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Dissemination Consultancy Repo

Sudan Renewable Energy Project
Energy Research Council
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Claudia H. Huff
Technology Applications Laboratory
Georgia Tech Research Institute

Organization of this report:

Acknowledgements

- I. Objectives
- II. Accomplishments
 - A. Publications
 - B. Demonstrations
 - C. Workshops
 - D. Communication Channels
 - E. Miscellaneous
- III. Dissemination Strategies
 - A. Overview
 - B. The Dissemination Process
 - C. The Dissemination Process for Charcoal Stoves
 - D. DRAFT Dissemination Process for Fuelwood Production
- IV. Recommendations
 - A. Future Consultancies
 - B. Staffing
 - C. Short-Term Activities
 - D. Dissemination Resources
 - E. Procurement

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Thanks are also due to the staff of the Technology Transfer Branch of the Technology Applications Laboratory, Georgia Tech Research Institute, and in particular to the branch chief, Ms. Carol Aton. The expert efforts of this team made it possible for me to leave my regular responsibilities for a full quarter with full confidence that everything would be just fine "back at the office."

1. OBJECTIVES

A short-term consultancy was arranged for the Fall of 1984 as a follow-up to earlier efforts which focused on initiation of technology dissemination activities by the newly established Technology Development and Dissemination Unit, Renewable Energy Research Institute. The objectives of this follow-up three-month consultancy were:

1. To continue work in the area of publications and demonstrations.
2. To develop and implement a training workshop for a selected technology.
3. To initiate cooperative activities with other energy-related institutions.
4. To establish communication channels with selected organizations in order to facilitate dissemination activities through the mechanism of Renewable Energy Development Grants.

II. ACCOMPLISHMENTS

A. Publications

Several publications were produced during this consultancy. Each is briefly described below.

Trainer's Manual for the Stovemaker's Workshop

This 18-page document covers the following topics:

- templates, materials, and tools
- tracing, cutting, and marking
- assembly procedures including grate punching
- solo production
- mass production
- economics

The manual is fully illustrated with drawings of tools, dimensions for the various metal pieces, and step-by-step assembly procedures. The appendix includes a listing of day-by-day activities entitled "Training Design" and copies of each of the two Trainees Manuals.

Trainee Manuals for the Open-Draft and Controlled-Draft Stoves

These manuals consist solely of illustrations showing the necessary tools, the dimensions of the various metal pieces and the step-by-step assembly procedures. All labels, titles, and dimensions are in Arabic.

Final Report on the Khartoum Stovemakers Training Workshop

The workshop report is a detailed recounting of the planning, implementation, and evaluation activities conducted in support of this training effort. It includes recommendations for improving subsequent offerings of the workshop that were garnered through an analysis of questionnaire results and the evaluations voiced by staff in a follow-up meeting. The appendices of this report include planning calendars, various checklists, budget data, press clippings, and questionnaire forms.

Charcoal Stoves Project Report

This 21-page document is entitled "Canun El Duga: Improved Charcoal Stoves for the Sudan." It recounts the development of the improved charcoal stove designs from 1979 on, with an emphasis on SREP efforts which began in 1983. Topics covered include:

- project objectives
- design characteristics
- laboratory testing
- field testing
- the stove contest
- dissemination activities

In the conclusion, the project's success is attributed to its emphasis on using existing metalworking artisans and stove sales channels. By working with this established capability, SREP was spared the need to spend considerable time and funds on infrastructural development, and moved directly to sales promotion.

Charcoal Production in Blue Nile Province

This 51-page report, the original draft of which was prepared by local consultants, underwent extensive revision and editing before its publication in December.

B. Demonstrations

Two demonstrations were held in marketplaces this fall. The first, in September, was held in U.N. Plaza in downtown Khartoum. Producers from the Khartoum Industrial Area participated. A second demonstration was held in Souk Ashabi in Omdurman in early December. This second demonstration was originally intended to support the sales activities of new producers from the Omdurman area who had attended the stovemakers workshop. But since these producers did not have the requisite number of finished stoves, Khartoum Industrial Area producers were also invited to participate.

C. Stovemaker's Training Workshop

On November 3-15, two stovemaker training workshops were held back to back:

- Opening ceremony, National Council for Research - Nov. 3
- Khartoum Industrial Area Training Session - Nov. 4-8
- Omdurman Industrial Area Training Session - Nov. 10-14
- Closing Ceremony, ERC/SREP Offices - Nov. 15

In all, 24 stovemakers received hands-on instruction in quality control and production methods for both the open-draft and controlled-draft versions of the improved stove. First, second, and third place prizes were awarded for the best stoves produced during the solo production phase of the training. A special prize was awarded for an innovative contribution. Certificates of achievement were awarded to all participants. Trainees were also provided with an opportunity to display their wares to retailers who were invited to the closing ceremony.

Planning for this workshop began in mid-September. Following an initiation meeting of all workshop staff, an implementation plan and schedule were devised to detail individual responsibilities and assignments. Major tasks included the following:

- budgetting
- procurement of tools, templates, and materials
- publicity
- development and production of manuals
- questionnaire design and data collection
- contact with trainees and retailers
- site coordination

Weekly staff meetings were scheduled in order to monitor progress and make any necessary mid-course adjustments. A follow-up meeting was held after the workshop closing in order to assess success and record recommendations for improvements to enhance future presentations of the training.

Initial results, drawn from analysis of interviews and questionnaires as well as from perceptions of workshop staff, indicate that the objectives of the workshop -- to improve quality control and production methods -- were met. The administration of follow-up questionnaires to the trainees, scheduled for early January, should provide an even better perspective on the success of this initial effort.

D. Communication Channels

A fruitful working relationship has been established with the Central Forestry Department and the FAO Fuelwood for Energy Project. Their assistance with logistics and transport for the stovemakers workshop was both timely and invaluable. A blacksmith from their staff attended the workshop and is now qualified as a trainer in the use of stovemaking tools and materials. Central Forestry/FAO is in the process of developing a proposal for a Renewable Energy Development Grant to conduct a workshop patterned after the SREP workshop, to be held at the Eastern Region office of the Forestry Department in Kassala.

Several other organizations have been approached about sponsoring a similar workshop with technical assistance and partial funding provided by SREP. After initial conversations with SREP staff, formal requests for proposals were mailed to the following:

Yassin Ahmed Abdel Wahid, Director
Adult Education Center, Shendi

Resne Tesfa Marian, Assistant Director
Foster Parents Plan, Wad Medani

Steve Watson and Napeesa Abdullah
Euro-Action Acord Program for Small Industry, Port Sudan

Wendy Stone and Gabriel Daniel
Sudanaid Metalworking Program, Gedaref

In addition, interest has been expressed by the Ministry of Agriculture's Extension Office in Ed Damer.

By using the Trainer's Manual, Trainees Manuals, and the Workshop Final Report, as well as a set of templates and models of both versions of the stove, it should be possible to replicate the workshop in other locations, provided that technical assistance from SREP is made available.

E. Miscellaneous

Additional miscellaneous assistance was provided to several efforts. Several meetings were held to encourage the management of Khartoum Nursery to use their unexpended grant funds for dissemination activities. Currently, there are a number of signs installed around the Three Towns area in key places which advertise the availability of seedlings. Funds were expended to repair a vehicle which will facilitate the outreach efforts of nursery staff in their interaction with farmers. A poster is under development which will further aid in advertising the availability of seedlings and technical assistance.

Initial planning efforts for the upcoming nursery workshop were held with SREP forestry staff and staff from the Dissemination Unit. Preliminary discussions were held to conceptualize the integrated agriculture/forestry seminar planned for next spring.

Meetings with staff from CARE-El Obeid and CARE-Gedaref were held. Dissemination Unit staff will be working with these agencies in the development of posters and other publicity materials.

In preparation for the November addition of two Peace Corps Volunteers to the Dissemination Unit staff, orientation programs and work plans for the first six months were prepared.

A form for reporting monthly progress, to be used by SREP project leaders, was developed.

Discussions were held with RERI staff about the mechanics of developing and sustaining an in-house newsletter.

And finally, I presented a seminar entitled "The Dissemination Process for Improved Charcoal Stoves - The Role of Workshops," on December 10 in the RERI Conference Room. The seminar was attended by RERI and SREP staff as well as representatives from the FAO Fuelwood Project and the National Energy Administration.

III. DISSEMINATION STRATEGIES

Overview:

Dissemination strategies are a key component in the technology transfer process whereby innovations are taken from the laboratory to the end-users. Strategies are developed through a step-by-step process:

1. Determining the needs of potential users.
2. Relating technical data to practical applications.
3. Determining the information required for transfer.
4. Identifying potential barriers to adoption or application.
5. Developing practical methods for overcoming these barriers.

In fact, the development of dissemination strategies is itself a process. As such, focus should be directed not to the individual tasks so much as to the mechanisms, or pathways, by which these tasks accomplish the intended goals. Successful technology transfer occurs in a balanced framework of thought and action.

Because technology dissemination is a process, there is a strong need for flexibility and adaptability. In short, resiliency is the key. Successful dissemination efforts are able to turn what might look like defeat into victory through the concerted application of analysis and imagination. What is required is the ability to incorporate new findings all along the way, even when the new information challenges basic assumptions. It is also important to remember that it is much easier to generate ideas than to perform all the hard work required to implement them.

Presented below are three documents:

1. The Dissemination Process (the planning tool in outline form)
2. The Dissemination Process for Charcoal Stoves
3. DRAFT Dissemination Process for Fuelwood Production

These documents were developed in conjunction with project staff.

THE DISSEMINATION PROCESS

- Assumptions:
1. Overall project objective is well-defined
 2. Needs assessment performed
 3. Focus on a technology that is developed and adapted to local situation as well as appropriate to the needs being addressed (i.e., lab and field tested)

I. Audience Analysis

1. Who will benefit from introduction of this technology?
2. What is the size of this audience?
3. Where is this audience located?
4. What are the characteristics of this audience?
 - a. What is their educational level?
 - b. What is their position in the social and economic structure?
 - c. What is the extent of their current knowledge of this technology?
 - d. How do they make decisions?
5. What are the relevant attitudes of this audience?
 - a. What is their attitude toward the problem being addressed?
 - b. What is their motivation towards solving the problem?
 - c. What is their attitude toward change in the sphere of their lives that will be affected by the introduction of this technology?
 - d. How extensive is the change of beliefs and practices that will be required?
6. What is the best mechanism for reaching this audience?
 - a. What existing communication channels does this audience have access to?
 - b. Which communication channels does this audience have the most faith in?
 - c. With what other population groups does this audience regularly communicate?
 - d. Are there new communication channels worth exploring in trying to reach this audience?

II. Technology Assessment

1. What are the relevant characteristics of this technology?
 - a. What is the initial cost?
 - b. What is the length of the average payback period?
 - c. What does a cost/benefit analysis reveal?
 - d. Is the technology easy to implement and to use?
 - e. Is it reliable and durable?
 - f. What advantages/disadvantages are inherent in the technology itself?
 - g. What social, cultural, and economic factors constitute incentives or disincentives to its implementation?
 - h. Upon which external factors that are beyond control does its success depend?
2. What production mechanism is available for this technology?
 - a. Who currently produces the technology?
 - b. Are production methods efficient?
 - c. Are materials appropriate and readily available?
 - d. Is production sufficient to meet increased demand?
 - e. How the production process and rates be improved?
3. What distribution network is available for this technology?
 - a. Who currently distributes the technology?
 - b. Is the distribution network efficient?
 - c. How can distribution be improved?
 - d. Can the existing network handle an increased flow of goods?
 - e. How can distribution be extended to reach new audiences?

III. Strategy Development

I. Defining hypotheses

- a. Inputs: laboratory and field test results
economic and technical analysis of potential applications
identification of primary and secondary audiences
(including characteristics, attitudes, favored communication channels)
identification of production mechanism (including people, methods, processes, materials, rates)
identification of distribution network (including people, mechanism)

justifiable assumptions about audience acceptance
justifiable assumptions about economic feasibility

- b. Outputs: potential production rates
potential distribution rates
potential market penetration/impact
projected costs
projected timeframe

2. Selecting Methods

- a. Mass media: radio
television
newspapers
journals
magazines
 - b. Publications: pamphlets/brochures
posters/flyers
technical reports
training manuals
 - c. Training: informal (one-on-one or small group)
hands-on workshops
seminars and conferences
 - d. Public presentations: videotape
film
slide shows
 - e. Demonstrations and field days/open houses
 - f. Fairs and expositions
 - g. Provision of grants and technical assistance
3. Developing a time-dependent plan for implementing the selected methods to achieve the defined goals

IV. Implementation

V. Monitoring and Re-Direction

- 1. Assessment of accomplishments to-date
- 2. Refinement of goals
- 3. Reconsideration of methods/further adaptation of technology
- 4. Adjustments to implementation plan

VI. Evaluation and Documentation

VII. Replication

The Dissemination Process
For Improved Charcoal Stoves
Sudan Renewable Energy Project

Preliminary Assumptions Met:

1. Project Objective - To successfully introduce an improved charcoal stove to the marketplace that reduces charcoal consumption and utilizes small charcoal pieces
2. Findings of Needs Assessment:
 - A. Traditional charcoal stove is the preferred cooking method of urban dwellers but it requires lots of charcoal to cook a meal (often requiring more pieces in mid-process). It's average efficiency is just 18%, in part because it has no insulation.
 - B. The price of charcoal is rising as the distance of haul from production sites increases. Another result of the long distance transport is that more and more charcoal arrives at the markets in smaller pieces.
 - C. Up to 30% of a sack of charcoal bought in the market consists of small pieces that cannot be used in the traditional stove. In addition, there is an abundance of small pieces which are available at little or no cost at charcoal depots and production sites.
 - D. The adoption of improved charcoal stoves by a significant proportion of the urban population will result in more efficient utilization of charcoal and the wood resource from which it is derived.
3. Technology Focus:
 - A. The improved stove design is 39% more efficient than the traditional stove (laboratory test results).
 - B. It is well-suited to the Sudanese style of cooking and is acceptable to consumers (field test results).

I. Audience Analysis

Principal beneficiaries of the new stove will be the urban dwellers, of whom approximately 95% use charcoal as cooking fuel. Since the new design is not a great departure from the traditional stove in terms of how it is used, the change of practices required to adopt the new stove is minimal. Principally, the user must learn to place smaller and larger pieces in their respective places.

Since this is a large audience, their educational level and socioeconomic position varies, but is composed principally of lower- and middle-income persons. Purchasing decisions are primarily affected by economic considerations and product attractiveness.

While the audience may not be fully aware of the deforestation problem in the Sudan, they do know that their consumption of charcoal is accounting for an ever-increasing proportion of their total income. Therefore, their motivation for adopting the new stove is judged as relatively high.

This audience has access to a variety of existing communication channels including electronic and print media. In addition, the new stove can be expected to generate its own publicity by word-of-mouth. In addition, this audience can be reached at point-of-purchase; that is, in the markets and at the depots where traditional stoves are on sale.

II. Technology Assessment

I. Technology Characteristics

The initial cost of the new stove is about LS 15. This may be prohibitive for lower-income families when a similarly-sized traditional stove is available for LS 5. However, the average payback period is just over two months. In addition, the new stove is more durable than the traditional design, lasting a year or more (as compared to only a few months for traditional stoves). The most vulnerable component, the

firegrate, is removable and therefore easily replaced. Thus, from a cost/benefit perspective, the new design represents "the stove that keeps on saving."

The new design is easy to use, reduces both cooking time and charcoal consumption, and utilizes the smaller pieces which are normally discarded. The shorter cooking time may represent a disadvantage to older women who are accustomed to napping during the cooking process. In addition, popularity of the new stove is dependent upon the continued availability, at little or no cost, of the smaller pieces of charcoal.

2. Production System

Experience indicates that the most promising production mechanism for the new stove is the artisan producers of the traditional stove. This group has the requisite metalworking tools and skills, knowledge of and access to materials, and experience with the stove marketing and distribution network. Various strategies could be developed to improve production rates and methods.

3. Distribution System

Similarly, a distribution network already exists for the traditional stove which can be utilized for introduction of the new design. Various strategies could be developed to acquaint the public with the new stove and to stimulate consumer demand.

III. Strategy Development

1. Goals

With the information gathered through audience analysis and technology assessment, goals could be developed for production/distribution rates and potential market penetration.

It was estimated that within a time period of six months, it would be possible to train twenty stovemakers who could each produce ten stoves per week, and that with the aid of a concerted publicity campaign, these stoves would be sold to consumers by retailers and through other mechanisms.

2. Methods

Methods selected to accomplish these goals included:

1. A stove contest designed to stimulate production, identify producers and their training needs, and to promote public awareness of charcoal conservation opportunities. The contest would serve to stimulate incentive production and, since the awards would include orders for stoves, would set the stage for commercial production activities.
2. Development of a brochure illustrating proper use of the stove to be used as a marketing tool and as an information resource for stove users.
3. A publicity campaign to acquaint the public with the availability and characteristics of the new stove, utilizing print and electronic media.
4. A series of marketplace demonstrations of the new stoves which would serve to stimulate public interest. The demonstrations would also afford an opportunity for producers to sell directly to the public, further stimulating commercial production activities.
5. A hands-on training workshop for new and existing producers designed to improve quality control and production methods. Through involvement of retailers in the workshop, further penetration of the distribution network could also be achieved.

3. Timetable

The stove contest was scheduled with a closing date of March 1, 1984. This coincided with initiation of the media campaign which would continue for some months. Printing of the brochure was scheduled to be complete at the conclusion

of the contest. With the brochure and stoves produced by contest winners, marketplace demonstrations could begin at once and be held monthly thereafter. It was determined that November would be a suitable time for assessing production strengths and weaknesses and for involving new artisans in the production process in order to meet an anticipated increase in demand. Therefore, a training workshop was scheduled.

IV. Implementation

During the implementation phase, several important facts emerged. To ensure strength and durability of the stoves, specific gauges of metal should be used for certain pieces. Also, there is a need to emphasize proper grate-punching techniques and the ideas behind them to the stove producers. Several necessary adjustments to the training design for the workshop were also identified.

V. Monitoring and Re-Direction

Problem areas identified during implementation and from various questionnaires administered through face-to-face interviews with stove users, producers, and retailers were folded into plans for future activities. Additional markets were identified, principally the charcoal depots and other urban centers. Local staff will work to improve production methods of Khartoum area producers and to help them reach the additional markets. Replication of the workshop and demonstrations in other urban centers could be accomplished through the mechanism of grants and the provision of technical assistance.

VI. Evaluation and Documentation

Follow-up interviews with users, producers, and retailers will provide the basis for a thorough evaluation of the project's success. Most of the necessary documentation has already been

produced in the form of the project report, the workshop report, and the training manuals. The training manuals will be revised to increase their usefulness and to reflect changes instituted since the first offering. A follow-up report based on interviews and other pertinent evaluation techniques will be developed.

VII. Replication

The stoves project will be replicated through the provision of documentation, technical assistance, and, where necessary, grant funds to other agencies throughout the Sudan.

DRAFT Dissemination Process for
Fuelwood Production

Preliminary Assumptions:

1. Project Objective - To increase fuelwood supplies as much and as rapidly as possible, in a manner most productive for both energy and agricultural demands.
2. Findings of Needs Assessment:
 - A. Some 60% of the total fuelwood demand is from the central part of Sudan (Eastern, Central, and Kordofan Regions) with a significant concentration in and around Khartoum.
 - B. Presently, there is a serious deforestation problem in this area, and it is projected that within ten years all its major fuelwood sources will be exhausted.
 - C. There are also serious food shortages nationwide, and increased agricultural production, particularly of staple cereals, has high priority.
 - D. Soil erosion and crop damage due to hot, dry winds and insufficient fallow periods is a factor in declining productivity of established agricultural lands.
 - E. Tree growing in shelterbelts and along canalsides can stabilize soils and increase agricultural productivity in adjacent lands, while providing a significant new fuelwood resource.
 - F. Low and erratic rainfall makes it difficult to achieve fast tree growth without irrigation, and prevents the use of most fast-growing species in rainfed areas.
 - G. Vast amounts of land in central Sudan are now under irrigated agriculture. In spite of legislation mandating that 15% of all agricultural lands be devoted to forestry, less than 1% of these lands are under tree cover and little shelterbelt and canalside planting is present.
 - H. In southern Blue Nile and Kordofan areas, there may be potential for fuelwood production through natural forest management and selective agricultural land clearing (i.e.,

leaving belts and woodlots in a manner helpful to long-term agricultural development). Yet, at present, baseline data on this land and its potential is not available.

3. Technology Focus:

- A. Primary focus is on irrigated farm forestry. Farm forestry is tree growing on agricultural lands in a way that increases both fuelwood and crop production, and reduces irrigation requirements.
- B. Farm forestry can take place on large agricultural schemes, village lands, or private farms. The greatest potential for production lies with the first group.
- C. A secondary focus will be on village forestry in western rained areas. Here, productivity will be low, but desert encroachment is extreme, and humanitarian interests support the establishment of self-help projects designed to maximize local participation in addressing this problem.
- D. A third focus will be to gather technical and economic data on southern Blue Nile and Kordofan areas. This will be used to determine the feasibility of natural forest management on lands destined to be cleared for large-scale mechanized farming.

1. Audience Analysis

1. Who?

- A. Senior Forestry and Agricultural officials, and directors of public and private agricultural schemes
- B. Village level organizations (councils, committees, etc.)
- C. Individual farmers

2. Location?

Most farmers live on their lands, but National Capital District holdings tend to belong to "gentlemen farmers" who live and work in the city and hire laborers to tend their farms.

3. Attitudes?

- A. Since Independence in 1956, agriculture and forestry interests have become polarized. They regard themselves as in competition for land and are deeply suspicious of each other's activities.
- B. The present food and desertification problem is softening these attitudes, and leading all parties to appreciate one another's needs.
- C. The greatest antagonism remaining is at the upper levels of the forestry and agricultural sectors. These people have the highest income and education, and the most deeply rooted prejudices.
- D. Individual farmers, by and large, want trees on their farms, especially as shelterbelts and border plantings.

4. Communication Channels?

- A. Radio and television are very important communication channels to this largely electrified part of Sudan.
- B. Farming technical assistance is also relayed through agricultural extension agents.
- C. Farmers unions exist, but these are more political and educational in function.
- D. Land licensing, controlled by regional governments and agricultural schemes, may be a mechanism worth exploring for enforcing established afforestation requirements.

II. Technology Assessment

I. Technology Characteristics:

- A. Irrigated lands will grow many times more species and more fuelwood than rainfed lands.
- B. Irrigated lands are in high demand for agriculture, so any afforestation planning must consider the impact of reducing crop land to plant trees.
- C. Establishing new irrigation systems solely for forestry activities is not likely to be economically feasible. Long pay-back periods make such investment beyond the

capacity of the vast majority of farmers.

- D. However, crop borders, canalsides, and other marginal lands within established irrigated farms could be used to plant trees. Since Egyptian studies show shelter-belts contribute to net increases in crop yields, even considering lands taken away for tree growing, it is possible for farm forestry to increase agricultural yields while providing new fuelwood supplies. This ensures a positive cost/benefit ratio.
- E. Tree planting is not difficult, but some rudimentary technical assistance is required to ensure success.
- F. Loss of water for more than two weeks is likely to destroy both crop and tree plantings. Therefore, reliable irrigation is essential for the survival of most fast-growing fuelwood species. Some indigenous species can withstand dry periods, and these should be utilized wherever possible.

II. Production Mechanism

- A. The requirements are seedlings and extension work.
- B. Neither of these is presently available. Seedlings are scarce and located far from the irrigated schemes (or are present but not available for farm plantings). Forestry extension is virtually absent in Sudan.
- C. However, considerable organization and enthusiasm exists at the village level in central Sudan. This should be tapped to develop both seedling supplies and extension facilities.
- D. Small community nurseries and community-based farm forestry programs can provide these facilities, particularly in systems like Gezira which are composed of numerous small holdings and villages.
- E. Intra-scheme forestry and nurseries can be used in cases where lands are held and farmed en masse by companies (as with the Seleit Scheme).

- F. Scientific methods of seed selection and propagation can greatly increase species fuelwood yields. In many cases (especially for indigenous species), applied silvicultural research is needed to determine proper methods of propagation. Efforts are underway to pursue this research and results will be folded into mid-course adjustments.
- G. Completion of the Khartoum Province and the Gezira Scheme Seedling Demand Studies will provide useful projections for nursery production needs and planting targets.

3. Distribution Network

- A. Currently, there is little forestry extension, and no tradition of having foresters work directly with farmers. There is also no involvement of agricultural extension agents in forestry activities.
- B. New forestry graduates have little or no practical training.
- C. There is a need to get foresters working on farms and agricultural schemes, and to train foresters and agricultural extension agents in basic nursery and planting skills.
- D. Establishing small community nurseries will make seedlings more available to farmers and will avoid present transport problems. They will also increase public awareness of tree growing techniques.
- E. Local primary and secondary schools should be involved in nursery and tree planting activities wherever possible. They are a source both of free labor and of future informed farmers.

III. Strategy Development

I. Hypotheses

- A. Since farmers want to plant trees, there is a need to

provide seedlings and extension, and to obtain high-level support for tree planting from irrigated scheme management.

- B. Since little forestry extension is available, there is a need to start work in and around Khartoum using SREP staff. This work can be used to establish useful demonstration projects and to build staff expertise and administrative skills.
- C. Foresters and agriculturalists can be brought to see the Khartoum area work and encouraged to replicate these activities in their own areas.
- D. SREP staff can be gradually pulled back from local activities and replaced with local forestry staff and agricultural extension agents. SREP staff may then serve to bring wider awareness of agriculture/forestry integration possibilities to selected audiences, and to solicit and assist in the formulation of grant proposals from the regions.
- E. Small Renewable Energy Development Grant contributions and maximum local input will demonstrate the replicability of projects. Only local currency should be required for necessary inputs from SREP.
- F. The first wood harvest may be four or five years away, but shelter effects should be felt as early as the second year (as much as 20% - 50% net increase in crop yields and a reduced need for irrigation).
- G. An analysis has been performed of the number of feddans under irrigated agriculture in Central, Khartoum, and Eastern Regions in 1980 and their potential fuelwood productivity. From this analysis it is hypothesized that 10% of this land could produce 61% of the 1984 charcoal output and 15% of the land could produce 92% of that output on a sustained yield basis. Official land-use policy currently requires the allocation of 15% of all agricultural lands under government manage-

ment for forestry activities. However, this policy is not effectively enforced.

2. Methods

- A. Radio and television will be most important. Radio is especially important because it reaches out to most farms.
- B. Visual aids for tree planting, shelterbelt design, and nursery establishment will be essential.
- C. Workshops to teach basic nursery skills should be organized for nursery workers and supervisors as well as agricultural extension agents.
- D. A seminar for senior forestry and agricultural scheme officials (as well as agricultural extension agents and forest conservators and researchers) could assist in breaking down barriers, establishing communication channels, and developing new projects at the regional level.
- E. Demonstrations, field days, and fairs usually result in little sustained follow-up activity since farmers are generally too busy working to attend such events.

3. Implementation Plan

A. Year past:

- One large scheme, one cooperative, and several small farmers in the Khartoum area are given grants to start farm forestry activities
- The capacity of local public and private nurseries is increased through grants used to provide seedlings.
- One rainfed village forestry project is developed.
- Two illustrated brochures, one on planting seedlings and one on shelterbelt design, are produced.

B. Coming Year:

- Monitor and evaluate performance of Year 1 projects, utilizing University students wherever possible.

- Conduct workshop in basic nursery skills.
- Sponsor agriculture/forestry integration seminar.
- Issue grants to regional projects for community nurseries, canalside plantings, and shelterbelts.

IV. RECOMMENDATIONS

A. Future Consultancies

The USAID evaluation of this project recommended 12 months of additional consultancies in dissemination. Six months would be directed towards defining "operationally useful end-of-project objectives, target audiences, and specific strategies and approaches designed to reach each audience." I believe the success to-date of the charcoal stoves program adequately demonstrates that the expertise required to accomplish such tasks is, to a large extent, already resident in project staff. The iterative nature of successful dissemination efforts suggests that little of value would be gained from the proposed consultancy. Instead, the necessary socio-economic studies could be better performed by a series of short-term local consultants contracted for at appropriate points in the process.

The second proposed six-month consultancy, in marketing, calls for expertise in entrepreneurial/small business development with specific experience in the Sudan. The ideas behind this consultancy need to be more fully conceived before efforts are undertaken to identify an appropriate individual. In any event, the experience of the International Division at Georgia Tech Research Institute, which for many years was synonymous with small business development programs in numerous developing countries on several continents, should not be overlooked as a potential resource for this work.

B. Staffing

As the technology areas under development within the project approach dissemination stage, new staff will be required. In addition, the GTZ project and other RERI activities may soon require the services of Dissemination Unit staff. With this anticipated increase in workload, funds will need to be earmarked for outside people to assist in

completing these tasks.

The relationship of Dissemination Unit staff to the various project leaders needs to be programmed. Dissemination staff need to be kept more fully informed of planned activities in the various technology areas so they can plan work assignments to meet anticipated needs. There should be clear lines of communication between project leaders and the dissemination staff assigned to each project. In addition, there could be twice-monthly meetings of dissemination staff which would serve to keep all informed of progress to-date and to facilitate the sharing of responsibilities during peak periods. Such meetings are especially important since Dissemination Unit staff are physically dispersed throughout the fourth floor, a situation that inhibits the freer flow of information that was possible through the interior windows in the barracks.

The role of the Dissemination Unit in RERI is increasing in importance. This trend can be expected to continue. Certain questions need to be addressed in order to assure the continued smooth functioning of dissemination efforts. For example, is the ultimate aim to establish a technology transfer capability within the National Council for Research? If so, what shape will that capability take (i.e., Division, Department)? Or is the goal to limit these services to the Energy Research Council? After such questions are resolved, new areas of expertise that are needed can be identified based on a consideration of anticipated work, new thrusts, and existing expertise.

However, before bringing on new people, a thorough evaluation and review of all existing staff members should be conducted. Under the leadership of Mr. Gaafar El Faki, the Dissemination Unit has produced a great deal with minimal resources. It must be remembered that this unit has existed within RERI for less than a year and, as such, its efforts are to be commended. But within the unit, there is a wide range of capability and, perhaps more crucial, a wide range

of performance levels. While some staff members work very hard, others do not meet obligations. Such discrepancies in performance and commitment mean that, in practice, some people are overburdened by having to assume responsibilities which rightfully belong to their colleagues in order to "get the job done." Therefore, it is recommended that the incentive system be used to reward superior performance and productivity. The present system, although designed to accomplish just that, is not always administered in this fashion. Upper management should make a concerted effort to adhere to the original intent of the incentives system. Incentives should be tied directly to merit: to the quality and quantity of work performed. By withholding incentives from underachieving staff, project management can make a clear statement that assignments and responsibilities should be fulfilled in a timely and effective manner. In this case, a potentially serious morale problem can be avoided and talented staff will be encouraged to continue to produce quality work.

C. Short-Term Activities

The following activities are recommended as a follow-up to recent efforts. Work on many of these items is already underway. This information is presented as a checklist for short-term assignments.

1. Reprints -- The stove user's brochure should be reprinted as soon as possible. If a model and a photographer must be hired to avoid further delays, then these expenses would be well-spent.
2. Artwork -- Currently, there is a need for several pieces of artwork. A cover must be developed for the "Charcoal Production in Blue Nile Province" report. Another cover design, utilizing a die-cut for display of the title, should be developed for the Charcoal Stoves project report, the Stovemaker's Workshop report, the Trainer's Manual and the Trainee Manuals. Since the same cover will serve all five documents, it is advisable to produce

1,000 copies of a design featuring four images (either photographic or drawn from existing slides and photos): a stove being used by a housewife, a scene from a stove workshop, a scene from a stove demonstration, and a close-up of the two stove models. Because 1,000 copies are to be produced, this work is justified from a cost-effective standpoint in terms of both artwork and printing expenses. Two posters need to be developed - one to advertise the availability of seedlings and one to illustrate the main features of the several stoves being developed (including the "jiko" being marketed in El Obeid). Further poster work is anticipated in the form of forestry/conservation ideas currently being developed by CARE staff in Gedaref. Finally, a design for T-shirts that is under development needs to be refined and used. The design used for the T-shirts might also serve as a stove logo, especially if it lends itself to the metal-press technique used by the stove program in Botswana, for which the required documentation is already on hand.

3. Workshop Follow-Up Publicity -- The following items remain to be completed as part of the follow-up activities for the stovemakers workshop: an article for Sudanow magazine (with illustrations), articles for each of the local newspapers about the workshop and the availability of the stoves (especially the controlled-draft design which was slighted in earlier publicity efforts).
4. Workshop Follow-Up Data Collection -- Follow-up questionnaires, currently in draft form, need to be refined and administered to the various audiences (trainees, retailers, stove users). An analysis of the results will serve to inform future dissemination activities in this area.
5. Videotape -- A script should be developed for the videotape that will be prepared of Jamal Sharbaak assembling a stove. The script should include a scene shooting plan, presented in detail, and specific plans for the voice-over that is keyed to the details

being portrayed. Preparation of a detailed script can eliminate the need for extensive editing and re-shooting.

6. Documentation -- There is a need to document the procedures followed in preparing for and conducting a marketplace demonstration. The effort should be pursued on two levels: one containing the specifics of conducting a local demonstration, and one outlining the generic steps to be followed so that distant groups that are promoting stoves can replicate the Khartoum area successes.
7. Workshop and Seminar Planning -- The Dissemination Unit will be called upon to render their expertise in support of both the nursery workshop and the proposed seminar on integration of forestry and irrigated agriculture. The former is principally a hands-on effort, and staff will be able to draw upon their experience with the stovemakers workshop. The latter, however, will require a great deal of prior planning as well as regular and timely communication with all participants, especially the speakers. A planning schedule should be set up as soon as possible and adequate "cushions" (to allow for the unforeseeable but inevitable delays) should be included.
8. Repeat of Stovemakers Workshop -- Another offering of the stove-makers workshop should be scheduled within the next six months for the Khartoum area. In preparation for this, color-coded models using selected gauges of metal will need to be constructed, as well as a display board, also color-coded, of all templates. In addition, the Trainer's and Trainee Manuals must be revised. The training design should be reorganized to include the videotape and to incorporate improvements suggested by staff and trainees following the initial presentation of this workshop.
9. Charcoal Stoves Outreach -- Efforts should be directed towards introduction of the new stoves in markets not already carrying these products. An appropriate target is the various charcoal/

fuelwood depots in the Three Towns area where traditional stoves are the only models currently available.

10. Follow-Up on REDGs -- Follow-up contacts with the various agencies encouraged to submit proposals for Renewable Energy Development Grants need to be made. If assistance from Dissemination Unit staff is required in preparing the proposals, this should be provided.

D. Dissemination Resources

The FAO Fuelwood for Energy Project/Central Forestry Department is in the process of assembling a mobile cinema unit and a full film/videotape editing facility as well as supportive equipment for document production. Items being procured include enlargers, reducers, graphics generation equipment, multiple binding capabilities, developing and reproduction facilities, and eventually, a basic print shop. Dissemination Unit staff will have access to these facilities and full use should be made of them.

In addition, they are planning a workshop, to be conducted by the chief engineer at Omdurman Television, in videotaping techniques. At least two Dissemination Unit personnel should attend this workshop.

As demand for Dissemination Unit capabilities increases, thought should be given to working more closely with FAO/Forestry staff in meeting requests for assistance in publications and audio-visual production, and in assembling basic resource materials for others interested in making use of the various communication channels with which staff have developed expertise.

E. Procurement

The following items, as recommended, are either already received or on order:

- new photocopier machine with collater for publications work
- glass-doored display case for publications and news clippings
- paper cutter
- credenza for publication originals and bound copies as well as smaller pieces of audio-visual equipment
- spiral binding machine with supplies
- plastic 10" by 12" photo frames
- plastic sleeved pages for storing slides
- a light table for reviewing slides

In addition, the following items should be procured as soon as possible:

- reusable plastic "chalk" board with multi-color dry ink pens for coordination of transport needs
- a two-drawer file cabinet for Dissemination Unit paperwork
- a drawing table with affixed T-square
- a portable easel with a supply of flip-chart paper
- several voltage stabilizers
- at least three non-interruptible power supplies for selected equipment such as computers and copiers

If cooperative arrangements with FAO/Forestry do not develop as planned, there will be a need either to purchase additional audio-visual equipment (especially video editing facilities) or to contract with an outside resource to perform this work. I recommend the latter option since the equipment is expensive and the level of expertise required to fully utilize it is extensive.