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NATIONAL WOODSTOVE PROGRAM
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FINAL REPORT

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Table of Contents

1. Summary 1
2. Activities and Accomplishments of Project 2
3. Problem Areas and Constraints 9
4. Achievement of Objectives 11
5. Implementation Plans for the Remainder of the Project 12
6. Financial Analysis 13
7. Recommendations for Complementary Activities 14
8. Lessons Learned 15

NATIONAL WOODSTOVE PROGRAM
FINAL REPORT

1. SUMMARY

The National Woodstove Program (NWP), implemented by Volunteers in Technical Assistance (VITA) in 1983, was created in order to develop and promote fuel-conserving cookstoves produced by the Somali private sector and extended by the National Range Agency (NRA). The goal of the program was to reduce the rate of deforestation by introducing wood- and charcoal-conserving cookstoves. Along the line there were also interim goals. Among them were introducing improved kilns to fire ceramic stoves, and teaching fuelwood and charcoal conservation techniques to the public. The program was funded by the U.S. Agency for International Development and the InterChurch Response for the Horn of Africa.

The target, according to the amendment of December 1984, was to produce and disseminate 4,000 improved soapstone stoves and 2,000 improved ceramic stoves.

In its two and a half years of operation, the NWP has succeeded in addressing the deforestation issue by educating the public and designing fuel-conserving charcoal- and wood-burning stoves. Of the five charcoal- and seven wood-burning stoves developed and lab-tested, one charcoal-burning soapstone stove and one wood-burning ceramic stove are in full-scale dissemination. Fuel savings of 20-40 percent have been achieved. These stoves and their marketing strategies were drawn from the data of the fuel consumption and cooking practices survey, the first of its kind in Somalia. ("Cooking Practices and Fuelwood Consumption in Selected Sites of Lower Shabelle, Benadir, and Gedo Regions of Somalia," by Smale et al., VITA/NWP, February 1984). The NWP survey demonstrated that the public needs further education about the extent of the deforestation problem.

Initial reactions to the stoves in field testing and pilot level dissemination were favorable with regard to fuel savings but negative in terms of quality of the product. Stove fabrication technology had not yet caught up with fuel-saving design changes. As a result, the NWP hired two UNICEF stove consultants to train potters, artisans, and the staff in stove fabrication techniques, quality control, and the construction of kilns and their utilization. Following these changes, the Cooperative of Dayax (El-Bur) started mass producing improved soapstone stoves, keeping in mind the critical dimensions by using templates and measurements and also maintaining strict quality control.

As a result of the project, potters began firing their stoves in kilns instead of the traditional open fires, resulting in a better quality stove. The project also strengthened traditional marketing systems by directing marketing efforts more toward the consumer.

The NWP was extended for another year from CIPL funds. VITA's activities as the implementing agency ended in January 1986 and the project was turned over to the Somali managers.

This final report touches on activities and accomplishments since the program's inception, but concentrates on the period after the amendment.

2. ACTIVITIES AND ACCOMPLISHMENTS OF PROJECT INCEPTION.

The National Woodstove Program (NWP) was initiated on March 31, 1983. It was based on a seven-month pilot project in the Lugh district sponsored by United States Agency for International Development and Interchurch Response for the Horn of Africa (ICR). The experience of the pilot project enabled VITA to launch the NWP quickly in pursuit of the project goals.

The major achievements of the NWP have been in the areas of prototype development, extension, public investigation, and personnel development.

These activities comprise the systematic approach taken by the NWP to introduce fuel-conserving stoves. Trends in current stove use, food preparation, user preference, and problems are matched with state of the art ideas in stove development by VITA (USA), Intermediate Technology Development Group (England), UNICEF (Kenya), Eindhoven University of Technology (Holland), and African countries and research centers around the world. Using these bodies of information, the NWP prototype development group designs lab tests and then, through household trials, field tests, and family discussions, determines if the new stoves are technically, economically, and socially acceptable.

Through the extension system and local media (radio, television, newspaper) the NWP informs the public about the deforestation problem and the program of fuelwood conservation through more efficient stoves. User reactions of field and market tests are documented and passed on to the prototype development group, which redesigns the stove until it reaches the optimum design for dissemination. Further pilot dissemination and mass production are monitored by extension agents, ensuring quality control through supervision of producers in the use of proper tools,

templates, measurements, and fabrication techniques. The agents also educate wholesalers and retailers on the benefits of selling improved stoves and their contribution to the well-being of their nation. Ceramic stove producers are provided with kilns in order to save fuelwood and produce strong quality stoves.

Full-scale dissemination can only take place by this process of iterative stove development by the NWP. The goals of the NWP are to encourage private sector production and public sector promotion (e.g. publicity) through the National Range Agency. During the NWP, marketing strategy has changed. Promotion and sales of mass produced stoves have been accomplished whith considerable success in the private sector and limited results through the public sector.

Socioeconomic studies have been completed that produced very important data for guiding the program by identifying key design factors.

The NWP staff has been exposed to stove technology by on-the-job training and most staff members have received overseas training. Their planning and managerial skills have increased through on-the-job training and a system of planning to which they contributed.

The NWP has been commended for its technical help to other PVOs and government agencies through the resources of its technical staff, and has served as an information resource through its small library.

Activities and accomplishments in each of the project areas that contribute to the fulfillment of the program objectives are outlined below.

Prototype Development

- Established a lab-testing facility at the National Foundry and Mechanical Workshop in Mogadishu.

- Trained three Somalis in stove-testing procedures and data analysis according to the international stove testing standards.

- Tested seven different traditional charcoal- and wood-burning cookstoves to quantify current performances.

- Field tested two ceramic wood-burning stoves and one metal charcoal burning stove for pilot dissemination purposes.

- Field tested improved soapstone stoves in Mogadishu.

-Developed and field tested one ceramic wood-burning stove and one soapstone charcoal-burning stove for full-scale dissemination purposes.

- Trained three technicians at Kenyatta University Center in Kenya.

- Trained one technician in Tanzania in kiln use and clay analysis.

- Designed and tested cheap metal wood-burning stoves and a modified version of the Haraka (UNICEF) metal charcoal-burning stove that is being disseminated by CARE/Somalia and American Friends Service Committee in the North-West and Awdal regions.

- Designed a cast iron grate for the improved soapstone stoves after testing and finding the sheet metal grates inappropriate for the purpose.

- Designed and constructed one inexpensive updraft kiln and simple circular kilns for potters so they can fire the ceramic stoves and other ceramic articles.

- Designed and constructed 17 community stoves in the supplementary feeding centers, (14 in Lugh supplementary feeding centers and three stoves at the orphanage in Mogadishu).

- Conducted clay analysis in all six refugee camps around Belet Weyn for mud block and stove production purposes.

- Designed and constructed a waste oil burning stove in Afgoi Wildlife and Forestry Training Centers. Because of the nature of the waste oil resource and the difficulty in collection, it was redesigned and changed to a wood-burning stove.

Extension

- Built stationary rammed earth stoves at Golweyn, Kurtun Warey and Qorioley. (Lower Shabelle Region). These stoves were not successful for two reasons: (1) the clay is not good for the purpose; and (2) the people prefer portable stoves.

- Conducted field tests of two ceramic wood-burning stove-designs in Golweyn (Lower Shabelle).

- Tested several wood-burning and charcoal-burning stoves in the lower Shabelle area, of which one ceramic wood-burning design was found appropriate and is now in the full-scale dissemination stage.

- Placed two women extension agents with the community outreach of Save The Children Federation to educate women in the use of improved stoves and the problem of deforestation.

- Held frequent cooking demonstrations comparing traditional and improved stoves, and educating the public on the problems of deforestation by giving lectures and using posters that show how to save trees.

- Trained potters in lower Shabelle in the use of templates and molds for producing improved ceramic stove.

- Systematically tracked stove producers, retailers, and consumers for feedback purposes.

- Established a training and demonstration center in Lugh.

- Trained 12 refugees in Lugh and Burdhubo on how to build mud stoves. More than 2,000 mud stoves were built in Lugh refugee camps.

- Field tested one ceramic wood-burning cookstove in Lugh.

- Ascertained feasibility of Hargeisa for metal stove production and assessed market demand for the improved soapstone stoves.

- Trained 23 extension agents, including seven members of the National Range Agency (NRA), and nine women graduates of the Kurtun Warey Technical School and members of the Somali Women's Democratic Organization (SWDO).

- Held lectures and cooking demonstrations in the BAI region and planned more for Upper Juba.

- Provided on-the-job training to three technicians by consultants on socioeconomic data collection, and analysis. All socioeconomic surveys, their design, and data analysis is totally conducted now by Somali staff.

Public Awareness

- Wrote newpaper articles describing the deforestation problem and discussing stoves as one possible solution.

- Broadcast radio programs discussing the benefits of stove use and issues on environment degradation.

- Participated in the National Arbor Day Program at Waberi District, displaying posters and a line of NWP stoves. This exhibition was filmed and shown on television.

- Participated in interviews by the Somali Film Agency of key project personnel and the General Manager of the NRA. The interviews covered the deforestation problem and improved stoves. Stove users were also interviewed on the actual household performance and scenes of the stoves in the market were filmed. The whole program was shown on television.

- Produced a primary school reader on deforestation and stoves.

- Produced one set of promotional materials (posters, instruction pamphlets, advertisements, etc.)

Sociological Investigations

- Completed the "Ali Matan Stove User Survey," which determined the suitability of disseminating monolithic mud stoves in refugee situations and the optimum dissemination techniques for this model.

- Completed the "Fuelwood Consumption and Cooking Practice Survey in Selected Sites of Lower Shabelle, Gedo, and Benadir Regions of Somalia." This information has been used in developing stove models and their field tests. Data on household practices and perceived problems in the kitchen have also been used for marketing purposes. The forestry programs of Save the Children, Interchurch Response, and the NRA have used fuel consumption information from the survey for planning purposes. The World Bank Energy assessing mission has also found this survey useful.

- Completed a market survey designed to identify better methods of production, marketing, and acquisition of materials for stove producers.

Production

- Established eight potters in Lower Shabelle, two potters in Lugh, and two in Belet Weyn. These potters are trained in the use of templates, molds, and kilns for the production of improved ceramic stoves. At their sites, kilns and shades are constructed to assist them in quality

production. By using the kiln, not only is the quality of the ceramic stove upgraded, but also the quantity produced increased for a given amount of fuel. The shades are used for storage and protection against the sun's rays and excessive winds (to avoid cracking).

- Produced, to date, 2,013 ceramic stoves, of which 95 percent have been disseminated in Lower Shabelle, Gedo, and Hiran regions.

- Established a block-making cooperative in Amalow camp (Belet Weyn) as an ncome generating activity for the refugees.

- Negotiated a contract with the private El-Bur soapstone cooperative to supply technical information and marketing support for an improved soapstone charcoal-burning stove.

- Produced, to date, 5,385 improved soapstone stoves, of which 4,315 have been disseminated in Benadir, North West, Togdheer, Awdal, Gedn, Lower Shabelle, and Hiran. The soapstone production cooperative also produced and marketed a significant amount in Balgaduud Region where the production site is located.

- Assessed possible soapstone production in the Derbi Hore (Awdal region) area.

- Produced and disseminated four different types of wood- and charcoal-burning stoves on a pilot level.

Marketing

- Established production and marketing systems for ceramic stoves, following a marketing strategy that relies on the traditional dissemination system of wholesalers and retailers.

- Marketed (disseminated) 510 ceramic stoves in Hiran, 574 in Gedo, and 929 in Lower Shabelle. In Hiran refugee camps the NWP constructed stores for the refugee retailers at the market place and provided loan money to help start their businesses.

Personnel Development

- Upgraded staff managerial and planning ability through six planning sessions held in the past two years.

- Trained the technical director and the administrative assistant in Information Resource Development at VITA/ Arlington.

- Trained most of the project staff in skills of on-the-job microcomputer use.

- Positioned the project staff to be able to run every aspect of the project without expatriate involvement. This was achieved through the managerial, technical, and language training the project provided for its staff.

Technical Assistance

- Provided technical assistance on many areas besides stoves as a result of the NWP's affiliation with the Technical Committee for Alternative Energy (TCAE) and VITA's reputation as a good source of technical information. These inquiries include subjects such as soap making, food processing, mini-hydropower installation, windmill erection and maintenance, and solar pump cost information. This advisory role is part of the project's mandate in the Cooperative Agreement.

- Installed two windmills in Gedo with the cooperation of TCAE. The one in Halba refugee camp is pumping 18 cubic meters per day. The other, which is in Lugh Hospital, was inoperative for a long time after the breakage of the pump rod. It is now in working condition.

- Upon request of the Somali Unit for Research on Emergencies and Rural Development (SURERD) for technical assistance, installed and tested two solar pumps at Habarre, Sheik Banane cooperative farm in Baidoa. The pumps are being used for irrigation purposes.

- Provided design assistance to the Food For Hunger International stove program.

- Evaluated and made recommendations for the mud stove program of Action Aid in Sabacad, Dam, Arey Adays, and Agabar camps.

- Evaluated the ceramic stove project of American Friends Service Committee in Daraye Macaan refugee camp. Short training was given to the potters and stove testers.

- Assessed the possible development of a stove project in the Hargeisa area. Two UNICEF consultants participated with the VITA technical group. The study resulted in recommendations for the CARE/Somalia stove component. A

short visit was made again by VITA's technical staff to assess marketing of improved soapstone stoves and to follow-up on the CARE/Somalia stove program.

- Visited VITA/Djibouti to assess the possibility of marketing soapstone stoves in Djibouti.

3. PROBLEM AREAS AND CONSTRAINTS

This section describes problem areas of constraints that have inhibited or are inhibiting the attainment of project objectives or project implementation according to schedule. Each problem issue includes a statement of the method chosen to deal with the problem area or constraint along with an analysis of its effectiveness.

It is impossible to cite here all the problems that existed during the life of the project, but we will discuss the important ones.

Production

The NWP started the stove program by testing different traditional stoves to quantify performances. After the socioeconomic survey was completed, the staff designed several metal, ceramic, and soapstone charcoal- and wood-burning stoves that conformed with cooking practices and conditions. One of the main problems encountered in designing stoves was the difficulty artisans had in reproducing stoves which maintained the critical dimensions necessary for stove efficiency. To overcome this, the NWP began to train artisans and potters in the use of molds, templates, and measurements. The NWP extension agents supervised the production of stoves and instituted strict quality control while teaching the potters how to do these things themselves.

Although much progress was made, this problem has not yet been solved completely. It is very difficult to achieve consistent quality in making ceramic stoves because firing, methods of stove body building, mixing and aging clay, etc, all affect the quality of the stove.

There has been a tremendous resistance to the production of improved stoves because the artisans and potters reject new ideas. This has caused a higher price of production for improved stoves. In the case of the VITA-designed soapstone stove, the initial price of production was four times that of the traditional soapstone stove. The price has gradually come down through educating the stone carvers on the benefits of improved stoves for the community, by simplifying the design of the stove,

and by demonstrating the financial benefit of producing the improved stoves. Today, the stoves are mass produced with quality control exercised by the producers as well as the retailers. They have become a major source of income for the cooperative.

One of the main constraints in the dissemination of the improved soapstone stoves is the production of grates. The demand for the stoves is high at the moment but people can not buy a stove without a grate. Initially, the stove had a soapstone grate but, considering the long life of the stove, this short-lived grate was dropped. The sheet metal grates were dropped for the same reason. Cast iron grates were produced by the National Foundry and by Fondria, a private foundry. After encountering technical problems in the production process, the National Foundry ceased manufacturing the grates. The price for the Fondria grates was too high. The Military Foundry started producing cast bronze grates (which are far better in quality and lifespan than the cast iron grates) but their output does not yet match stove production.

Marketing

One of the NWP's major functions has been to establish a strong cookstove production marketing system that can develop and grow on its own after NWP support is terminated.

To do this, a marketing study was conducted and a marketing strategy formulated. According to this strategy, the NWP will focus on public awareness and have the least involvement in the marketing system. The strategy was designed so that marketing of stoves may follow the traditional channels. Marketing soapstone stoves involves transporting them a long distance. The production site is 450 km from the capital and 1,470 km from the second capital so the transportation cost is one of the main problems.

Extension

VITA/NWP concentrated its extension efforts on cookstove producers both within and beyond the Somali refugee areas. These efforts were distinct from the more traditional relief efforts promoted by other Somali agencies and the PVOs working in the refugee camps. In the transition from relief to development assistance, several PVOs (ICR, FHI, Action Aid, SCF) reduced their cookstove distribution activities. Furthermore, the level of technical expertise both in the PVO community and in the Somali private sector was inadequate to design and produce high quality, fuel efficient stoves at prices competitive with more traditional stove models. In addressing both this technical deficiency and the need to go beyond relief work, VITA/NWP's potter training and public awareness campaign reached areas where extension efforts had not originally been planned.

The NWP has the experience to increase these efforts, but its limited staff and logistical resources will not permit expansion. In fact, the NWP is underbudgeted this year for continuation of its activities as planned.

This section would not be complete without at least mentioning the problems experienced this year with vehicles and fuel. With respect to the latter, there is not an agency in Somalia that did not at one point or another have to limit its activities due to shortage of fuel. NWP was more fortunate than most in that it was able to make bulk purchases from the National Petroleum Agency and continue to operate its vehicles with only a moderate reduction in activities. Hopefully, the project will be able to continue this practice in 1986. With respect to vehicles, the outlook is not so bright. The project has only one good working vehicle at the moment. Through the generosity of the UNHCR and InterChurch Response, the project was able to increase its extension work through the loan of two vehicles. These vehicles will be called back in the near future so an alternative solution will have to be found.

4. ACHIEVEMENT OF OBJECTIVES

The following table compares some of the project's quantifiable accomplishments with its quantifiable objectives.

ITEM	TARGET BY YEAR END	TOTAL No. PRODUCED	TOTAL No. SOLD
Soapstone stoves produced	4,000	5,385	4,315
Ceramic stoves produced	2,000	2,013	2,013
Kilns built	4	6	
Extension Agents trained	13	23	
Ceramic stove producers trained	10	12-15	
Ceramic retailers	8	15	
Soapstone stove retailers	2	NW 3 Lugh 1 B/W 1 L/S 1 MOG 3	

Radio programs	5	6
Newspaper articles	10	12
Stove technicians trained	3	3
Items Achieved but not in Amendment:		
Television programs	0	2
Supplementary feeding station stoves constructed	0	17

The preceding table indicates that in all major areas the project attained its scheduled objectives as of the target date December 31, 1985; in a number of categories, the targets were exceeded. We were fortunate in that, despite significant problems as outlined in Section 3, we met our implementation schedule.

5. IMPLEMENTATION PLANS FOR THE REMAINDER OF THE PROJECT

According to the project amendment, the official completion date of project activities was December 31, 1985. It is important to point out, however, that the management and staff of the NWP feel that this is only the beginning.

At the request of the National Range Agency, a 1986 allocation for NWP activities was submitted to and approved by the Ministry of Finance. This allocation will provide NWP with funding in shillings (through the CIPL Unit) to continue and expand its work in 1986. As of the completion date of the project, the project director's responsibility was assumed by Mohamed Nur Qabile, who previously had co-directed the project with the VITA chief of party, Jim McCormick. Qabile has proven himself to be a capable leader and, with the able assistance of the current technical director and head trainer, the project should be well managed and directed.

The future work strategy is expected to follow a path similar to that of 1985. If additional funds can be obtained through any of the other agencies we have petitioned (see Section 7), the project's work will be expanded to additional regions of Somalia. While production and dissemination of improved soapstone and ceramic stoves continues, the project will attempt to mass produce a metal stove that will be priced between the other two. Several prototypes of this metal stove have been produced and tested and the staff feels that it has a working model. It will

will still have to be determined, however, whether sufficient quantities of metal can be obtained to mass produce the stoves at the target price.

With respect to the soapstone stove production, the NWP staff will work with government officials and the members of the El-Bur Cooperative to try to bring down the current unit production price of SS 260. A reduction in price will make all dissemination efforts easier since it should lower the price at which the stove is available to the consumer.

6. FINANCIAL ANALYSIS

The following table presents a summary analysis of sources and uses of project funds, including a forecast of excess or insufficiency of funding for completion of project implementation.

1985 CIPL (Shilling) Expenditures (25.74 So Sh = 1 USD)

CIPL Approved Budget Line Item	Total Amendment Budget (USD)	Total Amendment Budget (So Sh)	Total Expenditures	% Spent
Expatriate Housing	23,500	604.890	590,402	97.6
Somali Staff Costs	104,121	2,680,090	2,652,843	98.9
Office & Utilities	19,000	489,060	397,397	81.2
Communication	4,229	108,844	94,937	87.2
Office Equipment and Supplies	10,000	257,400	253,123	98.3
Prototype Development	94,716	2,437,977	2,423,765	99.4
(Repairs) Vehicle Costs	4,114	105,902	96,800	91.4
Petroleum, Oil Lubricants	28,000	720,720	648,590	90.0
Contingency	14,262	367,104	420,698	114.6
TOTAL	301,942	7,771,987	7,578,555	97.5

N.B.

1. Additional funds received during the year were the carry over bank balance from 1984 (173,650) and funds from the Refugee Health Unit to build feeding stoves (37,020). These were added to "contingency" line item, making the total SS 577,774 and the percentage spent 72.8.

2. During the year, 15 percent of the line item totals were reassigned to other line items according to procedure.

Shillings Summary

Total Amendment Budget	7,771,987
Carryover From 1984	173,650
RHU Funds	37,020
TOTAL FUNDS AVAILABLE	7,982,657
TOTAL EXPENDITURES	7,578,555
BALANCE AS OF JANUARY 1, 1986	404,102

7. RECOMMENDATIONS FOR COMPLEMENTARY ACTIVITIES

A number of parallel or follow-up activities are suggested here that would enhance the attainment of project, Greater Somalia Democratic Republic or USAID development goals.

The NWP staff has proposed two parallel or follow-on activities to enhance and expand its work in 1986. The first of these is a proposal to Church World Service for an additional US$37,000 to be used for increased production and dissemination of improved soapstone and ceramic stoves. These additional funds would also provide for additional technical assistance either on a short- or long-term consultancy. Ideally, the consultant would assist in improving the quality and quantity of ceramic stoves produced in more efficient kilns. Such a consultant would also be free to assist in other needed areas. Since the funds would be provided in hard currency, it would afford the NWP the opportunity to purchase outside of the country certain items and equipment that cannot be found in Somalia.

The second proposal (which is also in harmony with our planned activities) is for a US$950,000 grant from the UNEP office in Nairobi. Obviously, this would be a major boost to all stove program activities in Somalia. The UNEP would like to promote major stove programs in Kenya, Sudan, and Somalia. The Minister

of Livestock, Forestry and Range Management, the general manager of the NRA, and the management of NWP felt that since Somalia already has a visible stove program, our proposal to UNEP should supplement the existing work of NWP. The proposal itself would provide for regional offices of NWP and increased logistical support. It would also provide for an expatriate technical director who would work with a Somali counterpart. This proposal would cover a four-year period and would allow for the purchase of four additional vehicles and other needed supplies. Most important, however, is that it would provide continuity to all phases of stove development, kiln building, and stove dissemination throughout Somalia. A final decision on both of these proposals should be forthcoming during the first quarter of 1986.

8. LESSONS LEARNED

- A conservation project should be implemented in close coordination with a reforestation project due to the complementary nature of the projects.

- Technology transfer is most efficiently accomplished through existing private sector production and marketing channels.

- A baseline socioeconomic study should concentrate on potential marketing avenues and constraints to dissemination and existing pricing structures and profit margins for artisans and retailers rather than an in-depth description of the household cooking and consumption patterns.

- Full-time technical supervision is required in the early phases of technology development.

- A forest conservation program should also address the industrial uses of wood and charcoal and encourage the use of alternative building materials such as rammed earth blocks.

- Monolithic mud stoves for household use should be abandoned as a technology for conserving fuels.

- Experimentation with technologies should be done on a pilot-level under actual field conditions, before diffusion or dissemination and replication. The consequences of introducing technology should be considered to avoid worsening the environmental condition, and also to incorporate benefits other than energy in the plan such as development of marketable skills and products or improved environmental and health conditions.