 2-3 more coats of a thick cement/lime/water plaster on interior gas holding surfaces.
3. Initial loading of the digester:
 - A. Fill with water to level of effluent end lentil.
 - B. Close off gas line.
 - C. Continue adding water until effluent end tanks are filled to top slab level.
 - D. Let sit for two days. If the water level sinks more than 20 cm. remove most water and replaster interior gas holding surfaces and repeat A through D. If gas is held, continue to E.

E. Begin adding an inlet tank load of fresh manure slurry daily.

G. Gas should begin being produced in 1-2 weeks. It should be bled-off for two weeks as it contains much air and CO₂. After 4-5 weeks the gas should be combustible.

4. Use of Algae and Aquatic Plant Growth Pond:

A. The pond should be seeded with appropriate flora. I would first recommend trying some local, non-poisonous species of Spirulina. If mosquito growth becomes a problem, I would recommend some species of duckweed as this grows very thick on anaerobic lagoons.

B. Pond growth can be harvested by filtering through a cloth sieve placed over the filtrate return module.

C. Pond growth should first be analyzed for animal toxins. If none are found, then palatability tests should be run with various livestock. If flora initial growth is not palatable other species of flora should be tried.

D. If pond growth is unacceptable to animals it can be redigested.

5. The effluent can be used directly on crops. Thus, all the nitrogen will get returned to the soil. The effluent should not be spread on very wet ground or too heavily at one time in any one place. This would establish anaerobic processes in the soil which are harmful to roots.

6. The digester should never be empty during rainy season.

7. The pond should be covered during heavy rains unless evaporation is a problem in which case it should be covered only occasionally.

8. If antibiotics are used on the animals supplying digester feed, their waste should be avoided for several days to insure that the antibiotics do not enter the digester.

9. The digester should be cleaned once a year during the dry season:

*Put up "no smoking" signs.

A. Open gas lines.

B. Bucket all but 20 cm. of slurry out.

C. Allow 2-3 days for digester to air out.

D. Enter digester and check walls and ceiling for cracks. Repair and replaster as necessary.

E. Rake up and remove scum.

F. Refill with dilute slurry. Gas production should begin within one week due to seed left in the digester.

EXPENSES FOR SOTUBA DIGESTER

Materials

1) Cement - 24 sacks - 113,200 MF ...	279.00
2) Cement Block - 450 at 140 MF@ - 63,000 MF...	155.00
3) Chicken Wire - 1.5 m x 35 m - 61,125 MF...	152.00
4) Rebar - 17 - 12 m #8 bar at 1740 MF @-25580 MF... 1 - 3-1/2 m lentil 6500 MF...	89.00
5) Gas line - 5 - 6 m, 2 cm ID - 5140 MF @-25,700MF...	64.00
6) Lime- 200 kg - 18,000 MF...	45.00
7) Gravel - 2-1/2 cu. m 17,000 MF...	42.00
8) Inlet Pipe - 2-1/2 m, 13 cm ID...	27.00
9) Sand - 7 cu. m (delivered) 10,000 MF...	25.00
10) Banco Block - 200 at 25 MF @ (delivered)...	13.00
11) Miscellaneous Gas Line fittings - 15,780 MF...	39.00
12) Miscellaneous Gas Line fittings - (bought in USA for shipping)...	39.00
13) Biogas burner - (bought in India)...	25.00
14) Miscellaneous tools and hardware - 28,700 MF...	71.00
	<u>SUBTOTAL..\$1058.00</u>

Labor

15) Excavation - 7 people, 9 days - 70,000 MF' ...	172.00
16) Construction - 1-2 masons, 2-8 laborers over 23 days - 121,600 MF...	<u>300.00</u>
	<u>SUBTOTAL..\$ 472.00</u>

Transportation

17) Materials search and delivery and travel to site over 6 week period - 43,150 MF...	\$ 106.00
	Grant Total... \$1636.00

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Notes on Expenses:

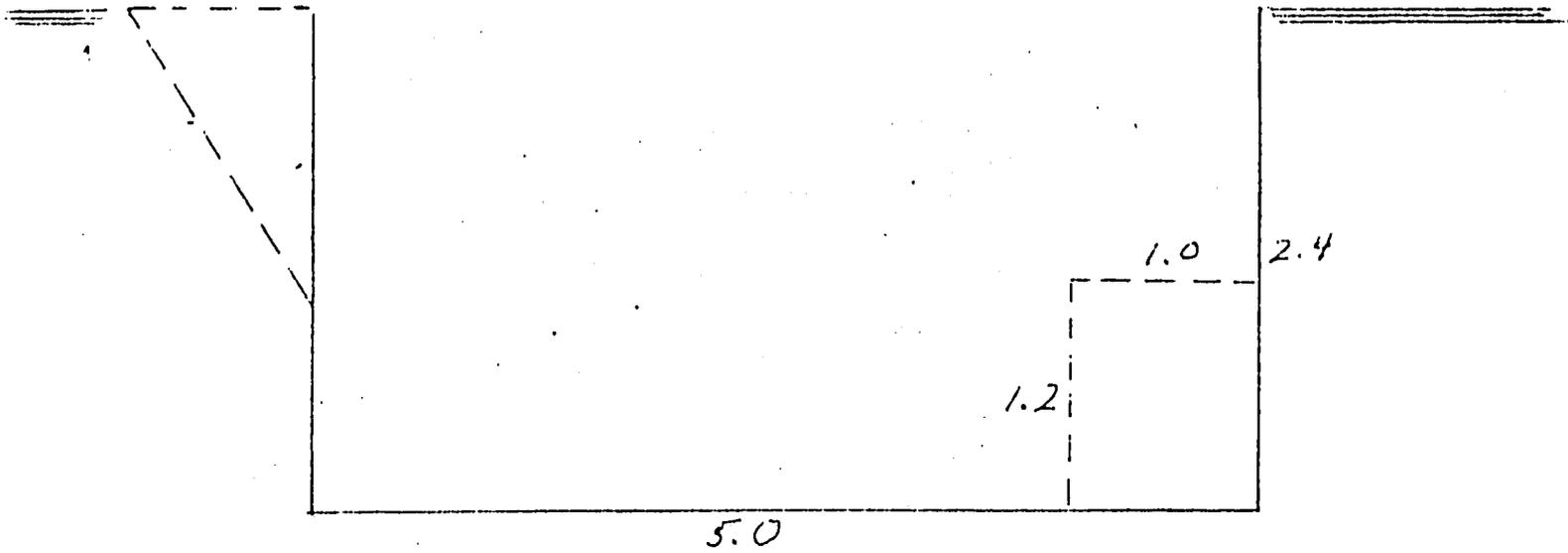
- 1, 2, 3, 4 - Very durable but not really "appropriate" in sense of local availability and costs. Experimentation with 1-2 m³ digesters should be done to develop materials appropriate to Mali.
- 5 - A cheaper line could probably be found with enough time.
- 6 - Helps in gas and water-proofing.
- 10 - Good and lasting when covered with chicken wire and plaster.
- 11, 12 - With enough time, less expensive fittings could be found or fabricated.
- 13 - Can be fabricated in Mali.
- 15 - Was outrageously high due to expansion.
- 17 - Vehicle got worse mileage than a tractor-trailer before dying completely.

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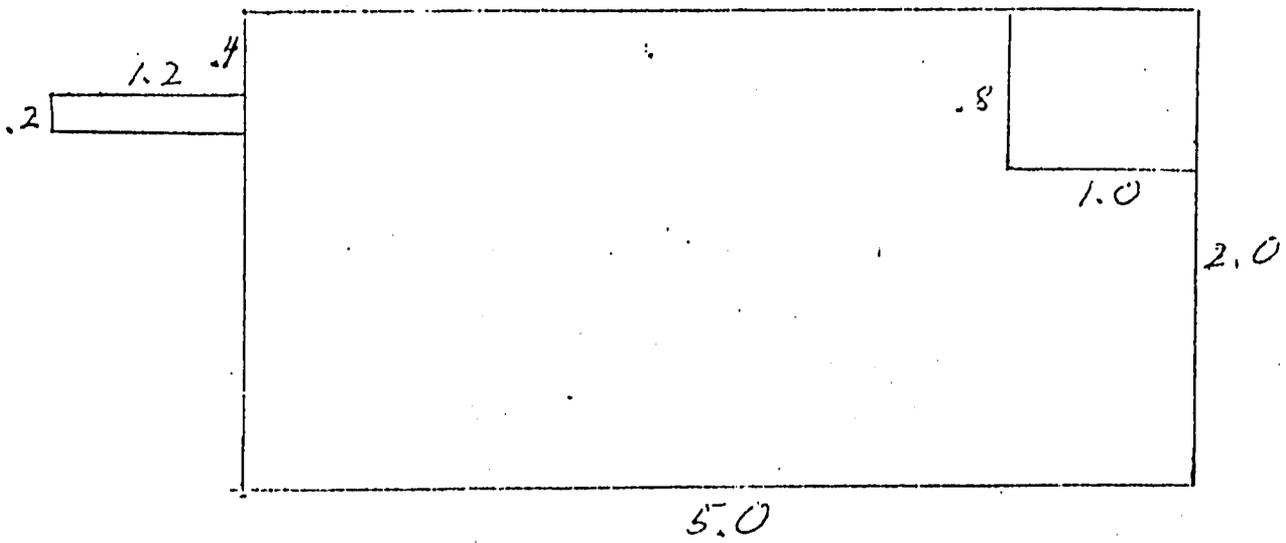
Sotuba Digester Specifications and Drawings

Pit Size

Side View



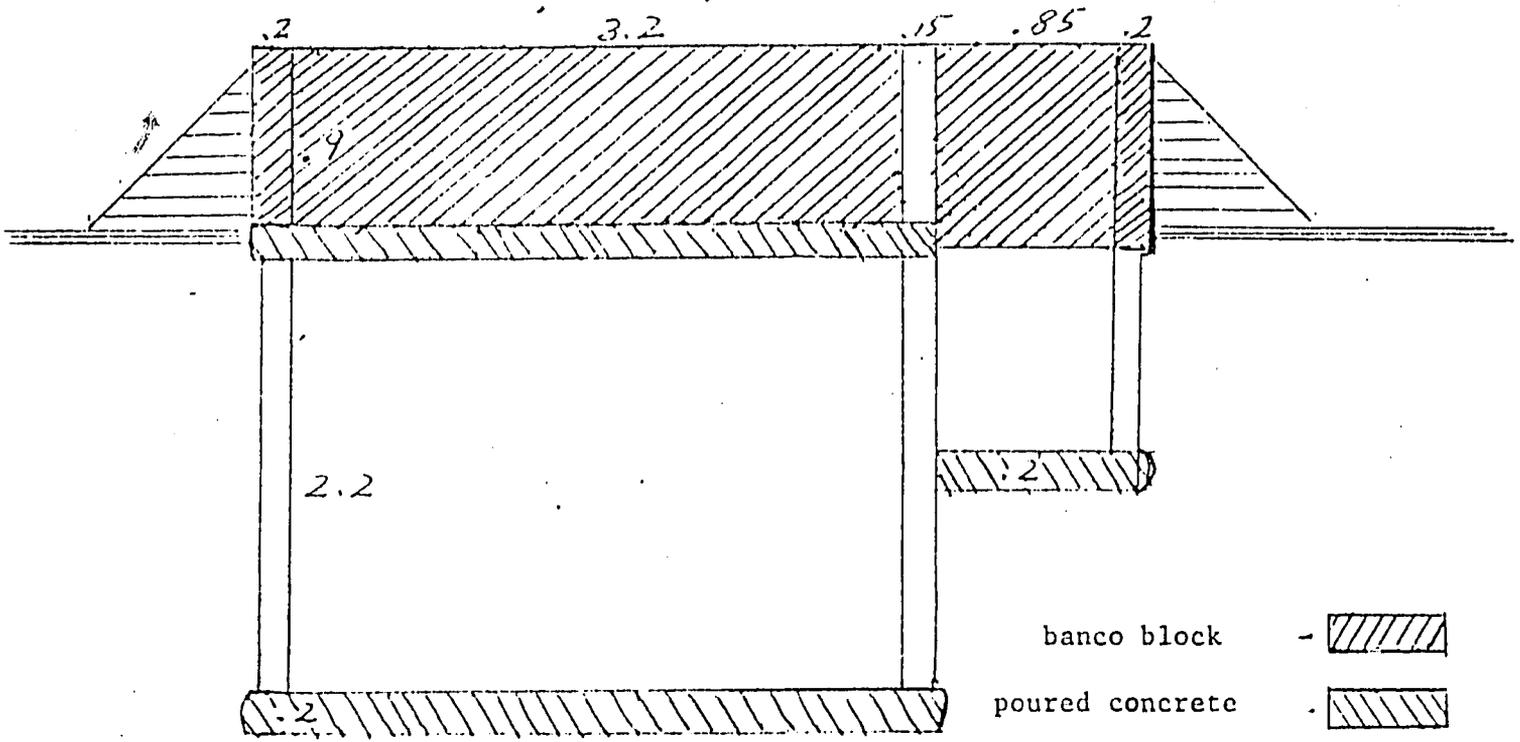
Top View



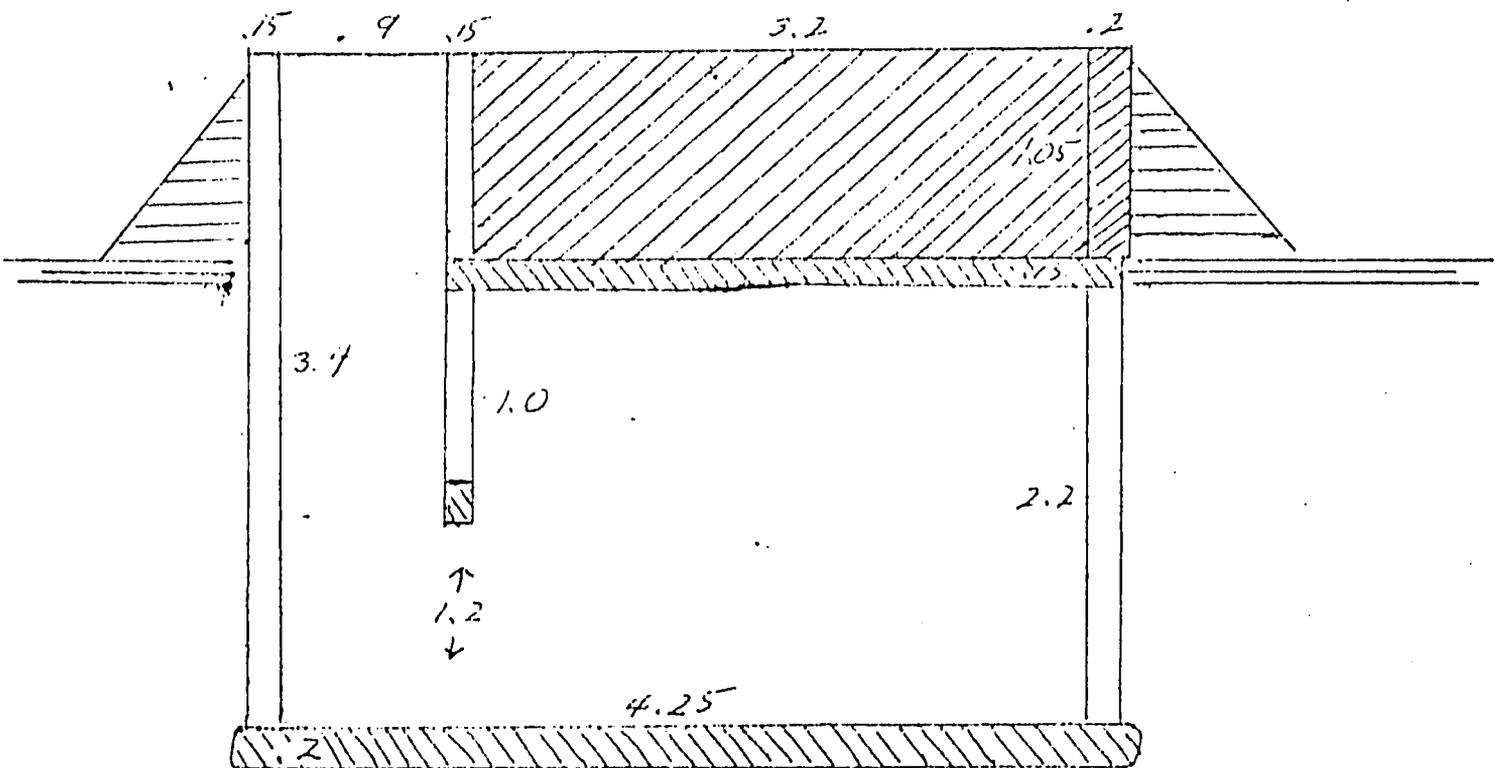
234

Walls viewed from within digester

South Wall

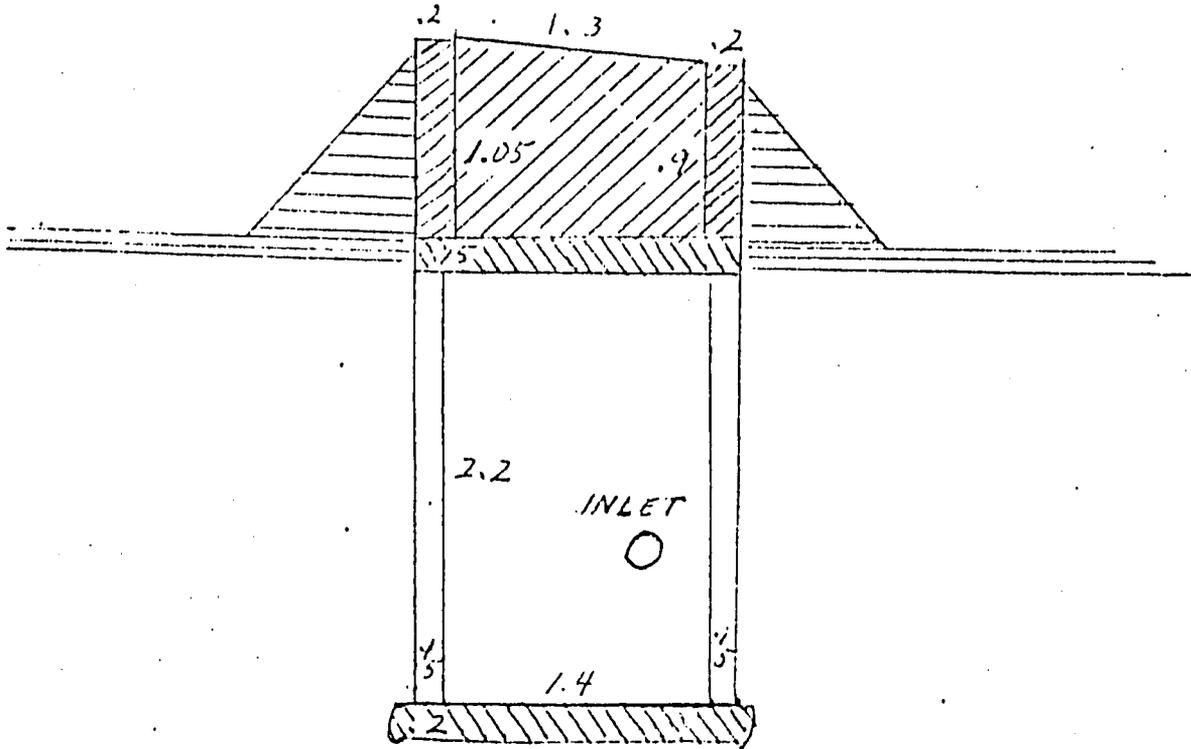


North Wall

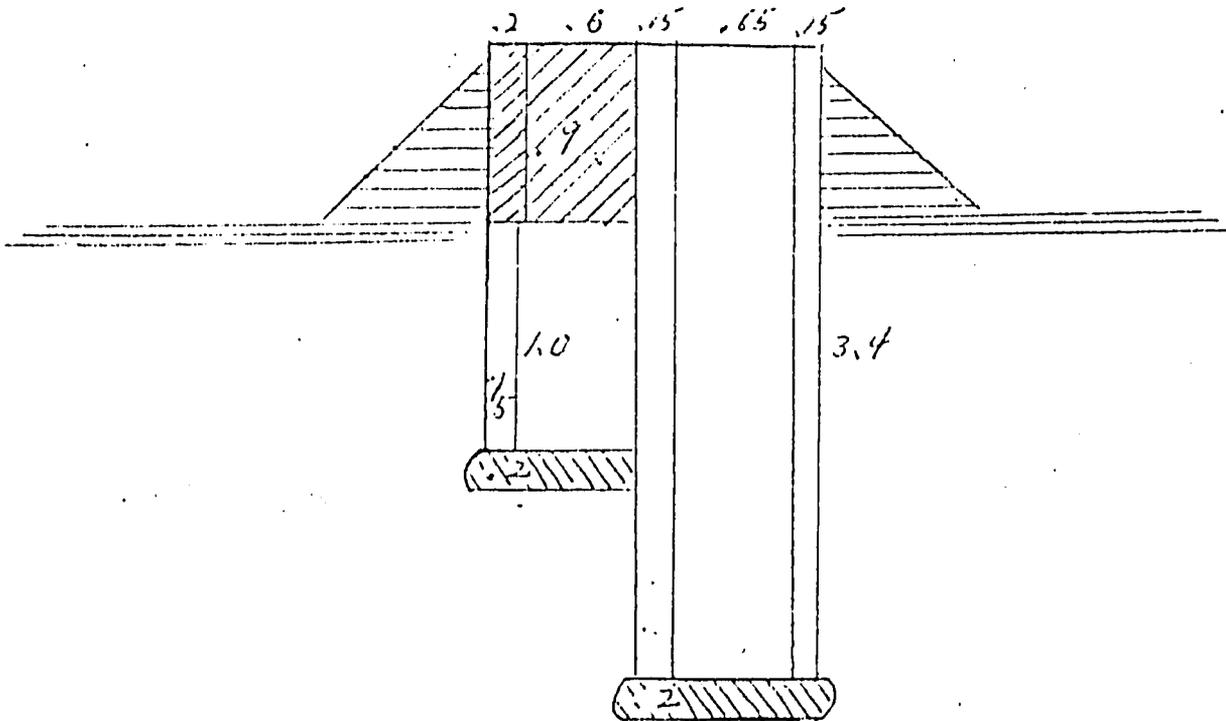


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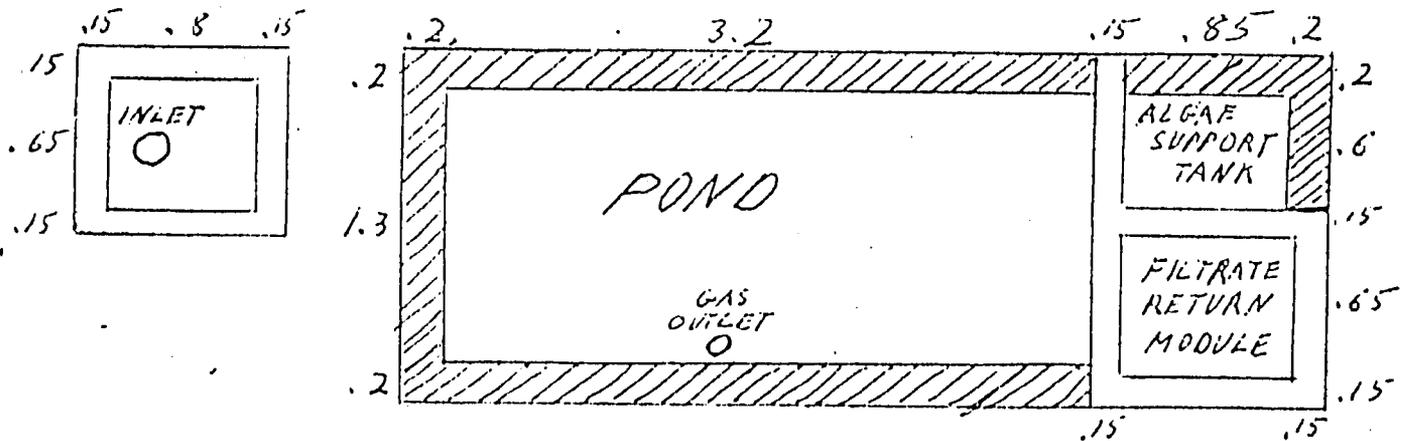
East Wall



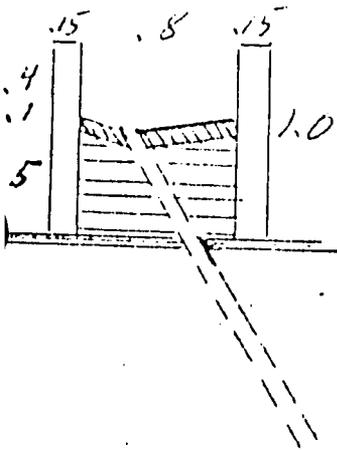
West Wall



Top View



Inlet-Side Cross-Section



Tank capacity (below pond level) 11.6 cu.m.

Gas storage capacity - 4.5 cu.m

Pond and Effluent Tanks capacity
(above pond level) - 4.9 cu.m.

Algae Pond residual capacity (10 cm deep) - .42 cu.m.

Algae Pond capacity - 3.7 cu.m.

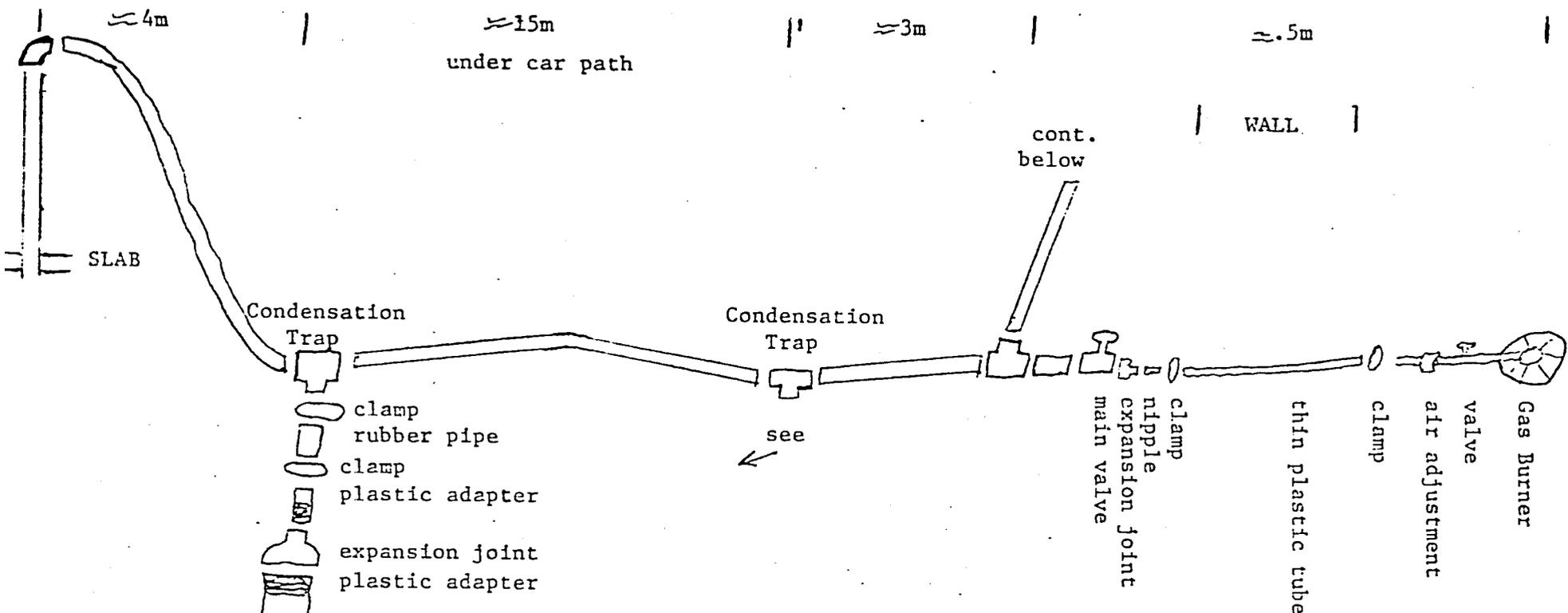
Inlet Tank capacity - .21 cu.m.

Retention Time at one load/day = 60 days ..

Expected gas production at 60 day RT - 3 cu.m./day

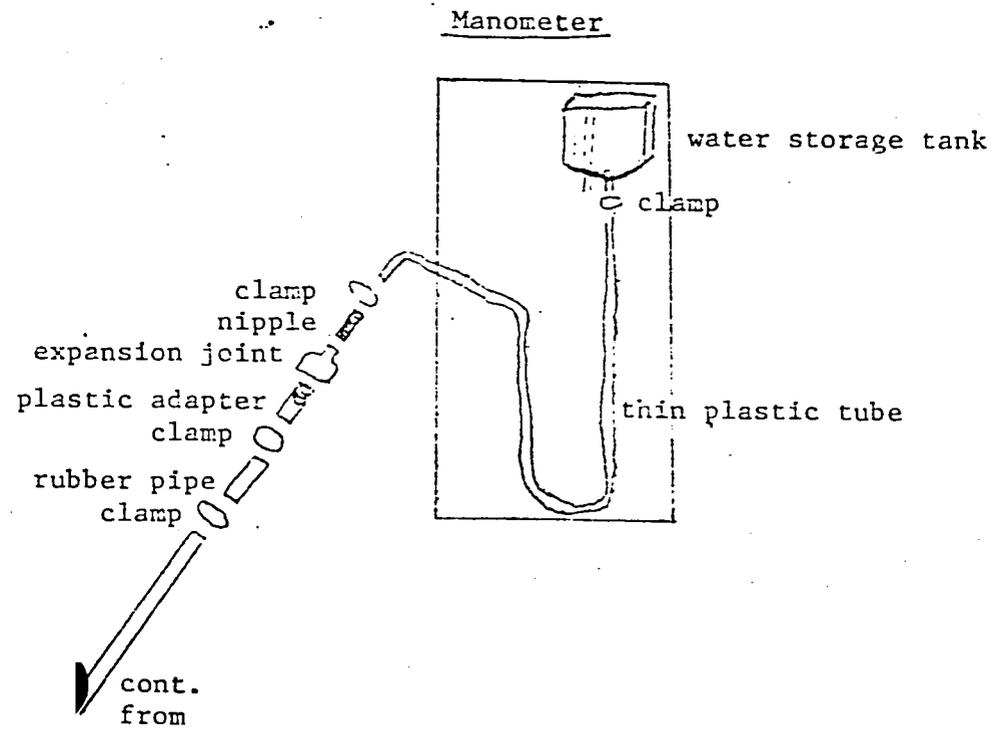
Expected gas production at 30 day RT - 4.5 cu.m/day
(but slurry less well decomposed and pathogen level of
effluent substantially higher)

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Gas Line

- clamp
- rubber pipe
- clamp
- plastic adapter
- expansion joint
- plastic adapter
- clamp
- large plastic pipe
- clamp
- plastic adapter
- expansion joint
- plastic adapter
- valve



Programming in Mauritania

The Current and Projected Direction of Mauritania's
Agriculture Development Strategy.

A brief overview of Mauritania's changing economy over the past decade tells the story of a country suffering under tragic ecologic devastation, where its once rich crop and animal based agriculture wealth has almost totally been destroyed by the encroaching desertification. The once wealthy Mour herdsmen have lost their herds through lack of food and water and abandoned their villages and traditional vocations for larger cities and towns where water supplies are stable and there is access to foreign relief food supplies.

The remaining productive regions of this country lie along the Senegal River Region and in oasis regions where water is plentiful enough for irrigation agriculture.

The Mauritania Government has invested heavily in these remaining viable agriculture regions in the hope of once again being able to be self-sufficient in food production. Most of the Mauritanian agriculture development strategy in these regions have been heavily capital intensive irrigation based systems backed by green revolution seed and fertilizer packages for rice and maize production. These agriculture techniques are new to Mauritanian farmers who traditionally have grown millet and sorghum under rain fed condition. The introduction of these highly intensive farming systems has placed a present and critical demand on trained manpower which can assist farmers in use on the new technology, as well as assist in development of the new social organization which

has emerged because of the interdependence created by large scale irrigation systems. The only Agriculture School in Mauritania is in Kiedi. Each year it graduates 30 graduates of which only a small number will end up as government extension agents. The result is there simply isn't the supply of trained manpower available to fill the demand.

Four years ago the Mauritania Government with the financial support consortium of nations mobilized the largest agriculture development thrust in its history. A Parastate Agency called (Sonadai) was set up under the Ministry of Agriculture which had the necessary political and economic autonomy to rapidly develop the Senegal River region. Sonadar development strategy centers on the construction of both small irrigation parameters under 50 has. and large irrigation parameters up to 4000 hactors.

A small parameter is initiated by a river village making a request for an irrigation project. The agency starts by conducting a survey of land and after which draws up a development plan. An agreement is drawn up which requires the village to form a group called a pre-cooperative which takes on the responsibilities of electing officials and taking on the direct tasks of farming work committees. The agency sends out surveyors who stake the parameter and supervise the villagers in the construction of the canals and drainage ditches. At completion a two or three cylinder diesel pump is delivered along with fuel tanks, pump accessories, seeds, and fertilizer. Sometime before planting season an agriculture extension agent is posted to the village and credit for seed and fertilizer is made available to the co-op members.

Farmers for the most part have never grown rice so the extension task is formidable. Nurseries must be planted, fields must be leveled and cultivated, seedling must be transplanted, fertilized and weeded. A trust relationship must be established between extension agent and the farmer and the agent must carefully teach and follow through the technical training with positive reinforcement. The social dynamic of the villagers in the co-op needs definition and organization if the co-op is to work. The impact of introducing all these cultural and technical changes into a small village is dramatic and demands far more care and technical assistance than is currently being provided. This year alone 30 such small parameters are being completed for fall rice season. Sonadar indicated the small parameter development program will continue to grow in the future.

The large parameter program differs greatly from the small parameters just discussed in that they require more costly infrastructure and all construction is largely done by heavy mechanized equipment. These larger parameters have been located near larger towns and cities making their social organization more complex and more highly dependent on Sonadar management for providing common water distribution and other services. The pre-cooperatives in the large parameters are numerous and made up of people with diverse backgrounds and motivations.

Apart from the Sonadar Program, the Mauritania Government has encouraged many smaller scale programs one of which is

vegetable production. Much of this extension activity occurs along the Senegal River under irrigated conditions. These project aren't nearly as well organized and financed as the Sonadar thrust, and much of the focus is on small self-sufficient family scale production. Other small projects have been involved in fruit production under irrigated conditions. Here again there is as yet no well financed large scale production effort being made by the Government.

In summary the apparent direction of Mauritania's agriculture thrust is toward the staple commodities with capital intensive small scale and large scale irrigation systems along the Senegal River region where water is dependable. This development strategy has placed a great strain on Mauritania's limited trained manpower with the predictable result that many extension and technical staff are over-extended, lack organization support and are therefore ineffective. Finally for as long as the desertification continues the Mauritania Government and people will be forced to seek new appropriate technology to survive on their increasingly fragile land.

Peace Corps - Mauritania's current agriculture program and potential direction for the future.

PC/M began programming agriculture volunteers in Sonadar and the Vegetable Production Program just over a year ago. These volunteers have now been in the field for just over a half year and the impact of their service on those programs is just now being felt. These volunteers have succeeded in providing a critical service to these small rice and vegetable parameters, both as agricultural and cooperative extension

agents. Volunteers have in every case gained the trust and support of the villagers with whom they work and live. Within the enormous vacuum/created by the over-extended Sonadar organization volunteers have helped bring stability by providing/useful technical and social extension assistance.

The visability of their success is low partially because the number of volunteers is small, five (5) PCV's in the Sonadar project and five PCV's in the vegetable production program. A second factor relative to the Sonadar is they are a very young organization which has devoted very little energy or resources in support or supervision of its field extension staff. This organization has in the past been far more successful at engineering irrigation systems rapidly then getting farmers organized to produce feasible crop yields. For PC/M Sonadar's lack of recognition of the good works of PCV's in the field has slowed expansion of probably the most potentially vital programming initiative in the country. PC/M is at this moment in the unique position of being able to help fill Sonadar's need for large numbers of trained manpower in a short period of time. Part of the recommended PC/M staff tasks is to find a way to get Sonadar to recognize the role PCV's are playing in the field and once recognized use the credibility to forge on with a new expanded program initiative. The timing of such an initiative is right, Sonadar has over the past year been criticized for its weak extension effort because many of the new small and large scale parameters have not had

successful crop years making credit repayment slow if not impossible. As a response to this failure Sonadar three months ago hired an American trained sociologist/agriculture extension director named Ms. Pierrette Vuthi who along with her assistant, Mr. Drout Claude are focusing on the problems of improving Sonadar's agriculture extension services to the small and large parameter. Pierrette is impressed with PCV's progress in the small parameters and this may provide the necessary political link to getting Sonadar's support to expand the program.

I would strongly recommend PC/M continue and expand into the future its involvement in the Sonadar Program as it is the most important agriculture initiative in Mauritania. Relation between Sonadar and PC/M should be strengthened and the way seems clear for that to occur with the arrival of a responsible extension policy maker on the Sonadar staff. The vegetable production program has been slighted in this report not because it isn't important but because the overwhelming programming questions have been focused toward the future of PC/M in the Sonadar Program initiative.

PC/M has a strong relationship with MOA/M and the continued programming of the Vegetable Production Program seems inevitable. The funding patterns for the years to come for that program are somewhat tenuous so the level of PCV support in the future is unknown.

The Mauritania Agriculture PCV's need technical pre-service training over a broad range of primary skills from vegetable and grain production to community organizations and cooperation management. Their jobs may embrace some, if not all, of the following tasks:

Provide Agriculture extension assistance in:

- Planting Rice Nurseries
- Land Cultivation and Preparation
- Rice Transplanting Techniques
- Vegetable or Rice Cultivation
- Vegetable or Rice Harvesting
- Vegetable or Rice Storage

Provide extension assistance in Irrigation Technology:

- Land survey, land leveling, and land security (fencing) techniques.
- Irrigation canal construction and repair.
- Water measurement and control techniques
- Drainage and erosion control techniques.
- Diesel maintenance and renewable energy alternatives.

Providing extension assistance in Cooperative Development including:

- Relate theory and practice of Cooperative Organization.
- Clarify roles of Government and Cooperative.

- Setting up Coop book systems.
- Help define roles of cooperative officials.
- Help develop attitude of self-sufficiency.

Of these tasks most M/PCV's feel comfortable with their extention skill in Cooperative Development and in vegetable and rice production. PCV's felt their pre-service training was weakest in the Technical Skills regarding irrigation systems and operations. Therefore, five (5) of the seven (7) A.T. modules recommended for agriculture volunteers are related to specific A.T. tools which look to be feasible in the irrigated agricultural region along the Senegal River. These include the following modules, water pumps, diesel maintenance, surveying, fencing, wind mills, and animal traction. Of the six (6) technologies diesel maintenance, animal traction and wind mills are AT/RE related. The remaining three (3); irrigation, water pumps, surveying and fencing are vital technologies for PCV's for planning and production of irrigated rice and vegetables.

Of the AT/RE related modules diesel maintenance is of the greatest importance to M/PCV's. Most Agriculture PCV's have encountered diesel pumps on their project sites. These pumps have a history of malfunction because of the lack of proper maintenance. These malfunctions have caused in some cases complete crop failure. As volunteers have grown to recognize that all their own extention efforts have been held hostage to the reliable operation of the diesel pump,

they have placed greater emphasis on the need for a strong pre-service diesel training module. With the recommended module presented in the second section of this report PCV's will be able to augment the SO.N.A.D.E.R. pump maintenance program and improve the level of training of the small parameter pump operators. This diesel technology module cannot clearly be classed as an AT/RE device, however, the technology is important to the efficient operation of diesel engines and resulting conservation of diesel fuel.

Wind mill technology is one of the two identified energy alternatives to diesel power for pumping water for irrigation. Wind mill technology is relatively unused along the Senegal River district. In our 500 mile journey along the river we encountered only one working wind mill which had been operating only two months with only partial success. US/AID wind mill expert, Bob Hughes, visited the river region and reportedly questioned whether there was reliable enough wind to economically power pumps for irrigation. Relatively little wind measurement data is available for the region to definitely rule out wind power. In land from the river many non-functioning wind mills stand abandoned over town wells, demonstrating the technology is not new to the country. The meteorological data will have to be collected for each site as a part of the decision-making regarding wind power potential. I would recommend that wind power be one of the elected IST training modules, rather than a pre-service training requirement. Two reasons for this are that Wind mill Technology is only appropriate for specific sites which

demonstrate having the wind potential, and the training module is probably the most technically demanding of all the AT/RE modules.

The second major AT/RE alternatives to diesel pumps is animal traction powered pumps. Mauritania has one-fourth of the world's population of camels and a large number of donkeys and horses. The potential use of this largely untapped energy resource is enormous. Animal harnessing for work is a known technology among Mauritians, but the applications have been restricted to transportation of people and goods and in some cases pulling water from deep oasis wells. The technology of harnessing animals for agricultural work such as plowing, puddling rice fields, land leveling, or pumping water is very important and must be encouraged. This AT/RE module was designed primarily around harnessing animals to rotary powered transmissions for pumping water. I would recommend that the animal power module join the category with wind power as an IST training module for those volunteers who have identified a need. Animal traction and its many applications to Mauritania's agricultural development cannot be overstated. This program alone could be identified as a primary AT/RE programming effort, except for the fact that Mauritania's national agriculture program seems to be moving toward small and large scale mechanization rather than toward animal traction.

The remaining three irrigation-related technologies are all recommended as appropriate for pre-service training. These technologies should be an integrated part of the basic tools PCV's need to increase their effectiveness in providing extension in the river district. The modules can be covered in a short time and will be used frequently in-service.

Understanding land surveying techniques is particularly important training which was overlooked in the past pre-service training programs. This skill will enable volunteers to teach farmers simple ways to layout and repair canals, level fields and extend their parameters.

The fencing module will enable volunteers to assist villagers in designing alternative low-cost fencing made of both local materials and/or a minimum of manufactured materials. Each Agriculture PCV visited was faced with the problem of securing the fields from animals.

The water pump module was included on the pre-service training module list because most volunteers' sites have pumps and like diesel engines need to understand their basic operational design and function as well as have a general knowledge of how to maintain them.

The final AT agriculture module, storage techniques, for agricultural produce, is very important to Mauritania's districts because over 25% of the produce grown is reported to be lost in storage.

I would recommend that this module be included in the training available in the first IST because volunteers will have a good fix on their own village storage problems after

six-months in the field, and training can be targeted to the specific crops and problems.

The Mauritania health volunteers AT modules are all recommended for pre-service training. Each of these modules have been developed around specific problem areas where Health Volunteers feel the additional training would make them more effective at their jobs. I would urge the adoption of each of these modules into this Fall's pre-service training effort especially in view of their relative simplicity in terms of material and programs.

Finally, I would recommend that PC/M adopt the general survival AT modules for use in pre-service training of all M/PCV's. Each volunteer should be trained in Lorena stoves, solar water heating and climate control and survival techniques.

These modules are vital to the day-to-day living in Mauritania's frequently hostile environment. Lorena stoves and solar water heating are fundamental AT/RE technologies appropriate to Mauritania, and ideal as secondary projects for volunteers.

PEACE CORPS ENERGY TRAINING

- * Mauritania In-Service Training
- * Farallones Training Manual (under separate cover)
- * Ecuador Biogas Training Proposal

Mauritania In-Service Training

The Task Assignment

Based on a request initiated by PC/M for A. T. Training Assistance in their mid-March agriculture and health program (IST) and for long range Appropriate Technology Renewable Energy (ATRE) programming assistance, OPTC arranged to have one ATRE Specialist Consultant to carry out the following tasks:

- Provide technical assistance to PC/M in the development of IST and secondary volunteer projects involving renewable energy/appropriate technology
- Develop ATRE modules which are relevant to PC/M's current agriculture and health programs
- Identify potential PC projects in Mauritania suited to primary ATRE programming

Originally the duration of the consultancy contract was to be one month, but after an initial assessment of the work to be accomplished, the contract was extended to seven weeks. Throughout the contract period, important additional work was added to the schedule. As an example, five days were spent on staff training in organization and programming techniques.

Upon arrival at the IST site in St. Louis, Senegal on March 17, OPTC Tech Trainer, Judith Oki, the Mauritania APCD/Ag, Roger Conrad, and I assessed the plans developed for the 10-day IST and a subsequent Mauritania ATRE programming trip. The seven week schedule was divided into two basic time frames: the first two weeks were devoted to the planning and implementation of the St. Louis IST and the

final five weeks were spent in Mauritania assessing potential ATRE projects and programs, three weeks of which were spent in the field making volunteer site visits. The remaining two weeks were spent in Noaukchott, contacting agency and government officials concerned with PC programming and working with PC/M staff on planning their fall pre-service training program.

The major goals of the 10-day IST program were to upgrade language skills, provide specific AT skill training, and to create an atmosphere in which volunteers could exchange ideas on village experiences and programs. The daily schedule allotted four hours of language training in the morning and four hours of technical training in the afternoon. From March 21-23 both health and agriculture volunteers participated in the technical training program, after which the health volunteers went to Noaukchott for the remainder of the training program.

During the remaining eight days, the eleven agriculture volunteers attended seven (7) training sessions on specific A.T., Agriculture and Cross Cultural areas. The summaries that follow give a brief overview of the major subject matter covered in each session. For more detailed reference, consult the teaching outlines in the addendum.

Lorena Stoves training

The session leader was Larry Jacobs from the Aprovecho Institute, a consultant to Vita under USAID program to support the Improvement of Rural Senegal Cook Stoves. The session began with a discussion of cultural aspects of introducing stove technology to a traditional community and some of the major considerations included in designing an appropriate stove unit. Those considerations included such items as fuel to be burned, inside vs. outside cooking, the height of the cooking area and the number of pots required under normal cooking conditions.

Sessions on stove construction followed The Cross Cultural discussions . John Hendrickson selected an Ideal Stove Construction Site in a nearby village nutrition clinic, where mothers gathered to learn about diets and food preparations. Three basic stove designs were constructed: a single pot, a two pot and a modified single pot with a chimney. By the end of the second day, volunteers had completed the construction and had acquired the skills to design and build their own units. The Lorena Stove training was felt by volunteers to be the single most important ATRE priority for their villages. Thanks to the flexibility and energy of Larry Jacobs, the task was completed in a record two days.

Goals and Objectives: Session on Mauritania Ag Programs

Peace Corps Mauritania is six months into its new agriculture program initiative. The Goals and Objectives Session focused on clarifying the roles of PC in Sonadar and in the Mauritania Vegetable Production Project. These programs are supported by different agencies under the Moal and each face different organizational constraints. For this reason the Goals and Objective Sessions were divided so the Sonadar group and Vegetable group arrived separately at their individual Goal and Objectives Statements. By the end of the sessions, volunteers had begun to clarify their individual goals for the program and what additional work was needed to meet their sponsoring agencies' goals. The session suffered from the lack of input from the Mauritanian Agricultural Ministry and Sonadar officials. In particular the session produced some important issues for future PC/M programming. Of these a major focus was placed on the need for improved communications and involvement of sponsoring agencies as PC/M in Job Training and Programming. Most volunteers felt new agency job descriptions based on their current field activities and experience could greatly reduce PCV Ambiguity about their assignments.

Overview of ATRE Development

In a specially scheduled evening session, Professor Bob Dunham, a USAID consultant from Energy Engineering Laboratories, led a seminar on the broader aspects of renewable energy development, including a description of the

various energy sources and some of the present uses of those sources throughout the world. Mr. Dunham provided the group with some insight into successful and unsuccessful ATRE devices which have been introduced in less developed countries. His remarks emphasized the importance of conserving energy by renewable energy sources, particularly in the areas of cooking and water heating.

Nematology and its Effect on Vegetable Production

On day four, Dr. Netcher from the Senegal National Agriculture Research Center delivered a Seminar on Nematology and the effects of nematodes on vegetables and rice. At the end of the lecture and slide presentation, volunteers discussed some symptoms and controls of the nematode.

Appropriate Technology Water Pump Session

Peace Corps Volunteer John Hendrickson from PC/S delivered a three-hour lecture on the results of pump research he has conducted in rural Senegal. With the aid of cut-away drawings, various pump designs were discussed. John carefully pointed out the criteria involved in choosing a pump and some of the mechanical and performance pros and cons of each type and design. This session gave volunteers a good conceptual understanding of pump operation, and John's recommendation on pump design and availability will be useful to volunteers putting together project proposals for self-help rural wells. (See addendum for further information re pumps.)

Appropriate Technology Awareness Session

As the Peace Corps consultant, I chaired this session on the technical and cross cultural constraints involved in introducing technology. Two role plays were prepared and enacted in order to examine the dynamics involved when a PCV introduces a new technology into a traditional society. The issue revolved around village officials and farmers who were trying to organize themselves in order to assume responsibility for installing a cooperative motor pump which had been donated by an overseas agency. The role play confronted the issue of the villagers need for self-sufficiency and the lack of village-based resources to support the effort. The session concluded with a discussion of social, political and technical criteria for recommending appropriate technology devices.

Cooperatives and Cooperative Management Sessions

I discussed the development and different types of cooperatives, pointing out how they differ from other social organizations, legally and functionally.

The internal operational structure of a model cooperative was examined in light of the inherent strengths and weakness in its democratic decision-making system. Examples from other parts of Africa and India were used to give an overview of the successes and failures of the cooperative movement. The session concluded with a discussion of the young Mauritania co-op movement and what the future may be for that institution.

Cost Benefit Analysis: Session

I designed this session to enable PCV's to gain the skills necessary to do cost analyses for project proposals. The economic approach to analyses of cost and benefit was discussed both in terms of economic and social costs, as well as economic and social benefits. The use of this tool in decision-making was discussed in view of the broad latitude for estimates and judgments of social cost and social benefits. A demonstration was given of a simple economic analysis to show how a simple project could be budgeted. The session concluded with a discussion of how the tool really formalizes on paper what people normally do informally in their minds.

This concluded the topics covered in the March IST. A PCV straw poll evaluation of the 10-day event indicated that all found the IST useful and worthwhile. Many PCV's felt the language portion of the I St. was of greatest benefit for it was the most important and at the same time weakest skill in their pre-service training. The feedback on the technical training material was mixed. Most PCV's actively participated in sessions where they perceived the skill and training applicable to their village or personal needs. Time did not permit more than a superficial overview for most technical subjects.

Credit should be given to APCD/M Roger Conrad for putting together the impressive collection of technical people under the constraints of the IST location and limited time.

USAID/w and USAID/m are to cite for their direct and indirect support of Bob Dunham, Larry Jacobs, Don Henry and Judith Oki. A note of appreciation also goes out to PCD Jack Shaefer from PC/Senegal for releasing PCV pump specialist and trainer, John Hendrickson, for the duration of the St. Louis IST.

The next portion of this report covers the five-week AT/RE Module development phase. Involvement in the IST helped facilitate the identification and preparation of the modules presented below.

- AT/RE and other AT Modules relevant to PC/M Ag and Health PCV

The PC/M and OPTC/AT/RE mandate for this five-week visit was to identify and develop ATRE modules that could be specifically applied to the current Ag and health programs and replicated for other pre-service and in-service training programs. Part of this mandate involved finding how and which ATRE devices could best be integrated into PC/MS' overall programming which is based on the delivery of agriculture extension and health care. In addition, training modules were to be identified which would conserve non-renewable energy and resources by providing technology which could more economically utilize scarce energy. Finally technology modules were developed which are not specifically energy-related but which are important to Mauritanian Development and to PCV ability to carry out their assignments more effectively. These technologies will be presented under general categories of Agriculture, Health and General. Each module has been broken down into tasks

and the approximate time in which a skilled trainer could deliver each section. In part, the following topics were selected because the volunteers found them useful and necessary and partially on information gathered during an intensive three-week trip visiting volunteers in the field. The order in which these technologies appear does not reflect the order of importance.

Agriculture Production Volunteers ATRE Training Modules

Technology: Lorena Stoves.

Goals: Firewood and charcoal fuels in Mauritania are quickly being depleted as the drought progresses southward. More efficient use of available wood fuels will reduce the economic and ecological stress current at a crisis stage. Clearly this technology is the single most important contribution volunteers can make in an AT Renewable Energy Program.

Objective: To know how to introduce and construct Lorena stoves into Mauritanian cultures and, as a training exercise, build one.

Tasks:

- Using visual aids, demonstrate strategy of introducing a Mauritanian household.
 - How many pots do they normally cook with at one time?
 - Where do they cook their food inside/outside?
 - What kind of fuel do they cook with?
 - At what height would they prefer to have the cooking surface?

Constructing of Lorena Stove:

Time Required

- Identify clay and sand.

- Use local assistance to identify which clay is best -- brick makers, potters, etc.

- Make and buy tools required to construct unit.

- Make sifter bed using 1/2 cm. screening fitted over a frame of 2 or 4 x 10 cm.

1/2 day

- Make block mold for chimney flues.

- Learn to make correct Lorena mix by working the moisture into a ball with your hands until you can throw it a meter into the air and catch it without breaking into clots.

- Start to build stove.

- Level ground using a pail of water to test run-off direction.

- Place pots into position so there is a full spread hand between pots and outside wall and a fist between each pot.

- Draw the perimeter of the stove in the soil with a stick.

- Lay blocks (Lorena or cement) as a foundation and fill center with Lorena mix.

- Complete stove blank, making sure Lorena is packed solid after each application of material.

- Allow to set overnight.

- Carve out fire box pot holes, flues and chimney chambers. (See Lorena book for specific instructions.)

1 day

1/2 day

- Do final fitting of pots and finish outside surface with dung or concentrated clay mix.

- Test stove for draft.

- Describe what maintenance must be done to stove if it cracks.

Materials: Lorena Handbook

- 1 meter x 1-1/2 meter 1/2 cm heavy screen. - Clay - Shovels

- Wood frame 10 cm in depth - Water - Trowels

- Block mold .25 cm square 10 cm high - Sand - Steel damper plates

2 days Total Time Required

Technology: Windmills

Time Required

1 Training Goal: Wind power could be an important form of renewable energy in Mauritania and has great potential in many regions for pumping water.

Objective: Know how to identify condition where a windmill can operate to pump water and how to construct a simple installation.

2 hrs. Tasks: Estimate amount of water required for project.

2 hrs. - Using meteorological data, find wind speeds for location where windmill is proposed.

- Calculate approximately how long each day wind is sufficient to turn a wind device; find out also whether there are seasonal fluctuations which must be taken into account.

8 days - Select a windmill pump design which will operate at optimal efficiency under wind conditions and know how to build it.

2 hrs. - Check out the proposed delivery of the chosen systems. Identify when there will be insufficient amounts of water and design alternatives to wind driven pump.

- Where possible, use locally available materials for construction.

4 hrs. - Refer to pump section for selection and sizing pump for wind unit.

2 hrs. - Identify power conveyance systems which can be used along a river to connect with wind power device.

10 days - Total Time Required for Training

Technology: Solar Water Heating

Goals: Firewood and charcoal fuel supplies in Mauritania are quickly being depleted as the Sahel drought progresses southward. Solar energy is in abundance in Mauritania with day time mean temperatures reaching as high as 150°F. Using simple devices, solar water heaters can reduce the amount of fuel currently used to heat water.

Objective: Design, construct and introduce simple water heater devices made from local materials.

Tasks:

- 1 hr. - Using visual aids, demonstrate theory of energy conservation when heating water, e.g., difference in BTUs required to raise water from 70°F to 212°F vs. 170° - 212°F. Calculate savings in fuel to underline importance.
- 1 hr. - Using a simple barrel painted black, demonstrate simplest heating. (See Farallones Model.)
- 1/2 day - Review construction of simple collector made from glass copper tubing and wood using design supplied by PC/W Renewable energy program.
- 1/2 day - Design a modified simple solar water heater from a piece of 4' x 8' corrugated steel painted black welded to a black barrel, position in the sun for maximum exposure, and demonstrate efficiency of heating.
- 2 hrs. - Discuss ways of introducing technology into Mauritanian culture.

Materials: PC/W Solar Energy Handbook

- 55 gallon barrel
- 4' x 8' sheet of corrugated steel
- Tools
- Thermometer
- Black paint and brushes.

1-1/2 day Total Time Required for Training

Technology: Storage Techniques - Solar drying, cold storage, construction of storage facilities.

Goal: Approximately 25% of the agricultural output of Mauritania is lost each year due to improper storage facilities. By using locally available resources, improved storage facilities will increase the income and availability of food.

Objective: Design, construct and introduce technology to improve storage facilities.

Tasks: Identify scope of storage problems in Mauritania by commodity.

- Potato
- Rice

- 2 hrs. - Vegetables
- Fruits
- Sorghum, millet
- 1 hr. - Using visual aids, discuss current methods used to store each commodity.
- Identify materials locally available for construction of storage facilities.
- 2 hrs. - Modify designs found in PC/W Storage handbook to local conditions.
- Place emphasis on rice, potato, sorghum, millet, and vegetable storage and possibility of developing cooperative facility which could provide mutual benefits of high quality storage to all farmers.
- 1/2 hr.

Materials:

- PC/W Storage manual.
- Visual aids describing local storage techniques.

1 day. Total Time Required for Training.

Technology: Animal Traction

Goal: Mauritania's large livestock industry represents a vast untapped resource for powering plows, water pumps and transportation.

Objective: Know how to design and construct devices which can be harnessed to animals.

Tasks:

- 1/2 hr. - Identify work being done which is both repetitive and stationary.
- 1/2 day - Review different A.T. designs for converting rotary power into reciprocating motion.
- 1 day - As an exercise, plan a water pump powered by animal traction. (Using parts from a 504 rear axle.)
- 1/2 hr. - Review different kinds of harnesses and how they can be adapted to improve locally used ones.
- 1/2 hr. - Review best use of animals like donkeys, cows, horses, and camels.
- 1 hr. - Design a simple leveling board to be pulled by animal.

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- 1 hr.
- Demonstrate how animal power could be used to pump water using a reciprocal pump in oasis area without sealing off access to the well head for bucket users.

Materials:

- Resources on animal traction and animal harnesses.
- Resources on mechanical linkage system which is locally available and can be used as a power for devices.
 - Resource book on how animal traction has been used in other countries.
 - Resource book on animal traction implements for agriculture.

2½ days. Total Time Required for Training.

Appropriate Technology Agriculture - Other.

Technology: Diesel Repair and Maintenance (Preventive maintenance).

Goal: Provide volunteers with working knowledge of prevention maintenance of diesel pumps of styles and types which they will encounter in the field in Mauritania.

Objective: With hands-on training techniques, train volunteers in essentials of diesel operation, maintenance and how to institute a good preventive care program.

Task:

- 1/4 day
- Using visual aids, familiarize volunteers with general theory of diesel technology (roles of fuel system, lubrication system, cooling systems, and operation specifications).
 - Using a two or three cylinder VM diesel, demonstrate where the various systems are on the engine body.
 - Describe the fuel system starting from the tank - fuel filter - injector pump. Discussing the role of each in a properly functioning engine and the maintenance problems associated with each step, eg.
 - Tank - bad fuel, dirt, improper vent.
 - Leaking
 - Fuel filter - 150 hr. maintenance (renew) clogging or flow restriction
Replace units, seals, vital importance to engine operation.

- Fuel pump -- injector pump.
Using visual aids, demonstrate complexity of with close and need to keep fuel clean. Point out problems of field repair.

1/2 day

- Injectors - remove injectors and have each volunteer adjust one until mix is proper. Diesel effects of improperly maintained and adjusted injectors on efficiency and power of engine.
- Fuel storage and conveyance.
 - point out value of clean fuel servicing containers, protecting them from dirt, and contamination, use of cloth filters for fuel and clean rags for clean up purposes. (Ceremony required in mat. of fuel.)
- Describe mat techniques to monitor fuel use and changing filter at proper intervals. Provide copies of a proposed system which has been field tested in a SO.NA.DE.R. site.

1 day

- Diesel fuel grade and combustibility.
- What to look for in checking for contamination.
- Describe blowing out a contaminated fuel line and problems of pressure back up.
- Discuss tools required to do maintenance on fuel system, injector removal and filter removal.
- Lubrication system. Starting from the Dipstick and oil pump, describe the functioning engine and the maintenance problems associated with each step.
 - Dipstick - Importance of machine levelness, range of acceptable lubricant level.
 - Oil filters - describe design and proper operation and importance to engine protection.
 - Oil type (temperature range of grades of oil.)
What ranges are recommended and why and what makes oil break down and require change.
 - Discuss tools needed to change oil and oil filter and actually do oil change.
- Cooling system - describe theory of heat exchange metal to air and the problems of dust which act as an inhibitor to the process.
- Demonstrate proper fan belt tension and show process of adjustment.

- Demonstrate cleaning procedure for repairing clogged and dirty air passages.
- Air intake system - describe how an oil bath air cleaner works and the importance of checking oil levels and keeping oil clean..
 - Demonstrate proper repair cleaning and reassembly of unit.

Materials:

- visual aid charts of above systems.
- repair manuals for VM 2 or 5 cylinder.
- VM engine with pump.
- Tools.
- Spare injectors.
- Spare oil and gas filters.

1½ day. Total Time Required for Training.

Technology: Surveying Irrigation Perimeter

Goal: Survey irrigation perimeter to establish lay of land so water distribution system can be installed.

Objective: Know how to use survey instruments and techniques to survey, chart, design and install a small perimeter and to level plots.

Tasks:

1½ hrs.

- Using visual aids, demonstrate the theory of surveying with
 - An auto level
 - A line level
- Using survey charts, show what a chart (plan table) topo schematic looks like the technique behind making one with a line level and auto level.

1/2 day

- Using an auto level, survey out a 1/4 ha. plot and draw up a plan table diagram.
- Using plan table diagram, propose a system of main canals and secondary canals which will irrigate the area. (Use slopes of 1/2% for all canals.)

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- Repeat process using a line level, and meter.
- 1/2 day - Using line level, auto level, lay out repair levels for existing but eroded canal system.
- Using SONADER canal profiles, stake repair sections for reconstruction.
- 1 hr. - Using visual aids, describe techniques of leveling land.
 - Test flood technique.
 - Line level technique.
 - Auto level technique.

1½ days Required for Training.

Materials:

Auto level

- Tripod
- Number transit stick
- Meter
- Line level
- High quality construction line
- Book on canal construction (SONADER recommends)
- Visual aids.

Technology: Fencing

Goal: Mauritania Agriculture Production cannot be stabilized until hectorage can be protected from ravage resulting from an overabundance of livestock.

Objective: Know how to build a fence from available material.

Tasks:

- Geographically describe how fencing is made with local material. In each case define constraints in material availability.
- 1/2 day - Using visual aids, describe each type of fence construction currently built by local farmers.

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1 day

- Discuss how you would improve design with a minimum of capital. Discuss how you might improve without outside capital.
- Using AT fencing text, study different fencing styles used in other parts of the world. Following these examples figure out strategy to improve local fence at the lowest possible costs.
- Build a three strand fence from 12aa wire.
- Make four cement posts in a mold with reconstruction bar.
- Dig holes and sink posts.
- Stretch wire and attach to posts.
- Weave material into fence wire making a mat.
- Describe alternative plant material which would improve fence.
- Discuss the value of planting a living fence behind the fence just constructed.

Materials:

- AT Book on fencing
- Wire 1294
- Cement
- Re-enforcing bar
- Map of Mauritania and local fencing used
- Visual aids on details of local fence construction
- Tools
- Local available of trash vegetative material to weave into three strand fence.

1 1/2 day. Total Time Required.

Technology: Water Pumps.

Objective: Know what pumps are recommended for various agricultural purposes and how these pumps are designed to operate, how to install and how to repair each.

Tasks:

- 1/2 hr. - Identify families of pumps available in Mauritania and demonstrate general mechanical theory of each.
- 1/2 hr. - Using available specification, approximate water delivery at different heads for each unit.
- 1/2 day - Disassemble each unit to discuss wear points and repair. Give information when spares are available (John Hendrickson).
- 1/2 hr. - Discuss alternatives power drive possibilities, amount of power required, expected deliveries.
- 1/2 hr. - Discuss appropriateness of different designs given field constraints (eg. sand in water).
- 1/2 hr. - Using actual models, demonstrate simple gearing arrangements for increasing delivery.

Materials:

- Selections of pumps used available in Mauritania
- Tools
- List of spares

1 day. Total Time Required for Training.

Appropriate Technology Modules Relating to Health Volunteers.

Technology: Electrolux Refrigerator Repair.

Objective: Know how to repair and maintain Kerosene refrigerator.

Tasks:

- Set up refrigerator and level box (distance from walls). Know how to start a kerosene refrigerator.
- Know how to check for proper fuel and (dangers of improper fuel).
- Know how to adjust/clean/service wick/replace wick.
- 4 hrs. - Adjust flame. (blue flame)
- Troubleshoot for improper flame. Know how to adjust wick.

- Imperfect notch between burner and pipe.
- Bad seal between protector cylinder and site.
- Clean the chimney.
- Defrost and cleaning.
- Find address for spare parts.

Materials Required:

- 1 Electrolux Brand Refrigerator.
- 1 Counsel Brand Refrigerator Model M2822.
- Spare parts catalogue.
- Kerosene.
- Chimney brush/clean rag.

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- Demonstrate the slowness of recovery time in Kerosene refrigeration by opening door five times with thermometer placed inside, then wait one hour and check temperature.

4 hours. Total Time Required for Training.

Technology: Food and Balance Sheet.

Objective: Know how to calculate the amount of food nutrition actually consumed by lactating mothers and infants.

Tasks:

- 1 hr. - Identify local foods grown or available in area --
Period of year.
- Identify parts of plant commodities consumed in
traditional recipes.
- 1 hr. - Develop a list of all available food in three groups
and using tables find values of protein, carbohydrates,
minerals and vitamins for each..
- Using tables, find final food values after cooking,
i.e. (boiling, roasting, steaming, stewing).

- Using local recipes, find final nutrition value at end of cooking for adult and child, infant portions, i.e. (how much of the mix do they have to eat to get a balanced diet).
- 2 hrs.
- Develop new recipes, which supplement vitamin and mineral deficiencies in diet using available foods, or recommend foods which could be grown to achieve balance (i.e., question in infants' diet re bulk; therefore, suggests high nutrition foods with low bulk)
- 1/2 hr.
- Alternatively, find vitamin substitute which achieves the same end at low cost, i.e, fortified milk, etc.
 - Test new recipes to check taste acceptance!

Materials

- Reference book on food values of different commodities.
- List of local consumed and available foods.
- List of local recipes.

1/2 Day Required for Training.

Technology: Calculating a low cost meal.

Objective: Find the lowest cost meal which provides all the protein, carbohydrates, vitamins and minerals.

Tasks: Identify and list all locally available foods.

- 1 hr. - Price foods in market place and identify when they are in price cycles over the year.
- 1 hr. - From food and balance sheet table, identify foods which are least expensive but provide protein, vitamins, minerals, and carbohydrates required.
- 2 hrs. - Find a way to incorporate food items into acceptable local dish.
- Develop three stage chart of possible low cost meals from the very cheapest to the most expensive.

Materials:

- List of local costs of food.
- Food and balance sheet.

1/2 Day. Time Required for Training.

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Technology: Sharpening Disposable and Renewable Needles.

Objective: To renew the edge of a hypodermic needle to its original sharpness using a fine Hone stone.

Tasks:

1 hr.

- Set up a work area with good light.
- Using visual aids, blow up a needle point to demonstrate the profile of a sharp needle and a dull needle.
- Using visual aids demonstrate proper use of Hone stone, pointing out direction of sharpening, flatness of stone to needle point level.
- Demonstrate the redirection of fillings along the canular which makes the final cutting (puncture) point.

1/2 hr.

- Allow people to practice with their own stone, check sharpness by holding a paper in the air by the corner and poke the needle into the paper on the opposite corner; if the needle passes easily, it is sharp; if it does not cut, more honing is required.

Materials - Visual aids

- Dull hypodermic needles
- Arkansas Hone stones
- Paper

1½ hr. Total Time Required for Training.

Appropriate Technology Training General
for All Mauritania Volunteers

Technology: Lorena Stove

Objective: To know how to construct a mud stove out of local material for cooking.

Tasks: Identify cooking requirements of USER, number of pots required, inside vs. outside cooking, type of pots used, type of fuel used, preferred level of cooking surface.

- Design stove around identified requirements (see Lorena Handbook).
- Build a sifting screen and block mold.
- Identify clay sources and sand sources.
- Gather materials.

2 days

- Level stove site (use water flow technique).
- Outline stove around pots leaving one finger span between pot and o/s wall.
- Mix Lorena.
- Build Stove Blank.
- Fashion fuels/pot holes/fire box.
- Place pot into stove and test draw.
- Describe maintenance to USER - cracks, etc.

Materials

- Trowel
- Shovel
- Screen and frame
- Clay
- Sand
- Energy lots
- Pot - (actual pot to be used)
- Water

2 days Total.

Technology: Air Circulation, heat control, and cooling.

Goal: Mauritania's climate requires volunteers' awareness of how to protect themselves from high heat levels and how to protect their food supply.

Objective: Develop an understanding of thermodynamics and how it can be used to reduce the discomfort of Mauritania's intensely hot climate.

Tasks:

- Under each of the following categories, identify thermodynamic principle and how you can benefit from it.
- House location and design.
 - Height of ceilings

- Thickness of walls.
 - Location of windows and doors and louvers.
- nr.
- Orientation of house - East, west, north, south relative to prevailing wind.
 - Location of house relative to walls of other buildings and trees.
 - Type and thickness of roof.
- 1 hr.
- Describe a typical Mauritanian day in terms of temperature fluctuations and how heat loads in houses if not properly vented.
 - Using visual aids, demonstrate open sky concept and why and where the coolest places can be found at different times of day and night.
 - Demonstrate ways to increase air circulation in a building by modifying windows and vents to reduce heat loads.
 - Examine locally produced technology used to avoid heat stress, decrease air circulation.
 - Use of straw woven mats.
 - Use of log and mat raised bed.
 - Shelter designs.
 - Activity levels throughout day.
 -
- 1 hr.
- Describe, using aids, thermodynamics of evaporation and effect of wind.
 - Identify local techniques for cooling water and food-stuffs. Bush refrigerator: identify how it works.
 - Goat skin water bag.
- 1 hr.
- Clay canneries (talk about their location and tripods relative to their efficiency.)
 - Burlap covered containers used as water coolers.
 - Discuss the value of a double roof with air space between. Demonstrate the value of being able to remove top roof at night to maximize cooling.

- Discuss sand storms and ways to reduce discomfort by installing window and door mats which can act as wind and sand breaks but still allow for air circulation.
- Recommend mats which are locally available that can be fitted to windows outside at the top and attached to the ground by stake.

Materials:

- Resource book on thermodynamics applied to warm climate housing.
- Visual aids on locally adapted technology.
- Need land book for Mauritanian volunteers on this subject!!!

4 hrs. Total Time Required for Training.

Most of these modules in some form have been part of technical training in Mauritania. In some cases volunteers have picked up the training after being in the field on their own. The formal training modules should give tech trainers a better focus on the requirements of volunteers in the field and lead to a more complete technical training program.

Discussion and Recommendations:

In order to establish the benefit of the proposed appropriate technology renewable energy modules to both PC/Mauritania agriculture program as well as to the general Mauritania government development strategy. The following three questions must be discussed:

- What are the current and project directions of Mauritania agriculture development strategy?
- What role are agriculture PCV's currently playing in that development plan and what future does PC/M intend to direct programming?
- How necessary are these AT modules in increasing the effectiveness of PCV's in those rolls and which modules are most important to their success.

Proposal

to

PROVIDE TRAINING TO VOLUNTEERS
AS METHANE GAS TECHNOLOGISTS
TO SERVE IN ECUADOR

for

ACTION
Washington DC

from

Perennial Energy, Inc.
Dora, Missouri

February 7, 1980

February 7, 1980

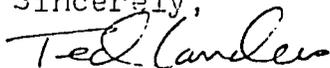
ACTION
Contracts Branch
806 Connecticut Avenue NW
Washington DC 20525

Dear Sirs;

Perennial Energy, Inc. is pleased to submit this proposal to you. We feel that due to the fact that our staff has a combined experience of over 25 years in the field of methane digestion, that we have designed, installed and have access to six digesters within a 20 mile radius of our business, that we have extensive teaching and training experience in the energy field, that we have successfully put on four digester workshops in the past, that we have recently completed a very successful hydraulic ram training program for 13 Peace Corp Trainees, and that at no material expense to ACTION, the trainees will construct a 400 cubic foot digester on a hog farm during the training program, we believe we are in the best position to carry out stateside training of Peace Corp Trainees in methane digestion technology.

Thank you for sending us the request for proposal #80-12.

Sincerely,



Ted Landers
Director of R & D
Perennial Energy, Inc.
PO Box 31
Dora, Missouri 65637

TL/paw

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INTRODUCTION

Ted Landers, Dr. Tom Abeles, and David Jessee of Perennial Energy Incorporated have had a long history of conducting training programs including four workshops on methane technology. This staff has built six different digesters within twenty miles of the training site. Perennial Energy recently completed a one week workshop on hydraulic rams for thirteen Peace Corps trainees. We enjoyed this contact with people interested in alternative technology and would like to help in the spreading of methane gas technology throughout the world. In this training program, we intend to give the trainees a good grasp of methane gas production and the design of digesters. They will have actual experience building digesters and will learn how to design, operate, and maintain them. We have put together an excellent training staff, including three returned Peace Corps volunteers, three staff members familiar with Ecuador, and two who have worked with digesters in less developed nations. (one in Ecuador, one in Nepal) The estimated cost of this program will be \$29,857.00.

1 a.

INTERIM AND TERMINAL TRAINING OBJECTIVES

At the end of the session, the trainee will be able to;

1. Discuss the basic scientific principles behind biogas production
 - a. discuss in basic terms methane production and digesters
 - b. build a one gallon methane production demonstration unit
 - c. understand the basic biochemistry which relates to methane producing organisms
 - d. carry out simple experiments to determine how to increase the production of methane under specific situations
 - e. choose and combine suitable substrates for incorporation in digesters
2. Design a digester for any type of situation in terms of substrate abundance, gas demand, climate, etc.
 - a. visualize various solutions to the design problems involved
 - b. discuss in detail the design of existing digesters with a good comprehension of the advantages and disadvantages of each type
 - c. discuss knowledgeably the engineering principles involved in the design of a digester
 - d. design a digester suitable for use in a given situation
 - e. develop an efficient means to gather manure and distribute effluent
 - f. make a cost benefit analysis to assess the impact of the introduction of this technology
3. Construct a digester, having a practical knowledge of all aspects of its construction
 - a. plumb a digester, building in adequate safety precautions
 - b. build a demonstration portable digester
 - c. use carpentry tools, layout, level, construct simple buildings
 - d. form up, level, and prepare ground, pour and finish concrete
 - e. use slipforms to build tanks and understand the composition of concrete and ratio of components
 - f. mix and apply cement mortar plaster for use as a sealing agent on digester tanks
 - g. solder, braze
4. Carry out and communicate to others the procedures involved in the operation and maintenance of a digester with an emphasis on trouble shooting
 - a. explain the procedures involved in operation and maintenance of a digester
 - b. carry out procedures, including mathematical calculations, involved in start up and daily maintenance
 - c. ascertain the causes of malfunctions of the digester and carry out corrective measures

5. Utilize alternative sources of energy in digester design
 - a. utilize solar energy to increase the efficiency of digester heating systems
 - b. design and construct heating systems
 - c. design alternative methods of agitation
6. Design systems for efficient methane utilization
 - a. devise system to scrub the gas for use in lighting, cooking, etc.
 - b. devise a lighting system for homes for optimum lighting and safety
 - c. devise gas burners for optimum heating capacity
 - d. convert engines to run on methane
7. Develop a strategy to implement the construction of digesters which will take into account the realities of Ecuador
 - a. discuss the cultural traditions and the constraints of scarce resources and materials in Ecuador
 - b. devise and implement effective communication strategies for the introduction of biogas technology to a community

1 b.

CONTENT OF TRAINING AND DESCRIPTION OF TRAINING ACTIVITIES

Biochemistry of Biogas- discuss the basic scientific principles behind biogas production.

<u>Component</u>	<u>Objective</u>	<u>Activity</u>	<u>Staff</u>	<u>Logistics Resources</u>
Introduction 2 hrs.	discuss in simple terms methane production and digesters	lecture and slide show introducing the very basics of methane production and the development history of digesters	Coburn	Hammond Camp Lecture Hall
Gallon Digesters 2 hrs.	Build a one gallon methane production demonstration unit	each trainee will build a one gallon digester	Coburn	Hammond Camp
Biochemistry Lecture 2 hrs.	understand the basic biochemistry which relates to methane producing organisms	lecture discussing C/N ratios, solids, PH, H ₂ S, gas evolution, start up inoculum as they relate to methane producing organisms	Collins	Hammond Camp
Biochemistry Lab 6 hrs.	carry out simple experiments to determine how to increase the production of methane under specific situations	each trainee will work with their one gallon digester, experimenting with various substrates pH, etc. learn to read pH paper, raise and lower pH, identification of % solids for different substrates	Collins 3 trainers	Hammond Camp

Continued - Biochemistry of Biogas

<u>Component</u>	<u>Objective</u>	<u>Activity</u>	<u>Staff</u>	<u>Logistics Resources</u>
Substrates 4 hrs.	Choose and combine suitable substrates for incorporation in a digester	lecture on substrates such as manure, vegetable wastes, etc., to include a discussion of chemical composition pH, % solids, toxicity, etc.	Fulhage	Hammond Camp

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Digester Design - design a digester for any type of situation in terms of substrate abundance, gas demand, climate, etc.

<u>Component</u>	<u>Objective</u>	<u>Activity</u>	<u>Staff</u>	<u>Logistics</u>
Digester Tour 4 hrs.	visualize various solutions to the design problems involved	visit Digester #1 a chinese type slip form digester, with sludge displacement visit Digester #3, now in operation, concrete 400 ft. plant with a vinyl gas storage bag	Jessee	Hickory Spring Farm Bill Roe Farm
Digester Tour II 4 hrs.	visualize various solutions to the design problems involved	visit digester #4 now in operation - a vinyl bag in a wooden frame with an innovative gas storage system digester #5 which is a passive 600 cu. ft. digester, not using electricity	Landers or Jessee	Ray Sprague Farm Waylon Gunter Farm
Existing Digesters 4 hrs.	discuss in detail the design of existing digestors with a good comprehension of advantages and disadvantages of each type	lecture and slide show on existing digestors with an emphasis on those types most applicable for use in less-developed countries, such as Ecuador, Mainland China, Taiwan, India Nepal, etc. Sub-systems will be analyzed such as gas	Landers	Hammond Camp

Digester Design - (Continued)

<u>Component</u>	<u>Objective</u>	<u>Activity</u>	<u>Staff</u>	<u>Logistics</u>
Design 8 hrs. 2 sessions with home- work in between	discuss know- ledgeably the engineering principles involved in the design of a digester	handling, influent and effluent, heating agitation, weather protection, etc. lecture on digester design including: a) digester sizing vs operating temperature b) digester sizing by energy demand c) digester sizing by resource availability Material selection 1. strength of mater- ial 2. wall thickness of different materials for various tank diameters and heights 3. gas storage containers 4. service conditions 5. cost vs labor consid- erations e) Heating system designs f) Gas handling designs, heat transfer, thermal loads.	Landers	Hammond Camp
Design Work Session 4 hrs. 7	design a digester suitable for use in a given situ- ation	three groups will visit farms in the area and gather information necessary for the design of a digester appropriate to that site and design a digester	3 Trainers	3 Farms

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Digester Design - (Continued)

<u>Component</u>	<u>Objective</u>	<u>Activity</u>	<u>Staff</u>	<u>Logistics</u>
Manure Handling 4 hrs.	develop an effecient means to gather manure and distribute effluent	lecture on the qualities of manure and effluent	Fulhage	Hammond Camp
Cost-Benefit Analysis 4 hrs.	make a cost/benefit analysis to assess the impact of the introduction of this technology	following an explanation of how to make a cost/benefit analysis, each trainee will make a cost/benefit analysis of the design made earlier and of the digester they are actually building	Brot	Hammond Camp

Digester Construction - construct a digester, having a practical knowledge of all aspects of its construction.

<u>Components</u>	<u>Objective</u>	<u>Activity</u>	<u>Staff</u>	<u>Logistics</u>
Hydraulics 1 hr. lecture	understand the principles of hydraulics	lecture on basic physics, water pressure of air pressure, inch of mercury, and safety precautions	Jessee	Hammond Camp
Hydraulics lab ½ day	plumb a digester building in adequate safety precautions	Basic plumbing techniques. The trainees will construct and understand a) simple hydraulic pressure relief valves b) hydraulic check valves c) condensation traps d) H ₂ S traps	Jessee	Hammond Camp
Barrel Digester ½ day	build a demonstration portable digester	trainees will build three barrel digesters	Raith	Hammond Camp
Pole Building 1 day	use carpentry tools and layout, level, and construct simple buildings	trainees will build a pole building to house a digester	Brink and 2 trainers	Walter Barnard Farm
Concrete 1 day	form up, level, and prepare ground, pour and finish concrete	trainees will pour a slab to be used as the base of a digester	Brink	Walter Barnard Farm

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Digester Construction - (Continued)

<u>Components</u>	<u>Objective</u>	<u>Activity</u>	<u>Staff</u>	<u>Logistics</u>
Slipforms 1 day	use slipforms to build tanks and understand the composition of concrete and ratio of components	trainees will build a tank, mix concrete, use a slipform	Raith	Walter Barnard Farm
Plaster 1 day	mix and apply cement mortar plaster for use as a sealing agent	trainees will plaster the tank that they built	Raith	Walter Barnard Farm
Soldering $\frac{1}{2}$ day	solder, braze	trainees will get 'hands on' experience, soldering, brazing, welding	Engl	Hammond Camp

Operation Maintenance - carry out and communicate to others the procedures involved in the operation and maintenance of a digester, with an emphasis on troubleshooting.

<u>Component</u>	<u>Objective</u>	<u>Activity</u>	<u>Staff</u>	<u>Logistics</u>
Operation 1 hr.	explain the procedures involved in operation and maintenance of a digester	lecture on operation and maintenance	Brot	Hammond Camp
Operation Lab 7 hrs.	carry out procedures, including mathematical calculations involved in start up and daily maintenance	trainees will go to a working digester, carry out actual procedure, identify % H ₂ S, etc.	Brot	One of the digester sites
Troubleshooting 2 days	ascertain the cause of malfunctions of the digester, and carry out corrective measures	trainees will examine case studies of digester malfunctions and troubleshoot problems on the smaller demonstration digesters	Brot	Hammond Camp

2/27

Alternative Energy - utilize alternative sources of energy in digester design

<u>Component</u>	<u>Objective</u>	<u>Activity</u>	<u>Staff</u>	<u>Logistics</u>
Heating lecture 4 hrs.	utilize solar energy to increase the efficiency of digester heating systems	lecture on basic solar insolation, collector efficiencies, and materials, solar water and air heaters, flat plate and concentrating. Passive gas heating designs, thermosyphon design parameters	Landers	Hammond Camp
Heating Workshop 8 hrs.	design and construct heating systems	trainees will build three solar water heaters a) active (pumped) using inexpensive plastic pipe b) passive batch type manual load c) concentrating, thermosyphon	Landers	Hammond Camp
Agitation	design alternative methods of agitation	discussion of animal power vs wind - possible field trip to see animal powered workshop	Coburn	Amish Farm

Methane Use - design systems for efficient methane utilization

<u>Component</u>	<u>Objective</u>	<u>Activity</u>	<u>Staff</u>	<u>Logistics</u>
Scrubbing ½ day	devise system to "scrub" the gas for use in lighting, cooking	each trainee will mix scrubbing chemicals, construct scrubbing vessels	Jessee	Hammond Camp
Lamps ½ day	devise a lighting system for homes, for optimum lighting and safety	each trainee will build a lighting device with a mantle, various types of lamps and their efficiency demonstrated	Jessee	Hammond Camp
Burners ½ day	devise gas burners for optimum heating capacity	in small groups the trainees will - 1. convert existing burners 2. design and construct homemade burners discussion of the importance of ratios of cross-sectional areas	Jessee	Hammond Camp
Engines ½ day	convert engine	after a demonstration and discussion of basic engine mechanics, trainers in groups will modify a carburetor	Jessee	Hammond Camp

Ecuador - develop a strategy to implement the construction of digesters which will take into account the realities of Ecuador

<u>Component</u>	<u>Objective</u>	<u>Activity</u>	<u>Staff</u>	<u>Logistics</u>
Ecuador ½ day	discuss the cultural traditions and the constraints of scarce resources and materials in Ecuador	Ecuador slide presentation, discussion of soils, crops, livestock, material resources, limitations to development, cultural traditions, health and environment as they relate to the introduction of anaerobic digesters.	Brink	Hammond Camp
Practice Teaching ½ day	devise and implement effective communication strategies for the introduction of biogas technology to a community	trainees will take demonstration digester or prepare whatever materials that would be effective and demonstrate the principles of anaerobic digestion and methane digesters to a rural group. This phase of training will allow the trainees to devise their own strategies of carrying out the demonstration.	3 trainers	Local School or small group of farmers

1. c

METHODOLOGIES

Lectures - Slide Shows - presented by technical experts in their field.

Problem-solving Sessions - where applicable the trainees will be given design and mathematical problems which will clarify the ideas presented in the lectures, with staff on hand to answer questions.

Hands On - laboratory work related to methane production workshop plumbing and carpentry, on-site work in construction, operation and troubleshooting

Discussion and Review - opportunities to meet with the staff to discuss material presented so far and exchange ideas.

Reading Assignments - Complete Biogas Handbook and problems in book - other material on hand.

Field Trips - visits to two, and possibly three working biogas digesters and two others which are not completed. visits to farms to design digesters and cost/benefit analysis.

Tests - every three to four days, correction and discussion.

Practice Teaching - first hand experience in communicating ideas.

Tutor Sessions - one-to-one contact to individualize instruction.

1. d

TRAINING AND STAFF INPUT

The major responsibilities for specific training components have been identified where possible in Content of Training. In each of the 'hands on' workshops, problem solving sessions, field trips and tours, at least three trainers or technical people will be on hand to assist. All trainers will be on hand for lecture presentations by visiting technical consultants so that they will be familiar with all technical aspects presented in the training session. The technical director and one of the trainers will be staying at Hammond Camp. At least one staff member will be available for assistance five evenings a week. Ted Landers and David Jessee will be on hand about 25% of the time, and will also be available in their office at Rural Gasification Project, five miles away.

The main aspects of staff input will be to provide technical direction, to ensure that safety precautions are followed, to encourage initiative, and to sensitize trainees to the realities of Ecuador.

All staff - with the exclusion of the Services Coordinator - will participate as necessary as trainers or tutors.

1. e

LOGISTICAL AND TRAINING RESOURCES

Trainees will be picked up at the airport in Springfield upon arrival and delivered to the camp. They will also be returned to the airport at the end of training.

The sites for presentation of the various training components are mentioned under Content of Training. The five digester sites are all located within 20 miles of the camp, and trainees will be driven in three vehicles back and forth whenever necessary.

Other possible field trip destinations are also within 20 miles of the camp except the possible field trip to an Amish farm, which is about 75 miles away.

All other training components will occur at the principal training site where a laboratory, incubator, workshop, lecture hall, discussion rooms, portable methane demonstration digester, and library are located.

1. f

2 SUNDAY	3 MONDAY	4 TUESDAY	5 WEDNESDAY	6 THURSDAY	7 FRIDAY	8 SATURDAY
morning		Staff Intro. Site Tour	Consultants Landers- Staff interact	Evaluation System Glossary	Gear Up	Introduction to staff, Rules & Regulations General Procedures Introduction
afternoon		Training Plan	Ecuador Metric	Gear Up	Trainees arrive Hand out literature Tour site	Meetings with staff
evening		Peace Corp Philosophy				

2/3

9 SUNDAY	10 MONDAY	11 TUESDAY	12 WEDNESDAY	13 THURSDAY	14 FRIDAY	15 SATURDAY
morning Trips to church	Metrics Gallon Digesters	Existing Digesters	Substrates	BioChem Lecture BioChem Lab	Hydraulics Lecture Hydraulics Lab	Barrel Digester (4hr.)
afternoon	Digester I Tour	Digester II Tour	Ecuador	BioChem Lab	Soldering	Option
evening						
16 SUNDAY	17 MONDAY	18 TUESDAY	19 WEDNESDAY	20 TH 3DAY	21 FRIDAY	22 SATURDAY
morning	Pole Building	Concrete	Design	Manure Handling	Operation Slipforms	Operation
afternoon	Pole Building	Concrete	Design	Practice Teaching	Slipforms	Operation
evening						

Sunday and evenings open for study assignments, possible slide shows, movies, pre-arranged tutor sessions, recreational activities, individual optional projects, laboratory work.

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23 SUNDAY	24 MONDAY	25 TUESDAY	26 WEDNESDAY	27 THURSDAY	28 FRIDAY	29 SATURDAY
morning	Heating Lecture	Cost Benefit Analysis	Design- Work Session	Plaster	Trouble Shooting	
afternoon	Heating Workshop	Heating Workshop	Optional	Plaster	Trouble Shooting	
evening						
30 SUNDAY	31 MONDAY	1 TUESDAY	2 WEDNESDAY	3 THURSDAY	4 FRIDAY	5 SATURDAY
morning	Scrubbing	Trouble Shooting	Trouble Shooting	Burners	Final Exam Tie Up Loose End	Review of week & Evaluation
afternoon	Lamps	Agitation	Option	Engines	Review Final Exam	
evening						

1. g

ASSESSMENT AND EVALUATION

A file will be kept on each trainee. All tests and paperwork assignments will be filed daily. Trainers on hand for workshops and field trips will file information daily on trainee progress, as well as an evaluation of the day's program. Trainees will also be asked to note on their assignments if they feel they need additional assistance. The project and technical director will meet individually with the trainees at three to four day intervals and discuss the achievement of objectives so far. They will also assess the need for additional tutor sessions or a redirection in emphasis of the program.

Tests will be designed to directly test the interim objectives as stated.

2.

STAFF

Contractor - Perennial Energy, Inc.

David Jessee - General Manager
Ted Landers - Director Research and Development
Dr. Tom Abeles - Chief Executive Officer

Consultants- - - - -Project Director- - - - -Secretary
Brad Jacobs Tonya Burgess
On board March 1 - April 11 On board March 4 -
Percentage of time - 100% April 11, 50% of time

Accountant
Pat Wiersema
On board March 4 -
April 11, 10% of time

Logistics & Resources
Linda Jacobs
On board March 1 - April 11
75% of time

Services Coordinator
Irene Buckwalter
On board March 7 - April 6
100% of time
2 full time helpers
4 part time helpers

Technical Director
Brot Coburn
On board March 4 - April 6
Percentage of time - 100%

Trainers/Instructors

Construction

Design

Skip Brink
On board
March 4 -
April 6
100% of time

Mike Raith
on board
March 4 -
April 11
75% of time

*

Ted Landers
on board
March 4 -
April 11
25% of time

David Jessee
on board
March 4 -
April 11
25% of time

PROJECT DIRECTOR

Brad Jacobs

Administration, Budget and Hiring of Training Staff

Be in contact with P.C. Washington.

Work with key staff, be sure all responsibilities are met, assist as needed.

Keep file on all trainees.

Organize and participate in Staff training

Orient staff to P.C. philosophy and requirement.

Meet frequently on a one-to-one basis with each Trainee to evaluate and discuss:

- a) Progress and understanding of material covered.
- b) Needs and changes that might facilitate learning process
- c) Gripes
- d) Problems (other than those which require professional help.)

Be in contact with Medical Consultants and Division Health Services.

Trainer, assist in training where needed.

Contact and assist consultants.

Program and allocate responsibilities such as:

lectures, workshops, staff assignments, drivers, field trips, notify service coordinators of food needs, etc.

Deal with staff problems, gripes, and changes that occur.

TECHNICAL DIRECTOR

Brot Coburn

Coordinate Technical Activities

Work closely with trainers to synchronize training techniques. Organize and/or allocate responsibility for work sessions, labs, and field trips, i.e.

- a) Work with staff leading the training session.
- b) Be sure all materials are available for labs and work sessions.
- c) Be sure all tools and materials are accounted for at end of each training session.
- d) Keep up with time schedules and report needed adjustments in Technical training.

Keep posted all scheduled staff duties

- a) Both leaders and assistants.
- b) Make adjustments and/or additions if necessary.

Be aware of each trainees abilities, both intellectual and physical, and their changes during the training process.

Be available for one-on-one talks with trainees, tutor, assistance with individual projects.

Submit daily evaluation reports both on content of training and trainee difficulties in completing interim objectives.

Write tests on material present or studied.

Follow the basic laboratory methane experiment.

LOGISTICS AND RESOURCES

Linda Jacobs

Evaluation - Maintain in-process evaluation file on all activities

Prepare and hand out evaluation forms to be used during each segment of training by staff in charge and assistants.

Collate evaluations for use in program modification and final analysis for report to P.C. Washington

Present findings to program director and at staff meetings upon request

Assist teaching staff with handouts, graphs, etc., and duplication of materials

Maintain library - research materials in big room.
Peace Corp literature, 3rd World information periodicals, daily newspapers, etc. Purchasing of such.

Driver for medical trips, supplies.

As time allows - work with training staff, tutor sessions, etc.

Assist in minor administrative duties.

TRAINER/INSTRUCTOR

Skip Brink

Instruct in digester construction.

Orient activity to Ecuador Reality.

Work with Mike and additional staff on various construction projects.

Be aware of each trainees abilities and progress during training programs.

Be available for tutor (one-on-one) sessions.

Attend daily briefing with Technical director to discuss strategies, responsibilities, changes, and resource needs for program. (in advance)

Submit reports on group activities with individual trainee progress evaluation sheets.

TRAINER/INSTRUCTOR

Mike Raith

Instruct in Digester Construction

Work with trainers and additional staff on various construction projects.

Submit evaluation forms.

Attend daily briefings with technical director, to discuss strategies, responsibilities, changes, and resource for program.

MAIN DESIGN AND TECHNICAL INSTRUCTOR

Ted Landers

Responsible for:

- a) Design of digesters
- b) Passive and active solar heating systems
- c) Existing digester information

Write tests on technical material presented.

Will conduct five days of instruction, and be on call at the Rural Gasification office in Dora.

Participate in Evaluation process and Final Report.

METHANE USE INSTRUCTOR

David Jessee

Conduct Plumbing and Hydraulics workshops.

Lead Digester tours.

Direct Methane Use Laboratories.

Participate in Evaluation process and final report.

Will conduct five days of instruction, and be on call at the Rural Gasification office in Dora.

SERVICE COORDINATOR

Subcontractor to Irene Buckwalter

- Food: Three meals a day for all trainees and staff.
Snack once a day.
Bag meals when necessary
Buying and hauling all groceries, etc.
- Housing: Arrange and provide cabin type multiple living
(3-4) quarters.
Maintain room for temporary overnight stays of
staff and consultants.
- Sanitation: Cleaning of utility and washrooms, routine health
and fire safety checks including necessary official
inspections.
- First Aid: Maintain adequate first aid kit.
- Heat: Firewood for cabins and fireplace, electric heat, etc.,
if necessary.
- Transportation: Pick up and return trainees in Springfield.
Maintain 8 seater 4x4 vehicle for emergencies, etc.
- Laundry: Provide and launder sheets, pillowcases, blankets,
towels, etc. regularly.
Provide facilities for trainees to wash their clothes.
- Helpers: Hire and pay two full time and four part time helpers
for food preparations, washing dishes, cleaning bath-
rooms and cabins, maintaining all buildings in a
clean and presentable condition except tool and supply
room.
- Electric: Pay all electric bills at Hammond Camp

3.

TRAINING SITE

Hammond Camp in the Mark Twain National Forest has been reserved for our main training and lodging site. It is located on a paved road 15 miles from West Plains, 5 miles from the Rural Gasification Project office, and 100 miles from Springfield. There are six digesters within a twenty mile radius. The camp has been used for past methane digester workshops of Perennial Energy Inc. The camp compound is surrounded by forest on all sides with a spring fed, canoeable river within walking distance. Trails lead in all directions from the camp into the forest. A paved state highway passes the camp within a few hundred yards.

The camp provides a large dining-lecture hall (approx. 30' x 60') with more than adequate supply of tables and chairs. An all-electric institution size kitchen facilities and walk in refrigerator adjoins the main room. Two smaller rooms are available for offices and infirmary. A large fireplace heats the rooms. Electric heat is available if necessary. Two heated cabins will be converted into a laboratory and a workshop. Other cabins will be available if needed. Cabins will be used to house the trainees and resident staff. They contain wood circulating heat stoves, and will have three or four trainees in each.

Staff will be used for transportation. Rental buses and pick-up trucks will be used as needed. A vehicle will be present at the facility 24 hours a day. Recreation and church transportation will be supplied when prearranged. A library will be maintained in the central meeting - dining area. It will contain:

- Alternative Energy Research
- Methane Research Materials
- Peace Corps Literature
- World Information Periodicals
- Daily Newspapers
- Etc.

Bathrooms, showers, and washing machine (1) dryer rooms (2) are located in the camp complex. Also, the following recreational facilities are present.

- 1 Volleyball court (blacktop)
 - 1 Half court basketball hoop
 - 2 Softball fields
 - 2 tetherball poles
 - 1 large covered concrete slab for training work or recreation (to be used during inclement weather)
- Chapel

A mobile demonstration methane digester will be present at the Camp. It is a sludge displacement chinese type, using a 500 gallon steel tank which is mounted in the middle of a trailer. A privy is located at one end and a kitchen at the other.

A plexiglass end on the tank shows easy viewing and demonstration of the sludge displacement principles.

RESOURCES

We have a complete library of references on biogas, alcohol, (see attached lists) and all renewable energy sources including wind, solar, and hydraulic rams. Also available are prints of operating biogas generators, home-built rams, biogas generator components and a movie (DOE) - "Solar Engineering, The Great Adventure". A copy of The Complete Biogas Handbook will be given to each trainee to keep. (400 pp by D. House)

Materials, supplies, and teaching aids available are overhead projector, movie projector, slide projector, chalk board, hydraulic rams, infrared heaters, digester component parts, CO₂ meter, methane alarm, digital VOM meter, oscilloscope, amprobe, cement mixer, transit, two slip forms, sight gauges, 400 cu. ft. incubator for digester experiments and \$10,000 worth of personal hand and power tools belonging to the staff and made available to the trainees as is necessary, and six existing farm size digesters.

RGP digester #1 is a 400 cu. ft. concrete chinese style biogas generator with steel reinforcement around the outside and uses a sludge displacement type of gas storage system. It was designed and built with the idea that material cost should be kept to a minimum regardless of how much labor is needed and operation and maintenance should be as simple as possible. This digester was designed to have the greatest amount of longevity and may be the most promising for use in Ecuador.

Number 2 is also a sludge displacement, chinese type but uses a 500 gallon steel tank and is mounted in the middle of a trailer with a privy on one end and a kitchen on the other. This unit makes an excellent demonstration unit having plexiglass on one end of the digester tank for easy viewing of the sludge displacement principle.

Digester #3 is a 400 cu. ft. concrete biogas plant built using the same slipform as digester #1 with a different gas storage system. The bulk of the biogas is stored in a low cost vinyl bag. Due to the vinyl's incapability to hold pressure, the biogas is pumped into a smaller displacement storage system using four 55 gallon drums.

Digester #4 was designed to be built in a minimum of time. Basically, it is a vinyl bag in a wooden frame. It incorporates several innovative gas handling devices which not only enhance safety but also simplicity.

RESOURCE LIST FOR METHANE DIGESTER WORKSHOPS BY
RURAL GASIFICATION PROJECT, DORA, MISSOURI

The Compleat Biogas Handbook (d. house)

Perennial Energy, Inc.
P.O. Box 31
Dora, Missouri 65637

Methane: Planning a Digester (Peter-John Meynell)

Schoken Books
New York, NY

Energy, Agriculture & Waste Management (William J. Jewell)

Ann Arbor Science Publishers, Inc.
PO Box 1425
Ann Arbor, Michigan 48106

The Feasibility of Methane Production From Dairy Animal
Wastes: The Farmer's Perspective (Braithwaite, Capener)

Department of Rural Sociology
NY State College of Agriculture & Life Sciences
Cornell University
Ithaca, New York 14853

Biosources Digest

Neus, Inc.
PO Box 1979
Santa Monica, Ca 90406

Practical Building of Methane Power Plants For Rural
Energy Independence (L. John Fry)

L. John Fry
1223 North Nopal Street
Santa Barbara, Ca 93103

Bioconversion of Agricultural Wastes for Pollution Control
& Energy Conservation (W.J. Jewell)

Department of Rural Sociology
NY State College of Agriculture & Life Sciences
Cornell University
Ithaca, New York 14853

Bio-Energy Directory

The Bio-Energy Council
Suite 825A
1625 Eye Street NW
Washington, DC 20006

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RESOURCE LIST CONTINUED

Report on the Design and First Year Operation of a
50,000 gallon Anaerobic Digester at the State Honor
Farm Dairy, Monroe, Washington (Ecotope Group)

Ecotope Group
2332 East Madison
Seattle, Washington 98112

Methane Generation from Human, Animal & Agricultural
Wastes (National Academy of Sciences)

National Academy of Sciences
2101 Constitution Avenue
Washington, DC 20418

Methane on The Move

Energy Potential Through Bio-Conversion of Agricultural
Wastes (Rurford, Varani)

Bio-Gas of Colorado, Inc.
342 E. 3rd
Loveland, Colorado 80537

Anaerobic Sludge Digestion

Water Pollution Control Federation
3900 Wisconsin Avenue
Washington, DC 20016

Bio-Gas Plant (Ram Bux Singh)

Mother's Print Shop
PO Box 70
Hendersonville, NC. 28739

Process Feasibility Study: The Anaerobic Digestion of Dairy
Cow Manure at the State Reformatory Honor Farm, Monroe, Wa.

Ecotope Group
PO Box 618
Snohomish, Washington 98290

Task VI- Biological Production of Gas (Abeles, Ellsworth)

ie associates
3704 11th Ave S
Minneapolis, Mn 55407

RESOURCE LIST CONTINUED

Bibliography of Anaerobic Digestion (Abeles, Freedman, DeBaere, Ellsworth)

Energy & Economic Assessment of Anaerobic Digesters for Rural Waste Management (Abeles, Freedman, Ellsworth, DeBaere)

Design Considerations for Anaerobic Farm Digesters (Abeles)

A Farm Integrated Utility System (FIUS): A Study of Farm Energy Use (Abeles)

Oasis 2000
University of Wisconsin Center
Rice Lake, Wisconsin 54868

ALCOHOL RESOURCE LIST

Brown's Alcohol Motor Fuel Cookbook

by Michael H. Brown
published by;
Desert Publications
Cornville, Arizona 86325

Makin' It On The Farm

by Micki Nellis
published by;
American Agriculture News
PO Box 100
Iredell, Texas 76649

Food For Thought

by Herman Frederick Willkie
& Dr. Paul John Kolachov
published by;
Indiana Farm Bureau, Inc.
Indianapolis, Indiana

Making Wine, Beer and Merry

by Kathleen Howard & Norman Gibat
published by;
Popular Topics Press
Box 1004
Fostoria, Ohio 44830

The Lore of Still Building

by Kathleen & Norman Gibat
published by;
Popular Topics Press
Box 1004
Fostoria, Ohio 44830

Let's Make Our Own Wines & Beers

compiled by John H. Toba
published by;
Provoker Press
St. Catharines, Ontario

The Report of the Alcohol Fuels Policy Review June 1979

by U.S. Department of Energy
available from the
Superintendent of Documents
U.S. Government Printing Office
Washington, D.C. 20402

Biomass Energy Success Stories

by U.S. Department of Energy
available from
Assistant Secretary for Energy Technology
Division of Solar Technology
Washington, D.C. 20545

ALCOHOL RESOURCE LIST CONTINUED

Comparative Economic Assessment of Ethanol From Biomass
prepared by The Mitre Corporation
for U.S.D. of E.
available from;
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, Virginia 22161

Feed Formulation

by & available from;
Distillers Feed Research Council
1435 Enquirer Building
Cincinnati, Ohio 45202

Making Alcohol Fuel Recipe & Procedure

by Lance Crombe
published by;
Putan Publishing
PO Box 3585
Minneapolis, Mn. 55403

Gasohol USA (monthly magazine)

available from:-
Circulation Department
Gasohol USA
PO Box 9547
Kansas City, Missouri 64133

Alcohol Fuels (annotated bibliography)

National Center for Appropriate Technology
PO Box 3838
Butte, Montana 59701

Methanol as a Fuel-Proceedings of Symposium held in Stockholm,
Sweden March 23, 1976

available from;
Office of the Scientific Counselor
Swedish Embassy
600 New Hampshire Ave, NW
Washington, D.C. 20037

Membrane Controlled Digestion

by Jeffries, Omstead, Cardenas & Gregor
available from ;
Department of Civil & Environmental
Engineering
Polytechnic Institute of N.Y.
Brooklyn, N.Y. 11201

Ethanol Fuels From Renewable Resources in the Solar Age

by Gregor & Jeffries
available from;
Department of Chemical Engineering
& Applied Chemistry
Columbia University
New York, N.Y. 10027

ALCOHOL RESOURCE LIST CONTINUED.

Alcohol Fuels; The Most Often Asked Questions
by Scott Sklar
available from;
NCAT
1522 K Street NW, Suite 1036
Washington, D.C. 20005

Alcohol Fuel Production For The Farm 1/79
special reprint from;
Small Farm Energy Project
PO Box 736
Hartington, Nebraska 68739

Korn Likkar Times (monthly newsletter)
Korn Likkar Times
PO Drawer E
Fayetteville, Arkansas 72701

4. b

RESOURCES

The Amish dwellings in nearby Seymour, Missouri use no electricity or internal combustion engines. One family makes horse-drawn carriages and uses horse power to run the shop. It is an ideal situation to acquaint the trainees with harnessed animal power to run lathes, drill presses, and perhaps a digester agitation mechanism. Due to the lack of telephones they have not been contacted.

Dora High School would be an excellent place for volunteers to do demonstrations and talks on Biogas Generation. The trainees would be evaluated by the staff and students alike. The principal has been contacted, and is agreeable to help if possible.

A small scale laboratory will be set up in two of the cabins at Hammond Camp. This will be for the regular testing and observation of the glass bottle methane experiments.

Tom Engh is a Metallurgical Engineer who now works in a self-owned auto repair shop. He has agreed to help out where needed with various types of material fabrication and repair.

Charles Fulhage is the state waste management specialist for the University of Missouri at Columbia. He is an agricultural engineer and has designed many waste handling facilities. He is closely involved with the swine manure methane digester that is operating at the University. He has been contacted, and agrees to work with manure handling and use.

Dr. Tom Abeles is world renown not only as an author of several papers on Bio Gas Generation but considered an expert in all fields of Alternative Technology.

He was a professor at the University of Wisconsin, and has worked with us on several methane workshops in the past. He has proved valuable not only as a lecturer, but as an educational organizer as well. He will be involved in staff training of technical aspects, and give the Introduction to Methane Digesters lecture to trainers and staff.

Dr. Colin Collins is a BioChemist and is currently the Head of the Science Department at Southwestern Missouri State University at West Plains Campus. He also works as a nutrition consultant to hospitals, schools, and animal feed companies. Dr. Collins has taught at four of our previous BioGas workshops in which his expertise in BioChemistry was well transferred to the students. His lectures during the training of the PC Trainees will be brought to the level of understanding of the trainees so that both the least and the most technical trainee will learn a great deal.

Number 5 is a totally passive digester using no electricity at all. It holds 600 cu. ft. of sludge and 450 cu. ft. of biogas all in one vinyl enclosure.

The New Life Farm, Inc. digester is a 2000 cu. ft. cellulose digester which is the only cellulose digester of this size known to be in existence and was designed and constructed by Ted Landers with financial help from the University of Missouri at Rolla.

ADDITIONAL MATERIALS TO BE PURCHASED

44	1 gallon bottles
22	3 gallon buckets
22	#13 stoppers
60'	latex tubing
20'	$\frac{3}{4}$ " OD copper tubing
7	55 gallon drums
3	4" X 12" nipples
6	4" PVC fip adapters
30'	4" PVC
20'	2" PVC
6	2" PVC mip adapters
3	$\frac{3}{4}$ " PVC mip adapters
3	$\frac{3}{4}$ " plugs
3	$\frac{3}{4}$ " valves
3	meters
	chalkboard

4. b
(Continued)

SPECIAL TRAINING SITE

The trainees will be taken to the Pig farm of Walter Barnard, where a site has been cleared for a Bio Gas Plant. The trainees will evaluate the situation and then begin construction on a 400 cu. ft. digester that will actually be used by the farmer.

The trainees will get 'hands on' experience of using a transit and sight level to determine elevations and angles for proper flow of manure through pipes. They will then construct a 12' x 12' pole building to be used to house the digester. After pouring a slab in the building and after proper curing time they will build a 10' diameter concrete tank 6 feet tall using a 1'x3'x3" curved slipform. After proper curing time the tank will then be plastered by the trainees. Steel reinforcing bands will be placed on the outside. This construction technique is Ecuador specific and the talents developed by the trainees will be valuable in Ecuador construction of Bio Gas plants.

The materials for this digester will be supplied by the Rural Gasification Project of New Life Farm under a CSA Grant. This should make this training component of the workshop extremely cost efficient.