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1986



THE TECH AND TOOLS BOOK

**A GUIDE TO
TECHNOLOGIES
WOMEN ARE USING
WORLDWIDE**

INTERNATIONAL WOMEN'S TRIBUNE CENTRE and
INTERMEDIATE TECHNOLOGY PUBLICATIONS



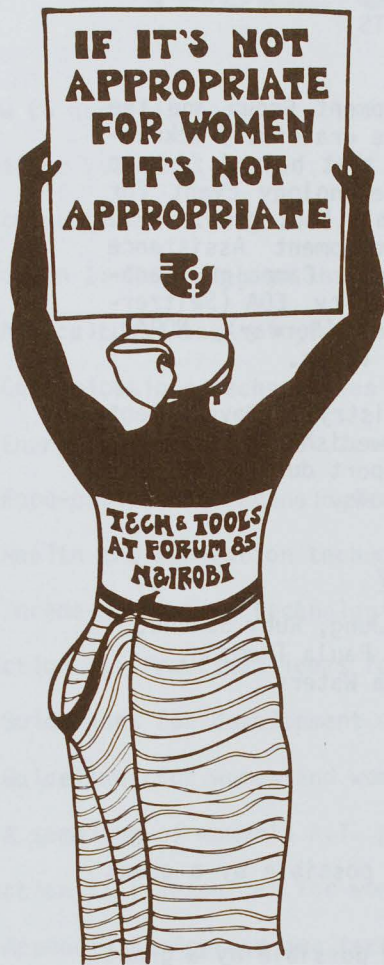
THE TECH AND TOOLS BOOK

A GUIDE TO
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WOMEN ARE USING
WORLDWIDE.

Compiled by Ruby Sandhu and Jeanne Sandler

with assistance from the hundreds of participants in and
contributors to Tech and Tools: An Appropriate Technology
Event for Women at Forum '85, Nairobi.

International Women's Tribune Centre/I.T. Publications, 1986



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CONTRIBUTORS

THE TECH & TOOLS BOOK has benefited from input and advice by hundreds of individuals and groups that have been consulted and have generously provided feedback in planning for Tech and Tools: An Appropriate Technology Event for Women at Forum '85 (see Appendix F). The individuals listed below took specific responsibility for writing, editing and/or artwork in this publication.

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ANN WARD is a mechanic who has worked with women's groups and technology projects in Fiji and Kenya.

*Catherine Rich died tragically last year in Sri Lanka. Her important contributions to this book and her commitment to development work will long be remembered by all who knew her.

HOW TO USE THIS BOOK

Please read this before using this manual...

1. Some Ideas on How to Use The Tech and Tools Book

We hope this manual will be a step towards INCREASING TECHNICAL CO-OPERATION AMONGST WOMEN!!! It is written for, by and about women and we hope you will find as many innovative uses for it as possible.

Some ideas on how you might use this book:



IDEA #1: Write away for information on a technology that might be useful to you and your group. (See addresses provided with each technology description.)



IDEA #2: Adapt the idea of the Tech and Tools Book to your own community and prepare your own directory of technologies that women are using in your town, district or country.



IDEA #3: Start a "Women's Appropriate Technology Mini-Resource Centre" and collect information that women can use in their projects. You can get quite a bit of free information. Organizations and journals listed in the Appendices at the back of this book are good beginning sources.



IDEA #4: Make copies of several of the technology pages in this book. Organize a meeting of women in the community and deliver a description of a technology to each of them. Ask them to read the "How It's Been Used" information and discuss the potential for their own uses. Have them generate ideas about the uses and misuses of technology in their family and community.

These are just some preliminary ideas. We hope you will stay in touch with us and let us know how you have used this book and if there is additional information that you would find useful.

2. Notes on Currencies Used in this Book

At times, you will find prices for various items in the book quoted in local currency. Below is a guide to their dollar equivalents as of March 1986.

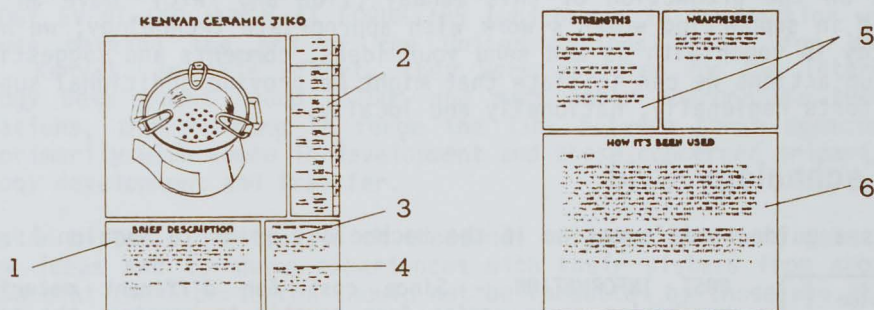
Currency (abbreviation)	Amount of currency per US\$
Belize dollars (B\$)	1.92 (B\$ per US\$)
Belgian francs (BFr)	35.70 (BFr per US\$)
Comunit� franaise africaine (CFA)	285.71 (CFA per US\$)
French francs (FF)	5.70 (FF per US\$)
Indian rupees (Rs)	12.00 (Rs per US\$)
Kenyan shillings (Kshs)	14.30 (Kshs per US\$)
South African rands (R)	2.23 (R per US\$)
Sri Lankan rupees (Rs)	20.00 (Rs per US\$)
Swiss francs (SF)	1.40 (SF per US\$)
United Kingdom pounds (£)	.59 (pounds per US\$)

3. A Guide to Sections of The Tech and Tools Book

Section I: Technologies that Women Are Using Worldwide

Technology information sheets are provided for 57 technologies in the areas of Agriculture, Communications, Energy, Food processing, Health and sanitation and Income-generation. We chose these categories because they were the ones represented at Tech and Tools. Both TECHNOLOGIES (eg., hardware, such as a maize sheller or solar refrigerator) and PROCESSES (eg., the technical process of producing banana chips or the Green Belt Movement) are included in this section.

Each technology page provides the following information:



1. This section provides general information about the nature and production requirements of the technology or process.
2. The grid provides easy reference to some of the characteristics of the technology or process.*(see page viii)
3. This section provides names and addresses of groups who can provide more information about how the technology is used and where it can be obtained.
4. Publications in which information about the technology has been presented in greater depth are listed here. Names and addresses of publishers are listed in Appendix B, pages 161 - 164.
5. The most important strengths and weaknesses of each technology are highlighted in this section.
6. A narrative on ways the technology is used is provided here. An attempt was made to identify the experience of a women's group. Where this was unavailable, we have included the experience of a community group.

Section II: Practical Ideas for Women's Appropriate Technology Projects

Section II includes guidelines for development workers and women's organizations interested in working with women to broaden access to and control over technologies. The women's projects described at the end of this section offer additional sources of information for readers who want to benefit from the experience of others.

Section III: Resources for Women's Appropriate Technology Projects

The appendices in this section are intended to broaden your outreach to and contact with the many organizations working in the area of AT. The contact list in Appendix F includes the names of all those who exhibited and demonstrated technologies at Tech and Tools in Nairobi. We urge you to make contact and continue the networking begun there!

The technologies and projects described in this book cannot begin to represent the breadth of women's experience with or requirements for technologies useful for labour-saving and income-generating purposes in different parts of the world. We hope you will use what we have compiled as a starting point for exploring your own needs and experiences. Also, since both the organizations working on the production of this manual (ITDG and IWTC) have an ongoing interest in supporting women's work with appropriate technology, we hope you will stay in touch with us and send your ideas, comments and suggestions for follow-up actions we can initiate that might be provide additional support to your efforts regionally, nationally and locally.

* The Technology Grid

Below is a guide to information in the technology grids in Section I:

COST:	NO COST
	LOW COST
	HIGH COST
USE:	NO TRAINING NEEDED
	TRAINING NEEDED
	TRAINED OPERATOR NEEDED
CONSTRUCTION:	SELF-BUILT
	ARTISAN-BUILT
	FACTORY-BUILT
POWER SOURCE:	DIESEL/ELECTRICITY
	ANIMAL/MANUAL
	RENEWABLE
PURPOSE:	LABOUR- SAVING
	INCOME- GENERATING
	DOMESTIC
MAINTENANCE:	SIMPLE
	TRAINING NEEDED
	SPECIALIST NEEDED

COST INFORMATION - Since cost for different materials and purchasing power varies from country to country, the categories chosen refer to the assessment of the groups that have used this technology.

USE - "No training needed" or "Easy to do" implies that one might need to be shown how to use the technology or do the process, but that this can be accomplished in several hours. "Training needed" indicates that a scheduled training session of several days or longer may be needed. "Trained operator" indicates that a skilled technician will need to be available to operate the technology.

CONSTRUCTION - Self-explanatory

POWER SOURCE - "Renewable" refers to such power sources as water and sun. Other categories are self-explanatory.

PURPOSE - Choices in this category summarize the primary uses to which groups have put this technology or process.

MAINTENANCE - "Simple" indicates that one might need to be shown how to maintain the equipment, but that this would not require training of more than several hours, and that the technology is not prone to breaking down nor in need of frequent replacement parts. "Training needed" implies that local groups can be trained in repair and will have materials necessary. "Specialist needed" indicates that maintenance can be fairly difficult, will require technical skills and, at times, parts may be hard to obtain.

In some cases, none of the categories in the grid apply to the particular technology or process. Where this is the case, no check (✓) has been placed in the grid.

PREFACE

Rarely have Third World women been as misrepresented as when they are portrayed as being incapable of understanding or participating in technical processes. The myth is that women are afraid of technology and have nothing to contribute in terms of developing and spreading improved technologies. The reality is that women have always been closely involved in the design, production and use of technologies and, if given the chance, have a major role to play in the technological and economic development of their countries.

In an attempt to encourage and increase women's access to, use of, and control of technologies, the International Women's Tribune Centre (IWTC), the World Young Women's Christian Association (YWCA) and the Appropriate Technology Advisory Committee (ATAC) organized TECH AND TOOLS: AN APPROPRIATE TECHNOLOGY EVENT FOR WOMEN AT FORUM '85 (which ran in conjunction with the Conference marking the end of the United Nations Decade for Women in Nairobi, Kenya). In this effort, they were assisted by the Intermediate Technology Development Group (ITDG) and many other appropriate technology organizations, thus helping to forge the link between those agencies concerned primarily with women in development and those concerned primarily with technology development and transfer.

This was an historic event at which thousands of women (and men) were able to find new ideas and to share experiences with their sisters from around the world. So that the experiences should not be forgotten by those who attended, and so that information on the technologies and technology projects exhibited there could be made available to many thousands of women who were unable to attend, IWTC and ITDG decided to prepare and publish this manual.

The manual, like the event out of which it arose, is the work of literally hundreds of women working on appropriate technology projects and with women's groups around the world. By showing what is already happening it is hoped that the manual will encourage the establishment of many similar women's technology projects. As such, it represents a milestone in the move towards the feminization of technology.

Marilyn Carr,
London, January, 1986

INTRODUCTION

Women and Technology for Development: Realities and Challenges

by Danielle Bazin-Tardieu

"If it is not appropriate for women, it is not appropriate."

Women's Work

Women of the Third World, particularly in rural areas, are expected to feed their families; not only by cooking but also by growing a part of the food to be consumed. They also have to be responsible for the processing, storage and marketing of food products. Furthermore, women undertake many non-farm activities both inside and outside their homes. They are usually obliged to provide the family with its fuel and water supplies, and even transport them on long distances. Urban women who are not employed in the formal sector, customarily embark on a variety of micro- or small-scale economic activities, in addition to their household tasks: petty trade, food processing and catering, housework of all sorts, seamstress or handicraft work, and sub-contracted work, particularly in Asia, where the women are provided with inputs and tools either by the owner of the enterprise or by middle persons and sub-contractors, and where they work on a piece-rate basis. In short, whether in rural or urban/semi-urban areas, women in developing countries bear the brunt of the family's maintenance, if not sheer survival. They work in the food, agriculture, energy, trade, transport, and income-generation sectors.

Technologies for Women

The crux of the matter is that women face these many responsibilities with little or undervalued knowledge and poor, outdated tools and equipment. Their age-old technologies seem not to have been adapted to the present times and the changes occurring in their societies and communities. Women need new technologies and practices, and to improve the old ones. The technologies that the women need, or are most likely to use, fall into two broad categories, social and productive.

Social technologies are geared towards improving the living conditions of women, their families and their communities. These deal with home improvement, sanitation, water management and the like. Such technologies include family bio-gas plants, solar energy equipment, water pulleys and water pumps, improved woodstoves and cooking stoves of various types, evaporation coolers for food preservation, equipment for food processing and food conservation, improved grain mills for community or village utilization, transportation and energy equipment.

Productive technologies are directed towards income generation and include, particularly, agricultural machinery and food-processing technologies. These lead to micro-, small-scale or middle-scale agro-industries, based on the transformation of agricultural products, including animal production, wood, and textiles, as well as food and agricultural products.

'What is Appropriate for Women

The question is how to involve women in determining which technologies they need for their own development and that of their families, their communities and their countries? How can women have better access to, use of, and control of such technologies? What lessons can be learnt from the experience of almost two decades of promotion of new or improved technologies in the Third World?

In deciding which new technologies are appropriate for particular users, the main consideration must be, what do the women really want? This includes technical as well as social, cultural and political considerations of a given society or country. For example, the family structure and its balance of power and authority must be considered, as well as any changes that the new or improved technologies might bring. It is not that such changes are undesirable or that they should be avoided, but that they have to be anticipated and strategies developed to cope with them. Other concerns include how the new technologies affect women's time management, how they can be adapted to women's cultural habits, or even body movements, and what economic returns they may bring to the women concerned.

Producing and Marketing New Technologies

The manufacture and distribution of new technologies are important issues to be considered, particularly in relation to women. One of the reasons for the failure of appropriate technologies introduced at the village or community level, is the refusal of agencies introducing them to consider technology as a commodity.

Technology is a "product" to be manufactured, mass-produced or reproduced, and sold, at a price that the consumers can afford to pay. The electrical injera baker in Ethiopia, the hand-pump in India, or the rubber sandals made of old car tyres displayed in almost all African markets, are good cases in point. If they can be found in many households, it is because they are available on the market, on a regular basis, and at an affordable price. It is no use developing prototypes which stand as "white elephants" and silent reproaches in most Third World "technology centres" if such prototypes cannot be reproduced and marketed. Technology must go to the market, i.e. to the consumers. This means that adequate production and pricing policies should be developed at local and national levels towards that end.

Given the above, it is important to radically change the strategy usually adopted so far for the dissemination of technology. Rather than asking

peasants or women's groups and communities to build themselves the prototypes developed at the technology centres, efforts should be made to produce the equipment for mass distribution, with the communities and their organizations being called upon to install them. Naturally, such mass production should use raw materials which are locally available (or easily obtainable). Moreover, production should be done by workshops and small-scale industrial facilities already existing in the countries. Maintenance and repair should also be dealt with locally.

Strategies

There are no easy solutions to the problems of introduction, transfer, and control of technology. However, two important issues, particularly where women are involved, are the role of structures and institutions, and the change of their mentalities. What follows is a list of concerns that are important in any strategy considerations. Naturally, most of the ideas expressed here have already been put forward elsewhere. There is, however, a need to repeat them and implement them.

--In order to gain access to, and control of technology, women must organize themselves in ways that put more emphasis on planning, structure and coordination. At the national level, their organizations should associate themselves with research and development institutions, laboratories, universities and local industrial firms and workshops, as well as extension and training institutions where new technologies are developed, policies decided and strategies planned. These should be encouraged to create or develop special units for appropriate technology or rural technology geared towards women. Such concerns must become part of their overall research, training and action programmes.

--National machineries for the advancement of women should themselves both design and implement programmes in appropriate technology for women, as well as be involved in evaluating their impact at grass-roots levels, both in rural and semi-urbanized areas. NGO's*, which often specialize in developing programmes at the grass-roots levels, should be involved in the general conceptualization and formulation of appropriate technology, and science and technology programmes. Local industrial firms, workshops and artisans should be called upon to replicate, and as much as possible, mass-produce, the prototypes and equipments designed by research and development institutions and technologists, upon receiving requests from, and after consultation with, the women/users themselves.

--It is essential to link up new equipment and technology with actual or planned development projects such as village industries or small-scale industries, rural development schemes, nutrition or health education projects, and clinics or schools. Once pilot projects have proven successful, it is essential to introduce them into mainstream development projects as quickly as possible.

*Non-Governmental Organizations

--Training and extension programmes should be an integral part of the application and dissemination stage of any appropriate technology. Training should be organized at various levels - for trainers, extension workers and supervisors, and, of course, the users themselves - in courses which are long enough to impart knowledge, skills, and "do-how," and which include strong "hands-on" components. They should be repeated regularly and followed up with proper monitoring and on-site supervision.

--The institutionalization of training is the ultimate goal. Technology education should be developed for young persons, particularly for young girls, who in the past have had to concentrate on the so-called "feminine" disciplines.

-- If creativity and inventiveness are encouraged, not only in the schools, but also in the extension classes and the training institutions, as well as at the village level, users will be stimulated to change or improve the new equipment being introduced or purchased. Prizes should reward such innovations, and the use of media for national exposure and dissemination may be useful ways for encouraging them to take place.

Information

--The dissemination and exchange of information on available technologies is important for ensuring that women have access to, and control of, appropriate technology. There is a dire need for reliable information about appropriate or intermediate technologies, and about how they can be obtained, despite the maze of literature issued by the considerable number of organizations, firms or groups dealing with appropriate or intermediate technology. This information needs to be presented in a form and language that are easily accessible and disseminated to the people who need it. The production of manuals such as this one is an important and commendable step in the right direction. Others should follow, focusing for example on specific fields such as food processing or water management, or even on specific crops or products. Efforts should also be made to translate such manuals into local languages or to produce more popular types of training materials.

--One cannot, in this framework, over-emphasize the need to exchange information between developing countries and regions. Some techniques or equipment which have been developed in Asia, for example, may be utilized in Africa or Latin America, and vice versa. Very often excellent material that has been developed in one country is not known outside that country, or the region in which that country belongs.

--Last, but not least, organizations which have taken the lead in the field of women and technology and which have the resources, should intensify and co-ordinate efforts to collect and disseminate information on improved and traditional technologies with proven use to women. All this needs to be done to encourage the exchange of information and training materials between developing countries.

TECHNOLOGIES THAT WOMEN ARE USING WORLDWIDE

1

Give me a machine
that can be my sister.



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AGRICULTURAL TECHNOLOGIES

THE PROBLEM...

Long hours labouring on the farm to grow food for home consumption, local markets or cash crops and taking care of livestock are basic tasks in the lives of rural women. The introduction of improved farming techniques has tended to bypass these women, being restricted to mechanization of men's crops. Moreover, such mechanization has tended to have negative repercussions on women. For example, tractor ploughing multiplies the area to be weeded (often unpaid work for women), and mechanized harvesting often deprives women of opportunities for wage labour.



What is needed is greater emphasis on low-cost improvements and innovations which will help women in their role as food producers. Also important is the provision of social and infrastructural support for women in agriculture. Without this, the technology is of little use.

THE ISSUES TECHNOLOGIES SHOULD ADDRESS...

In support of improved farming techniques and technologies, women's demands in the agricultural sector include:

- *Protection of land traditionally worked by women, and, more fundamentally, a revision (both culturally and in law) of land tenure systems which exclude women from ownership;
- *Access to agricultural and related skills training, information and extension advice;
- *Access to credit (which conventionally depends on land as collateral but need not do so);
- *The right to membership in co-operatives as an individual, and support for women's co-operatives (along with appropriate training);
- *Research related to vegetable growing, small-scale farming systems and animal husbandry.

by Jancis Smithells

CAST-IRON MAIZE SHELLER



	NO COST	
COST:	LOW COST	
	HIGH COST	<input checked="" type="checkbox"/>
USE:	EASY TO DO	<input checked="" type="checkbox"/>
	EASY AFTER TRAINING	<input checked="" type="checkbox"/>
	NEEDS SPECIAL OPERATOR	
CON- STRUCTION:	SELF-BUILT	
	ARTISAN-BUILT	
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input checked="" type="checkbox"/>
	ANIMAL/ MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	
PURPOSE:	LABOUR- SAVING	<input checked="" type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

A sturdy, hand-operated machine that is used to shell maize by passing a maize cob between a rotating, studded wheel and the main body. A clockwise rotation of the wheel draws the cob into the sheller, strips the kernels and ejects the cob out the other side.

FOR MORE INFORMATION

WRITE: 1) UNICEF, Technology Support Section, P.O. Box 44145, Nairobi, Kenya; 2) TROPICAL DEVELOPMENT AND RESEARCH INSTITUTE, Industrial Development Dept, Culham, Abingdon, Oxon, OX14 3DA, UK.

READ: 1) "A comparison of maize shelling methods for small scale farmers," Pinson, G.S. and Walker, D.J., TROPICAL SCIENCE 25, (Blackwell Scientific Pubs, Oxford UK 1985).

STRENGTHS

1. Up to 95 per cent of the kernels are removed with minimum breakage.
2. The sheller is adjustable to suit various sizes of maize cobs.
3. Simple and durable construction requires only occasional cleaning and oiling of the shaft.

WEAKNESSES

1. The bearing blocks require regular replacement.
2. The sheller is expensive.

HOW IT'S BEEN USED

KENYA

The use of the sheller is being promoted by UNICEF in Kenya; unfortunately the results of its use from the UNICEF project are not yet available.

SWAZILAND

It is, however, possible to discover the usefulness of the sheller from a study conducted in Swaziland using traditional, hand-held and mechanized shellers. The study found that despite the introduction of improved and mechanized shellers, the traditional method was still preferred. The users were most concerned with recovering as many grains as possible with the least amount of damage. The use of a mechanized system will inevitably introduce damage through pressure, while with hand-held devices it is possible to control the applied pressure. With mechanized devices damage may be caused unknowingly by the operator. The study also found that the mechanized sheller was suitable for a small farmer who has sufficient need to shell for storage; the farmer has to have a certain surplus to make efficient use of the sheller.

The study was conducted by G. Pinson and D.J. Walker in Swaziland. It can be obtained from the Tropical Development and Research Institute.

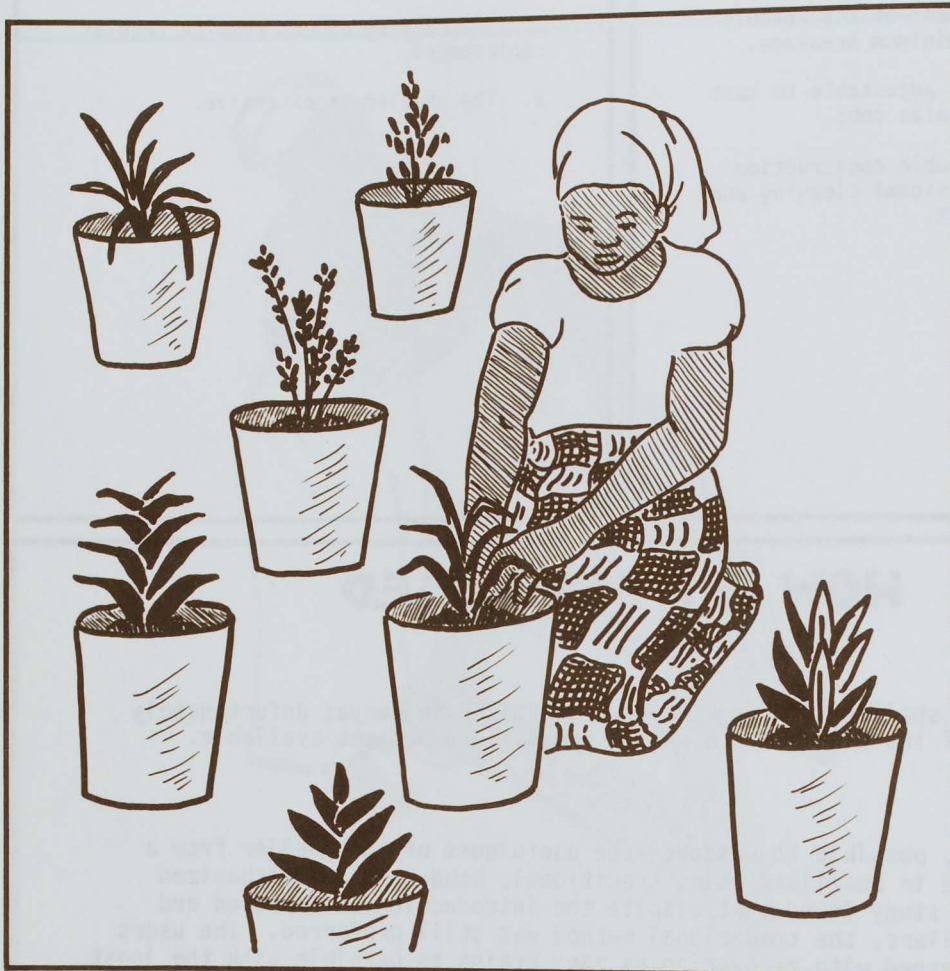
COST	
USE	
CONSTRUCTION	
POWER SOURCE	
PURPOSE	
MAINTENANCE	

FOR MORE INFO

WRITE: 1) UNICEF, Technology Support Centre, P.O. Box 44145, Nairobi, Kenya; 2) TROPICAL DEVELOPMENT AND RESEARCH INSTITUTE, Industrial Dept, Culham, Reading, OX14 3DA, UK.

READ: 1) "A comparison of maize shelling methods for small scale farmers", G. Pinson, G.S. and D.J. Walker, TROPICAL SCIENCE JOURNAL, Well Scientific Publications, UK 1985).

GREEN BELT MOVEMENT



	NO COST	✓
COST:	LOW COST	
	HIGH COST	
USE:	EASY TO DO	✓
	EASY AFTER TRAINING	✓
	NEEDS SPECIAL OPERATOR	
CON- STRUCTION:	SELF-BUILT	✓
	ARTISAN-BUILT	
	FACTORY-BUILT	
POWER SOURCE:	DIESEL/ ELECTRICITY	
	ANIMAL/ MANUAL	✓
	RENEWABLE	✓
PURPOSE:	LABOUR- SAVING	✓
	INCOME- GENERATING	✓
	DOMESTIC	
MAIN- TENANCE:	SIMPLE	✓
	TRAINING NEEDED	
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

The Green Belt Movement in Kenya is one of two major components in a country-wide tree planting programme implemented by the National Council of Women (NCW). Women's groups are assisted to establish tree nurseries and to rear seedlings which are sold to NCW. These are then distributed to other women's groups and rural communities for planting in Green Belts around the country.

FOR MORE INFORMATION

WRITE: 1) PROF. WANGARI MAATHAI, PO Box 14832, Nairobi, Kenya.

READ: 1) THE GREEN BELT MOVEMENT, Maathai, W., available from author (see address above); 2) BLACKSMITH, BAKER, ROOFING-SHEET MAKER, Carr, M. (I.T. Pubs, London, 1984).

STRENGTHS

1. Encourages soil conservation and land reclamation through tree planting.
2. Increases supply of fuelwood in rural areas.
3. Creates income-earning opportunities for women through rearing of seedlings.

WEAKNESSES

1. Organizational difficulties in expanding the programme.
2. Difficulty in ensuring proper care taken in planting and tending trees.

HOW IT'S BEEN USED

KENYA

The Green Belt Movement was initiated by the Kenyan National Council of Women (NCW) in 1977. NCW also runs a complementary tree nursery programme.

Nursery projects require labour by women's groups to prepare nursery plots (often on a communal piece of land), plant seedlings and maintain them, using simple tools supplied by NCW. When necessary, technical assistance is provided from the local forestry department officer. When seedlings are mature, the NCW purchases them from the women for 50 US cents per seedling. Each individual woman receives cash payment for her labour and produce. NCW then distributes seedlings to members of other women's groups, farmers and other customers for planting in Green Belts. By the early 1980s, there were 50 NCW nurseries and 200 Green Belts in Kenya, and the movement is steadily expanding.

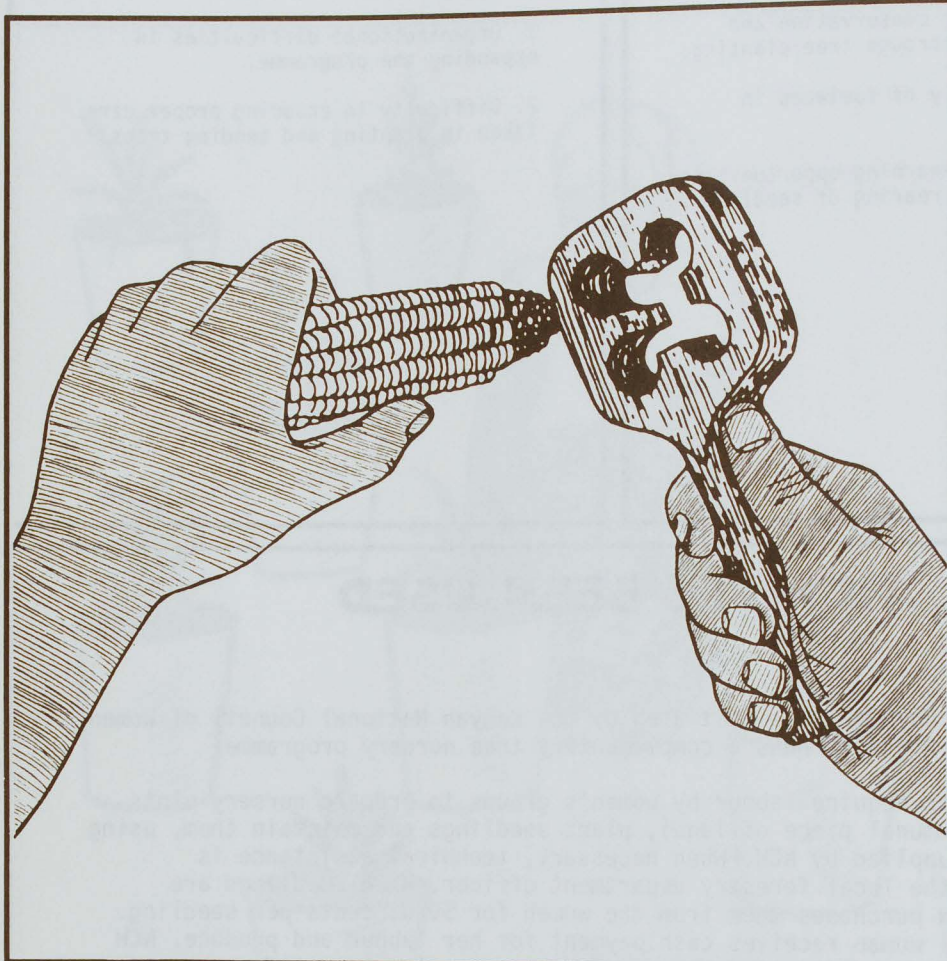
The success of the programme lies in the role that women themselves play--they are in control of the projects, including the management, decision-making and physical work. Also, the women see the benefits of adopting an innovation which has potential to ease burdens associated with their own work. The cash payment for seedlings creates an additional incentive to care for the trees.

FOR MORE INFO

WRITE: 1) PROF. W. MAATHAI, PO Box 3199, Nairobi, Kenya.

READ: 1) THE GREEN MOVEMENT, Maathai available from address above; 2) BLACKSMITH, BAKER, ROOFING-SHEET MAKER. (I.T. Pubs, Ltd.)

HAND-HELD MAIZE SHELLER



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	EASY TO DO	<input checked="" type="checkbox"/>
	EASY AFTER TRAINING	<input type="checkbox"/>
	NEEDS SPECIAL OPERATOR	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input checked="" type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input checked="" type="checkbox"/>
	INCOME- GENERATING	<input type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

This particular maize sheller is suitable for small day-to-day requirements and is very simple to use. The dry maize cob is held in one hand and the sheller in the other. The end of the cob is pushed into the large hole in the sheller and by working around the cob the ridges will pull out the grain. When half the grain has been removed, the sheller is turned over and the rest of the grain is removed by holding the other end of the cob.

FOR MORE INFORMATION

WRITE: 1) TROPICAL DEVELOPMENT AND RESEARCH INSTITUTE, Industrial Development Department, Abingdon, Oxfordshire OX14 3DA UK.

READ: 1) RURAL TECHNOLOGY GUIDE 1, "A Wooden Hand-Held Maize Sheller," Tropical Products Institute, 1980; 2) THE A.T. JOURNAL, Vol. 9, No. 4, March 1983.

HELLER

STRENGTHS

1. It is inexpensive to purchase.
2. It can be made by local artisans using locally available materials.
3. It removes grain with very low levels of damage.
4. It is a labour-saving device for domestic purposes.
5. The sheller is not as tiring as the traditional method, though extensive use can induce wrist fatigue.

WEAKNESSES

1. It is only suitable for small day-to-day requirements.

HOW IT'S BEEN USED

GLOBAL

Tropical Development and Research Institute, UK, has received reports from 20 developing countries where the sheller is in use. Generally, the sheller is preferred for use in operations extending over short periods - perhaps 15 to 30 minutes - during which time up to 10kgs of grain might be shelled.

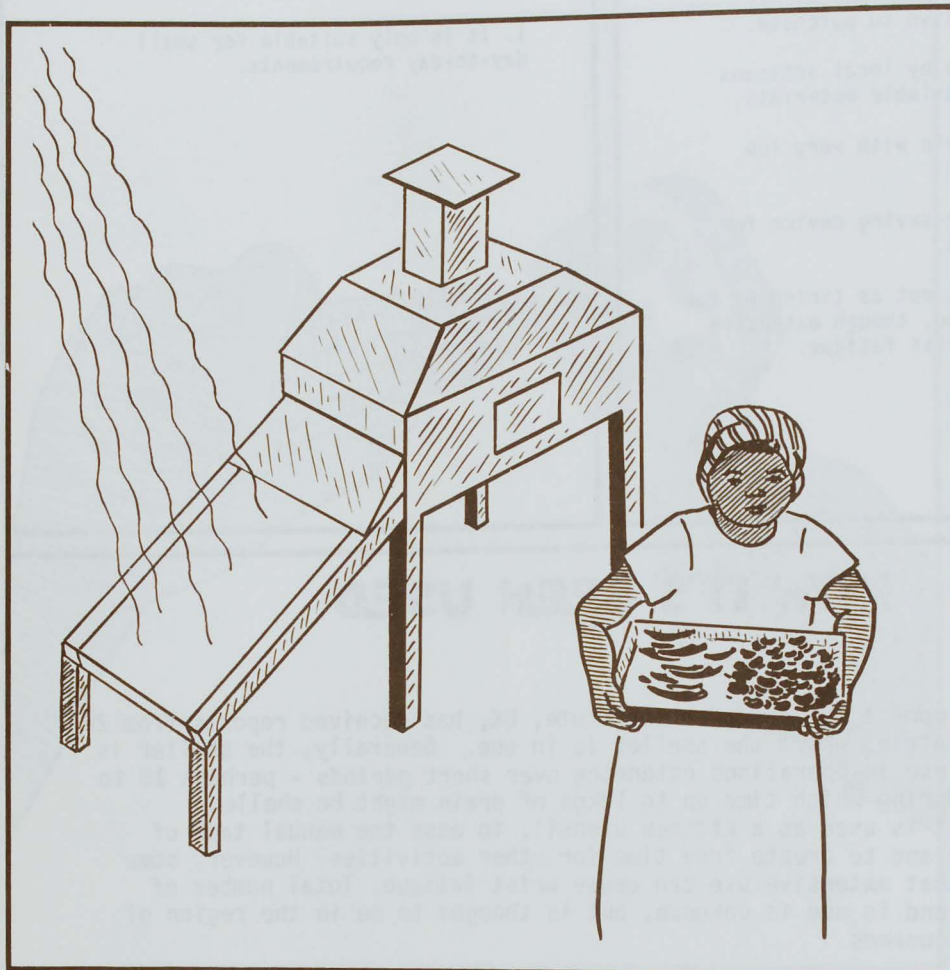
Essentially, it is used as a kitchen utensil, to ease the manual task of shelling maize and to create free time for other activities. However, some users report that extensive use can cause wrist fatigue. Total number of shellers made and in use is unknown, but is thought to be in the region of hundreds of thousands.

FOR MORE INFORMATION

WRITE: 1) TROPICAL DEVELOPMENT AND RESEARCH INSTITUTE, Industrial Development Department, Abingdon, Oxfordshire OX14 3UE

READ: 1) RURAL TECHNOLOGY GUIDE 1, "A Wooden Heller Maize Sheller" Tropical Products Institute, 1980; 2) RURAL TECHNOLOGY JOURNAL, Vol. 9, No. 1, March 1983.

INDIRECT SOLAR DRYER



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	NO TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CONSTRUCTION:	SELF-BUILT	<input checked="" type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input type="checkbox"/>
	ANIMAL/MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR-SAVING	<input type="checkbox"/>
	INCOME-GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAINTENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

Solar drying is carried out to ensure stability of product quality and availability for a given storage period. In an indirect dryer, air is heated in a solar air-collector and circulated through the product to be dried, which is contained in a drying chamber. In this particular design the collector is made of black painted plywood and covered with agricultural polyethylene (which lasts two years). A transparent glass cover can also be used but it is more expensive and easily damaged. The storage chamber is made of metal to resist rain and because it lasts longer than wood. The chamber is insulated at the sides.

FOR MORE INFORMATION

WRITE: 1) APPROPRIATE TECHNOLOGY CENTRE, Kenyatta Univ. College, PO Box 43844, Nairobi, Kenya; 2) ZENTRUM FÜR AUGEPASSTE TECHNOLOGIE, Schwengi Str 12, 4438 Langenbruck BL, Switzerland.

READ: 1) "Application of small-scale solar crop-dryers to dry maize in Kenya," ENERGY FOR RURAL AND ISLAND COMMUNITIES, (Pergamon Press, Oxford, 1981, pp 377-386).

STRENGTHS

1. Equal drying from all sides - thus eliminates problem of overdrying found with direct solar drying and traditional drying.
2. Foods retain nutrients because they are not directly touched by the sun's rays.
3. Food does not need to be turned over, and an operator is not needed as with traditional drying.
4. Can be constructed using locally available materials, and can last up to six years with only minor repairs.

WEAKNESSES

1. Polyethylene sheet needs to be replaced every one to two years.
2. Technical skills are needed to design the dryer. However, it can be constructed by unskilled people once the design table indicating scales is provided.

HOW IT'S BEEN USED

ATC PROJECT - KENYA

During the 1979-81 drought in Kenya, many women's groups realized that one of the methods of avoiding seasonal food shortages is to reduce post-harvest losses of food stuff and to improve food-preservation techniques. The cheapest way to do this was to remove water from the crop to facilitate long-term storage. Thus the National Council for Science and Technology developed the indirect solar dryer and introduced it to women farmers in Western Kenya.

The dryer was designed to be used by organized women's groups and farmers' co-operative societies. Dryers have been installed at Farmers' Co-operative Centres in Nyanza and Western provinces. The dryer is being used to dry maize; vegetables and fruits can also be dried. The women are pleased with the dryer because it allows them to have more control over the drying process than was possible with the traditional method. Moreover, the dryer does not require the presence of an operator as is necessary with the traditional drying. Use of the dryer allows women more time for domestic work.

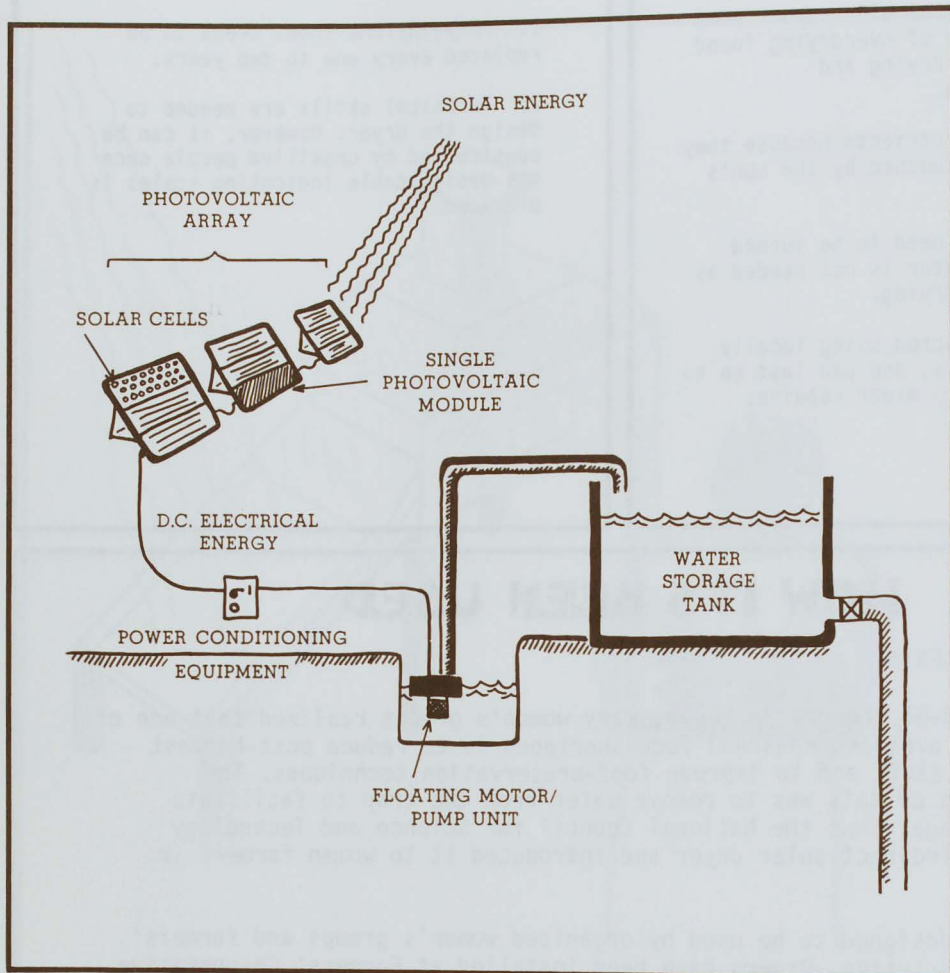
Information on the dryer is being disseminated through demonstrations and public campaigns. Plans are also being made to organize training workshops so that women can learn how to construct the dryers.

FOR MORE INFO

WRITE: 1) AFRICAN TECHNOLOGY CENTRE, Univ. College, PO Nairobi, Kenya; 2) FÜR AUGEPASTE, Schwengl Str. 11, Langenbruck, B. 3

READ: 1) "Small-scale solar crop-dryers in Kenya," ENERGY AND ISLAND COMMISSION (Pergamon Press, 1981, pp 377-380)

SOLAR PUMP



COST:	NO COST	
	LOW COST	
	HIGH COST	✓
USE:	NO TRAINING NEEDED	✓
	TRAINING NEEDED	
	TRAINED OPERATOR NEEDED	
CONSTRUCTION:	SELF-BUILT	
	ARTISAN-BUILT	
	FACTORY-BUILT	✓
POWER SOURCE:	DIESEL/ELECTRICITY	
	ANIMAL/MANUAL	
	RENEWABLE	✓
PURPOSE:	LABOUR-SAVING	✓
	INCOME-GENERATING	✓
	DOMESTIC	✓
MAINTENANCE:	SIMPLE	
	TRAINING NEEDED	✓
	SPECIALIST NEEDED	✓

BRIEF DESCRIPTION

Solar pumps have a number of attractive features for small-scale applications in remote areas. The main uses for solar pumps are irrigation, village water-supplies and livestock water-supplies. Photovoltaic cells, are used to convert solar radiation into mechanical energy; this mechanical energy then powers a motor pump. Solar pumps store and distribute water to its point of use.

FOR MORE INFORMATION

WRITE: 1) INTERMEDIATE TECHNOLOGY POWER, Mortimer Hill, Mortimer, near Reading, Berkshire RG7 3PG, UK

READ: 1) SOLAR WATER PUMPING: A HANDBOOK, Kenna J. and Gillett, W. (I.T. Pubs, London, 1985).

STRENGTHS

1. Has low running costs, i.e. low maintenance requirements and no fuel costs.
2. Saves time and energy expended by women on water collection. These savings can generate additional economic activity or lead to increased leisure time.
3. Electrical energy can be generated right at the site of use.
4. Is reliable, with a lifetime expectancy of up to 20 years.
5. Is non-polluting and quiet.

WEAKNESSES

1. Initial capital cost is high (US\$10 to US\$15 per peak Watt), but running cost is low.
2. Although a simple technology, it demands an infrastructure to function properly, i.e. trained person for repairs and if electrical circuitry fails the pump has to be sent back to the manufacturer.
3. Major problem with solar pumps is that there is a lack of familiarity with the technology.

HOW IT'S BEEN USED

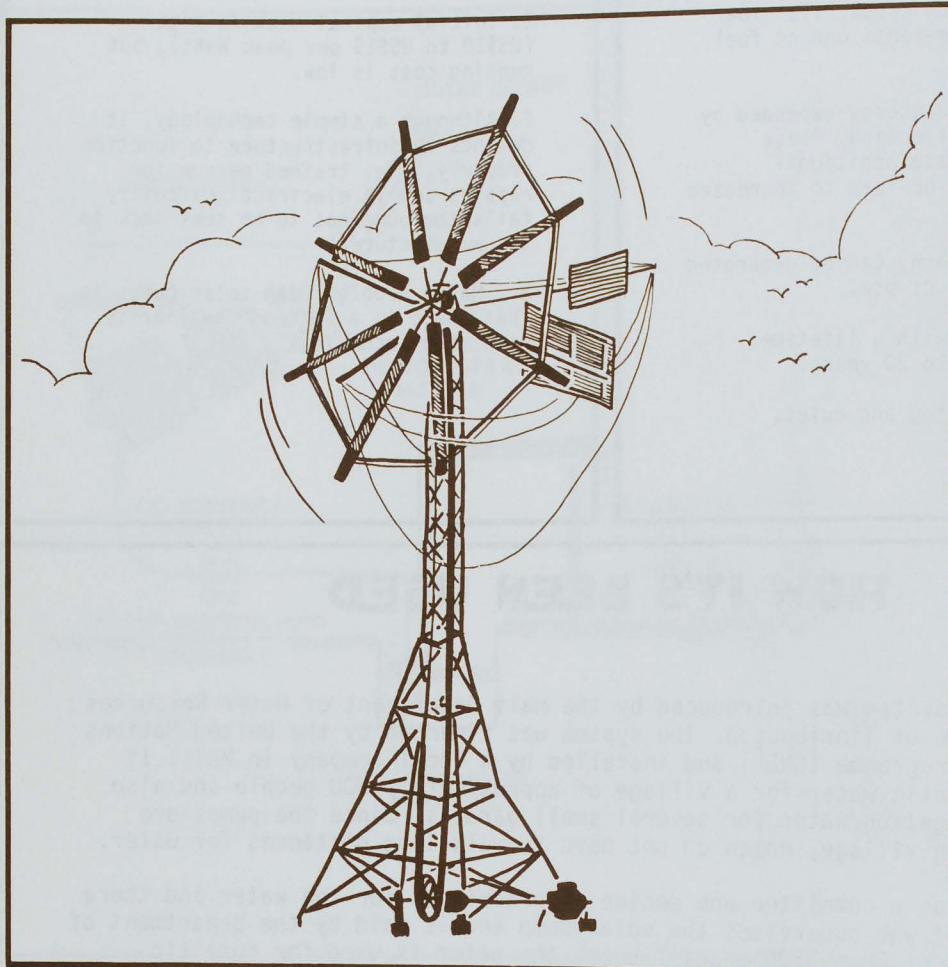
MALI

A solar pump system was introduced by the Mali Department of Water Resources in the village of Tioribougou. The system was financed by the United Nations Development Programme (UNDP) and installed by a local company in Mali. It supplies domestic water for a village of approximately 500 people and also supplies irrigation water for several small gardens. Since the pumps are located in the village, women do not have to walk long distances for water.

The village has a committee who decide on priorities for the water and there is a 'Gardien' who supervises the solar pump and is paid by the Department of Water Resources. From 8:00am until noon, the water is used for domestic purposes, at no charge. From noon onward, water is sold in 200 litre drums at .50 CFA. This water is used for construction. Water for irrigation is sold at .05 CFA per square metre of garden per month. At this price, considerable profit can be made by growing vegetables.

To date, there are 80 to 100 solar pumps in use in Mali.

WINDPUMP



COST:	NO COST	<input type="checkbox"/>
	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input type="checkbox"/>
	RENEWABLE	<input checked="" type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input checked="" type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAIN TENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

The I.T. Windpump driven at no cost by the wind, pumps water for humans, animals and crop irrigation. It can pump water from over 600 feet, needs only annual maintenance, and will last 20 years. The windpumps are available in four rotor sizes which make this a particularly efficient pump compared with the traditional windpump designs. The rotor blades can be individually replaced if damaged for any reason. It has 24 rotor blades which make the pump very effective for deep boreholes. The I.T. Windpump can replace the expensive, imported, diesel-engine pumps because it is immune to fuel shortages.

FOR MORE INFORMATION

WRITE: 1) INTERMEDIATE TECHNOLOGY DEVELOPMENT GROUP, Myson House, Railway Terrace, Rugby, CV21 3HE, UK

READ: 1) WATERLINES, Vol. 1, No. 2, Oct 1982.

STRENGTHS

1. Provides water at less than half the delivery cost of diesel pumping.
2. Run and driven by free renewable energy.
3. Can be produced where there are light industrial facilities locally, thus reducing problems in obtaining spare parts.
4. Creates local employment.
5. Designed for a life span of 20 years with minimum maintenance.

WEAKNESSES

1. Initial cost is high (but relative cost is very low over life span and for its purpose).
2. The windpump is site specific - there has to be wind in order for it to function.

HOW IT'S BEEN USED

BHEL - KENYA

The Intermediate Technology Development Group (ITDG) developed the I.T. Windpump from widely available steel sections so that it would be suitable for low-volume economic production in developing countries. It would also be adaptable for either high-volume, low-head pumping or for the more traditional low-volume, high-head borehole pumping. ITDG found people with whom they could work in Kenya, Botswana, Uganda, Tanzania, Sudan, Nigeria and Pakistan.

The Kenyan group, BHEL, has introduced about 90 pumps in Kenya and surrounding countries. Two of these pumps were sited at Kaikor near the Kenya-Sudan border in 1981 as part of the Turkhana Rehabilitation Project. The region had experienced a very bad drought in 1979 and 1980. The pumps provide water for more than 4000 people and their livestock. The regular supply of borehole water is clean and safe and provided anew each day. Overflow water is drawn off into a furrow and irrigates sorghum, maize and legumes. With the availability of clean water, the population of Kaikor has increased. In response to this increase, two more windpumps have been installed within a 80km radius of the first two. An additional advantage for the villagers is that with the windpumps their water supply is now closer to where they live. This is especially important for the women because they do not have to walk long distances to fetch water.

COMMUNICATIONS TECHNOLOGIES

THE PROBLEM...

The problem of isolation is a very serious one for women. Not only are we isolated from each other, but from society as a whole - particularly if we live in rural areas. It is difficult to communicate our needs and priorities publically, and conveying these needs to decision-makers is even more difficult. Women around the world are involved in developing projects and strategies that could serve as inspiration to women in other areas, if only the tools and techniques for communicating these nationally, regionally and internationally were available to women. It is a problem that is made worse by the mass media, which rarely reflect the reality of women's lives and concerns and more often present a false image of women in general.



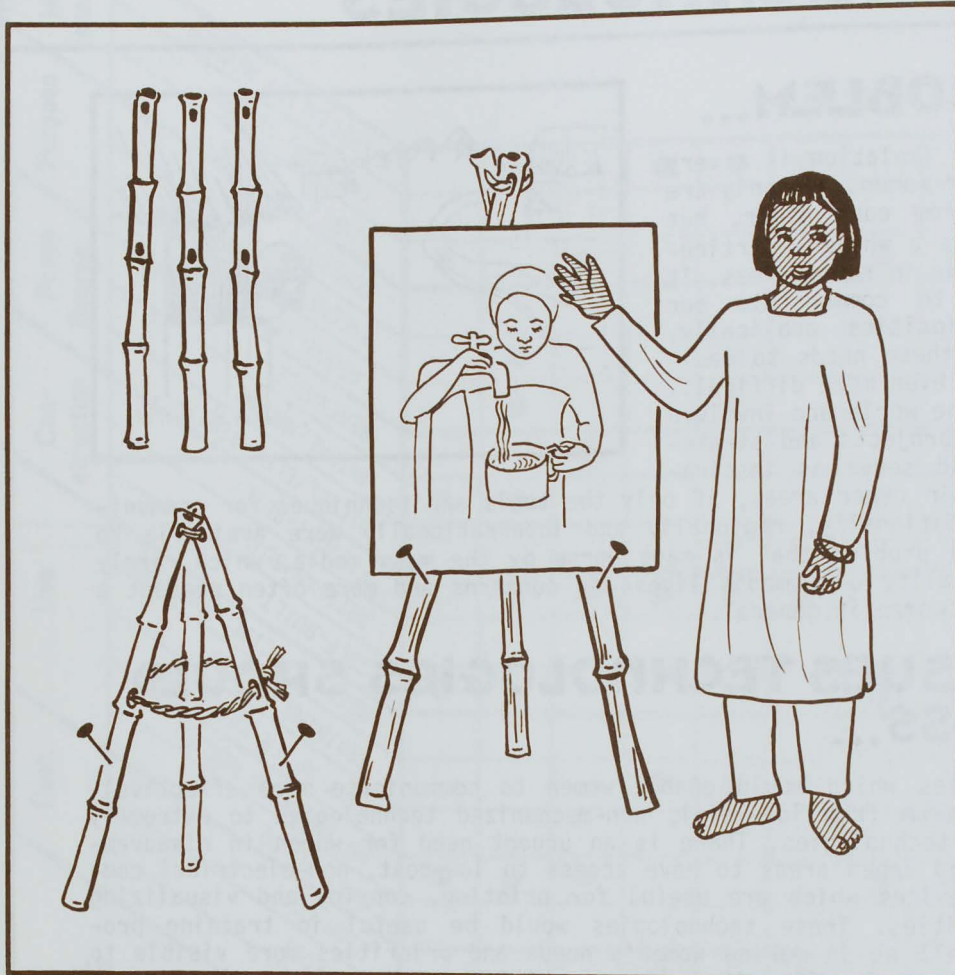
THE ISSUES TECHNOLOGIES SHOULD ADDRESS...

The technologies which would enable women to communicate more effectively span the spectrum from low-level, non-mechanized technologies to extremely sophisticated technologies. There is an urgent need for women in disadvantaged rural and urban areas to have access to low-cost, non-electrical communications devices which are useful for printing, copying and visualizing women's activities. These technologies would be useful in training programmes, as well as in making women's needs and priorities more visible to their communities. Equally, there is a need for women to learn about techniques for producing such communications tools as chalk, rubber cement, and magic markers from locally available materials using low-cost techniques.

Acknowledging the reality that 60% of the world's illiterate population are women, it is imperative that this group have access to technologies through which images and spoken words can be conveyed and by which they can receive information independent of written media. Women's centres and organizations need technologies that will make their efforts to collect, organize, and disseminate information more effective. In creating both mainstream and alternative media, women worldwide are striving to take a more active role in shaping and benefitting from the "information explosion," - an effort which, in part, will be dependent upon their access to, and familiarity with existing and emerging technologies.

by Joanne Sandler

BAMBOO TRIPOD-EASEL



COST:	NO COST LOW COST HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED TRAINING NEEDED TRAINED OPERATOR NEEDED	<input checked="" type="checkbox"/>
CONSTRUCTION:	SELF-BUILT ARTISAN-BUILT FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY ANIMAL/MANUAL RENEWABLE	<input checked="" type="checkbox"/>
PURPOSE:	LABOUR- SAVING INCOME- GENERATING DOMESTIC	<input type="checkbox"/>
MAINTENANCE:	SIMPLE TRAINING NEEDED SPECIALIST NEEDED	<input checked="" type="checkbox"/>

BRIEF DESCRIPTION

Easels are extremely useful for working with small groups in training and workshop sessions. A stand-up easel allows the trainer and participants to display materials, worksheets, etc. as a focal point of discussion for the whole group. This easel will hold a flannel-board, a flip-chart or any other large, stiff-backed visual aid.

FOR MORE INFORMATION

WRITE: 1) INTERNATIONAL WOMEN'S TRIBUNE CENTRE, 777 United Nations Plaza, New York, NY 10017, USA

READ: 1) WOMEN AND GRAPHICS: A BEGINNER'S KIT, Nltr 21 (IWTC, New York, 1982).

STRENGTHS

1. The bamboo easel is made of low-cost, locally available materials.
2. It is convenient to carry around from site to site.
3. It is sturdy and will withstand significant wear and tear.

WEAKNESSES

1. Substitute materials will have to be found in areas where bamboo is not available.

HOW IT'S BEEN USED

Step-by-step instructions for making the bamboo tripod easel are provided below:

MATERIALS: -Three 1.5m poles -4m heavy cord -Two 3cm wooden pegs

PROCESS

1. Drill a hole through one end of each pole. With 20cm of heavy cord, tie the three ends together securely, but not so tightly that tripod legs cannot be opened.

2. Drill another hole near the centre of each pole. Beginning with the first pole, slip the heavy cord through the hole and tie a knot at one end of the cord leaving at least 8cm hanging free. Pull the rest of the rope through the hole until the knot you have made rests firmly against the pole.

3. Measure off a distance of 60cm and insert the rope through the hole in the next bamboo pole and make another knot.

4. Follow this same process with the third pole, always allowing a 60cm length of rope for the distance between the poles. For the last length of rope, tie the two ends together (remember, you have 8cm hanging free), measuring first to be sure the length of the cord between the two poles will be approximately 60cm in length when the knot is completed.

5. Set your tripod up now as it will be when you use it. Decide at what height you want to place the bottom edge of your visual materials and mark this spot on the front two poles. (It would be a good idea to measure this distance to make sure both marks are the same length from the bottom.)

6. If your rope holes are big enough, you may be able to slip the wooden pegs through these. If not, drill two holes and insert wooden pegs or sticks to support flannelboard or other display.

N.B. The length given for the wooden pegs will vary according to the size of the bamboo. You will want at least 7cm of the peg sticking out, so cut your pegs with this in mind.

BUTTON-MAKING MACHINE



COST:	NO COST	<input type="checkbox"/>
	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	NO TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CONSTRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input type="checkbox"/>
	ANIMAL/MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR-SAVING	<input checked="" type="checkbox"/>
	INCOME-GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAINTENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input checked="" type="checkbox"/>

BRIEF DESCRIPTION

There are a variety of button-making machines available from suppliers in different parts of the world. The one described in this entry costs approximately US\$30. (The metal circles and pins for making the buttons are also available and cost approximately US\$35 per 250 metal circles and pins.) The equipment makes a button with a roughly 5.5cm diameter and comes with very clear and easy-to-follow directions. All the operator needs is a paper printed with the message - which is then pressed onto the metal circle with the button machine and covered in hard plastic.

FOR MORE INFORMATION

WRITE: 1) EQUALITY PRODUCTS, 1554 Bardstown Rd, Louisville, Ky 40205, USA.

CODE	100
USE	100
CONSTRUCTION	100
POWER SOURCE	100
PURPOSE	100
MAINTENANCE	100

STRENGTHS

1. Manual version does not require electricity, and it is small, lightweight and portable.
2. Can be used both for organizational purposes for meetings within a group, and, to a limited extent, for making buttons for sale.
3. Easy to use after several minutes training.

WEAKNESSES

1. Machine needs to be imported in most developing countries.
2. Supplies (i.e., metal circles and pins) may need to be imported.
3. To produce attractive buttons, a person with some artistic ability or experience will be needed to produce the original version of the button.
4. Pressing down on the machine to make each button is labour-intensive and tiring for one person. The task needs to be shared.

HOW IT'S BEEN USED

TECH AND TOOLS - KENYA

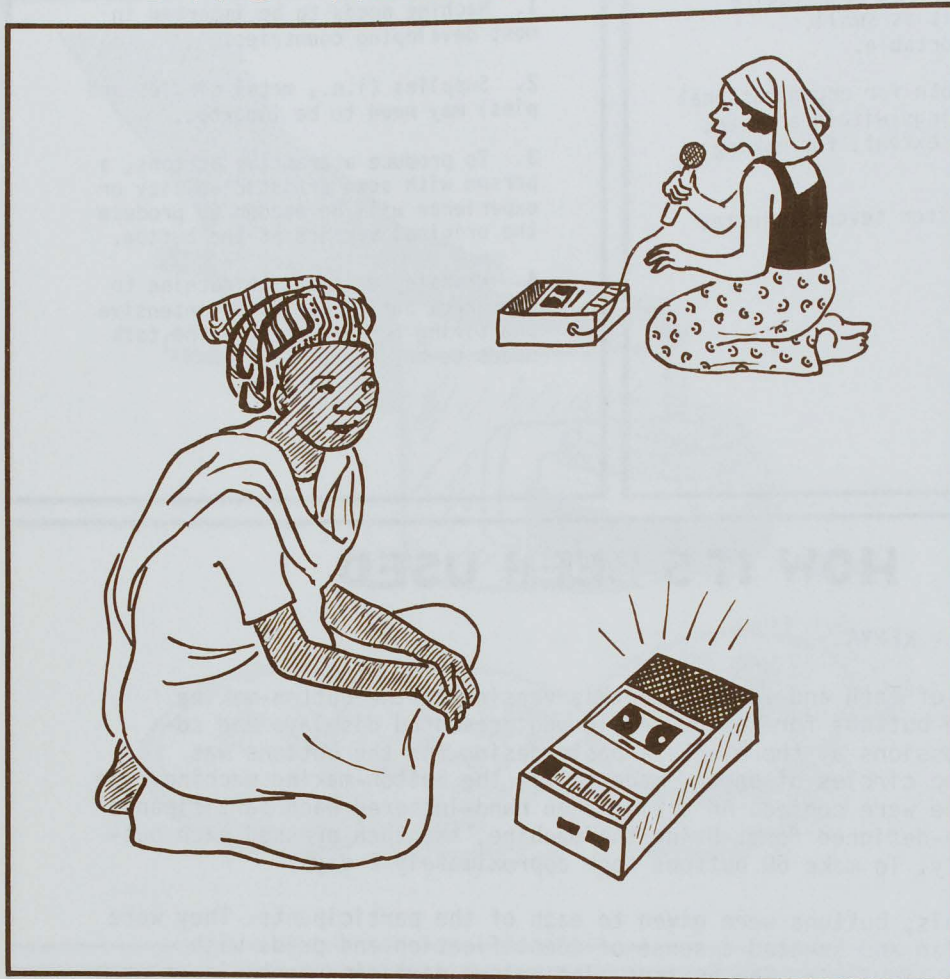
The organizers of Tech and Tools used this version of the button-making machine to make buttons for the 60 people who presented displays and coordinated discussions at the event. A basic design for the buttons was created on round circles of paper, made to fit the button-making machine. One hundred of these were copied. An artist then hand-lettered each participants' name in the pre-designed form. Using the machine, she then pressed each button individually. To make 60 buttons took approximately 2 days.

At Tech and Tools, buttons were given to each of the participants. They were extremely popular and created a sense of identification and pride with working at Tech and Tools. The buttons also helped participants to learn each others' names more quickly. Each participant kept her/his button, which served as a long-lasting reminder of the event.

FOR MORE INFORMATION

WRITE: 1) EQUALITY PRODUCTS, 1554 Bardonia, N.Y. 10958

CASSETTE RECORDER FOR TWO-WAY COMMUNICATION



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	NO TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input type="checkbox"/>
	RENEWABLE	<input checked="" type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input type="checkbox"/>
	INCOME- GENERATING	<input type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

There are numerous cassette recorders available, many of which are cheap enough for small groups to afford. But, while many people use cassette recorders to play music or to record lectures or interviews, several development organizations and individuals working in the field are attempting to use the technology in new and different ways.

All that is needed is a portable cassette recorder of any type and compatible cassette tapes for recording.

FOR MORE INFORMATION

WRITE: 1) CALFORU, Montevideo, Uruguay.

READ: 1) IDRC REPORTS, October 1985, (International Development Research Centre, Ottawa)

STRENGTHS

1. Technology is very light and portable; easy to carry around from village to village.
2. Eliminates dependency on the written word for recording or passing on information; thus, particularly useful for working with illiterate or newly literate groups.
3. Copies of cassette tapes can be easily made and passed on to larger audience; may also be suitable for broadcast over radio.

WEAKNESSES

1. In most cases, technology and supplies (batteries, tapes, etc.) need to be imported.
2. People are still unfamiliar with using cassette recorders for communication.
3. If people speak into the recorder too quickly, or if the recording quality is poor, it is difficult to understand what has been said.

HOW IT'S BEEN USED

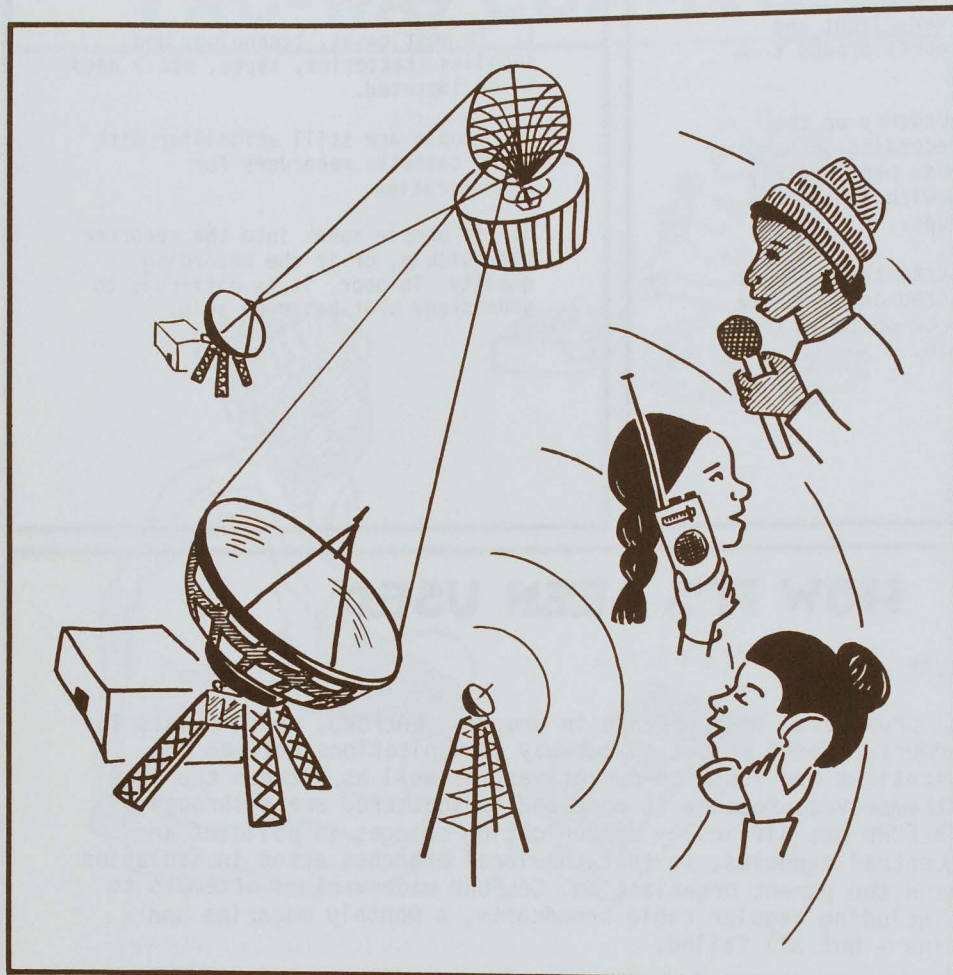
CALFORU - URUGUAY

An agricultural producers' co-operative in Uruguay, CALFORU, which exists for small-scale farmers, needed to set up two-way communications between the national organizations and local co-operatives, as well as between the local co-operatives themselves. Because it operated in scattered areas throughout the country, CALFORU had difficulty communicating changes in policies and news from the central agencies, so that the local branches acted in isolation of each other and the parent organization. CALFORU made various attempts to remedy this - including regular radio broadcasts, a monthly magazine and special bulletins - but all failed.

A consultant was hired to work with CALFORU on finding a technology that was low-cost, simple and could operate over long distances. They decided cassette recorders would be suitable because one can record the first part of a conversation on one side and the other side could be used by the receiving group. As a result, CALFORU started the Cassette Forum. It operates as follows: 1) All groups receive a cassette tape stating a problem or issue; 2) Each group listens to the cassette, records their ideas on the second side and sends it back to the co-ordinating committee; 3) The committee analyses all responses which they record on a new cassette and sends it back out to all groups.

This method has produced an increase in the frequency in exchanges of communication within CALFORU. Cassette communication is also being used in such groups as: School for Fathers (Sao Paulo, Brazil), Indian agricultural co-operatives (Ecuador), Organization of Popular Education Centres (Venezuela) and women's productive workshops (Colombia).

COMMUNICATIONS SATELLITE



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CONSTRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input type="checkbox"/>
	ANIMAL/MANUAL	<input type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR-SAVING	<input type="checkbox"/>
	INCOME-GENERATING DOMESTIC	<input type="checkbox"/>
MAINTENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input checked="" type="checkbox"/>

BRIEF DESCRIPTION

A communications satellite system consists of three parts: the transmitter, on the ground, sends a signal to a satellite orbiting in space, which receives it, makes it louder, and retransmits it to ground stations on earth. Each satellite has a number of channels which carry voice, radio, data or television signals.

Satellites cost millions of dollars to launch, but there are numerous satellites now orbiting the earth that governments sometimes make available for educational and/or development projects. A variety of experiments in using satellites for social development have taken place worldwide.

FOR MORE INFORMATION

WRITE: 1) OFIS BILONG OL MERI, PO Box 623, Nadi, Fiji; 2) OVERSEAS EDUCATION FUND, Ref/WID Programme, 2101 L St., NW, Suite 916, Washington, DC, 20036, USA; 3) IWTC, 777 United Nations Plaza, New York, NY 10017 USA.

READ: 1) SATELLITES AND SEAMSTRESSES, OEF, Washington, DC; 2) "Satellites for Development, Broadcasting and Information," COMMUNICATION RESEARCH TRENDS, 1983, Vol. 4, No. 2.

STRENGTHS

1. Allows numbers of groups in different countries to hold meetings via the telephone or at ground stations.
2. Brings radio and television to areas of countries that cannot be reached by cable or other means.
3. Training women in using satellite communications, and familiarizing them with issues of access and control, is a means of making them active towards eventual ownership and use of satellite worldwide.

WEAKNESSES

1. Access to and control of satellites is an issue which has aroused a lot of argument, since the Western countries have monopolized satellite space. As long as governments and private industry own satellites, the use of this technology will be controlled by such bodies.
2. Many people are uncomfortable communicating via telephone or by audio-conference and this often restricts how satellite meetings can be used.
3. There is no privacy; operators (governments) can hear and record conversations.

HOW IT'S BEEN USED

RefWID - USA

The RefWID project of the Overseas Education Fund was designed to work with H'mong women refugees who had come to the United States. The objective was to train them in income-earning skills. A problem, however, was that the women were settled in four cities, separated by as many as 3,000 miles.

Organizers decided to hold a video teleconference training, using satellites to link up four locations. Six to eight weeks were spent preparing for the training which included: deciding topics to be covered, selecting presenters, translating scripts into H'mong languages, teaching participants to use the equipment and setting protocol and rules for the teleconference.

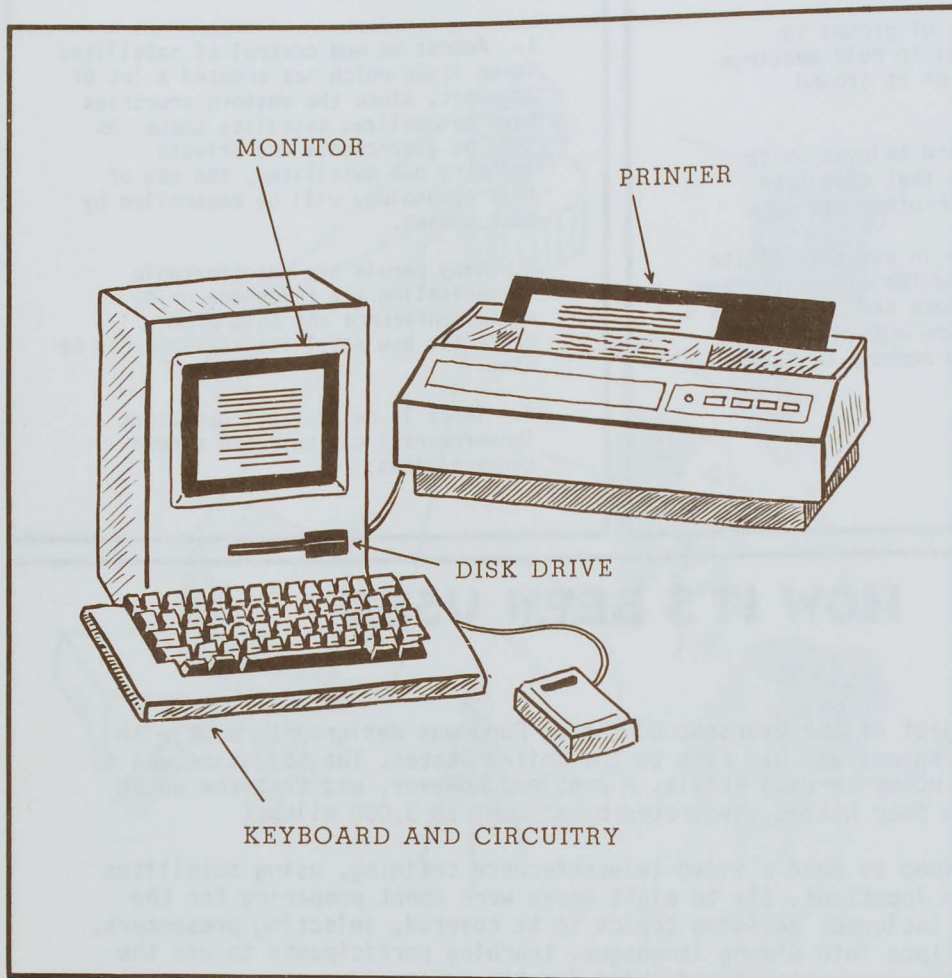
Two teleconferences were held. The first involved 170 women in a three-hour session. It cost US\$8,500, far less than in-person meetings would have cost. While satellite teletraining cannot replace in-person communication, it was found to be an economic alternative.

WORLD YWCA - FIJI

YWCA branches all over the Pacific use satellite time donated to community groups to have occasional meetings to discuss important current issues. YWCA's in major cities of Australia and in Papua New Guinea, New Zealand, the Solomon Islands, Vanuatu, Fiji, Tonga, Western and American Samoa, Cook Islands, Hawaii and California are linked together for audio-conferences. Before the meetings, groups arrange for dates and the time the women who are participating are to go to the terminals, most of which are located at university centres.

FOR MORE INFORMATION
 WRITE: 1) OFFICE OF THE DIRECTOR, MERI, PO Box 622, Washington, DC 20006; 2) OVERSEAS EDUCATION FUND, Ref/WID Program, 10017 USA; 3) YWCA, United Nations Plaza, NY 10017 USA.
 READ: 1) SATELLITE COMMUNICATIONS FOR SEAMSTRESSES, REF/WID, Washington, DC; 2) "Satellite Communications for Development, Broadcasting and Information," COMMUNICATION RESEARCH TRENDS, Vol. 4, No. 2.

MICROCOMPUTER



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input checked="" type="checkbox"/>
	ANIMAL/MANUAL	<input type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input checked="" type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input checked="" type="checkbox"/>

BRIEF DESCRIPTION

A microcomputer gives its user the ability to "process" millions of words, numbers and other "data" using a compact system of components. Microcomputers are particularly useful for: 1) Calculating and analyzing financial records; 2) Editing and correcting text for publications, letters or other printed material; 3) Handling and maintaining mailing lists and other lists of information.

A microcomputer system generally consists of: 1) A microprocessor and keyboard, which houses the intelligence of the equipment; 2) A monitor, which displays the information being worked on; 3) Disk drives, which hold "floppy disks" for information storage; and 4) A printer.

FOR MORE INFORMATION

WRITE: 1) WOMEN'S ALTERNATIVE MEDIA UNIT, ILET, Casilla 16-637, Correo 9, Santiago, Chile; 2) INTERNATIONAL WOMEN'S TRIBUNE CENTRE, 777 United Nations Plaza, New York, NY 10017, USA.

READ: 1) IWTC AND ITS WORD PROCESSOR: WHAT WE WOULD HAVE DONE DIFFERENTLY IF HINDSIGHT HAD BEEN FORE-SIGHT, (IWTC, New York, 1984)

STRENGTHS

1. Reduces time spent on re-typing revised and edited text, as it stores information on a floppy disk which can be recalled and corrected within minutes.
2. Maintains long and constantly updated lists in alphabetical or numerical order.
3. As it is an advanced and rapidly spreading technology, skill in microcomputer technology can open up job and income-earning potential for women.

WEAKNESSES

1. Extremely susceptible to power surges and failures. One can lose invaluable information if working on the computer during a power failure.
2. Parts and maintenance are difficult to obtain in many countries, even in urban areas.
3. Health hazards of prolonged use of microcomputers have not been comprehensively explored.
4. Supplies are used up quickly and are fairly expensive.

HOW IT'S BEEN USED

WOMEN'S ALTERNATIVE MEDIA UNIT(WAMU) - CHILE

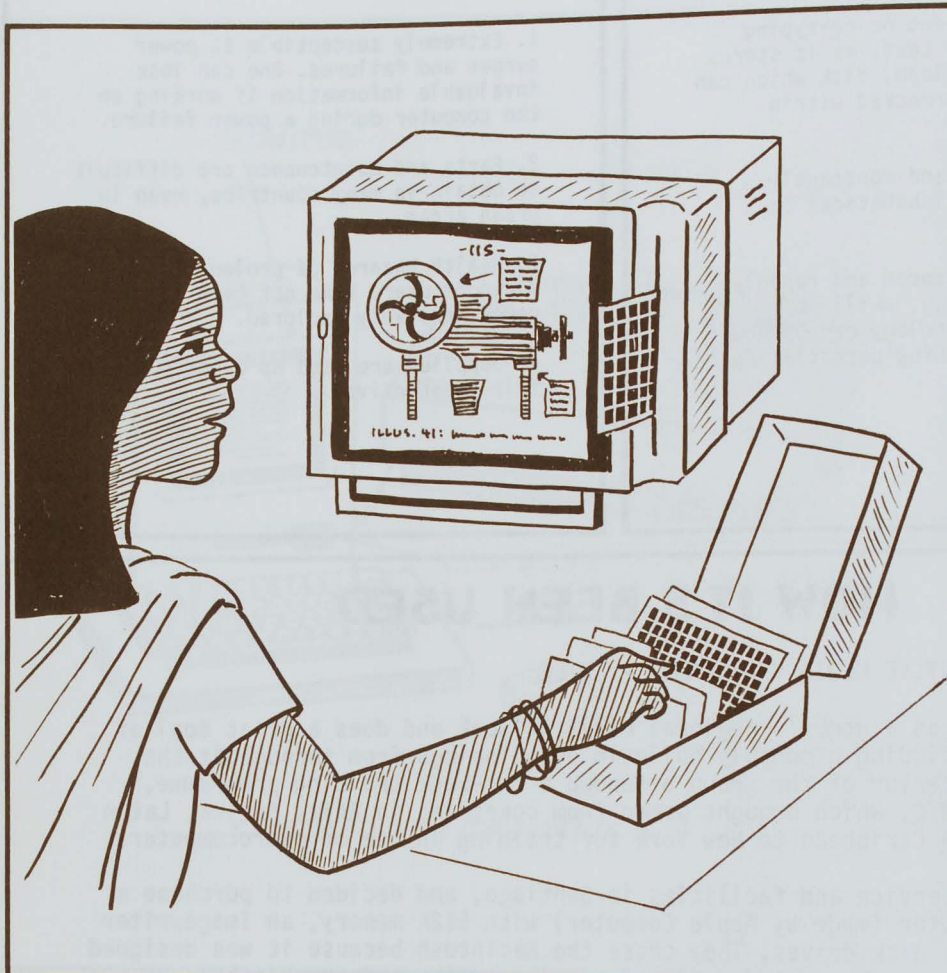
WAMU functions as a women's regional media network and does a great deal of publishing, including a monthly bulletin of clippings from throughout the region. The director of the group attended a two-week training programme, sponsored by IWTC, which brought women from countries in Asia, Africa, Latin America and the Caribbean to New York for training in use of microcomputers.

WAMU explored service and facilities in Santiago, and decided to purchase a MacIntosh Computer (made by Apple Computer) with 512K memory, an Imagewriter printer and two disk drives. They chose the MacIntosh because it was designed for novice computer users and employed a unique method of graphic help signals for instructing users on the equipment. They purchased the equipment and software in the United States with a grant from a church organization there. They found a technician in Santiago who converted the computer to 220V current from 110V.

WAMU purchased their system in January, 1985 and were using it to produce their monthly bulletin by April 1985. They used the software that is standard for the MacIntosh, "MacWrite" and "MacPaint" to produce their information.

While WAMU has encountered virtually no technical problems with the equipment, they continue to refine and expand their use of the computer. Primary areas which they continue to explore include: 1) Identifying software that they can use to manage their mailing lists. With this software, they will be able to search their lists more effectively and maintain closer contact with their constituency; 2) Creating schedules that will allow everyone in the office to use the computer more frequently.

MICROFICHE LIBRARY



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input checked="" type="checkbox"/>
	ANIMAL/ MANUAL	<input type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input type="checkbox"/>
	INCOME- GENERATING	<input type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input checked="" type="checkbox"/>

BRIEF DESCRIPTION

Microfiche are 10.1cm x 15.2cm plastic cards on which photographic images are made. For libraries, microfiche is a technology which makes it possible to photograph pages of books onto these cards, and then use a microfiche reader which magnifies the page in its original size onto a screen. It is a technology which is used by resource centres or libraries trying to save shelf and storage space taken up by books.

The Appropriate Technology Microfiche Library uses this equipment to store over 800 books and documents about appropriate technology. It has 112,000 pages of reference materials and is organized with indexing and reviews of each document.

FOR MORE INFORMATION

WRITE: 1) VOLUNTEERS IN ASIA, PO Box 4543, Stanford, California 94305, USA

STRENGTHS

1. Users can be taught to operate the microfiche library in a relatively short time (15 - 30 minutes).
2. For organizations with limited space, there are noticeable savings in the amount of room that is taken up storing books and other documents.
3. It is possible to transport the whole library to different locations, as it only weighs approximately 13.5 Kgs; thus, one can share it amongst different locations.

WEAKNESSES

1. Needs electricity to work.
2. Expensive for budgets of most local organizations (US\$875 to purchase, plus US\$100 - US\$225 to airfreight).
3. As it is imported, it may be difficult to repair and to find spare parts.
4. People are still used to browsing through a book rather than referring to a microfiche. Also, a person cannot borrow one or several books or articles to take home.

HOW IT'S BEEN USED

GLOBAL

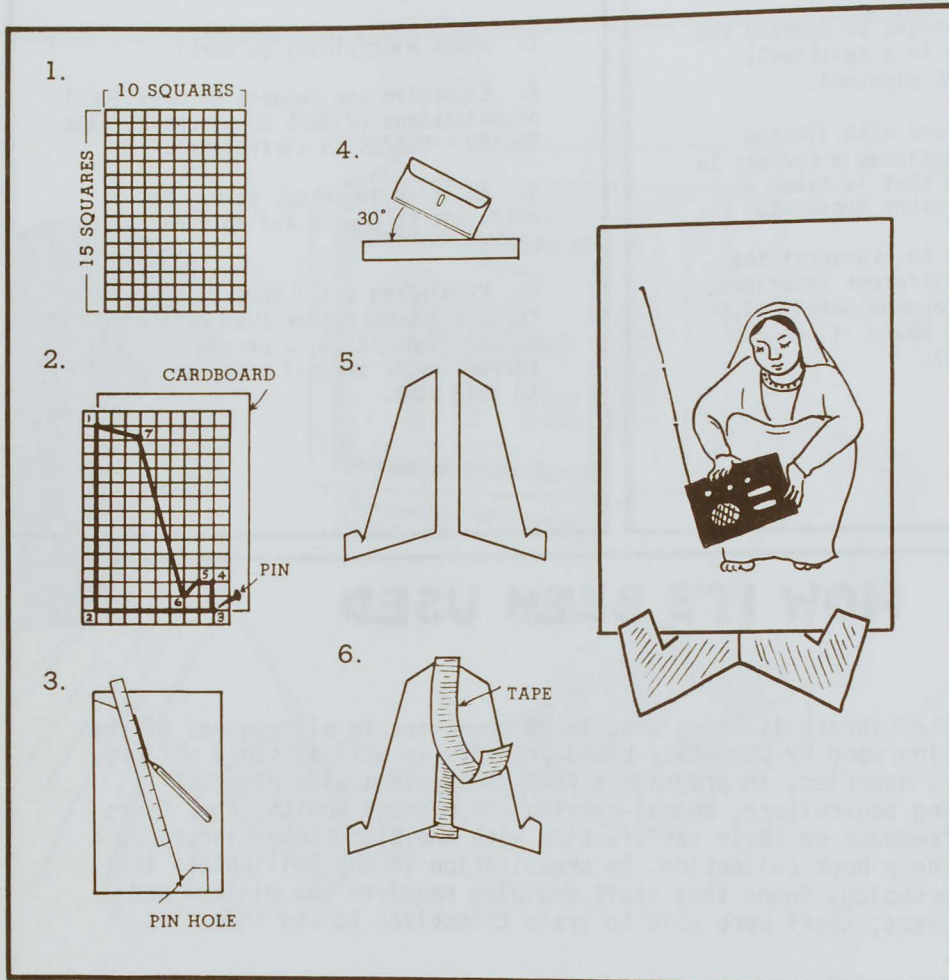
The AT Microfiche Library is being used in 95 countries in all regions of the world. It is being used by community-based projects as well as field offices of international agencies, in programmes that deal with a wide range of issues, including aquaculture, animal-raising and primary health care. Users have provided feedback on their satisfaction with the Microfiche Library as a complement to their book collection. An organization in the Philippines that is using the technology found that staff training required was minimal and that, in many cases, staff were able to train themselves to use this reference tool.

For those interested in purchasing or previewing the AT Microfiche Library, it might be advisable to try to locate a group that is using one in your country. Volunteers in Asia will provide the nearest contact if they receive a request for this information. A sampling of groups that have expressed great satisfaction with this resource include: 1) PLAN, PMB 245, Freetown, Sierra Leone; 2) AKAP, 66JP Rizal St., Project 4, Quezon City, Philippines; 3) HEIFER PROJECT, Box 13272-Delmas, Port-au-Prince, Haiti.

FOR MORE INFO

WRITE: 1) VOLUNTEERS
ASIA, PO Box 4542,
California 94205, USA

PORTABLE EASEL



	NO COST	
COST:	LOW COST	✓
	HIGH COST	
USE:	NO TRAINING NEEDED	✓
	TRAINING NEEDED	
	TRAINED OPERATOR NEEDED	
CONSTRUCTION:	SELF-BUILT	✓
	ARTISAN-BUILT	
	FACTORY-BUILT	
POWER SOURCE:	DIESEL/ELECTRICITY	
	ANIMAL/MANUAL	✓
	RENEWABLE	
PURPOSE:	LABOUR- SAVING	
	INCOME- GENERATING	
	DOMESTIC	
MAINTENANCE:	SIMPLE	✓
	TRAINING NEEDED	
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

This easel, made of cardboard, is ideal for holding pictures mounted on cardboard or a small flannel-graph board when no large presentation board is available. The finished easel can be folded and is easily transported to training sites by extension workers for small group workshops and presentations. It can be brightened by using coloured tape or by painting the cardboard. If a more durable easel is desired, the same process for making the easel can be used with a lightweight wood.

FOR MORE INFORMATION

WRITE: 1) INTERNATIONAL WOMEN'S TRIBUNE CENTRE (IWTC), 777 United Nations Plaza, New York, NY 10017 USA.

READ: 1) WOMEN AND MORE GRAPHICS, N1tr. 25, (IWTC, New York, 1983).

STRENGTHS

1. The easel is easy to make, easy to transport and easy to store away.
2. Can be made from locally available materials.
3. Users can adapt the design to the size they require.

WEAKNESSES

1. The cardboard version is not particularly long-lasting and will have to be replaced if frequently used.
2. It may take some practice for those making the easel to achieve a cleanly cut piece of cardboard with straight sides.

HOW IT'S BEEN USED

Below is a step-by-step guide to making your own portable easel.

MATERIALS: 2.5cm wide tape; heavy cardboard (24-ply if possible) with dimensions of at least 20cm x 35cm); paper that is at least the same dimensions as the cardboard; razor; ruler; straight pin.

PROCESS: (For illustrations of each step, see numbers corresponding to instructions below in illustration on previous page.)

1. Take a piece of paper and divide it into 2.5cm squares. To do this, use a ruler to make a pencilled dot at 2.5cm intervals along all four sides of the paper. Then make lightly pencilled lines joining the dots. You should now have your paper marked off in 2.5cm squares. As a last check, make sure you have at least 8 squares across your paper and 15 squares down.

2. With your pencil, place a heavier dot at points on the squares corresponding to dots 1 through 7 on the pattern. With your ruler, join these dots with a heavier line. The line joining the points 1 and 2 should cover 13 full squares and about 1/4 of the 14th square.

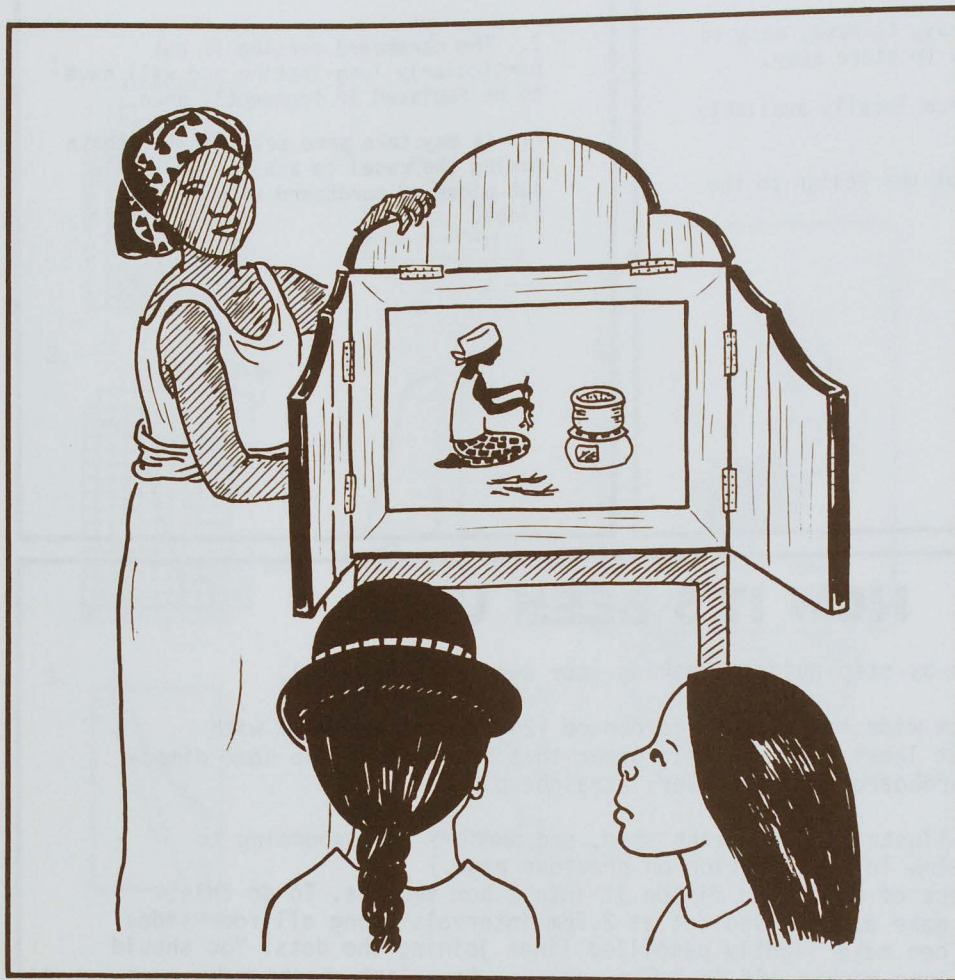
3. Place your pattern over the cardboard with the long side and bottom of the pattern along the long edge and bottom of the cardboard. With a straight pin, puncture the easel drawing at points 1 through 7. Make sure you can see the pinholes when the pattern is removed.

4. With your ruler, connect the pinholes on the cardboard with straight pencilled lines. Hold your ruler firmly against the line you have made, and use your razor to cut the cardboard. (Your cutting blade should be very sharp and you should hold the razor at a 30-degree angle.)

5. On another piece of cardboard (or the same piece, if you have space), repeat steps #3 and #4. You now have two pieces of cleanly cut cardboard.

6. Place the pieces of cardboard about .75cm apart and tape them together on both sides. You now have a cardboard easel that is ready to use.

PORTABLE WOODEN THEATRE



	NO COST	
COST:	LOW COST	✓
	HIGH COST	
	NO TRAINING NEEDED	✓
USE:	TRAINING NEEDED	
	TRAINED OPERATOR NEEDED	
	SELF-BUILT	✓
CONSTRUCTION:	ARTISAN-BUILT	
	FACTORY-BUILT	
	DIESEL/ELECTRICITY	
POWER SOURCE:	ANIMAL/MANUAL	✓
	RENEWABLE	
	LABOUR-SAVING	
PURPOSE:	INCOME-GENERATING	
	DOMESTIC	
	SIMPLE	✓
MAINTENANCE:	TRAINING NEEDED	
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

This version of a Japanese portable wooden theatre, known as a "Kamishibai," has been used for approximately 50 years. It is a device for presenting popular stories to audiences of 15 - 20 people. It consists of a flat wooden or cardboard box, the front of which can be opened in the form of a stage, with a side opening for inserting and removing pictures. It can be placed on a stand or table in front of an audience.

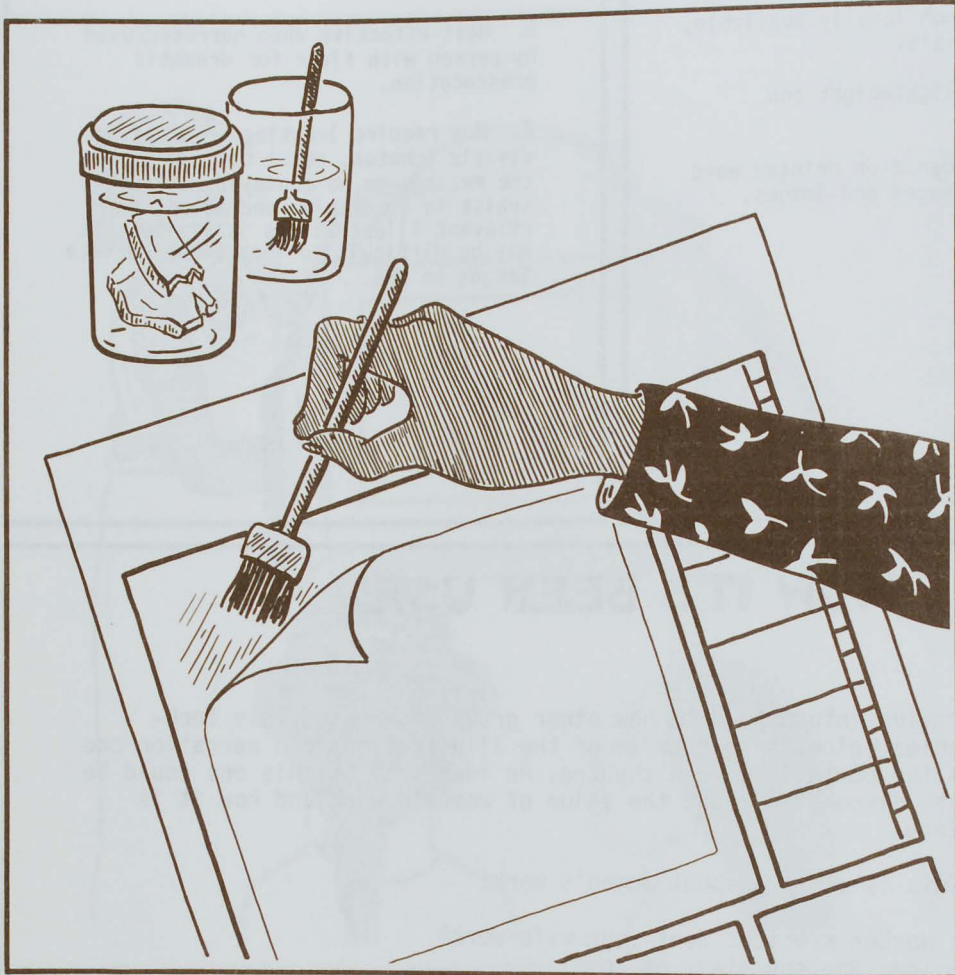
All pictures are inserted in the side opening - in the order in which they will be shown - before the performance begins. Illustrations can be made using line drawings, cartoons, photographs and other visuals. The person narrating can improve the performance by using music and different voices.

FOR MORE INFORMATION

WRITE: 1) CENTRE FOR HEALTH EDUCATION AND APPROPRIATE TECHNOLOGY, University of Bologna, Bologna, Italy, Attn: Prof. Silvio Pampiglione.

READ: 1) APPROPRIATE TECHNOLOGY FOR HEALTH, Newsletter #7, (WHO, Geneva, Oct 1980)

RUBBER CEMENT



	NO COST	
COST:	LOW COST	✓
	HIGH COST	
	NO TRAINING NEEDED	✓
USE:	TRAINING NEEDED	
	TRAINED OPERATOR NEEDED	
	SELF-BUILT	✓
CON- STRUCTION:	ARTISAN-BUILT	
	FACTORY-BUILT	
	DIESEL/ ELECTRICITY	
POWER SOURCE:	ANIMAL/ MANUAL	✓
	RENEWABLE	
	LABOUR- SAVING	
PURPOSE:	INCOME- GENERATING	
	DOMESTIC	
	SIMPLE	✓
MAIN- TENANCE:	TRAINING NEEDED	
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

Rubber cement is probably the easiest paste to use when preparing a flyer or other publications to be printed. Anyone who has to "cut and paste" written material will find it invaluable, because it does not dry or stick fast immediately, but gives you time to move the cut-out image around for positioning. Another handy feature is that you can remove paste around the edges by simply rubbing it off with your finger. This simple way of making your own rubber cement from scrap pieces of rubber could give you large and cheap supplies.

FOR MORE INFORMATION

WRITE: 1) INTERNATIONAL WOMEN'S TRIBUNE CENTRE, 777 United Nations Plaza, New York, NY 10017 USA.

READ: 1) WOMEN AND GRAPHICS: A BEGINNER'S KIT, Nitr. 21, (IWTC, New York, 1982)

STRENGTHS
 This process simplifies the process of preparing artwork or text to a "cut and paste-up" work on material to be printed.
 It reduces dependency on foreign suppliers of commercially manufactured paper.
HOW
 Information below provides a procedure for making rubber cement.
RECIENTS:
 Persons who have access to raw rubber (tree latex), gasoline, or some baby bottles (plastic) and uncoloured gasoline.
TOOLS:
 A clean tin can, a small piece of cloth, a piece of filtered gasoline, a brush, and the rest of the materials.
 The tin can is held over the charcoal.
 You may need to repeat the process from gasoline. Charcoal is used to filter the gasoline.
WARNING: GASOLINE IS FLAMMABLE. USE OUTSIDE ONLY. DO NOT

STRENGTHS

1. Greatly simplifies process of sticking artwork or text to a page when doing "paste-up" work on materials that are going to be printed.
2. Reduces dependency on foreign imports of commercially manufactured rubber cement.

WEAKNESSES

1. Gasoline is used in the making of the rubber cement. Gasoline is flammable and requires great care when mixing. It should not be used near fire and it is important to keep it out of reach of children.
2. Can only be used where scrap rubber supplies are available.
3. Needs charcoal, which is a scarce fuel also needed for cooking.

HOW IT'S BEEN USED

The information below provides a step-by-step guide to making your own rubber cement.

INGREDIENTS:

- 5 grams of raw rubber (translucent, light-brown sheet kind - crepe soles from shoes, or some baby bottle nipples may be used)
- 250cc of uncoloured gasoline (if not available, see #5 below)

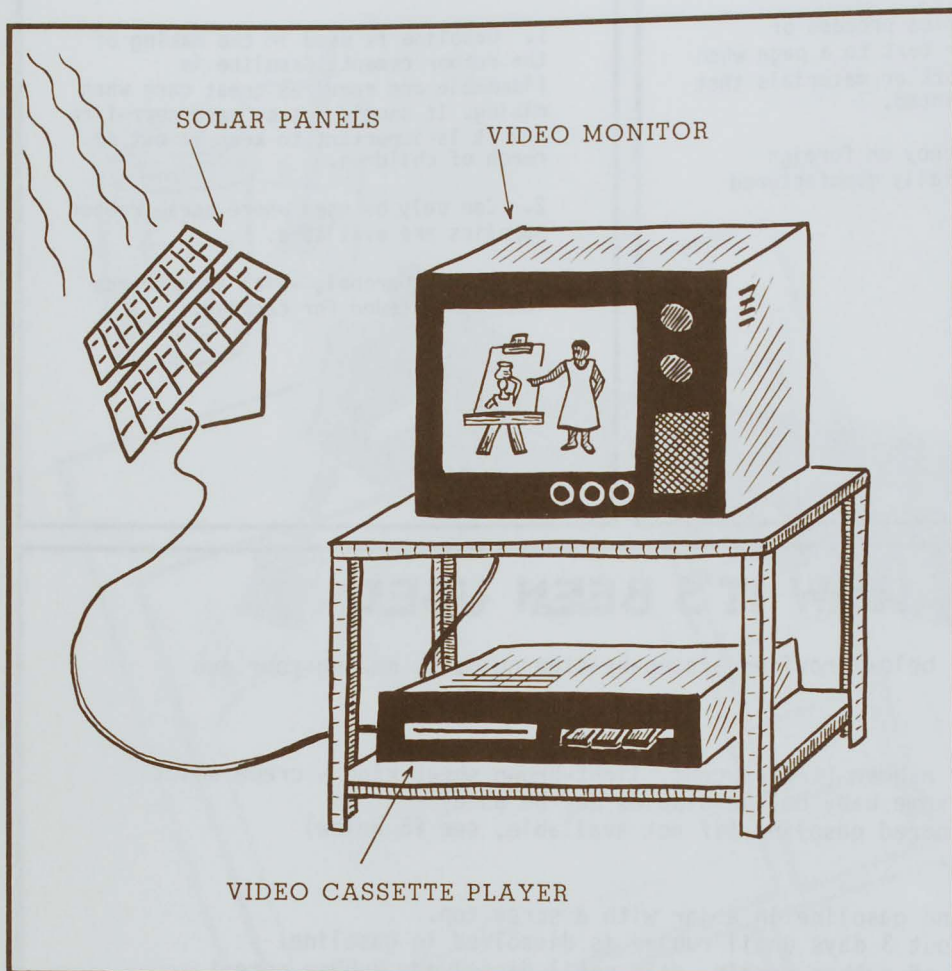
PROCESS:

1. Put rubber and gasoline in a jar with a screw top.
2. Let stand about 3 days until rubber is dissolved in gasoline.
3. If any globs of rubber remain, stir until dissolved. Rubber cement should be smooth and milky-coloured in appearance.
4. Store in airtight, brown bottle in ventilated cupboard. One idea you may want to try is to insert a one-inch paint brush through the metal cover of the jar. This will give you a brush for applying the rubber cement.
5. If uncoloured gasoline is not available, use the following process to filter the coloured gasoline:

- a) Take a clean tin can and puncture a hole in the bottom. Place a small piece of cloth on bottom to keep particles of charcoal out of filtered gasoline.
- b) Fill the rest of the can with small particles of charcoal.
- c) By holding can over a bowl or other container, pour the gasoline over the charcoal.
- d) You may need to repeat the process several times to remove all colour from gasoline. Charcoal may have to be changed after 3 or 4 pourings.

CAUTION: GASOLINE IS FLAMMABLE. USE CARE WHEN MIXING RUBBER CEMENT. WORK WITH GASOLINE OUTSIDE ONLY. DO NOT USE NEAR FIRE. KEEP AWAY FROM CHILDREN.

SOLAR-POWERED VIDEO



COST:	NO COST	<input type="checkbox"/>
	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input checked="" type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input type="checkbox"/>
	RENEWABLE	<input checked="" type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input type="checkbox"/>
	INCOME- GENERATING	<input type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input checked="" type="checkbox"/>

BRIEF DESCRIPTION

Solar-powered video is intended for use where ordinary power sources are unavailable. The solar battery in the video is charged during daylight hours and can store electricity. The video can therefore be used during the day and in the evening. A built-in timer automatically turns off the television during the night. The basic equipment necessary for this system includes a solar battery and battery protector, a colour TV receiver and a photovoltaic unit. The video is a useful educational and communications tool in rural areas.

FOR MORE INFORMATION

WRITE: 1) WORLDVIEW INTERNATIONAL FOUNDATION (WIF), Skippergt. 21, 0154, Oslo 1, Norway; 2) BJORN ROAR BYE, WIF School Service, Box 503, 6401 Molde, Norway.

STRENGTHS

1. A solar panel has a life of ten years.
2. Requires no electricity.
3. It is noise-free.
4. It is relatively easy to operate.

WEAKNESSES

1. It is more expensive to set up than using a generator.
2. Systems are not widely available.

HOW IT'S BEEN USED

BANGLADESH/SRI LANKA/MALDIVES/NEPAL

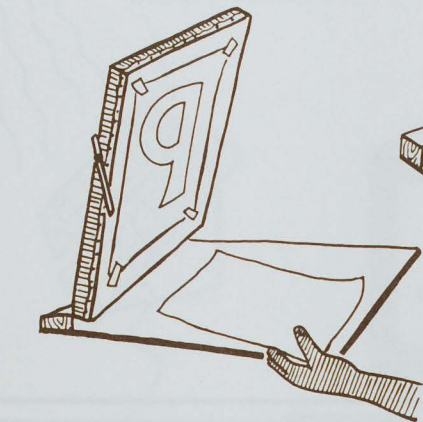
Worldview International Foundation (WIF) works with advanced technology to assist Third World groups in establishing education/communication programmes. It began working with solar-powered video in December 1983, so specific projects using the technology are still in the planning stages. Thus far, trainees at several WIF Media Centres in Asia have been introduced to the system.

In Bangladesh, the Ministry of Education wanted to communicate with the people through television. WIF is trying to introduce the solar-powered video to several villages in Bangladesh. In the Maldives, two projects are being planned. One is a project for distance education and the other is a project aimed at motivating parents to send their children to school. A family health project will start in Nepal and a 'water-for-health' project will start in Sri Lanka, both of which will make use of the solar-powered video technology.

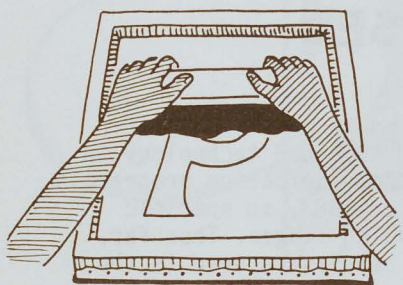
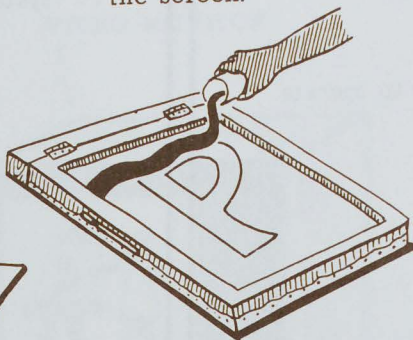
WIF Media Centres are located at the following addresses: 10 Kinross Ave, Colombo 4, SRI LANKA; House 76A, Road 12A, Dhanmondi, Dhaka, BANGLADESH; PO Box 2912, Kathmandu, NEPAL; Sea Coast, Marine Drive, H-30, Male, MALDIVES.

STEN-SCREEN

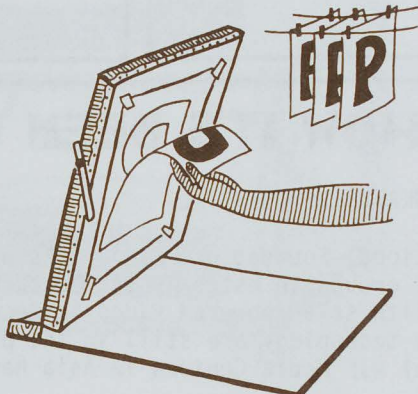
1. The stencil is taped onto the screen.



2. Ink is poured onto the screen.



3. The squeegee is used to pull the ink across the stencil.



4. The print is pulled off the screen and hung up to dry.

	NO COST	
COST:	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input checked="" type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input checked="" type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

The sten-screen is a printing device which uses a wax stencil to reproduce copies of written materials for educational, advertising, or income-generating purposes. In the printing process, the wax stencil is fixed to a wooden framed screen. Ink is pushed through the screen with a squeegee onto the paper or material below it. The stencil is usually typed on but can also be drawn or hand printed on to create the images and text. As few as one, or up to eight different (foolscap sized) pages or posters can be printed at one time depending on the size of the screen. It is particularly advantageous for groups working in areas where no copying facilities are available. The printer can be used for producing images on paper and textiles.

FOR MORE INFORMATION

WRITE: 1) KENYA GIRL GUIDES, Evonne C. Muli, PO Box 40004, Nairobi, Kenya;
2) IAN McLAREN, 37 Fieldgate Lane, Kenilworth, Warwickshire CV8 1BT, UK
3) ALOZ, PO Box 4480, Harare, Zimbabwe

READ: 1) THE STEN SCREEN: MAKING AND USING A LOW-COST PRINTING PROCESS, McLaren, I. (I.T. Pubs., London, 1983).

STRENGTHS

1. Simple and inexpensive to construct using locally available materials.
2. Does not require electricity and is easy to operate.
3. Has income-generating potential.
4. Inks can be made with local materials or traditional paints.

WEAKNESSES

1. An initial investment cost required to set up printer is approximately US\$75.
2. Some printing supplies may not be available locally.
3. A typewriter is necessary to print large amounts of text.

HOW IT'S BEEN USED

ALoz - ZIMBABWE

The sten-screen was introduced to the Adult Literacy Organization (ALoz) of Zimbabwe, where it was used as a learning tool for demonstrating the role and importance of local newspapers. Other groups in Zimbabwe have shown interest and three national training courses have been set up to demonstrate the printer to women's groups, teachers and community development volunteers. Rural groups have been especially interested in using it to print patterns on fabric.

GIRL GUIDES ASSOCIATION - KENYA

The Kenya Girl Guides Association acquired a sten-screen in July 1985. The Guides were making plans for the celebration of their 75th year anniversary and they decided to use the printer for making posters. One leader and a group of guides received 16 hours training and practice with the printer. They were then able to print posters and T-shirts. The Guides have plans to pass the training on to rural groups. The leaders familiar with the printing process all agreed it is a valuable copying device for rural areas.

ENERGY TECHNOLOGIES: A SUMMARY

	Cost			Use			Construction			Power Source			Purpose		Maintenance				
	NO COST	LOW COST	HIGH COST	EASY TO DO	NO TRAINING NEEDED	EASY AFTER TRAINING	TRAINING NEEDED	NEEDS SPECIAL OPERATOR	SELF-BUILT	ARTISAN-BUILT	FACTORY-BUILT	DIESEL/ELECTRICITY	RENEWABLE	LABOUR- SAVING		INCOME-GENERATING	DOMESTIC	SIMPLE	TRAINING NEEDED
BAKERIES	•			•				•				•					•		
COMMUNITY COOKER	•			•				•				•					•		
GREEN CHARCOAL		•			•				•								•		
HEAT STORAGE COOKER						•			•								•		
KENYAN CERAMIC JIKO								•											
MICRO-HYDRO ELECTRIC POWER																			•
NADA CHULA									•										
NOFLIE STOVE									•										
POTTERY LINER STOVE									•										
PRESAWASH									•										

ENERGY

THE PROBLEM

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 energy problem re
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 term solutions to

**THE ISSUES
ADDRESS...**

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 tributing energy tech

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 families and communi
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 afford to purchase t

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ENERGY TECHNOLOGIES

THE PROBLEM...

It has been estimated that 100 million people in developing countries are unable to obtain sufficient fuelwood to meet their needs and that a further one billion are affected by occasional shortages. This energy problem requires solutions at grassroots levels which fit the cultural, social and economic realities that women face. There are no tools, machines or equipment which will fit all situations.



One critical area, in which headway has been made, is the introduction of improved stoves, designed to save the amount of firewood used by households - and thus the amount of time women spend walking to find and transport fuel for cooking. Continued development of technologies and techniques that provide renewable power sources - including bio-energy, solar and hydro power - for a variety of women's tasks will be critical if we are to devise long-term solutions to the global energy crisis.

THE ISSUES TECHNOLOGIES SHOULD ADDRESS...

As the development of fuel-efficient stoves is of primary concern, to reflect the importance of this effort, a variety of types of stove and strategies are described in this manual. Technologies should also provide opportunities for women to assist in developing renewable energy forms. Bearing in mind problems which arose in past attempts to introduce energy-saving technologies, the following are some of the important questions to ask when designing and distributing energy technologies:

- *Are women involved in the design and development process? (Their lack of involvement in past programmes has been a significant factor in lack of acceptance of new technologies, particularly improved stoves).
- *Will the new or improved technology require a small change in cooking, or other habits, or will it require major adaptations in the lives of women, families and communities?
- *Will women be involved in the construction and maintenance of the technology? If so, do they have the time for this involvement? If not, can they afford to purchase the technology?

It is important to recognise that introducing labour-saving technologies will not be sufficient by itself to reduce women's drudgery; any programme to introduce new technologies must acknowledge that a re-distribution of responsibility between all members of a community is necessary if women are to have time to fully participate in their country's development.

by Ruth Lechte and Yvonne Shanahan

BAKERIES



	NO COST	
COST:	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	EASY TO DO	<input type="checkbox"/>
	EASY AFTER TRAINING	<input checked="" type="checkbox"/>
	NEEDS SPECIAL OPERATOR	<input type="checkbox"/>
CON-STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input checked="" type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input type="checkbox"/>
	ANIMAL/MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

There are three types of ovens which can be used for small-scale bakeries. The Rim oven is made of old wheel rims of vans covered with a mixture of sand and clay. The Oil Tin oven uses an oil drum covered with mud as a base. The Square oven, the largest of the three, is built of bricks lined with metal sheets. All three ovens use wood as fuel, but charcoal can also be used. The Oil Tin oven has the capacity to bake 3 loaves at a time, the Rim Oven 9 loaves and the Square Oven bakes between 40 and 70 loaves at a time.

FOR MORE INFORMATION

WRITE: 1) RURAL INDUSTRIES INNOVATION CENTRE, Private Bag 11, Kanye, Botswana

READ: 1) THE A.T. JOURNAL, VOL. 12, No. 1, June 1985.

STRENGTHS

1. The ovens are made of inexpensive material making them accessible to poor rural people interested in starting bakeries.
2. The capacity of the Rim and Oil Tin ovens is just enough for communities where demand for bread is not very high so that small-scale bakeries can be set up by individual women.
3. The capacity of the Square Oven is large enough to supply shops and institutions.

WEAKNESSES

1. Skill is needed in the construction of ovens.
2. Due to difficulties in heat control the quality of the bread may be negatively affected. (However, the bread can be shifted periodically to obtain a uniform product.)
3. Smoke contamination is experienced in the Oil Tin and Rim ovens.

HOW IT'S BEEN USED

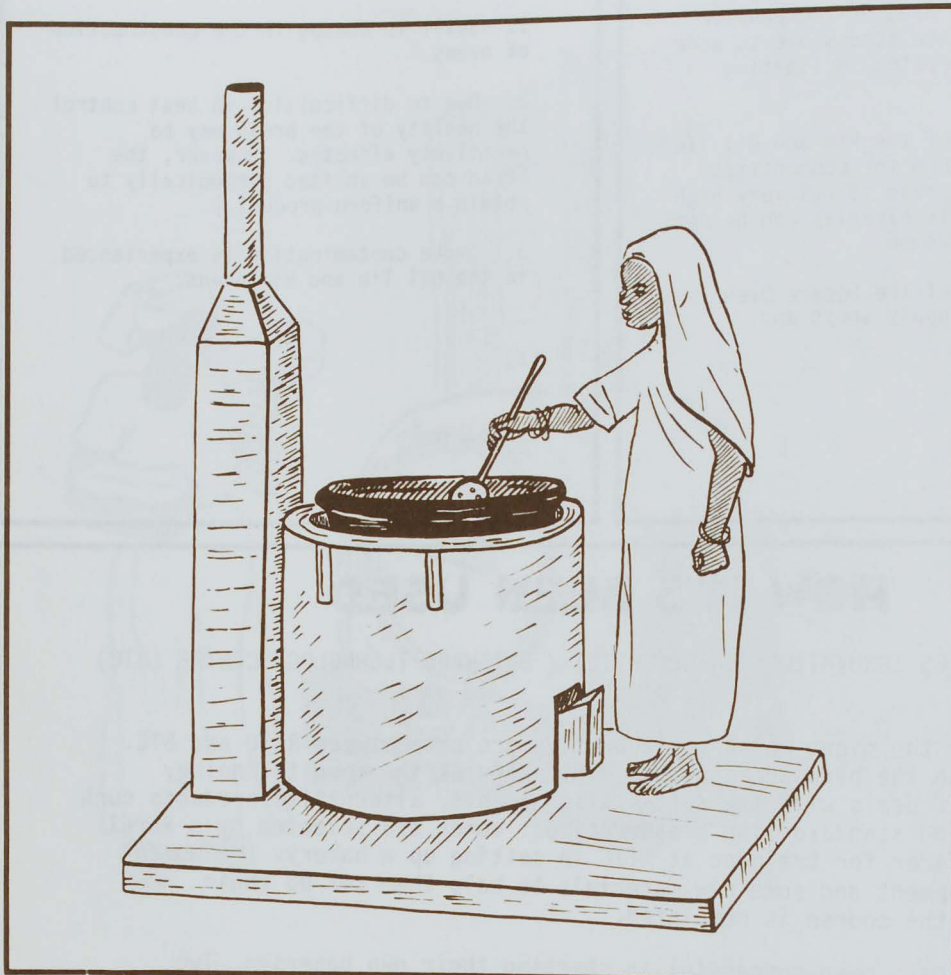
RURAL INDUSTRIES INNOVATION CENTRE (RIIC) / BOTSWANA TECHNOLOGY CENTRE (BTC)
- BOTSWANA

The design for the ovens was a collaborative project between RIIC and BTC. RIIC deals with the hardware aspect and BTC handles the food technology component. BTC deals with the anti-staling agents, alternative products such as biscuits, and standardizing bread recipes. Women are selected by a Rural Industrial officer for training at RIIC in setting up a bakery. The women are given equipment and some raw materials to help them set up their bakeries when the course is completed.

Several women have been successful in starting their own bakeries. Two thriving bakeries have been set up in Ramotswa and Habane, Botswana. The bakeries supply bread for the town, school and local shops. The bread is preferred to that from the capital city because it costs less and is baked fresh daily. The bakeries' buns and cakes have also become very popular. Some of the income produced is used by the women for individual needs, while the rest is reinvested.

Continued technical assistance in control and management of small businesses is given to the women during the initial phases of managing their newly formed bakeries.

COMMUNITY COOKER



COST:	NO COST	
	LOW COST	✓
	HIGH COST	
USE:	NO TRAINING NEEDED	✓
	TRAINING NEEDED	
	TRAINED OPERATOR NEEDED	
CON- STRUCTION:	SELF-BUILT	
	ARTISAN-BUILT	✓
	FACTORY-BUILT	
POWER SOURCE:	DIESEL/ ELECTRICITY	
	ANIMAL/ MANUAL	✓
	RENEWABLE	✓
PURPOSE:	LABOUR- SAVING	✓
	INCOME- GENERATING	
	DOMESTIC	
MAIN- TENANCE:	SIMPLE	✓
	TRAINING NEEDED	
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

The community cooker is an artisan-built stove designed for the preparation of large quantities of food in schools, hospitals and other institutions. A 42-litre capacity metal pot enters deep into the stove and rests on a platform just above the fire. The pot is also supported by its special rim which fits snugly on the metal ring of the stove top. The stove burns wood and other biomass; the smoke is removed by a chimney. The stove body can be built with a range of materials from clay brick to cast iron.

FOR MORE INFORMATION

WRITE: 1) BELLERIVE FOUNDATION/UNEP, Nairobi, Kenya

READ: 1) MODERN STOVES FOR ALL, Micuta, W. (I.T. Pubs, London, 1985).

STRENGTHS

1. Can be built with a range of materials including those that are low-cost, and thus can be produced at a variety of prices depending upon the abilities of the consumer population.
2. Substantial fuel savings for institutions.
3. Cooks food quicker and is clean to use which is important for cooking large amounts of food all day.

WEAKNESSES

1. Has to have a specially made cooking pot.
2. Has to be made and installed by trained personnel.

HOW IT'S BEEN USED

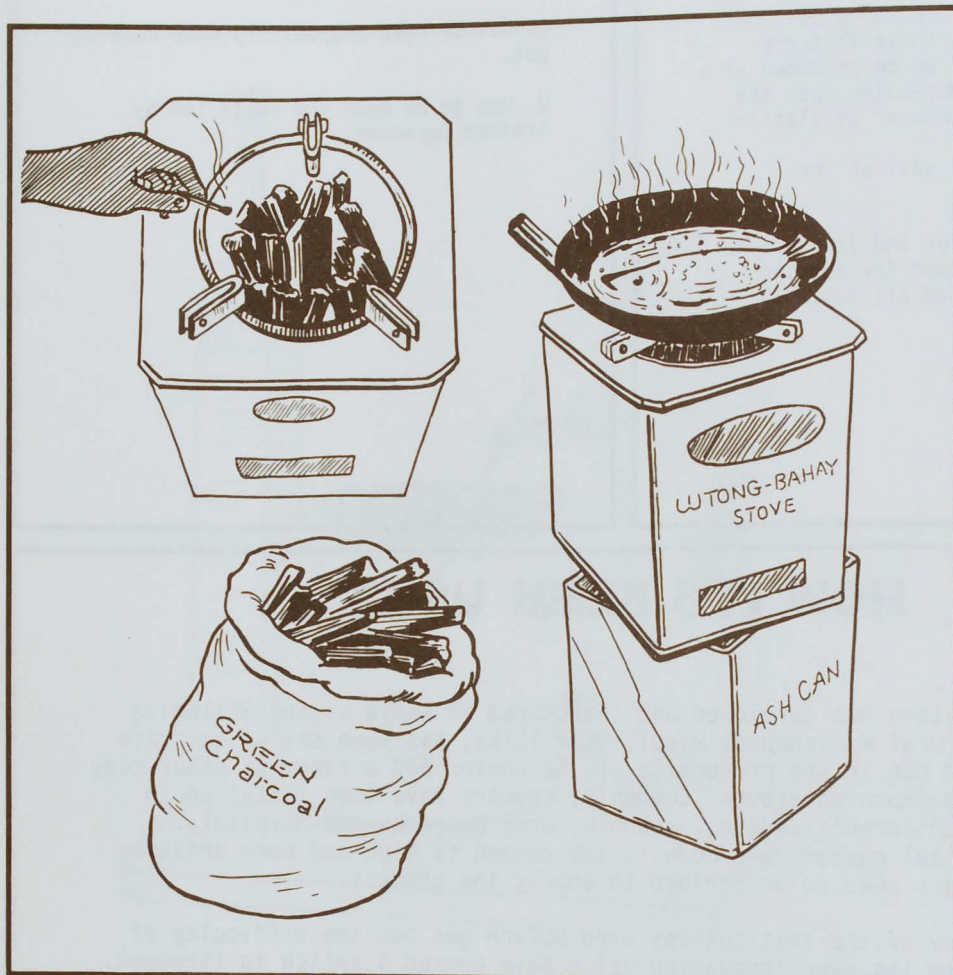
KENYA

The community stove was developed and introduced in Kenya by the Bellerive Foundation. A rural workshop at Rirui, near Thika, has been set up to train local women and men in the production of the cooker and a range of other clay and metal-based improved stoves. Community cookers have been installed in dispensaries, children's centres, schools, army barracks and hospitals. Although the total numbers are modest, the demand is high and more artisans and entrepreneurs need to be trained to supply the product.

Previously, many of the institutions used butane gas but the difficulty of obtaining it and its ever-increasing price have caused a switch to firewood. Other institutions relied upon the traditional open fire. The Dagoretti Children Centre, which cares for 150 disabled children, is one example of an institution which has successfully switched from the traditional method to the community stove. Adaptations of the community cooker for different fuels have been built for several schools in Thika.

The Bellerive Foundation has also assisted the United Nations High Commission on Refugees to build a community cooker operated on gas for an Afghan refugee camp near Peshawar, Pakistan.

GREEN CHARCOAL



	NO COST	
COST:	LOW COST	
	HIGH COST	✓
USE:	EASY TO DO	
	EASY AFTER TRAINING	✓
	NEEDS SPECIAL OPERATOR	
CONSTRUCTION:	SELF-BUILT	
	ARTISAN-BUILT	
	FACTORY-BUILT	✓
POWER SOURCE:	DIESEL/ELECTRICITY	
	ANIMAL/MANUAL	
	RENEWABLE	✓
PURPOSE:	LABOUR- SAVING	
	INCOME- GENERATING	✓
	DOMESTIC	
MAINTENANCE:	SIMPLE	✓
	TRAINING NEEDED	
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

Green charcoal is used as an alternative fuel source for household, commercial and industrial heating and cooking purposes. It is produced from partially decayed organic material such as grass. Green charcoal is sold in compact, uniform briquettes which last longer and burn better than ordinary charcoal.

FOR MORE INFORMATION

WRITE: 1) MAPECON, 2533 Madre Perla Street, Vito Cruz Ext., Manila, Philippines; 2) RACHEL POLESTICO, AT Centre, Xavier University, Cagayan de Oro City, Philippines.

STRENGTHS

1. It comes in compact, easy to use briquettes and is extremely cheap. A 10kg bag would be about US\$1.25.
2. The by-products of green charcoal-ashes can be used as household utensil cleaners, in foot baths, and as fertilizer.
3. Saves precious wood, since it makes use of non-woody plant materials such as leaves and straw.
4. Use of green charcoal results in hardly any smoke pollution.

WEAKNESSES

1. Rain slows down the production process since sun is used as a drying agent.
2. Expense of setting up plant and machinery requires financial assistance.
3. May smoke profusely if the green charcoal is not thoroughly dry.
4. Unused portions from a batch of green charcoal cannot be used once the batch has been opened.
5. Requires stove or grill with good air vents or it will smoke badly.

HOW IT'S BEEN USED

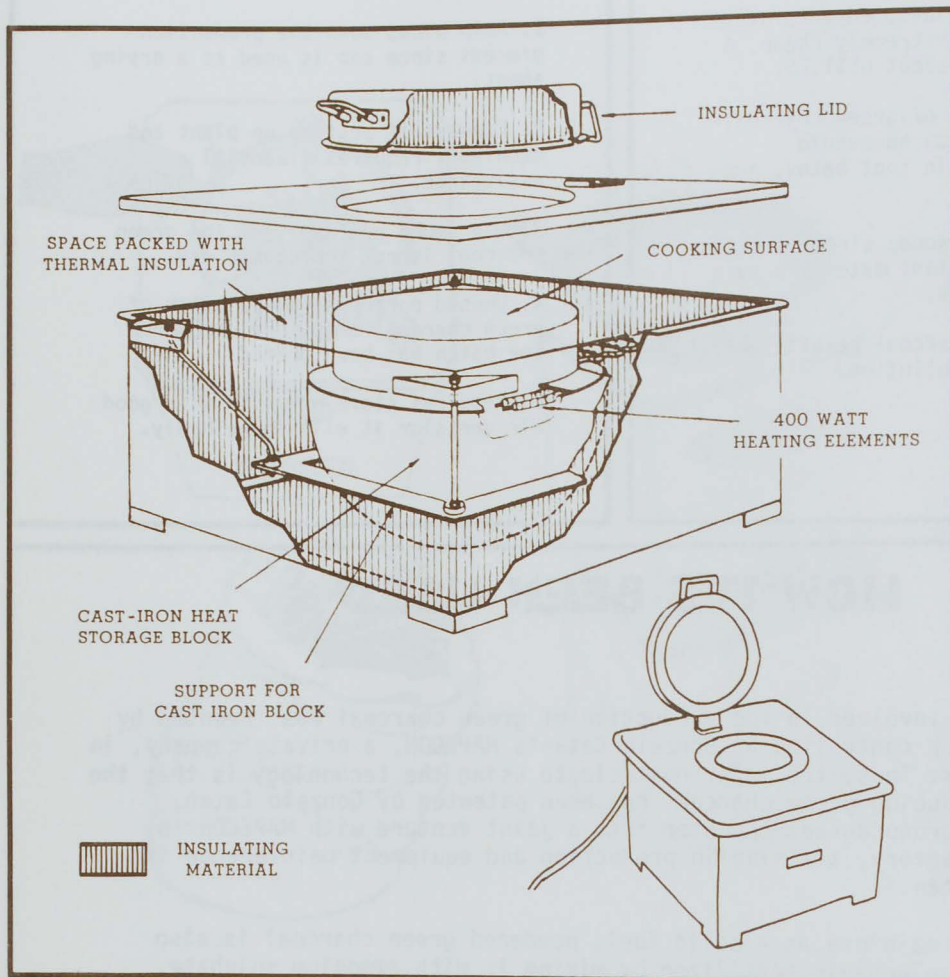
PHILIPPINES

The technology involved in the production of green charcoal was invented by and is very much controlled by Gonzalo Catan's MAPECON, a private company, in the Philippines. Thus, the major obstacle to using the technology is that the method for producing green charcoal has been patented by Gonzalo Catan. However, if a group agrees to enter into a joint venture with MAPECON in setting up a factory, training in production and equipment maintenance is provided by Catan.

Aside from its main use as a solid fuel, powdered green charcoal is also being used as an organic fertilizer by mixing it with ammonium sulphate. Green charcoal-ashes can also be used as a cleanser for kitchen utensils using 2 cups ash and 1 cup detergent.

A simple method for producing green charcoal has been developed by two women in the Philippines, Rachel Polestico and Annabel Damasco, at Xavier University (see WRITE for address). However, this method is labour intensive and requires more time. Another alternative fuel available in the Philippines is Siroco. It is a solid fuel composed of an alcohol fibre and oil mixture. The fuel was invented by Ms. Carlita Doran, who can be contacted at CRD International, 25 SCT Fuentabella Street, Timog Avenue, Diliman, Quezon City, Philippines.

HEAT STORAGE COOKERS



COST:	NO COST	<input type="checkbox"/>
	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CONSTRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input checked="" type="checkbox"/>
	ANIMAL/MANUAL	<input type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR-SAVING	<input checked="" type="checkbox"/>
	INCOME-GENERATING	<input type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAINTENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

All storage cookers are basically the same. There are two heating elements, consisting of spirals of nickel/chromium wire strung on a necklace of ceramic beads. These are laid in grooves on a 40kg hemisphere of cast iron, which is itself suspended by four thin steel rods hung from the casing in which the cast iron block is housed. The space between the iron block and its outer case is insulated. When the cooker is not in use, the well-insulated, hinged lid sits on the exposed part of the cast-iron block to reduce heat loss and to keep the block hot. Heat is generated by an electrical element and stored in the cast-iron box until needed. Thus, heat is generated overnight, when the electrical load is low, and is used for cooking at the owner's convenience.

FOR MORE INFORMATION

WRITE: 1) INTERMEDIATE TECHNOLOGY DEVELOPMENT GROUP, Myson House, Railway Terrace, Rugby CV21 3HT, UK; 2) COMUNIDAD POR LOS NINOS, Fundacion Educadora San Nicolas, Aptdo Aereo 278, Z.P. 8, Envigado, Antioquia, Colombia.

READ: 1) THE A.T. JOURNAL, Vol. 9, No. 4, March 1983.

STRENGTHS

1. Provides an acceptable alternative to cooking over wood or kerosene.
2. Releases labour from fuelwood collection.
3. Makes use of spare electricity from micro-hydro plants.
4. Enhances space heating effect.

WEAKNESSES

1. The cooker may be expensive for low-income families.

HOW IT'S BEEN USED

COMUNIDAD POR LOS NINOS - COLOMBIA

The Comunidad por los Ninos, in conjunction with ITDG, installed a micro-hydro plant to power a sawmill. The plant generated more electricity than was needed by the mill, and this provided the opportunity to divert the extra electricity into an auxiliary load - a heat storage cooker.

The Comunidad por los Ninos developed their own type of cooker, based on a Norwegian model. Great interest was shown during the trial period. The result is that 300 Watt storage cookers, using the design developed, are to be installed. The total amount of power required for these cookers is 4.8kw which is well within the capacity of the scheme. Over a 24-hour period, the storage cookers receive enough electricity (converted to stored heat) for cooking the family meals. The women are very pleased with the cookers because they are clean in comparison with traditional cooking methods and are more convenient. Moreover, because the cooker does not require fuelwood, the women are released from the tiresome task of fuelwood collection.

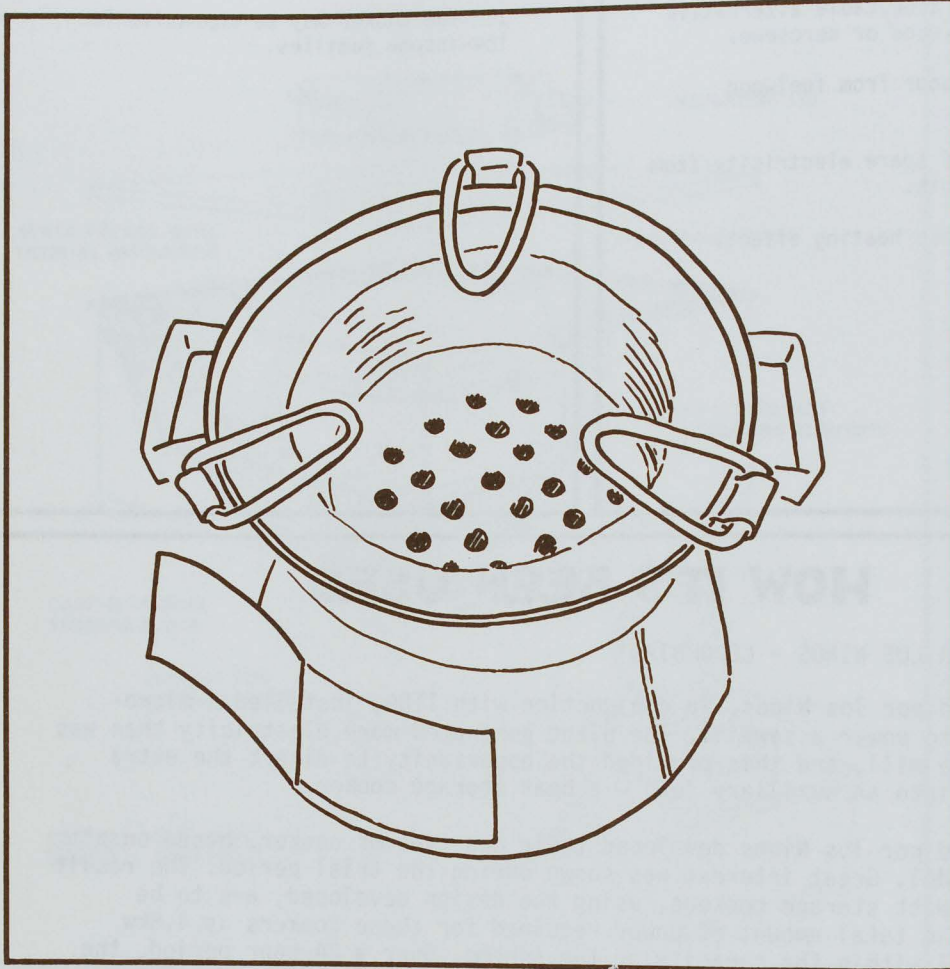
ITDG is also in the process of introducing heat storage cookers in Nepal where power from turbines to drive mills is greater than the amount required by the mills. The excess power can be used to generate electricity for storage cookers.

FOR MORE INFORMATION

NOTE: 1) INTERMEDIATE TECHNOLOGY DEVELOPMENT CENTRE, Myson House, Rugby CV21 3JF. 2) COMUNIDAD POR LOS NINOS, Educadora de Niñas, Aptdo Aereo 218, Envigado, Antioquia, Colombia.

NOTE: 1) THE A.T. JOURNAL, No. 4, March 1981.

KENYAN CERAMIC JIKO



	NO COST	
COST:	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
	NO TRAINING NEEDED	<input checked="" type="checkbox"/>
USE:	TRAINING NEEDED	<input type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
	SELF-BUILT	<input type="checkbox"/>
CON-STRUCTION:	ARTISAN-BUILT	<input checked="" type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
	DIESEL/ELECTRICITY	<input type="checkbox"/>
POWER SOURCE:	ANIMAL/MANUAL	<input type="checkbox"/>
	RENEWABLE	<input checked="" type="checkbox"/>
	LABOUR-SAVING	<input checked="" type="checkbox"/>
PURPOSE:	INCOME-GENERATING	<input type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
	SIMPLE	<input checked="" type="checkbox"/>
MAIN-TENANCE:	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

The Kenyan Ceramic Jiko (KCJ) is a portable stove made from a scrap-metal shell and ceramic lining. It is a single pot stove which burns charcoal and is available in several popular sizes to suit different pots. Its waisted, broad-based shape and ceramic lining distinguishes it from the traditional straight-sided Jiko stove. The price in 1985 ranged from Ksh 60 upwards.

The KCJ is generally intended for use in urban areas of Kenya.

FOR MORE INFORMATION

WRITE: 1) KENGO, PO Box 48197, Nairobi, Kenya; 2) ITDG, Myson House, Railway Terrace, Rugby, CV21 3HT, UK

READ: 1) WOOD-STOVES DISSEMINATION, (Ed) Clarke, R. (I.T. Pubs, London, 1984); 2) BOILING POINT, (ITDG Stoves Programme Journal, ITDG, Rugby, Dec. 1985)

STRENGTHS

1. Charcoal savings give payback in under two months.
2. Cooks more quickly than the traditional Jiko and retains heat longer.
3. It is portable and can be used inside the home and out of doors.
4. Improved stability and insulation enhances safety in use.
5. Existing artisanal production and marketing/retailing activity can be used.

WEAKNESSES

1. Ceramic liner is less durable than metal shell and will require repair and/or refitting. Artisans require training to do this.
2. Heavier than the traditional stove.

HOW IT'S BEEN USED

KENGO - KENYA

The improvements to the traditional stove were modelled on a stove from Thailand which combines a metal shell and ceramic lining for burning charcoal. The Kenya Non-Governmental Organizations Association (KENGO), which was formed in 1982 to co-ordinate NGO activities on energy issues, is deeply involved in working with improved stoves. They work with male artisans in the informal sector who produce the metal shell for the Jiko, while the ceramic liner is made in two centralized and relatively capital-intensive units by men. Elsewhere, for rural market towns, the option of making ceramic liners by informal women's groups is being tried. At least 60,000 KCJs have been made and sold in Nairobi during the last 18 months. It is estimated that KCJs have up to 30 per cent of the Nairobi market.

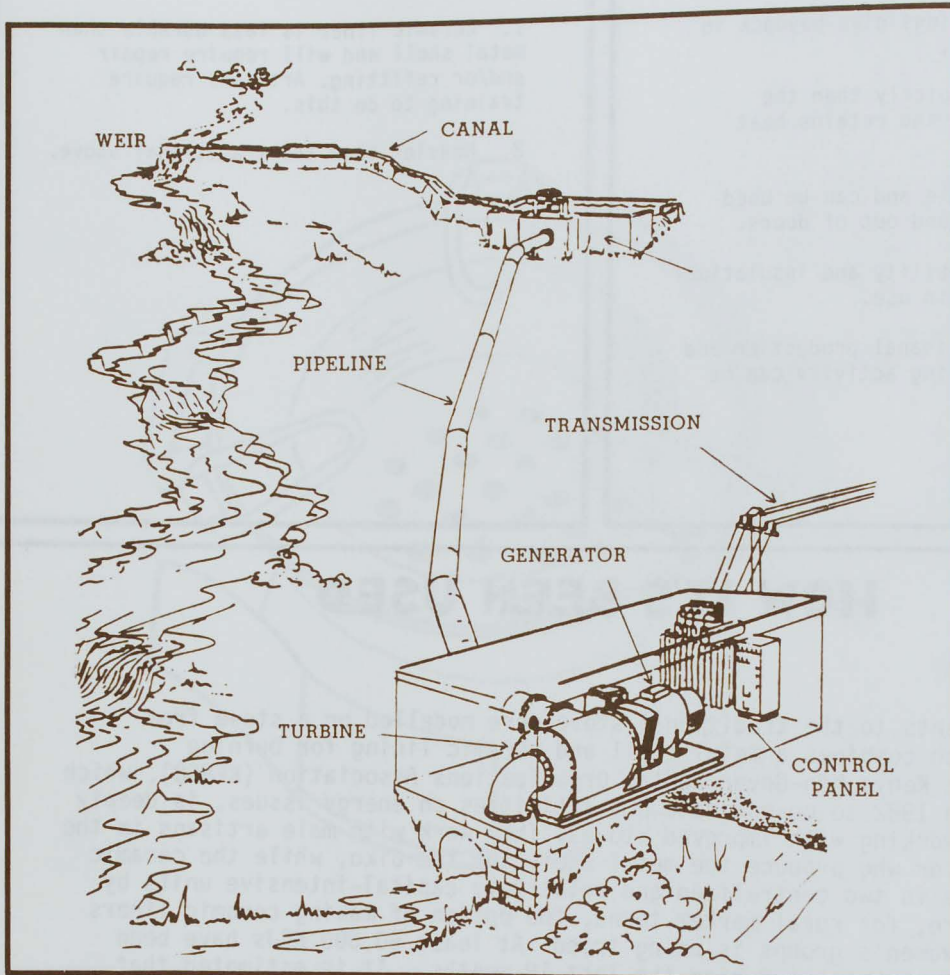
A key element in the success of the KCJ programme was the 'aggressive' marketing of the stove by members of the National Stove Programme. This included demonstrations, advertising and the development of a distribution network through shops, which now purchase direct from artisans or from one of the assembly units, (both of which are now making substantial profits).

Versions of the KCJ are being developed and used in other parts of Africa.

COST
USE
CONSTRUCTION
POWER SOURCE
PURPOSE
MAINTENANCE

FOR MORE INFORMATION
 WRITE: 1) KENGO, P.O. Box 197, Nairobi, Kenya
 2) DG, Myson House, 100, Racecourse, Rugby, CV1 1JL
 LEAD: 1) WOOD-STOVE SEMINAR, (Ed. 1987) (I.T. Pubs, London)
 BOILING POINT, (Ed. 1987) Stoves Programme, Dept. of Energy, Rugby, Dec. 1987

MICRO-HYDRO ELECTRIC POWER



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input checked="" type="checkbox"/>
CON-STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input checked="" type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input type="checkbox"/>
	ANIMAL/MANUAL	<input type="checkbox"/>
	RENEWABLE	<input checked="" type="checkbox"/>
PURPOSE:	LABOUR-SAVING	<input type="checkbox"/>
	INCOME-GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAIN-TENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	SPECIALIST NEEDED	<input checked="" type="checkbox"/>

BRIEF DESCRIPTION

The use of water as a source of power has been in practice for at least 2000 years and water has been used to produce electricity for the past century. Small-scale (100kw and less) hydro power is an efficient, low-cost alternative to diesel or national electric supply systems as another aid to community self-sufficiency and self-development. Micro-hydro is especially important in areas where national electric supplies cannot reach. It can help develop remote, hilly areas more quickly, create employment through small industries such as grinding and milling, and provide power for domestic use. Micro-hydro systems require land areas of adequate annual rainfall and hilly terrain to work efficiently.

FOR MORE INFORMATION

WRITE: 1) INTERMEDIATE TECHNOLOGY DEVELOPMENT GROUP, Myson House, Railway Terrace, Rugby CV21 3HT, UK; 2) COMUNIDAD POR LOS NINOS, Fundacion Educadora San Nicolas, Aptdo Aereo 278, Z.P. 8, Envigado, Antioquia, Colombia.

READ: 1) MICRO-HYDRO ELECTRIC POWER: Technical Papers, Holland, R. (I.T. Pubs, London, 1983).

STRENGTHS

1. Provides quite low-cost, renewable, non-polluting electrical and mechanical power.
2. Spare electricity can be channelled into a heat storage cooker and can also be used to provide lighting.
3. Creates employment through encouraging creation of small-scale industries.
4. Most of the needed equipment, such as turbines and pipelines, can be manufactured locally.

WEAKNESSES

1. Needs suitable rainfall and a hilly area.
2. The initial cost for installing a micro-hydro is high.

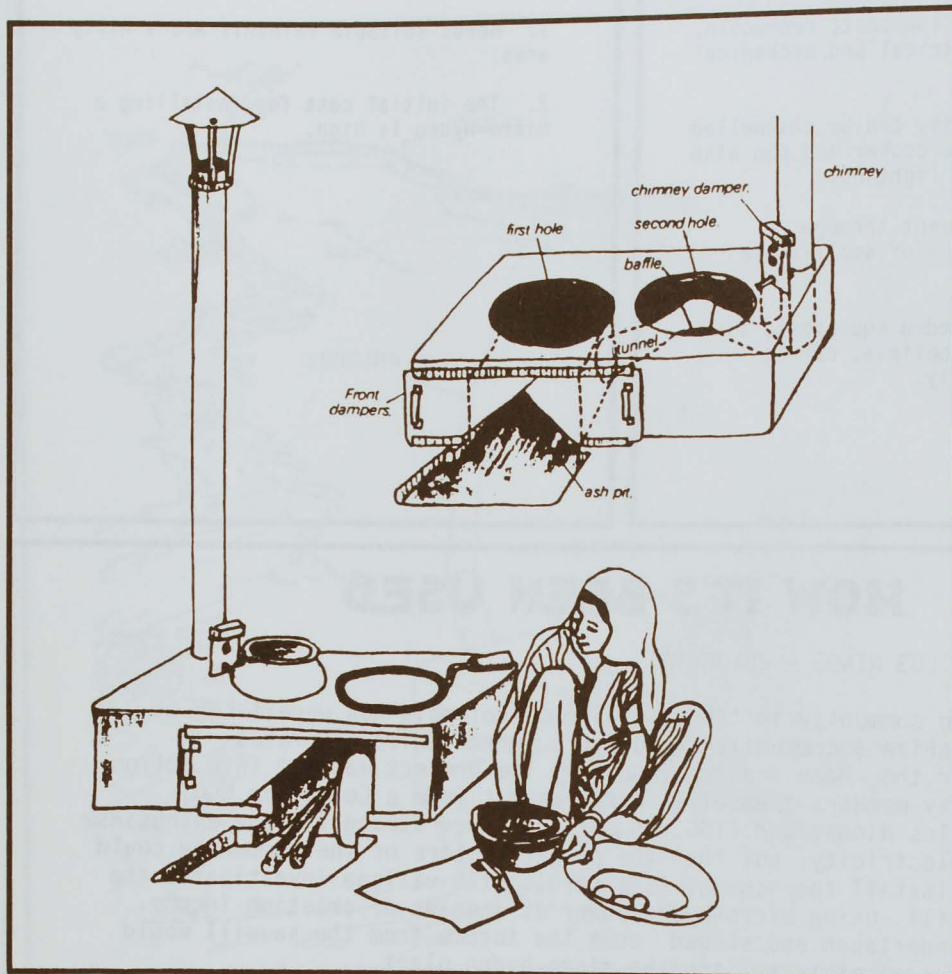
HOW IT'S BEEN USED

COMMUNIDAD POR LOS NIÑOS - COLOMBIA

A small farming community in the mountains of Colombia has undertaken a project to organize a community-owned hydro scheme which generates electricity for the home and for industry. The project was put into action by the community members themselves with support from a Colombian NGO, Comunidad por los Niños, and ITDG. A survey showed strong village enthusiasm for domestic electricity, but that the poorer members of the community could not afford to install the scheme. As a result, the village investigated the idea of a sawmill, using micro-hydro power as a means of creating income. Studies were undertaken and showed that the income from the sawmill would help cover the cost of installing the micro-hydro plant.

To pay back money invested for the generator and transmission lines, the villagers donated money equivalent to their savings in kerosene and candles. The remainder of the project was funded by a US\$20,020 interest-free loan from ITDG. Project costs were kept low as all the construction and management of the equipment were undertaken by the villagers. Operators of the mill and generator were trained by the national technical school. The villagers used the extra electricity generated to install heat storage cookers in their homes, saving the community about 4,000 hours of firewood collection time.

NADA CHULA



	NO COST	
COST:	LOW COST	✓
	HIGH COST	
	NO TRAINING NEEDED	✓
USE:	TRAINING NEEDED	
	TRAINED OPERATOR NEEDED	
	SELF-BUILT	
CONSTRUCTION:	ARTISAN-BUILT	✓
	FACTORY-BUILT	
	DIESEL/ELECTRICITY	
POWER SOURCE:	ANIMAL/MANUAL	
	RENEWABLE	✓
	LABOUR- SAVING	✓
PURPOSE:	INCOME- GENERATING	✓
	DOMESTIC	✓
	SIMPLE	✓
MAINTENANCE:	TRAINING NEEDED	
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

The Nada Chula is a mud stove which can be built in different shapes and sizes to suit household needs, limited kitchen space and the aesthetic preferences of the users. In the low-lying areas, the average two-pot stove is popular, while in mountainous areas, the three-pot, square, T or L-shaped stove with two tunnels and tin chimneys are preferred. The only fixed dimension is the firebox which should have an internal height of 17cm. The stoves are usually built on the floor using sun-dried mud slabs, soil and a clay fibre mix.

FOR MORE INFORMATION

WRITE: 1) MADHU SARIN, 48, Sector 4, Chandigarh 160001 North India

READ: 1) BOILING POINT, No. 7, Dec. 1984; No. 8, Dec. 1985 (ITDG Stoves Programme, Rugby, 1984/5).

STRENGTHS

1. Stove is built with a chimney for smoke removal.
2. Consumes less firewood than traditional stoves.
3. Reduces overall time and labour required for cooking.
4. Has enabled number of women artisans to be trained and to generate income as stove builders.

WEAKNESSES

1. Chimneys and tunnels need to be cleaned regularly or they will clog up.

HOW IT'S BEEN USED

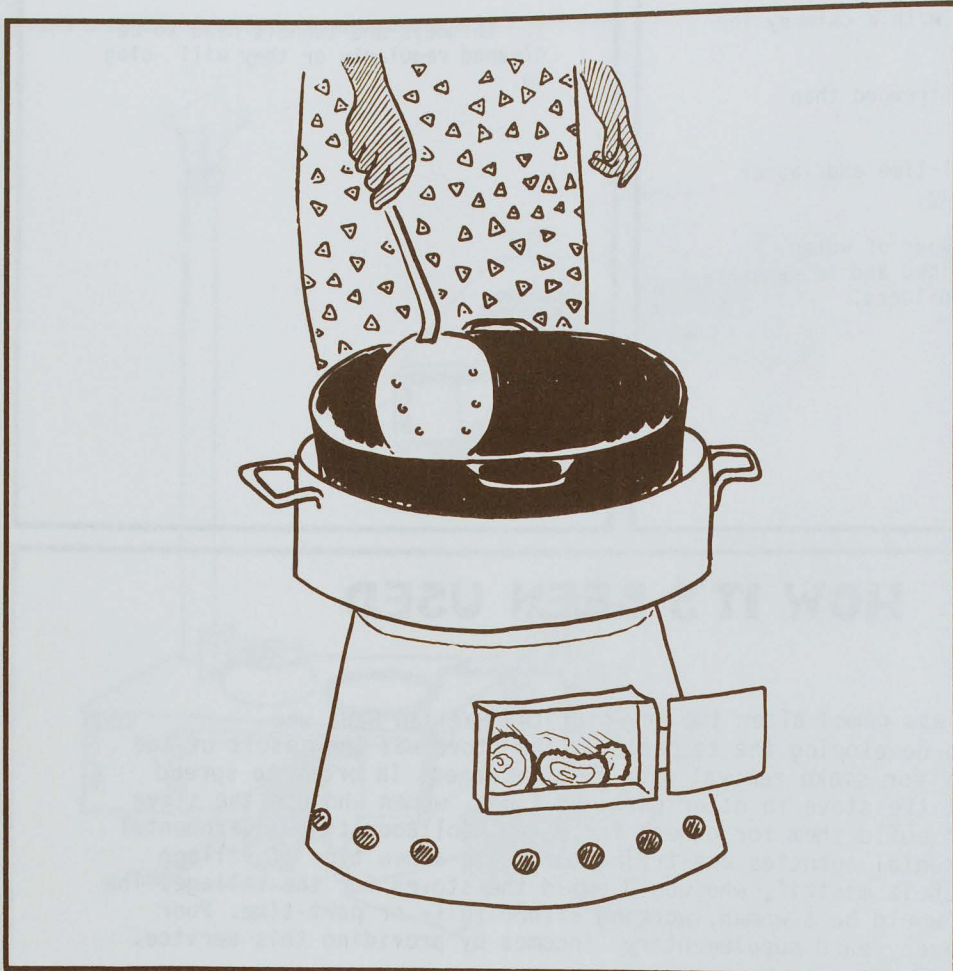
INDIA

The Nada Chula was named after the women of the Harijan Nada who participated in developing the technology. The stove was the result of the expressed needs for smoke removal made by some women. In order to spread knowledge about the stove in other parts of India, women who use the stove were trained to build them for others for a fee. Collaborating governmental and non-governmental agencies are trying to create a new type of village artisan, the 'chula mistri', who would build the stoves for the village. The 'chula mistri' would be a woman, working either full- or part-time. Poor women could thereby earn supplementary incomes by providing this service.

Initially, the full cost of the stove was paid by the owner. However, in order to make it accessible to poorer families, subsidies are now being provided. The women are pleased with the stove. As well as smoke removal the benefits mentioned by women include, protection from excess heat (whilst at the same time providing a warmer living environment), reduced cooking time, fuel savings and an overall decrease in the labour required for cooking.

By the end of 1984 a few thousand stoves had already been built. Additionally, the stove is one of 15 models recommended for promotion under the Government of India's 'National Project for Demonstration of Improved Stoves'.

NOFLIE STOVE



	NO COST	
COST:	LOW COST	✓
	HIGH COST	
USE:	NO TRAINING NEEDED	✓
	TRAINING NEEDED	
	TRAINED OPERATOR NEEDED	
CON- STRUCTION:	SELF-BUILT	
	ARTISAN-BUILT	✓
	FACTORY-BUILT	
POWER SOURCE:	DIESEL/ ELECTRICITY	
	ANIMAL/ MANUAL	
	RENEWABLE	✓
PURPOSE:	LABOUR- SAVING	✓
	INCOME- GENERATING	
	DOMESTIC	✓
MAIN- TENANCE:	SIMPLE	
	TRAINING NEEDED	✓
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

'Noflie' means 'easy stove' in the Woloff language of West Africa. The Noflie is an all metal, portable cooking stove. It is a single-pot stove which burns both wood and groundnut shell briquettes, which are processed in the Gambia. The char from the stove can be used in metal irons for pressing clothes and for the preparation of tea. It is made by local artisans and pays for itself in fuel savings in less than two months.

FOR MORE INFORMATION

WRITE: 1) UNSO NATIONAL STOVE PROJECT, Dept of Community Development, Marine Parade, Banjul, The Gambia; 2) ITDG STOVE PROGRAMME, Myson House, Railway Terrace, Rugby, CV21 3HT, UK.

READ: 1) National women's work booklet COOKING STOVES FOR THE GAMBIA (Dept. of Community Dev., UNSO National Stoves Programme, Gambia, 1985); 2) NOFLIE - A PORTABLE WOOD BRIQUETTE STOVE (Dept. of Community Dev., UNSO, Gambia, 1985)

STRENGTHS

1. It is faster than the traditional stove and retains heat longer.
2. Fuel savings give payback within two months.
3. Portable, relatively light to carry; can be used inside the home or out of doors.
4. Stable and safe to use. Has a pot shield to reduce chances of contact burn.
5. Metal artisans can make the Noflie stove with basic training.

WEAKNESSES

1. Metal stove is likely to corrode; the grate requires regular replacing by metal worker due to high temperatures of burning fuel.
2. The range of pot sizes used is limited to the stove size and it can cook only one pot at a time.
3. It is more expensive than the traditional stove.

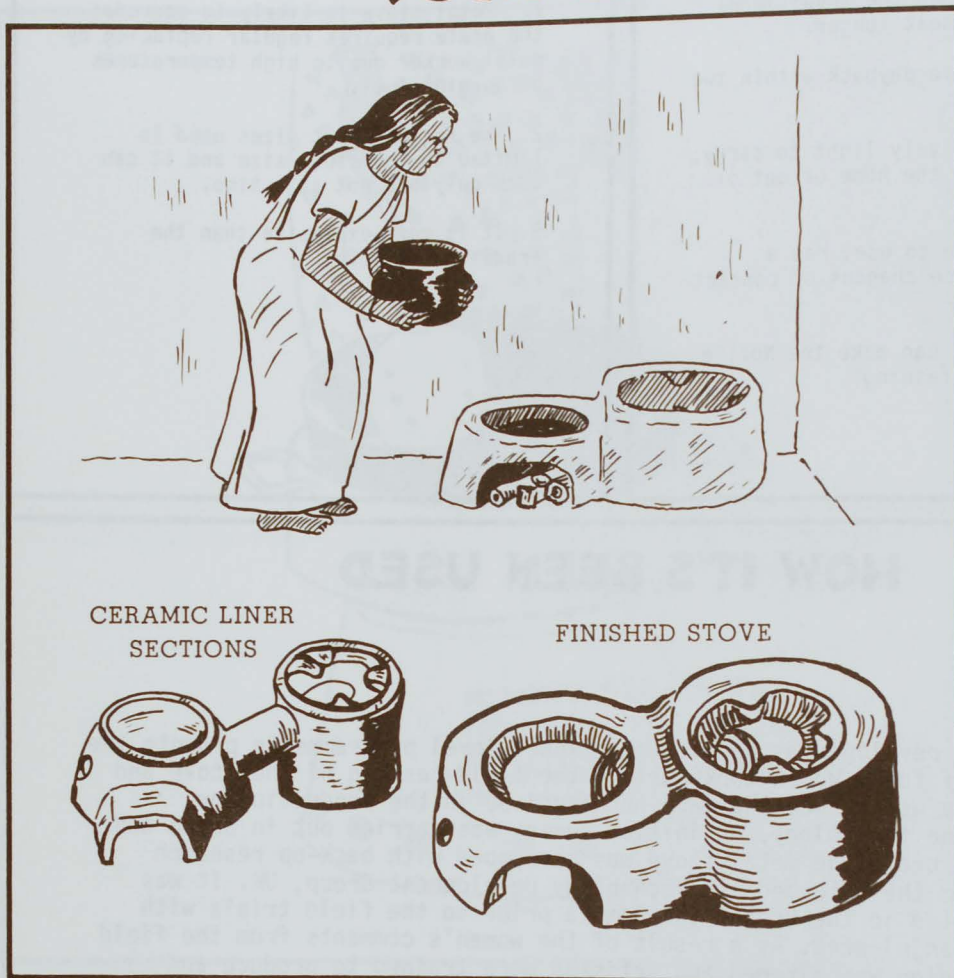
HOW IT'S BEEN USED

GAMBIA

The Noflie was developed as part of a national level programme to promote the conservation of fuel. Women took part in the field-testing of the stove and are the primary users, but they are not involved in the production or marketing of the technology. An initial survey was carried out in urban and rural areas. A prototype metal stove was developed with back-up research assistance from the Intermediate Technology Development Group, UK. It was laboratory tested in the UK and the Gambia prior to the field trials with women in the Banjul area. As a result of the women's comments from the field trials, the design was altered and artisans were trained to produce and market the stove. There are about 2500 Noflies currently in use in the Gambia.

The project has helped to promote the new stove to women by holding demonstrations at markets, trade fairs and with women's groups around the country. The design is now beginning to be used in other sahelian countries exploring the use of processed fuels as alternatives to charcoal and wood. Pottery versions of the Noflie stove are being developed in the rural areas with women potters who will make and sell them.

POTTERY LINER STOVE (SRI LANKA)



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	NO TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input checked="" type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input checked="" type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input checked="" type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

Made by local artisan potters, this stove is produced in two pieces and then installed in the kitchen with a protective insulating layer of mud. The final assembly provides two cooking holes over a single firebox for burning wood and other woody residues. It is currently being popularized in the rural areas of Sri Lanka.

The present design is the sixth generation of stoves developed. The pottery liner is insulated externally with a mixture of 4 parts of clay, 4 parts of sand, 2 parts of ash and 1 part of cowdung. One stove costs approximately US\$1.50.

FOR MORE INFORMATION

WRITE: 1) SARVODAYA KANDY DISTRICT CENTRE, Palletalavinna, Katugastota, Sri Lanka; 2) ITDG STOVES PROGRAMME, Myson House, Railway Terrace, Rugby, CV21 3HT, UK

READ: 1) WOOD-STOVE DISSEMINATION, Ed. Clark, R. (I.T. Pubs., London, 1985)

STRENGTHS

1. It uses between 30 - 50 per cent less firewood than traditional stoves.
2. Two pots can be used at the same time, reducing cooking time.
3. The enclosed firebox keeps the kitchen and the food cleaner.
4. The pottery liner and insulating mud layer keeps the firebox warm between meals enabling fast and simple re-lighting.
5. Repairs are easy and can be done by the owner.

WEAKNESSES

1. The improvements in fuel consumption and cooking time depend on using both the cooking holes simultaneously. The stove is less advantageous when used for tea and snack preparation.
2. The traditional stove can be made at no cost. The improved pottery stove costs Rs30 to produce.
3. It takes up more space than a traditional stove and cannot be easily moved.

HOW IT'S BEEN USED

SARVODAYA - SRI LANKA

The stove design was evolved over several years by the Sarvodaya Movement in Sri Lanka with the collaborative assistance of ITDG, UK. From 1979 to 1981, the project focused on developing an appropriate stove design for the needs of the Kandy District, the most hilly part of central Sri Lanka. It was initiated with a large Lorena stove, but then moved towards development of smaller stoves, first with chimneys and then without. In 1981, the Dian Desa (Indonesia) stove project was brought in to make stove improvements. During 1981 and 1982, six training courses were held involving 75 people. Trainers were often men who did not cook and therefore did not identify with women's needs. A new strategy was developed, using female Sarvodaya health observers. The stove design was changed from a mud mixture to one in which a pottery liner was insulated with mud.

Sarvodaya technical staff train Sarvodaya health workers to build and operate the stoves. Health workers demonstrate the stove in their work with Mother's Groups. If women in the groups want to use the stove, they pay the health workers, who purchase the stove from the District Centre and install them in the women's houses. They provide instruction on operating the stove and do follow-up with users in their visits to different villages.

Stoves are made by male and female potters, but emphasis thus far has been on providing training to male potters who are considered more mobile. A small number of women have been trained as installers, but the majority of installation training, as well, is provided to men. To date, over 10,000 stoves have been installed nationally, using the Sarvodaya experience as a basis for national stove dissemination strategies.

PRESAWASH



	NO COST	
COST:	LOW COST	✓
	HIGH COST	
	NO TRAINING NEEDED	✓
USE:	TRAINING NEEDED	
	TRAINED OPERATOR NEEDED	
	SELF-BUILT	
CON- STRUCTION:	ARTISAN-BUILT	
	FACTORY-BUILT	✓
	DIESEL/ ELECTRICITY	
POWER SOURCE:	ANIMAL/ MANUAL	✓
	RENEWABLE	
	LABOUR- SAVING	✓
PURPOSE:	INCOME- GENERATING	
	DOMESTIC	
	SIMPLE	✓
MAIN- TENANCE:	TRAINING NEEDED	
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

A small, hand-operated washing machine. The machine consists of an air-tight aluminium drum which can be rotated on its stainless steel non-slip stand with a detachable handle. The garments are placed inside it through the open top, followed by the required quantities of washing powder and hot water. The lid is then firmly screwed on and the drum rotated at about one turn per second for about two minutes, using the handle provided. This action causes the heat in the drum to expand and compress the trapped air, forcing dirt out of the fibres of the materials being washed. At the end of the wash, the cover is slowly unscrewed to release the pressure in the drum. The clean items are then ready for rinsing.

FOR MORE INFORMATION

WRITE: 1) PRESAWASH LTD, Unit 6A, Sanders Close, Finedon Road Industrial Estate, Wellingborough, Northants NN8 4QH, UK; 2) KENGO, PO Box 48197, Nairobi, Kenya; 3) Marcella Pakua, Appropriate Technology Development Institute, Private Mail Bag, University of Technology, Lae, Papua New Guinea.

STRENGTHS

1. No electricity or plumbing is required.
2. The machine will wash all types of fabrics, from tough denim trousers to wool and other delicate materials.

WEAKNESSES

1. The machine is not yet being produced in any developing country so it would have to be imported.
2. Spare parts for the machine would also have to be imported (i.e. rubber washers).

HOW IT'S BEEN USED

UNITED KINGDOM

The machine is being manufactured in the United Kingdom. It was displayed at Tech and Tools in Nairobi where it was very popular. In demonstrations, women observed that it was easy to operate and required less exertion than washing by hand. The design of the machine is not complex and it could be made locally using scrap metal.

KENGO, an appropriate technology organization in Nairobi, has worked with the Presawash to determine if a locally-made version could be produced. A participant at Tech and Tools from Papua New Guinea has asked her AT group to determine whether a locally-produced version could be manufactured. Her assessment was that a technology similar to the Presawash could make clothes-washing for women in both rural and urban areas much easier. Engineers within her organization are exploring the possibility of local production. (See WRITE section for addresses of KENGO and ATDI/Papua New Guinea.)

OR MORE INFORMATION

WRITE: 1) PRESAWASH Unit 6A, Sanders Close, Inedon Road Industrial Estate, Wellington, Northants NN8 4P, UK. KENGO, PO Box 4835, Nairobi, Kenya; 2) ATDI, Appropriate Technology Development Institute, c/o Bag, University of Technology, Lae, Papua New Guinea.

FOOD-PROCESSING TECHNOLOGIES: A SUMMARY

	Cost			Use			Construction			Power Source			Purpose		Main-tenance			
	NO COST	LOW COST	HIGH COST	EASY TO DO	NO TRAINING NEEDED	EASY AFTER TRAINING	NEEDS SPECIAL OPERATOR	SELF-BUILT	ARTISAN-BUILT	FABRIK-BUILT	DIESEL/ELECTRICITY	RENEWABLE	LABOUR-SAVING	INCOME-GENERATING		DOMESTIC	SIMPLE	TRAINING NEEDED
BANANA CHIPS	•		•				•				•		•					
CANDLE AND HACKSAW-BLADE PLASTIC SEALER	•		•		•		•				•		•					
CASSAVA GRATER						•		•										•
CHORKOR FISH-SMOKER	•				•		•											
GRATE-O-MATE	•				•		•											
JAM-JAR LID SEALER	•				•		•											
OSMO-SOL DRYING	•					•												
REFRACTOMETER																		
SAGO POPS	•																	
SCREW PRESS FOR COCO-NUT OIL EXTRACTION	•																	
SHEA BUTTER PRESS																		
SORGHUM MILLING																		

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FOOD-PROCESSING TECHNOLOGIES

THE PROBLEM...

Surplus foods and fresh produce are often wasted because women do not have access to technologies which would allow them to process and store them. Women need technologies that provide viable alternatives to traditional methods which are labour intensive and generate low returns. Very often, technologies designed to alleviate women's burden end up displacing women themselves and providing men with income-



generating possibilities. Moreover, women food producers are being threatened by firms producing similar competitive products using imported materials.

THE ISSUES TECHNOLOGIES SHOULD ADDRESS...

With food-processing technologies aimed at generating incomes, as with other income-generating technologies, it has been found that it is often not the technology itself or its transfer that causes problems. Rather it is social factors - such as the appropriateness of the technology for the group it is trying to serve. In order for a technology to be acceptable, the designers need to consult the beneficiaries. The designers of the improved technology should have paid attention to traditional methods, cultural attitudes and user preference.

Developing and disseminating food technologies amongst village/rural women's groups can also be politically important. It helps to build or improve the prestige of local foods - starting with what they have; it also complements agriculture and nutrition education promoting food self-reliance. Food processing makes possible the production of drinks and snacks from local foods and this pre-empts or counters the promotion of imported products. One problem that may arise from the introduction of new technologies is that of packaging and marketing. If products are to compete in the market, they have to meet certain requirements, e.g., hygiene, and they also need to be produced in economically reasonable quantities.

by Cathy Rich and Elizabeth Cox

STRENGTHS

1. Uses surplus locally available raw materials to set up a small-scale industry.
2. It provides an income-generating activity requiring few or no skills.
3. There is no waste as the banana skins can be used for pig feed.
4. There is a ready market for snack foods.
5. It is inexpensive to set up such an enterprise.

WEAKNESSES

1. Since the enterprise would most probably be set up in a rural community, transport of goods to urban areas could pose a problem.

HOW IT'S BEEN USED

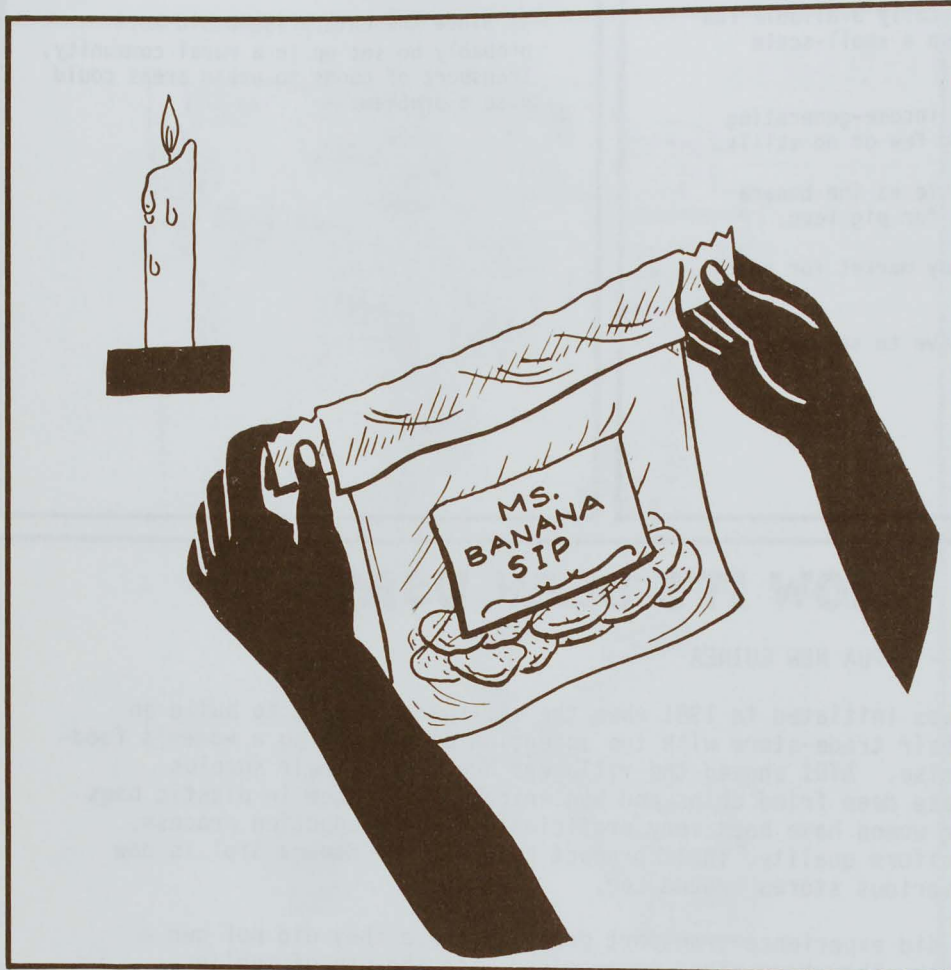
SITUM PROJECT - PAPUA NEW GUINEA

This project was initiated in 1981 when the villagers started to build an addition to their trade-store with the intention of developing a women's food-making enterprise. ATDI showed the villagers how to use their surplus bananas to make deep fried chips and hygienically seal them in plastic bags for sale. The women have been very proficient in the production process, achieving a uniform quality. Their product known as 'Mr Banana Sip' is now sold through various stores around Lae.

The villagers did experience transport problems since they did not own a vehicle; however, they have since compromised with the use of public transport. Originally, the chips were sold informally through private orders in the Situm area, including the local school and soccer field. At present, an average of 1400 to 2000 bags per week are sold wholesale to the Lae health foodstore, supermarket and school canteen.

Consumer acceptance has been good and it seems from store owner's reports that potential demand is higher. Enquiries have been received from retailers in several other provinces but this demand cannot be met at the moment. Widespread distribution is beyond the current production and organizational capacity of the group. The Situm group has taken the initiative to teach other women what they have learned. They recently accommodated a group of women from a women's club in Sepik and gave them "on-the-job" training for three weeks. Through job training the Situm women were able to transfer three year's worth of experience in three weeks. The Sepik women established the same banana chip process on a smaller scale, producing the same quality of product.

CANDLE & HACKSAW-BLADE PLASTIC SEALER



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	EASY TO DO	<input checked="" type="checkbox"/>
	EASY AFTER TRAINING	<input checked="" type="checkbox"/>
	NEEDS SPECIAL OPERATOR	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input checked="" type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

This technology is used for sealing plastic bags of food for storage and sale. It is a technology which women can use not only for home purposes, but for commercial purposes as well. The method consists of folding the top edge of the plastic bag over the teeth of a hacksaw blade, (a used hacksaw blade works better), and passing the folded edge through a candle.

FOR MORE INFORMATION

WRITE: 1) APPROPRIATE TECHNOLOGY DEVELOPMENT INSTITUTE, Private Mail Bag, University of Technology, Lae, Papua New Guinea

READ: 1) THE A.T. JOURNAL, Vol. 11, No. 1, June 1984.

STRENGTHS

1. Women use this skill for commercial purposes and it is cheaper than electric or battery-operated sealers.
2. It offers an effective sealing alternative for people who have no access to electricity.
3. It is suitable as a sealing process for all kinds of village industries.

WEAKNESSES

1. The sealings are not as good as machine sealings. However, with more practice it is hoped that this can be alleviated.

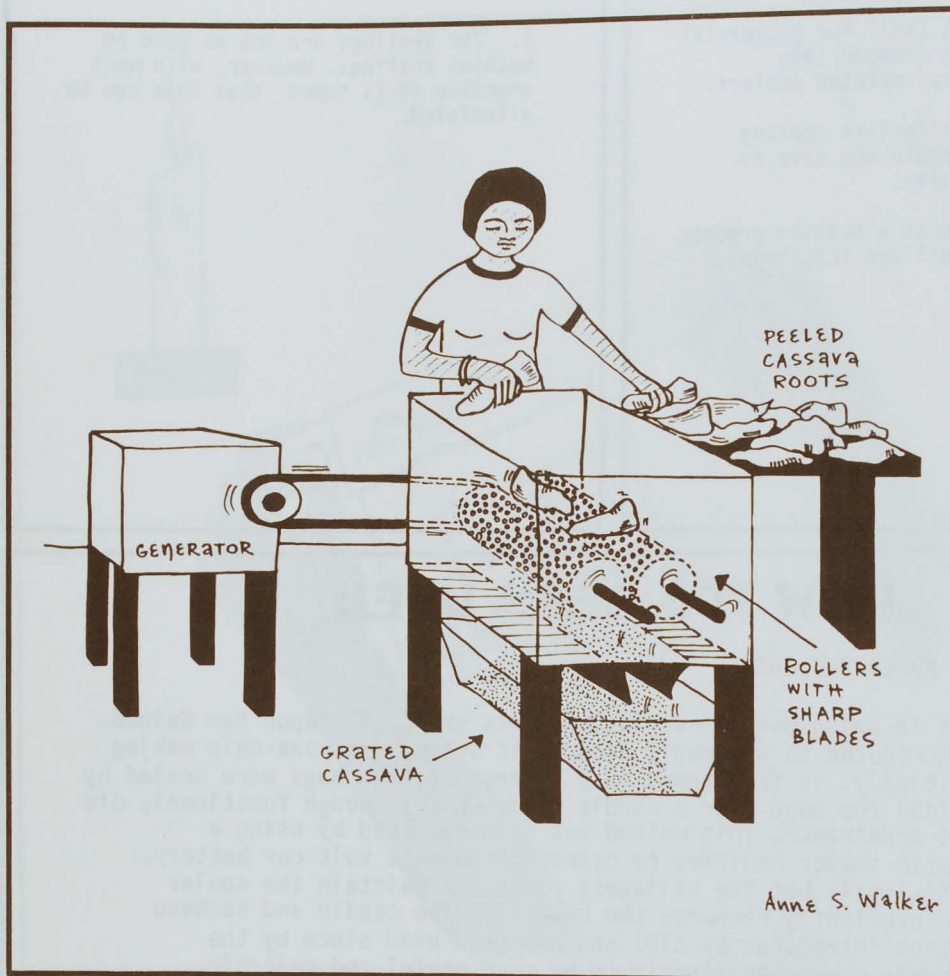
HOW IT'S BEEN USED

ATDI PROJECT - PAPUA NEW GUINEA

This technology is being used by various women's groups in Papua New Guinea. It was first introduced to a women's group that set up a banana-chip making enterprise. Initially, in the banana-chip enterprise, the bags were sealed by running the folded top edge over a candle flame which, though functional, did not have a neat appearance. This method was then replaced by using a commercial plastic sealer modified to operate from a 12 volt car battery. This worked efficiently but the villagers could not maintain the sealer themselves or conveniently recharge the battery. The candle and hacksaw technique was then introduced by ATDI and has been used since by the banana-chip makers; the women find it to be more useful and reliable.

Due to its success, and through a series of self-help women's training programmes, this techniques has been adopted by several village groups. ATDI is now experimenting with the use of a clean-burning oil lamp which could be substituted as a cheaper alternative to the candle.

CASSAVA GRATER



COST:	NO COST	
	LOW COST	
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input checked="" type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	
	ARTISAN-BUILT	
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input checked="" type="checkbox"/>
	ANIMAL/ MANUAL	
	RENEWABLE	
PURPOSE:	LABOUR- SAVING	<input checked="" type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	
MAIN- TENANCE:	SIMPLE	
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	SPECIALIST NEEDED	<input checked="" type="checkbox"/>

BRIEF DESCRIPTION

The cassava-grating machine is used for grating peeled cassava. It consists of a motor placed in a wooden box and blades for chopping and grinding cassava tubers; the machine runs on diesel fuel. The cassava tuber is inserted and passes through different sections of the machine where it is chopped and ground. The machine can process approximately 3,000 lbs. of cassava daily. It can be operated by one person and can also be used to grate coconut.

FOR MORE INFORMATION

WRITE: 1) MODESTA NORALES, Lu Fuluri Dangriga, P.O.Box 76, Dangriga, Belize.

STRENGTHS

1. Quicker and less physically demanding than the traditional method.
2. Processes larger quantities of cassava than the traditional method.
3. Easy to learn how to use the machine.

WEAKNESSES

1. Disrupts cultural traditions of grating cassava since it involves less people in the process; detracts from the social value of grating cassava collectively.
2. Dependent on technicians for maintenance; thus production stops when the machine breaks down.
3. Requires large capital investment initially.

HOW IT'S BEEN USED

THE LU FULURI DANGRIGA GROUP - BELIZE

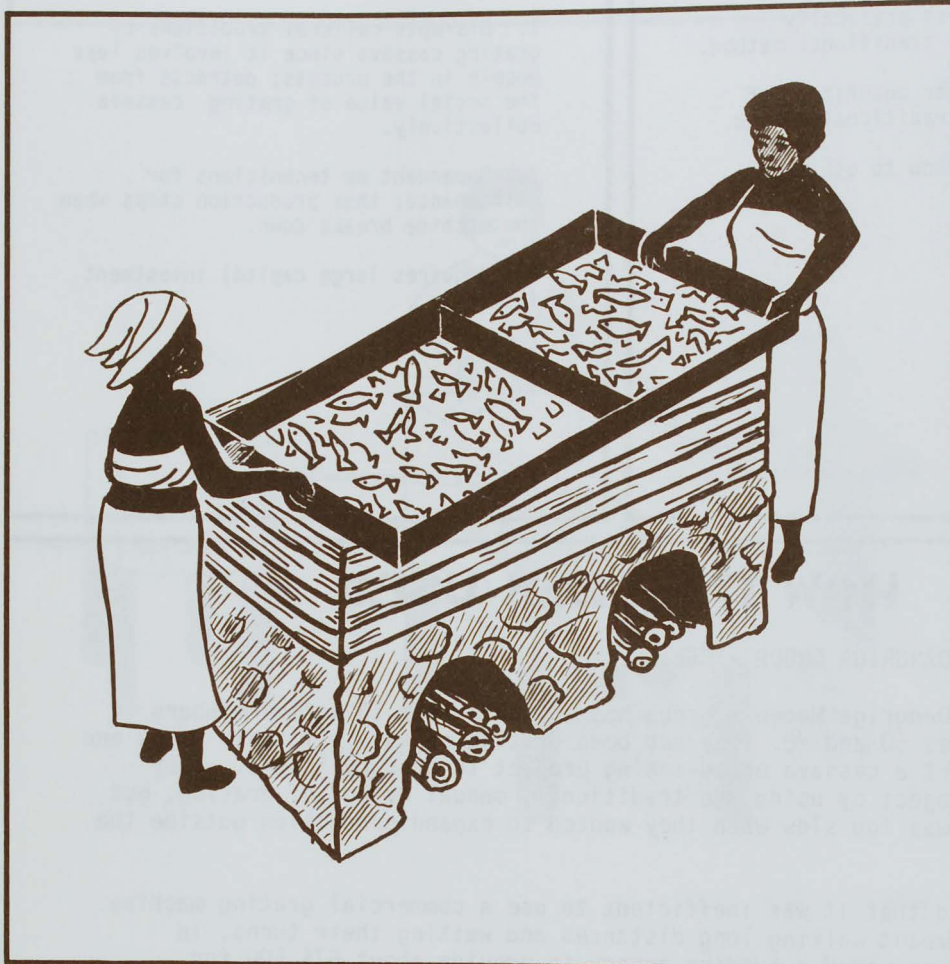
The Lu Fuluri Dangriga Women's group has approximately 13 active members between the ages 50 and 70. They had been grating cassava all their lives and decided to start a cassava bread-making project to produce income. They started the project by using the traditional, manual method of grating, but found that it was too slow when they wanted to expand production outside the community.

The women found that it was inefficient to use a commercial grating machine service as it meant walking long distances and waiting their turns, in queues. They persuaded a funding agency to provide about BZ\$ 500 for purchase of a machine (with casing around it), and for the training of several members in its operation.

The machine changed the way the group worked together: (1) It has forced the group to be more cost-conscious and business-like. (2) They are now more production oriented. (3) There is a greater division of labour. (4) They are planting much more cassava since they have the capacity to process more. The women are well known in the country and the community as they are the only women's group that owns a machine and produces collectively.

The group has had the machine for six months and is generating an income from selling the cassava bread and from hiring out the machine.

CHORKOR FISH-SMOKER



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	NO TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input checked="" type="checkbox"/>
	ARTISAN-BUILT	<input checked="" type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input checked="" type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

A fish-smoking oven used to preserve food, the chorkor increases the nutritional value and the taste of the fish, thereby making it more marketable and increasing the income received from the sale of fish. It has proven to be far more reliable and efficient than the traditional, and some improved, smoking ovens. The chorkor smoker is simply a stack of 10 - 15 smoking trays, well encased in flexible, resistant sheeting material, usually with a sheet of plywood above and below it, and well battened down. Due to the 'chimney' formed by the stacking of the trays on the oven the heat and the smoke constantly circulate inside. Thus, a high quality, evenly smoked product is achieved with a minimum of fuel.

FOR MORE INFORMATION

WRITE: 1) UNITED NATIONS DEVELOPMENT FUND FOR WOMEN, (formerly UN Voluntary Fund for Women), DC2-13th Floor, New York, NY 10017, USA. Attn: Olubanke Akerele; 2) Mrs SALOME ANSON, NATIONAL COUNCIL ON WOMEN AND DEVELOPMENT, Ministry of Foreign Affairs, P.O.Box M.53, Accra, Ghana.

READ: 1) "WOMEN IN FISH PRODUCTION: A PRACTICAL GUIDE TO IMPROVED FISH-SMOKING IN WEST AFRICA," UNICEF, New York, 1983.

STRENGTHS

1. The oven has a low construction cost and a long life (15 years).
2. The oven holds up to 18kgs of fish per tray and 15 trays per oven.
3. Due to greater retention of heat and circulation of smoke, the finished product has a higher quality and uniformity.
4. The smoker wastes very little heat so it has a lower consumption of firewood.
5. It is easy to operate and therefore much less time and effort is required than with other ovens.

WEAKNESSES

1. Due to its design the oven would have to be constructed by skilled artisans.
2. For proper functioning, the oven needs to be maintained on a regular basis. (However, maintenance is very easy.)
3. For greater lifespan, mud ovens need to be protected from rain.
4. The tray frames need to be replaced every three years and the wire mesh every two years.

HOW IT'S BEEN USED

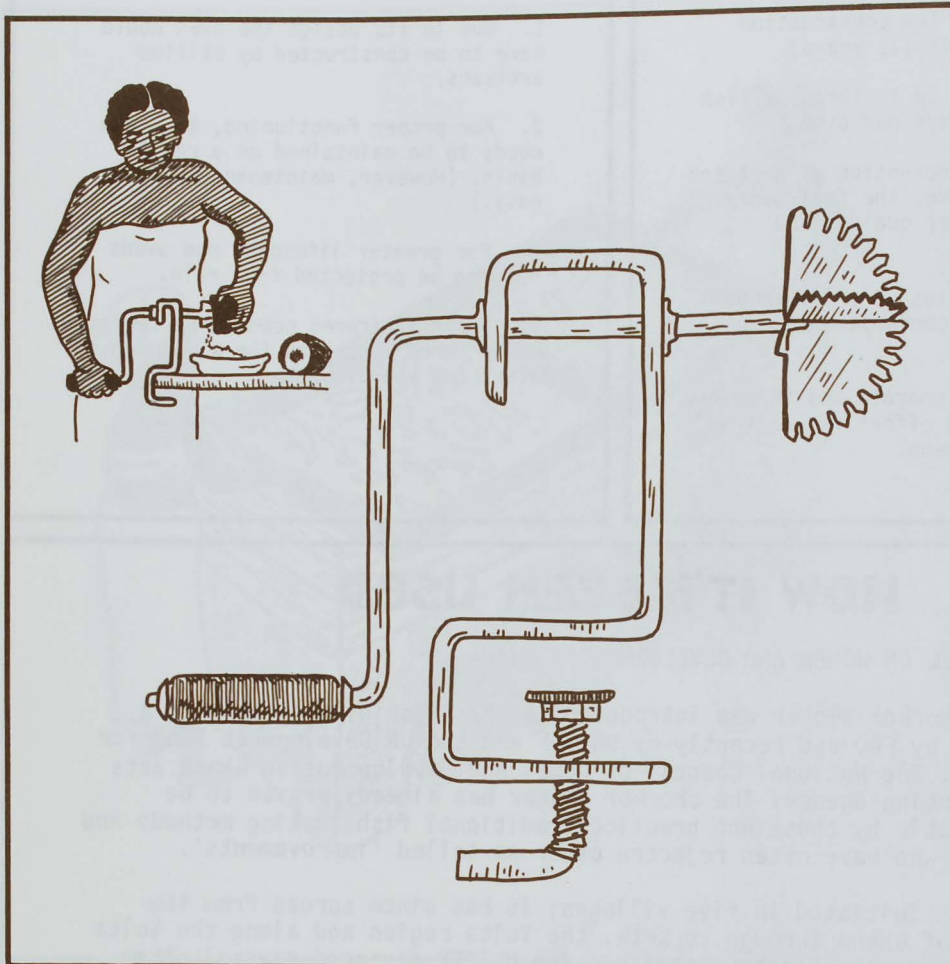
NATIONAL COUNCIL ON WOMEN AND DEVELOPMENT - GHANA

The improved chorkor smoker was introduced in Ghana, originally through a project funded by FAO and recently by UNICEF and the UN Development Fund for Women (UNIFEM). The National Council on Women and Development in Ghana acts as the implementing agency. The chorkor smoker has already proven to be readily acceptable by those who practice traditional fish smoking methods and by those women who have often rejected other so-called 'improvements'.

The project was initiated in five villages; it has since spread from the central coast of Ghana through to Keta, the Volta region and along the Volta Lake to Dutroya in the Northern region. The UNIFEM financed several other small, fish-smoking projects in West Africa. The chorkor smoker has spread beyond Ghana's borders to Togo, Benin and Guinea Conakury.

The Ghanaian women not only purchase and process fish, but also transport large amounts of fish over hundreds of kilometres to market places. International agencies such as the UNIFEM have also facilitated women's access to loans. The women are able to use this credit to expand their businesses. For example, in the ocean part of Terna, a number of women who began as simple local peddlers now own large ocean-going fishing vessels. The Ghanaian women also act as extension agents by training women from other villages and neighbouring countries (Benin and Guinea). This type of peer training is an excellent way of spreading knowledge and also develops the women's self-esteem.

GRATE-O-MATE



	NO COST	
COST:	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	
	NO TRAINING NEEDED	<input checked="" type="checkbox"/>
USE:	TRAINING NEEDED	
	TRAINED OPERATOR NEEDED	
	SELF-BUILT	<input checked="" type="checkbox"/>
CON- STRUCTION:	ARTISAN-BUILT	<input checked="" type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
	DIESEL/ ELECTRICITY	<input checked="" type="checkbox"/>
POWER SOURCE:	ANIMAL/ MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	
	LABOUR- SAVING	<input checked="" type="checkbox"/>
PURPOSE:	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
	SIMPLE	<input checked="" type="checkbox"/>
MAIN- TENANCE:	TRAINING NEEDED	
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

The Guyanese coconut grater, the Grate-O-Mate, is a simple, manually operated device which replaces the traditional method of grating coconuts using perforated tins. The traditional method was extremely laborious and time consuming. The Grate-O-Mate is a successful innovation because it utilizes existing skills and an existing market for coconut-based products. Of primary importance, it improves the income-generating potential of women through efficient budgeting and use of time.

FOR MORE INFORMATION

WRITE: 1) WOMEN'S REVOLUTIONARY SOCIALIST MOVEMENT, Headquarters, 44 Public Road, Kitty, Georgetown, Guyana

READ: 1) BLACKSMITH, BAKER, ROOFING-SHEET MAKER, Carr, M. (I.T. Pubs, London, 1984).

STRENGTHS

1. Saves time and energy in addition to preventing bruised fingertips which occur when using the traditional method.
2. It helps to provide a source of income from the sale of goods made with coconut.

WEAKNESSES

1. The metal Grate-0-Mate is more expensive than traditional graters. However, the manufacturers are trying to produce it with less expensive materials.

HOW IT'S BEEN USED

WRSM PROJECT - GUYANA

The Grate-0-Mate was designed by Farrall's Engineering Industry in Guyana at the request of the Women's Revolutionary Socialist Movement (WRSM). The graters were readily accepted by the women and now form the basis of successful enterprises selling coconut sweets, tarts and buns.

The women's organization is now establishing productive women's enterprises using other parts of the coconut, such as the shell and the fibres, to make locally demanded commodities. For example, some women are making buttons from the shells while others are making mattresses from the fibres. Assistance has been sought from the local technology institution in upgrading the fibre-processing techniques so that higher value products, such as ropes and mats, can also be made.

Five thousand graters have already been made and distributed in Guyana. The Grate-0-Mate has also reached other women's groups in the Caribbean through the 'women in development' network. In addition, a Dominican businessman has approached WRSM and the manufacturer to negotiate sales and distribution rights.

JAM-JAR LID SEALER



COST:	NO COST	<input type="checkbox"/>
	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	NO TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CONSTRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input checked="" type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input type="checkbox"/>
	ANIMAL/MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR-SAVING	<input checked="" type="checkbox"/>
	INCOME-GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAINTENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

The sealer is used to provide an airtight seal on jam jars. It is an efficient method of sealing jam jars compared with previous methods using plastic and rubber bands. The sealer was designed in the UK and costs UK £20. A low-cost prototype has been designed in Sri Lanka and is being locally produced for a cost of Rs 200.

FOR MORE INFORMATION

WRITE: 1) ITDG, Myson House, Railway Terrace, Rugby CV21 3HT, UK; 2) THOMAS HUNTER LTD., Omnia Works, Mill Road, Rugby CV21 3HT, UK (manufacturer); 3) INDUSTRIAL DEVELOPMENT BOARD OF CEYLON, 615 Galle Road, Katubedda, Maratuwa, Sri Lanka (local manufacturer).

READ: 1) THE A.T. JOURNAL, Vol. 12, No. 1, June 1985.

STRENGTHS

1. It can be made locally if it proves impossible to obtain from the UK supplier.
2. It is cheap and easily affordable by a small group.
3. Jars are sealed in a similar fashion to those produced by large manufacturers so they can compete in the marketplace.
4. It provides an airtight seal preventing contamination and thus increases the shelf life of the product.

WEAKNESSES

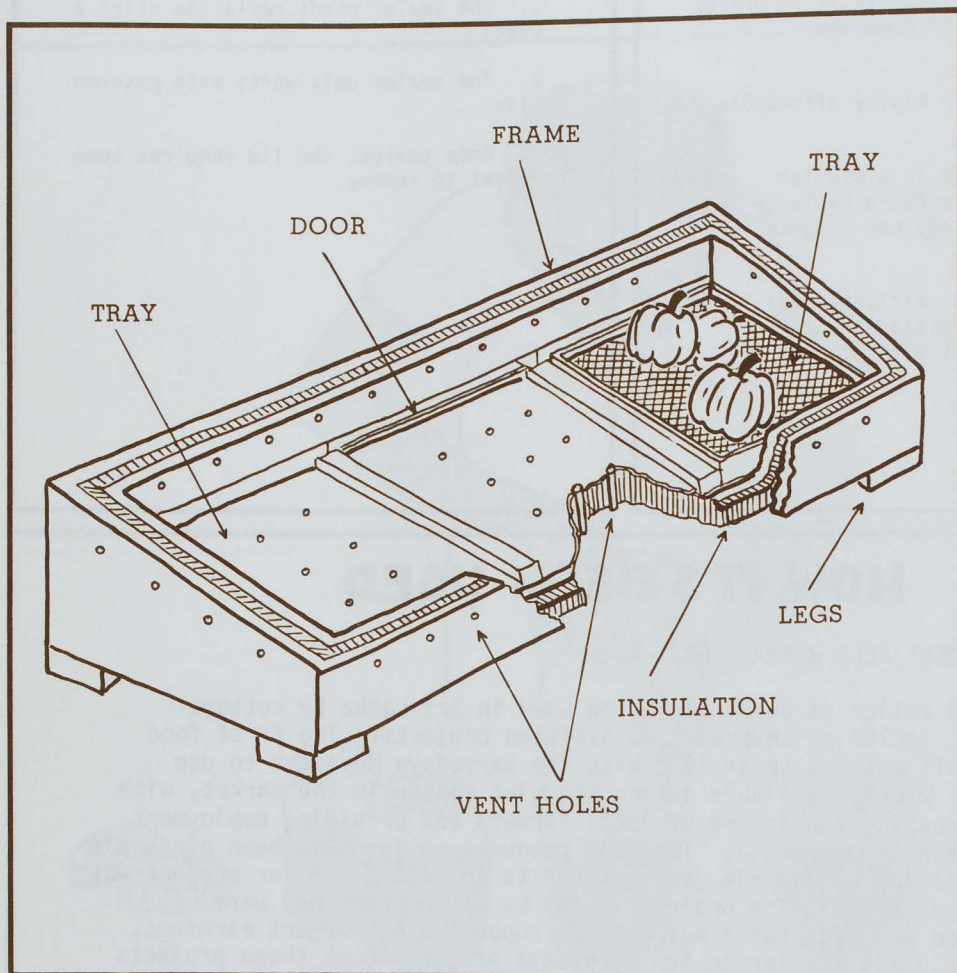
1. The sealer needs replacing after a year.
2. The sealer only works with push-on lids.
3. Once sealed, the lid requires some effort to remove.

HOW IT'S BEEN USED

SARVODAYA MOVEMENT/REDD BARNA - SRI LANKA

The jam-jar lid sealer is currently being used in Sri Lanka by cottage industry units, including several ITDG assisted projects. The first food preservation unit was set up in 1982 with the Sarvodaya Movement to use fruits that are widely available during the glut season in the market, with the aim of increasing the income of local farmers and providing employment opportunities for young people. The main products so far have been pineapple jam, lime pickle and wood-apple jam. Due to its success a similar project was initiated by Redd Barna. The project is run by seven women who were initially funded by Redd Barna but now are supported by project earnings. The products sold are similar to the Sarvodaya project. Both these projects use the jam-jar lid sealer; the sealer was bought on a co-operative basis in both cases. The sealer is cheaper than commercial sealing machines. The only other alternative in Sri Lanka are plastic lids which do not give the product a professional appearance. The sealed jars are able to withstand rough handling and are easily transported. Furthermore, the shelf life of the product is significantly increased.

OSMO-SOL DRYING



	NO COST	
COST:	LOW COST	✓
	HIGH COST	
USE:	NO TRAINING NEEDED	
	TRAINING NEEDED	✓
	TRAINED OPERATOR NEEDED	
CON-STRUCTION:	SELF-BUILT	
	ARTISAN-BUILT	
	FACTORY-BUILT	✓
POWER SOURCE:	DIESEL/ELECTRICITY	
	ANIMAL/MANUAL	
	RENEWABLE	✓
PURPOSE:	LABOUR-SAVING	✓
	INCOME-GENERATING	✓
	DOMESTIC	
MAINTENANCE:	SIMPLE	
	TRAINING NEEDED	✓
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

Osmo-Sol drying is the combination of solar drying and drying through the movement of moisture through the skins of fruit. The process can be used to dry fruits and vegetables. The fruit is peeled and then boiled in a sugar solution. It is then allowed to stand for a number of hours in order to absorb the sugar and lose moisture. The fruit is dried in a solar dryer. The dryer differs from 'normal' dryers in having a cover made from a specialized type of plastic (Melinex 071) instead of polythene.

FOR MORE INFORMATION

WRITE: 1) PUEBLO A PUEBLO, Dr. Dan Salcedo, PO Box 1909, Tegucigalpa, Honduras

READ: 1) "The Processing of a Date-Like Caramel from Cashew Apple," TROPICAL SCIENCE (TDRI, Oxon, 1982); 2) THE A.T. JOURNAL, Vol. 8, No. 4, March 1982.

STRENGTHS

1. Surplus fruits are not wasted.
2. Vitamin availability is extended past the months when the fresh fruit is available.
3. Provides a viable income-producing activity.
4. Simple procedure requiring little maintenance.
5. Melinex 071 lasts longer, is stronger and does not yellow.

WEAKNESSES

1. Melinex 071 is more expensive than polythene.

HOW IT'S BEEN USED

PUEBLO A PUEBLO - HONDURAS

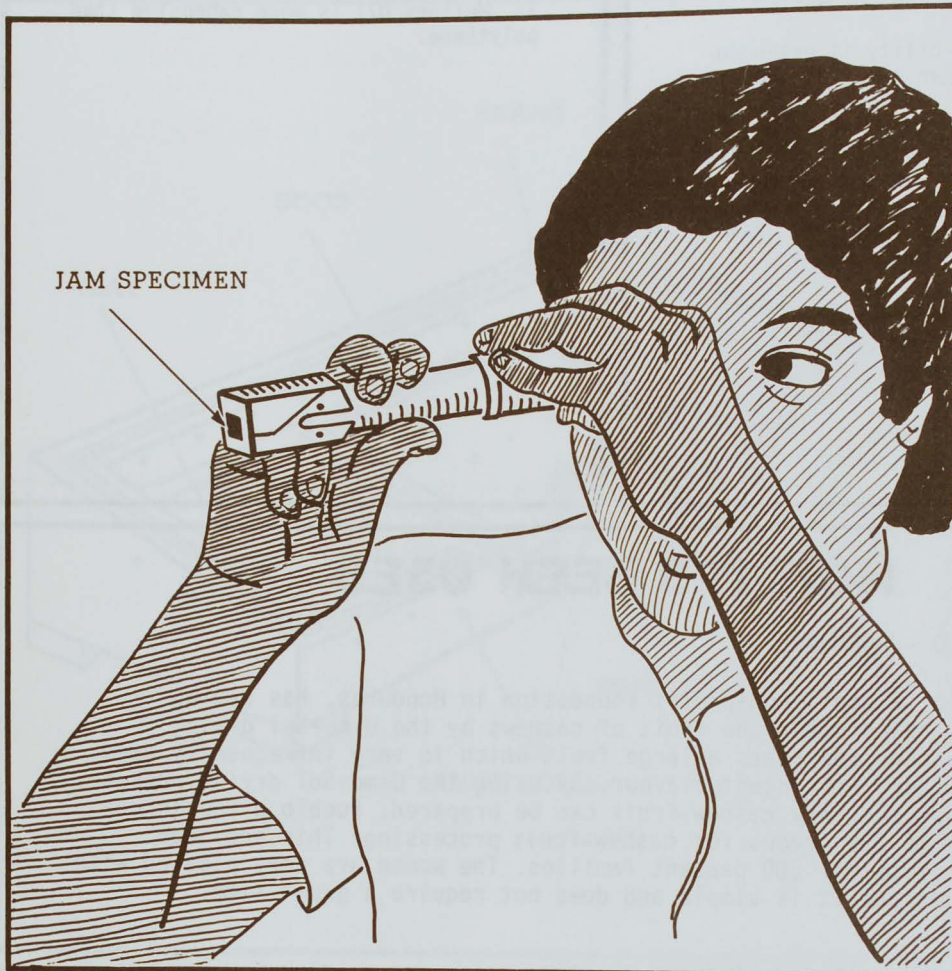
Pueblo a Pueblo, a small non-profit foundation in Honduras, has set up co-operatives that process the fruit of cashews by the Osmo-Sol drying method. The cashew tree bears a large fruit which is very infrequently used as it has a bitter, astringent flavour. By using the Osmo-Sol drying process, a date-like, sugared, dry cashew-fruit can be prepared. Pueblo a Pueblo has disseminated some 200 dryers for cashew-fruit processing. This provides income to approximately 200 peasant families. The women are very pleased with the process, because it is simple and does not require a great time commitment.

The women produce an average of 15 - 20 lbs daily of the finished product. The packaged product has a shelf life of about 6 to 8 months, and is a favourite sweetmeat snack which the women rarely have trouble selling.

BANGLADESH

The Mennonite Central Committee has established a women's village-level solar drying project for drying coconuts. A major problem so far is that drying cannot be done between June and September, which is their rainy season.

REFRACTOMETER



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAIN TENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

A quality control instrument used to obtain readings of the percentage of sugar in a substance. Sugar content is measured by smearing a little of the substance containing the sugar on to the refractometer. In the production of jam, accuracy of sugar content is vital in order for the jam to keep. Foods, particularly jams, depend upon certain levels of sugar for their preservation and routine testing is essential if spoilage due to low sugar levels is to be prevented; if the sugar levels are too high, crystallization may occur. The range of sugar levels for successful jam is fairly narrow which is why the refractometer is so helpful.

FOR MORE INFORMATION

WRITE: 1) INTERMEDIATE TECHNOLOGY DEVELOPMENT GROUP, Myson House, Railway Terrace, Rugby CV21 3HT, UK; 2) REDD BARNA, 54 Davidson Road, Colombo 4, Sri Lanka; 3) SAVE THE CHILDREN, 27/1 Melbourne Ave., Colombo 4, Sri Lanka.

READ: 1) THE A.T. JOURNAL, Vol. 12, No. 1, June 1985.

STRENGTHS

1. It is a compact instrument that is easy to use.
2. Refractometer gives a more accurate reading of sugar levels than was traditionally possible.

WEAKNESSES

1. At a cost of about UK£100, the refractometer is beyond the means of an individual or a small group without access to loans.
2. If it is broken, a specialist is needed to repair the refractometer.
3. The refractometer has to be imported.

HOW IT'S BEEN USED

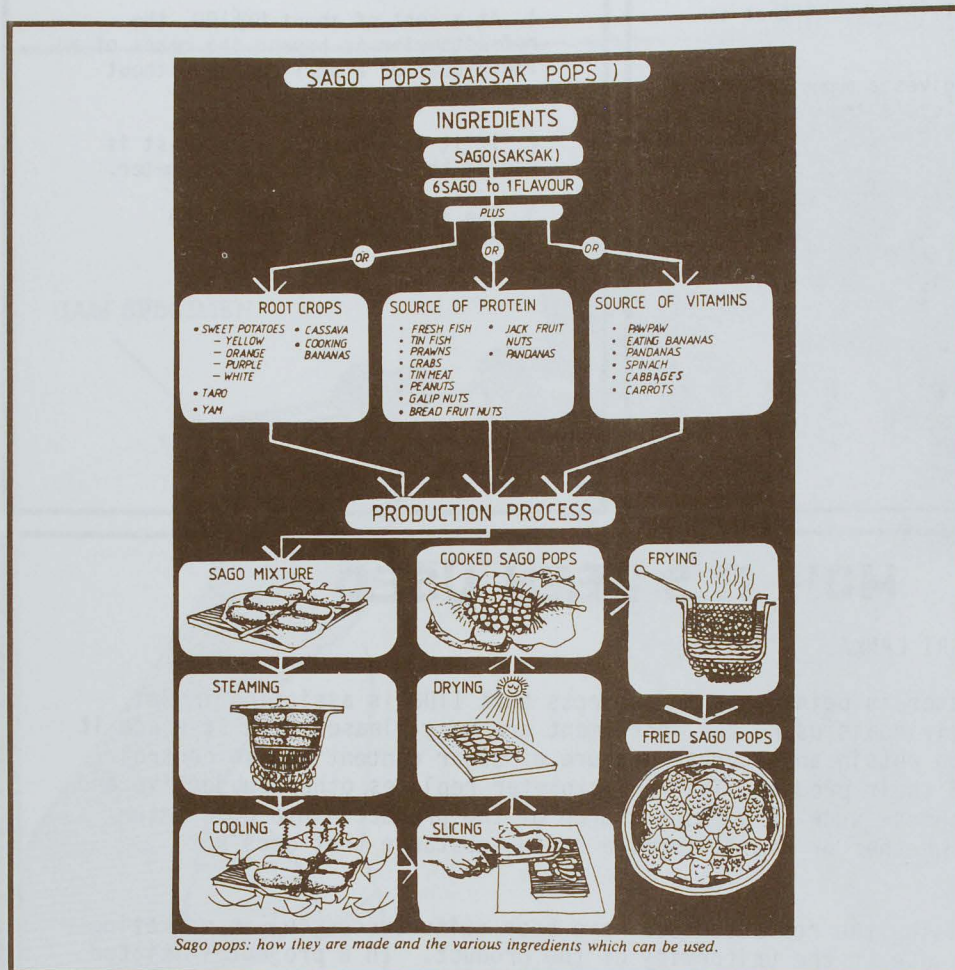
REDD BARNA - SRI LANKA

The refractometer is being used in projects that ITDG is assisting in Sri Lanka. The individuals using the instrument are very pleased with it since it enables them to obtain an accurate measure of sugar content and so control the quality of their product. The refractometer replaces other subjective and inaccurate methods- such as putting a drop of the product into cold water and observing whether or not it forms a solid substance that does not disperse.

The projects using the refractometer have been quite successful in marketing their products due to the uniformity of the product. In a project initiated by Redd Barna, a refractometer was donated to a group of eight women. The women used it in the production of wood-apple, water-melon and strawberry jam. The jams are popular with both locals and the tourists. The group has been promised a steady order from a wholesaler if they can ensure product quality and obtain the seal of approval from the Bureau of Ceylon Standards. The women do not foresee this being a problem.

As a result of this group's success, several other food projects using a refractometer have been initiated. Save The Children is supporting a similar project in Megoda, Sri Lanka. A women's group in Ecuador is using the refractometer to make guava cheese.

SAGO POPS



COST:	NO COST	
	LOW COST	✓
	HIGH COST	
USE:	EASY TO DO	✓
	EASY AFTER TRAINING	
	NEEDS SPECIAL OPERATOR	
	CON-STRUCTION:	ARTISAN-BUILT
	FACTORY-BUILT	
POWER SOURCE:	DIESEL/ELECTRICITY	
	ANIMAL/MANUAL	✓
	RENEWABLE	✓
PURPOSE:	LABOUR- SAVING	
	INCOME- GENERATING	✓
	DOMESTIC	
MAIN- TENANCE:	SIMPLE	✓
	TRAINING NEEDED	
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

Sago, an edible starch extracted from the pith of various species of palm trees, is the staple food of many rural communities in South-East Asia, India, Sri Lanka, Central and South America. A range of sago based products (biscuits, cereals, snack food), can be created by combining small-scale processing techniques with traditional sago preparation. 'Sago Pops' is a popular snack being produced by women's groups for sale. The sago extract is first steamed and then cooled for slicing; the slices are then dried before being sealed in air tight containers for sale. The dried slices need to be fried before they are eaten.

FOR MORE INFORMATION

WRITE: 1) APPROPRIATE TECHNOLOGY DEVELOPMENT INSTITUTE (ATDI), Private Mail Bag, University of Technology, Lae, Papua New Guinea.

READ: 1) THE A.T. JOURNAL, Vol. 12, No. 2, Sept. 1985.

STRENGTHS

1. Uses locally available and abundant materials.
2. Process requires use of kitchen utensils only and is 90 per cent waste free. (Slices that do not conform to quality control are eaten by the family.)
3. Sago pops have consumer appeal and an extended shelf life.
4. Reduces dependency on products made of imported raw ingredients or imported foodstuffs.
5. Sago can be stored longer than traditional crops.

WEAKNESSES

1. Marketing of sago pops is limited in areas where the product is not yet familiar.
2. Proper packaging materials, which are expensive, are needed to ensure freshness of the product.

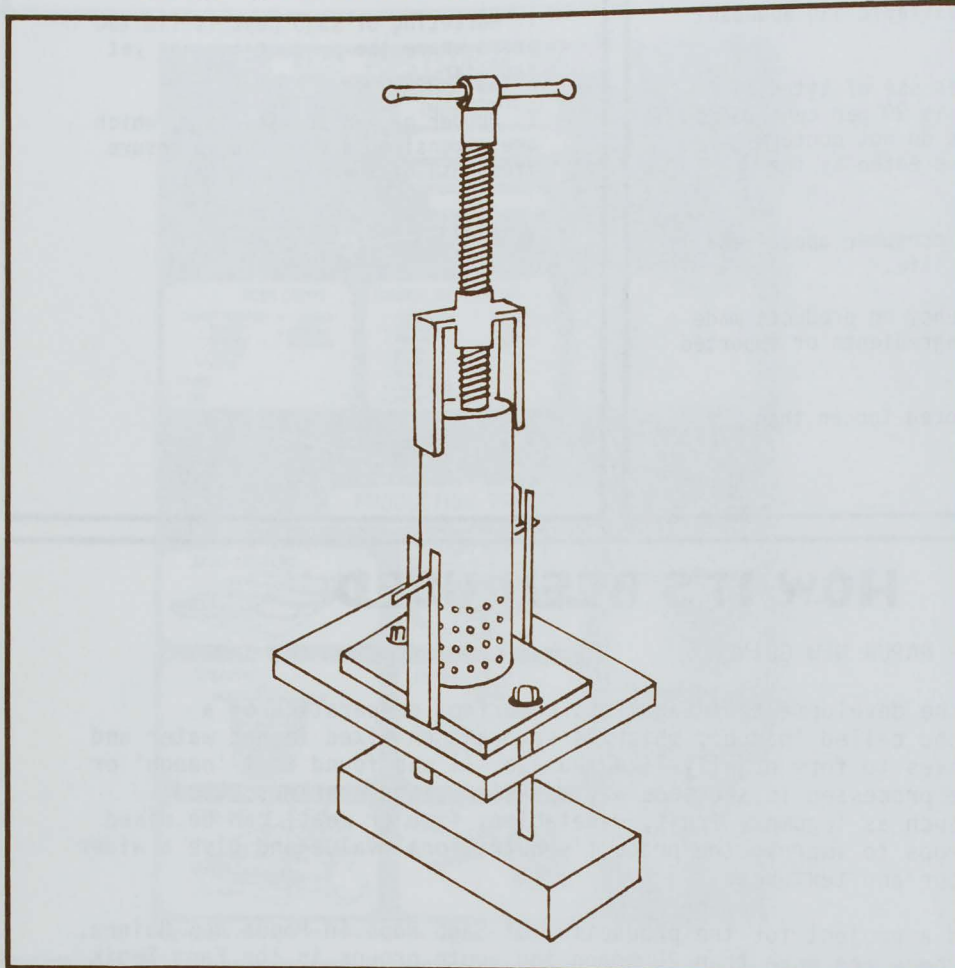
HOW IT'S BEEN USED

ATDI PROJECT - PAPUA NEW GUINEA

The idea for the development of Sago Pops came from preparation of a traditional food called 'nangu', which is sago starch mixed in hot water and wrapped in leaves to form a jelly-like sausage. It was found that 'nangu' or Sago Pops were processed in the same way as Asian prawn crackers. Local ingredients, such as legumes, fruit, vegetables, fish or meat, can be mixed in with the Pops to improve the product's nutritional value and give a wider range of flavour and textures.

ATDI initiated a project for the production of Sago Pops in Papua New Guinea. As a result, there are more than 20 women and youth groups in the East Sepik region which have already started commercial production. At the moment, they serve the local villages. In neighbouring countries (Thailand, Malaysia and Indonesia), a similar product is being produced using equivalent methods but substituting cassava for sago.

SCREW PRESS FOR COCONUT OIL EXTRACTION



	NO COST	
COST:	LOW COST	✓
	HIGH COST	
	NO TRAINING NEEDED	
USE:	TRAINING NEEDED	✓
	TRAINED OPERATOR NEEDED	
	SELF-BUILT	
CONSTRUCTION:	ARTISAN-BUILT	✓
	FACTORY-BUILT	✓
	DIESEL/ELECTRICITY	
POWER SOURCE:	ANIMAL/MANUAL	✓
	RENEWABLE	
	LABOUR- SAVING	✓
PURPOSE:	INCOME- GENERATING	✓
	DOMESTIC	
	SIMPLE	
MAINTENANCE:	TRAINING NEEDED	✓
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

The screw press is one of a series of technologies needed for coconut oil extraction. This one is made out of a hollow metal cylinder with holes punched at its lower end, where oil comes out when ground copra or grated coconut is pressed by a screw mechanism attached at the upper end of the cylinder. The base of the press, which is commonly made out of metal, can also be used for pressing honey, fruit juices, cassava starch and many other food products.

FOR MORE INFORMATION

WRITE: 1) AT CENTRE, Rachel Polestico, Xavier University, Cagayan de Oro City 8401, Philippines.

READ: 1) "Promising Technologies," AT/80, Vol. 1, No. 2, Manila, Oct. 1982

OR
CTION

STRENGTHS

1. Can be operated without difficulty and requires no fuel.
2. If it is made out of metal, it is durable, and can withstand considerable wear and tear, needing only occasional cleaning.
3. Can perform any process requiring high pressure separation of liquid from solid.
4. Can be constructed as a portable machine and can be used at any location as long as its base is securely fastened or installed on a fixed base.

WEAKNESSES

1. Can be very heavy because it is made of metal and is difficult for women to use if the design does not provide for longer handles and easier removal of solid residues after oil has been extracted.
2. Can be built out of scrap materials, but needs a shop equipped with lathes and welding facilities for construction, especially of the screw shaft.
3. Can rust very easily if it is not cleaned well or it is left unused for a period of time.

HOW IT'S BEEN USED

PHILIPPINES

Various community groups have used this machine in relation to coconut-oil processing both with the oil extraction from ground copra and for extraction of coconut milk from grated coconut meat. Co-operatives in Sta. Ana, Tagoloan and Oguis, and Initao used this type of machine for making edible oil and for oil used in making soap.

Women in community groups are trained to use this machine by such agencies as the Appropriate Technology Centre of Xavier University/Philippines. The AT Centre will also be building the machine, which has been purchased with funds raised co-operatively by the women's groups. Women's groups have invested in the machine because it has proven to be useful and maintenance free.

The presser is most effectively used in a small oil-processing plant. It is not as useful if used independently of other lines of machinery needed for oil, juice or honey extraction. In the production process, the presser operates in the batch system and can sometimes delay operations if different steps in production are not well scheduled. To date, dissemination of the presser has been limited to demonstrations and seminars held for coconut-oil processing groups, and through published descriptions in technology journals.

OR MORE INFORMATION
 WRITE: 1) AT CENTRE
 estico, Xavier University
 ayon de Oro City, Philippines.
 AD: 1) "Promising
 hnologies," ATJ, No. 2, Manila, Oct

SHEA BUTTER PRESS



	NO COST	
COST:	LOW COST	
	HIGH COST	✓
USE:	NO TRAINING NEEDED	
	TRAINING NEEDED	✓
	TRAINED OPERATOR NEEDED	
CONSTRUCTION:	SELF-BUILT	
	ARTISAN-BUILT	
	FACTORY-BUILT	✓
POWER SOURCE:	DIESEL/ELECTRICITY	
	ANIMAL/MANUAL	✓
	RENEWABLE	
PURPOSE:	LABOUR- SAVING	✓
	INCOME- GENERATING	✓
	DOMESTIC	
MAIN TENANCE:	SIMPLE	
	TRAINING NEEDED	✓
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

Shea nuts are traditionally processed by women into an edible fat, shea butter. The proceeds accumulated using the traditional method are not worth the labour input. GATE (a German-based technology organization) developed a hand press using a dry method, in which the fat is squeezed out of the heated shea-powder under high pressure. Using the shea press, the fat output is between 40 and 45 per cent (related to dry kernels), while the output with the traditional method is about 25 per cent.

FOR MORE INFORMATION

WRITE: 1) GATE/GTZ,
Postfach 5180, D-6236
Eschborn 1, Germany.

READ: GATE Magazine, June,
1986. (See address for GATE
above.)

SEE: "The Butter Trees of
Zambougou" (Video in Eng/
French/Span). Available from:
GATE, Dag Hammarskjold-Weg 1,
D-6236, Eschborn 1, Germany

STRENGTHS

1. Use of the press reduces working time, since only a quarter of the time traditionally spent is needed.
2. Significantly increases income because the sale value of shea butter is greater than that of shea nuts.
3. Reduces consumption of firewood and eliminates the use of water in the processing of shea butter.
4. Press can also be used to produce peanut oil.

WEAKNESSES

1. Initial cost of press is high; but, it is estimated that it will pay for itself in two years.
2. A significant amount of training is needed, both to ensure local manufacturing capabilities and to teach women how to use the technology.
3. Requires constant maintenance by trained personnel.
4. Women have not been trained to manufacture nor to repair the equipment, skills which supplement the income-generating potential of the technology.

HOW IT'S BEEN USED

GERMAN APPROPRIATE TECHNOLOGY EXCHANGE - MALI

German Appropriate Technology Exchange (GATE) initiated this project in 1981 when it carried out a preliminary study in Mali and Ghana to establish the best conditions for introducing the hydraulic hand presses developed by the Royal Tropical Institute (Netherlands). In 1982/83, four prototypes were tested in four Malian villages and a craft enterprise began production of the presses in Bamako in 1984. To date, 20 presses have been installed in various villages, and demand for the presses is greater than supply.

Although the press is expensive, at a cost of approximately US\$1100 (the complete technology package, including a house, oven, installation and maintenance is US\$1700), women have been able to secure subsidies from assistance agencies to purchase the press. Assuming there are good shea nut harvests, women can earn approximately US\$2400 annually with the press, compared to US\$1500 annually using the traditional method.

GATE has prepared a manual on operating the press, which is given to an instructress who works with village women when a press is acquired. A one-week course is also given to village women to teach basic technical skills, such as how to open and close a valve or how to screw a spindle in and out. The women prefer to leave minor repairs or maintenance to men, although this has, in some cases, led to conflicts when the specialists charge exploitative rates for repair services. In these cases, the women have banded together and identified a more trustworthy specialist for repair services.

Problems of local manufacture and the constant maintenance that the press needs are being handled cooperatively between GATE and local technicians. Plans to further disseminate the press include bringing in female development workers from the German Volunteer Service to assist the local instructresses in training the village women.

SORGHUM MILLING



	NO COST	
COST:	LOW COST	
	HIGH COST	✓
USE:	EASY TO DO	
	EASY AFTER TRAINING	✓
	NEEDS SPECIAL OPERATOR	
CON-STRUCTION:	SELF-BUILT	
	ARTISAN-BUILT	
	FACTORY-BUILT	✓
POWER SOURCE:	DIESEL/ELECTRICITY	✓
	ANIMAL/MANUAL	
	RENEWABLE	
PURPOSE:	LABOUR-SAVING	✓
	INCOME-GENERATING	✓
	DOMESTIC	
MAIN-TENANCE:	SIMPLE	
	TRAINING NEEDED	
	SPECIALIST NEEDED	✓

BRIEF DESCRIPTION

The traditional method of milling sorghum is replaced by a mechanized method known as dry abrasion. In the traditional method the grain has to be soaked before grinding to separate the bran from the grain. The mechanized method follows the same principle of separating bran from grain, but the grain is not soaked before starting. This is advantageous because soaking the grain decreases the length of time the cereal lasts before it goes bad. The mechanized method consists of a dehuller, which separates the bran from the grain, and a hammermill, which grinds the grain to meal. Additionally, the mechanized method replaces the tedious process of hand winnowing by use of a fan.

FOR MORE INFORMATION

WRITE: 1) RURAL INDUSTRIES INNOVATION CENTRE (RIIC), Private Bag 11, Kanye, Botswana; 2) INTERNATIONAL DEVELOPMENT RESEARCH CENTRE (IDRC), PO Box CP8500, Ottawa, Canada K1G 3H9.

READ: 1) THE A.T. JOURNAL, Vol. 12, No. 1, June 1985.

STRENGTHS

1. A labour-saving device releasing up to four hours per day of a woman's and her children's time.
2. The mill can be used for batch service milling (where women bring their own grain for milling), and for commercial milling (where the mill owner buys grain and grinds it for sale).
3. The equipment can be made in developing countries using readily available or cheaply imported materials and local resources.

WEAKNESSES

1. The equipment is expensive, (about UK£6,250). Rural women would have to buy it on a co-operative basis or with financial assistance from appropriate agencies. (In Botswana, funding from the government and development banks is readily available.)

HOW IT'S BEEN USED

IDRC/RIIC/BAMB - BOTSWANA

In co-operation with IDRC, RIIC and BAMB (Botswana Agricultural Marketing Board) the village of Kanye (Botswana) received a model of a sorghum commercial mill. Surveys had clearly shown a need for such machines; following successful implementation in Kanye, commercial mills were installed in four other villages. Seminars were held on the use of the equipment with information on how to run a business as a mill owner. Support systems were also set up to investigate incorrect user practice and low quality manufacture. In addition the Botswana Mill Owners Association was set up for the owners to share a forum of mutual interest. The forum discusses policies such as lobbying the government to put a levy on sorghum prices to encourage the sale and purchase of sorghum from BAMB.

The mills, 36 to date, are run by co-operatives, private individuals and brigade centres. In addition to the numerous benefits already mentioned they provide over 250 direct jobs. There are firm orders for more mills as well as export orders from South Africa.

Another advantage of the mills is that they lend themselves to both commercial milling and service milling. Commercial milling has reduced the country's dependence on imported foods and enabled consumers to obtain their preferred traditional food. Service milling allows the villagers to bring their own sorghum (or buy it at the mills) and have it processed by the mill. This relieves women from a time-consuming and laborious daily task.

HEALTH AND SANITATION TECHNOLOGIES: A SUMMARY

	Cost			Use			Construction			Power Source			Purpose			Main-tenance			
	NO COST	LOW COST	HIGH COST	EASY TO DO	NO TRAINING NEEDED	EASY AFTER TRAINING	NEEDS SPECIAL OPERATOR	SELF-BUILT	ARTISAN-BUILT	FACTORY-BUILT	DIESEL/ELECTRICITY	ANIMAL/MANUAL	RENEWABLE	LABOUR-SAVING	INCOME-GENERATING		DOMESTIC	SIMPLE	TRAINING NEEDED
BAMBOO-REINFORCED WATER TANK	•				•						•				•				
CEMENT-STORAGE JAR				•															
HOME MEDICINES						•													
LEAF PROTEIN							•												
ORAL REHYDRATION SPOON																			
PIT LATRINE																			
PVC HANDPUMP																			
SHAKIR STRIP																			
SOLAR REFRIGERATION																			
SOYRICO																			
WATER PURIFICATION USING MORINGA OLEIFERA SEEDS																			
WHEELBARROW FOR CARRYING WATER																			

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HEALTH AND SANITATION TECHNOLOGIES

THE PROBLEM...

Women in developing countries are traditionally the managers of the household and as such are responsible for the health and welfare of their families. Undertaking this task, they are constrained by various problems: a lack of access to water and sanitation facilities; a lack of understanding of the relationship between clean water and sanitation and health; a lack of access to adequately nutritious



foodstuffs, and a lack of time and resources to provide family care on the scale needed. Additionally, interest in "women's" health is frequently limited to and focuses on their health during pregnancy, which obscures the issues and needs of women as participants in ongoing family and community life.

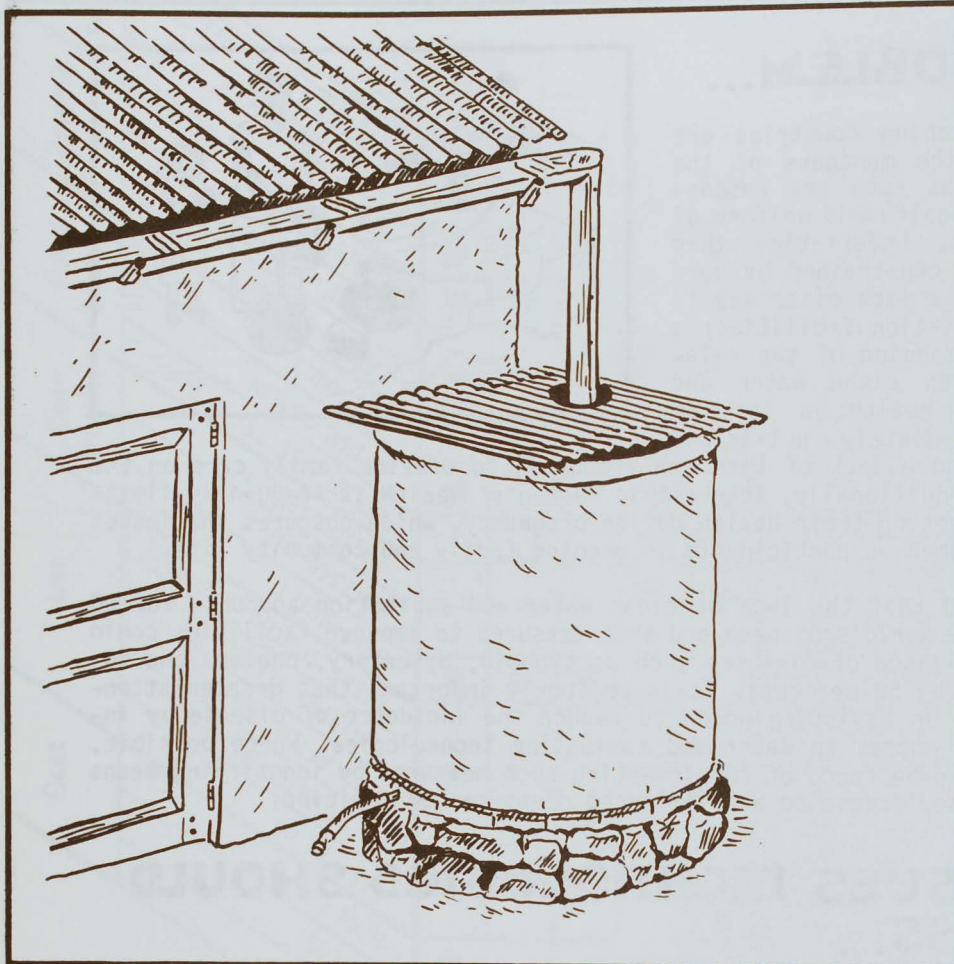
It is estimated that the lack of clean water and sanitation accounts for 80 per cent of the world's disease and that measures to improve facilities could reduce the incidence of diseases such as typhoid, dysentery, cholera and infant diarrhoea by 50 per cent. It is obviously important that greater attention be placed on assisting women to reduce the incidence of disease by increasing their access to water and sanitation technologies. Where possible, ways should also be found of supplementing such measures by identifying means whereby increased access to well-balanced diets can be achieved.

THE ISSUES TECHNOLOGIES SHOULD ADDRESS...

Health-related technologies are particularly sensitive to socio-cultural conditions and careful consideration needs to be given to the acceptability of suggested "improved" technologies. In addition, women rarely stress clean water and sanitation as a priority need - partly because they have more pressing needs, such as the provision of food, and partly because they often fail to link disease with dirty water and poor sanitation. Thus, technologies related to improving hygiene and nutrition must usually be introduced as part of a package which includes measures to meet women's stated priority needs, as well as provisions for public health education. Without this, the motivation and the ability of women to use health-related technologies will be extremely low.

by Anne Ward and Ruby Sandhu

BAMBOO-REINFORCED WATER TANK



COST:	NO COST	<input type="checkbox"/>
	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CONSTRUCTION:	SELF-BUILT	<input checked="" type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input type="checkbox"/>
	ANIMAL/MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR-SAVING	<input checked="" type="checkbox"/>
	INCOME-GENERATING	<input type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAINTENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

The bamboo-reinforced, concrete, rainwater tank shaped as a cylinder can hold 11,300 litres and receive rainwater from gutters and drainage pipes attached to the sloping metal roofs that are common in Thailand. A woven mesh, formed from untreated bamboo, increases the strength of the concrete used in tank construction and reduces the hoop and bending stresses on the base and walls of the structure.

The construction techniques, developed by Community-Based Appropriate Technology and Development Services (CBATDS), enables a tank to be built in three days by inexperienced labour assisted by local skilled workers. Thirty days after it is built, the system is ready for use.

FOR MORE INFORMATION

WRITE: 1) POPULATION AND COMMUNITY DEVELOPMENT ASSOC., CBATDS, Bangkok, Thailand.

READ: 1) RAINWATER HARVESTING, Pacey A. with Cullis, A. (I.T. Pubs, London, 1986)

STRENGTHS

1. Tanks fit rural Thai homes in terms of size, use and local life-styles.
2. Bamboo can be collected and prepared by the villagers themselves without outside technical help, and many aspects of the work required for tank construction match well with local skills and training.

WEAKNESSES

1. The tank may be expensive for low-income families.
2. If the bamboo becomes exposed, it will start to deteriorate.

HOW IT'S BEEN USED

POPULATION AND COMMUNITY DEVELOPMENT ASSOCIATION (PDA) - THAILAND

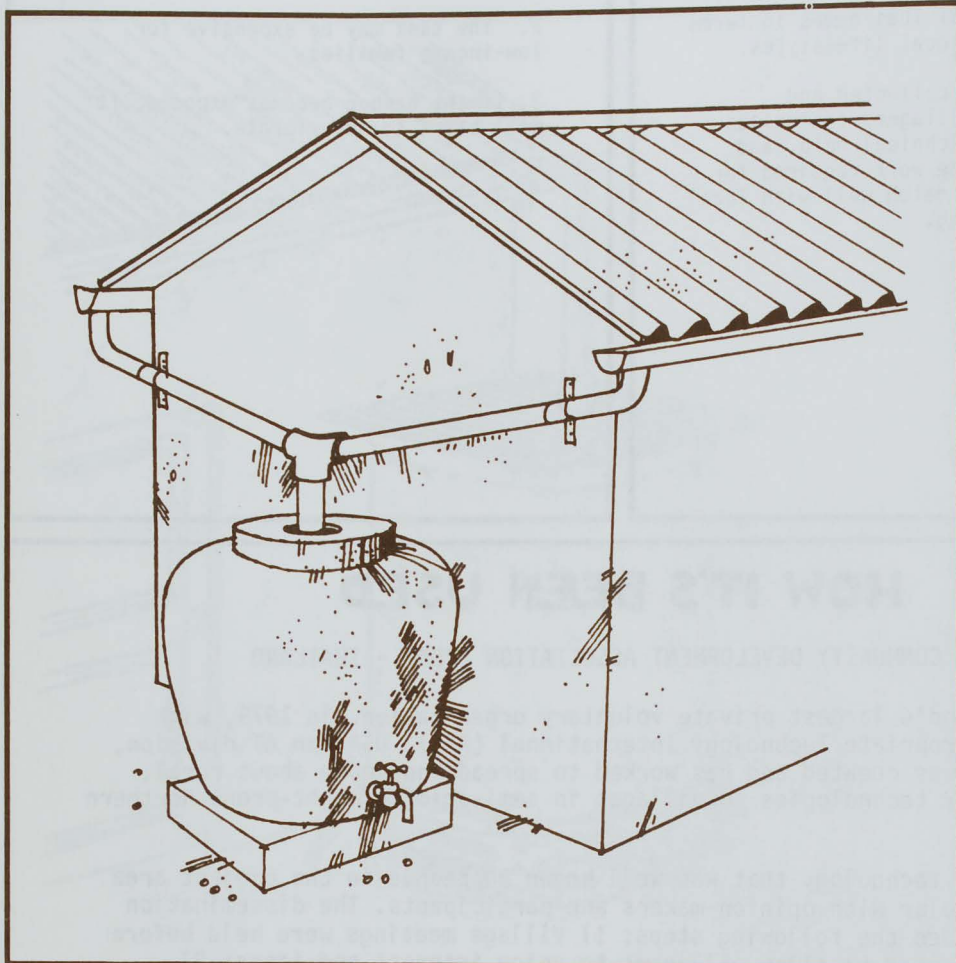
PDA is Thailand's largest private voluntary organization. In 1979, with money from Appropriate Technology International (ATI), USA, an AT division, called CBATDS was created and has worked to spread knowledge about rural, drinkable water technologies to villages in semi-arid, drought-prone Northern Thailand.

CBATDS chose a technology that was well known to people in the project area to make it popular with opinion-makers and participants. The dissemination strategy included the following steps: 1) Village meetings were held before the project started to allow villagers to voice interest and ideas; 2) Participants were chosen on the basis of need, time commitments and ability to repay loans; 3) Loan repayment agreements were adapted to individual circumstances; 4) Self-help production teams of 10 - 15 villagers were organized under the supervision of one or more CBATDS staff; 5) CBATDS delivered building materials (except bamboo) to the site; 6) Construction was undertaken; 7) Follow-up, evaluation and troubleshooting was provided by CBATDS.

The large volume tanks cost US\$267.00, but with financing provided by CBATDS, the villagers are able to purchase them for US\$156.00 and are required to repay this amount over two years, without interest. Participants make an initial 10 per cent downpayment, and monthly payments of approximately US\$19.00. Loan repayments are deposited into a revolving loan fund, administered by CBATDS and used to lend to others who wish to install tanks.

Informal surveys have shown that families with tanks have lower incidences of diarrhoea than non-tank owners. Furthermore, construction of 1500 pit latrines and community ponds has been stimulated by installation of the tanks.

CEMENT STORAGE JAR



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	NO TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CONSTRUCTION:	SELF-BUILT	<input checked="" type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input type="checkbox"/>
	ANIMAL/MANUAL	<input type="checkbox"/>
	RENEWABLE	<input checked="" type="checkbox"/>
PURPOSE:	LABOUR-SAVING	<input type="checkbox"/>
	INCOME-GENERATING	<input type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAINTENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

A rainwater storage tank intended to provide water for domestic purposes. A large bag, made of coarse cloth or several sacks, is packed with any available material, such as grass, chaff, sand or wood-shavings. A circular object is placed in the neck of the bag to make a large opening. The bag is moistened and a thin layer of cement is plastered over the outside. Chicken mesh and wire are wrapped around the bag on top of the cement; another thin layer of cement is then applied. When the cement is dry, the bag and contents are carefully removed. The jar is plastered inside with waterproof mortar and left to cure for ten days. The jar can be made on the ground or placed on a raised platform so that a pipe and tap can be fitted to enable water to be removed.

FOR MORE INFORMATION

WRITE: 1) UNICEF, Technology Support Section, Eastern Africa Regional Office, P.O.Box 44145, Nairobi, Kenya

READ: 1) WATERLINES, Vol. 3, No. 1, July 1984.

STRENGTHS

1. The jar makes water easily accessible.
2. The jars store roof rainwater which is usually cleaner than the surface water supplies traditionally used--especially after the first 'flush' of a downpour has been allowed to run waste.
3. Cheap and simple to build using locally available materials.

WEAKNESSES

1. Facilities to drain away spilled water are needed, i.e., a soak pit.
2. Roofs have to be designed in a way that allows for collection of rain-water.

HOW IT'S BEEN USED

UTOONI DEVELOPMENT PROJECT - KENYA

The cement water jars are being built in Kola by the Utooni Development Project. The project is planning for 3 jars per household in the village. Approximately 150 jars are already in service and an estimated 350 more are needed. The jars are designed to store roof rainwater which would normally run to waste. They are intended to provide water for domestic consumption. Women are reluctant to participate in the building of the largest jars, since the practice of climbing inside these to prepare the lining is culturally unacceptable.

The Utooni Development Project has constructed some of these jars near tree nurseries and experimental seed plots. This means that water is available as needed and repeated journeys for water are not necessary. The jars are filled manually on a rotating basis by a team of villagers.

UNICEF PROJECT - KENYA

In Lusigitti, barely eight miles (12.8kms) outside of Nairobi, the women are without land, their poverty is acute, and there is very little rainfall. UNICEF is assisting women in the construction of cement jars. Each woman contributes Kshs 260 towards her jar, and UNICEF provides another Kshs 240. The women raise the money needed by producing items made of banana fibre.

CONSTRUCTION
POWER SOURCE
MAINTENANCE
FOR MORE INFORMATION
WRITE: 1) UNICEF, Technology Support Section, Eastern Africa Regional Office, P.O. Box 44185, Nairobi, Kenya
LEAD: 1) WATERLINES, No. 1, July 1994

HOME MEDICINES



COST:	NO COST	<input type="checkbox"/>
	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	EASY TO DO	<input type="checkbox"/>
	EASY AFTER TRAINING	<input checked="" type="checkbox"/>
	NEEDS SPECIAL OPERATOR	<input type="checkbox"/>
		<input type="checkbox"/>
CON-STRUCTION:	SELF-BUILT	<input checked="" type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input type="checkbox"/>
	ANIMAL/MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR-SAVING	<input type="checkbox"/>
	INCOME-GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAIN-TENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

Production of medicines for common ailments using harvested plants and leaves with medicinal properties. The machinery used in the process is mainly manually operated, and can be made/adapted to specific needs. The major processes include: grinding and mixing; steam extraction; settling and pill making. A semi-automatic pill-making machine is also available.

FOR MORE INFORMATION

WRITE: 1) GANDHIGRAM TRUST, Gandhigram-624302, Maduairi District, Tamil Nadu, India; 2) KENYA ENERGY NON-GOVERNMENT ORGANIZATION (KENGO), PO Box 48197, Nairobi, Kenya.

READ: 1) FILM BY UNESCO, "Traditional Medicine: Fact or Fiction," 2) BLACKSMITH, BAKER, ROOFING-SHEET MAKER, Carr, M., (I.T. Pubs, London, 1984)

STRENGTHS

1. The processes do not require a high degree of skill.
2. Provides a stable supply of medicinal herbs at fair prices.
3. Provides jobs for poor women (through collection of herbs and production of medicines).

WEAKNESSES

1. There are seasonal constraints on harvesting medicinal plants.
2. Regular collections from the villages are not guaranteed - which disrupts the pattern of production.

HOW IT'S BEEN USED

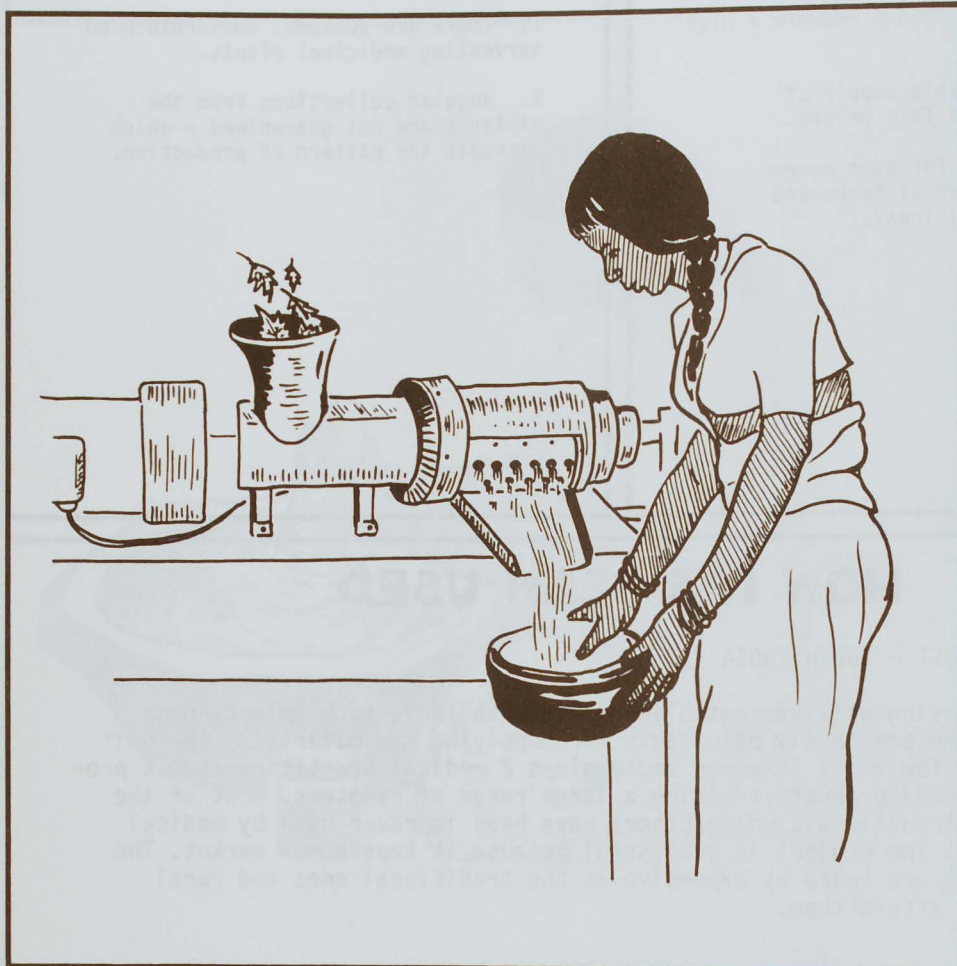
GANDHIGRAM TRUST - SOUTH INDIA

A rural processing unit was established in South India to help very poor people who were previously paid badly for supplying raw materials. The unit provides jobs for about 25 women and employs 2 medical practitioners. It produces 120 branded products treating a large range of symptoms. Most of the mixtures are traditional, while others have been improved upon by medical practitioners. The project is successful because it taps a new market. The city medicines are twice as expensive as the traditional ones and rural people cannot afford them.

KENGO - KENYA

Traditional herbal medicine is also common in Kenya. It is practised both as a form of health care and as an adjunct to Western medicine. It utilizes two powers - the power of the herb and the power of the healer. The remedies consist of formulae prepared using natural substances: animal, mineral and vegetable. Vegetable matter accounts for 90 per cent of the remedies. The Kenya Medical Research Institute is promoting commercial production of medicinal plants and herbal medicines. Advantages of this promotion lie in the reduction of imported medicines and in increased employment opportunities for women.

LEAF PROTEIN



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input checked="" type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input checked="" type="checkbox"/>
	ANIMAL/ MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input checked="" type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

A two-stage production unit used to extract leaf juice which, when heated, produces a curd containing 55-60 per cent well-balanced protein. It may be used fresh or dried. Leaf-protein extraction is appropriate in areas which lack sufficient protein but which have enough rainfall to promote leaf growth. The fibrous residue from the process can be fermented to provide ruminants. Projects are currently in progress in India, Pakistan, Sri Lanka, Mexico, Ghana and Egypt. The leaf-protein production units are expensive and need to be purchased on a co-operative basis.

FOR MORE INFORMATION

WRITE: 1) CAROL MARTIN, FIND YOUR FEET LTD, 13-15 Frognal, London NW3, UK; 2) ANNEMARIE SKEPPARE, Banergatan 85, 2tr, S-11526 Stockholm, Sweden; 3) SITA RAJASURIYA, SARVODAYA MVMT, 98 Rawatawatte Road, Moratuwa, Sri Lanka.

READ: 1) IRED FORUM, No. 17 (IRED, Geneva, Sept. 1985)

STRENGTHS

1. The machines provide a method of extracting protein from leaves which is otherwise difficult to obtain.
2. Use of the machine provides by-products such as fodder, which can be sold for additional income, and de-proteinized juice, which can be used as a fertilizer or for production of biogas.
3. Provides a nutritional supplement without changing dietary habits.

WEAKNESSES

1. Texture of leaf may affect use of machine.
2. The unit has to be country-specific because of different leaf textures in various countries.
3. The plant needs water and crops growing in the area, so it is not suitable for drought areas.

HOW IT'S BEEN USED

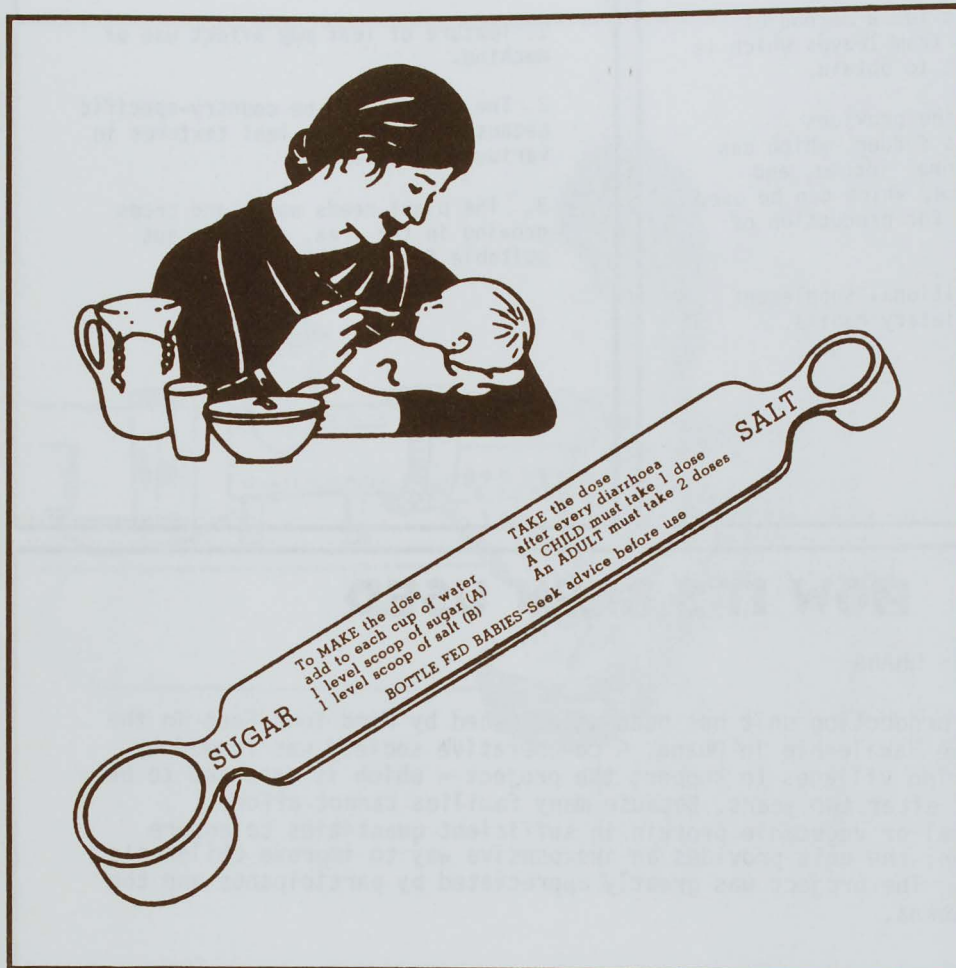
FIND YOUR FEET - GHANA

A leaf-protein production unit has been established by Find Your Feet in the village of Kpone Bawaleshie in Ghana. A co-operative society was formed by three neighbouring villages to support the project - which is expected to be self-sufficient after two years. Because many families cannot afford expensive animal or vegetable protein in sufficient quantities to ensure proper nutrition, the unit provides an inexpensive way to improve children's protein intake. The project was greatly appreciated by participants and the Government of Ghana.

SARVODAYA - SRI LANKA

The Sarvodaya Movement in Sri Lanka is using the extractor to fortify the porridge given every morning to pre-school children in poor fishing villages. The machine was a gift of Find Your Feet, UK, for a two year research project on leaf protein in co-operation with the Ministry of Planning. The experiment involved 40 children and health medical reports have shown positive improvements in haemoglobin counts. The experiment is now over but use of the machine continues. A cheaper version of the machine is being sought. Pedal-powered, hand-operated and electric-driven models of the machine are also available.

ORAL REHYDRATION SPOONS



	NO COST	
COST:	LOW COST	✓
	HIGH COST	
USE:	EASY TO DO	✓
	EASY AFTER TRAINING	
	NEEDS SPECIAL OPERATOR	
CON-STRUCTION:	SELF-BUILT	
	ARTISAN-BUILT	
	FACTORY-BUILT	✓
POWER SOURCE:	DIESEL/ELECTRICITY	
	ANIMAL/MANUAL	
	RENEWABLE	
PURPOSE:	LABOUR- SAVING	
	INCOME- GENERATING	
	DOMESTIC	✓
MAIN- TENANCE:	SIMPLE	✓
	TRAINING NEEDED	
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

Oral rehydration solutions are given to children suffering from diarrhoea. The solution is offered to the child after every watery stool. A measure of sugar (comparable to a scoop) and a measure of salt (comparable to a pinch) are mixed in a glass of water. The salt is added first and should be tasted to make sure it is no saltier than tears.

An oral rehydration spoon can be made out of local materials, such as wood, and can serve as a measuring device for sugar and salt. Special plastic spoons are also available, but may not be accessible for all households. The measurements of the holes are checked against those of the plastic spoon, which is available from TALC as a model.

FOR MORE INFORMATION

WRITE: 1) AHRTAG, 85 Marylebone High St., London, W1M 3DE, UK; 2) TALC, PO Box 49, St. Albans, Herts, AL1 4AX, UK.

READ: 1) WATERLINES, Vol. 1, No. 2, Oct. 1982; 2) HELPING HEALTH WORKERS LEARN, Werner, D. and Bower, W., (Hesperian Foundation, Palo Alto, California, 1982)

STRENGTHS

1. Uses local resources; supplies are almost always available thus the method reaches more people.
2. Treatment can begin at the first sign of diarrhoea - so more preventive than curative.
3. Practical and easy to understand.
4. Less dependency on outside resources, centralized services and high technology.

WEAKNESSES

1. Measurements are less precise, 'less controlled' than those administered in a health centre - but they are more readily available than a health centre.
2. May be less safe in individual cases due to possibility of errors in preparation - but probably saves more lives because it reaches more children more quickly.

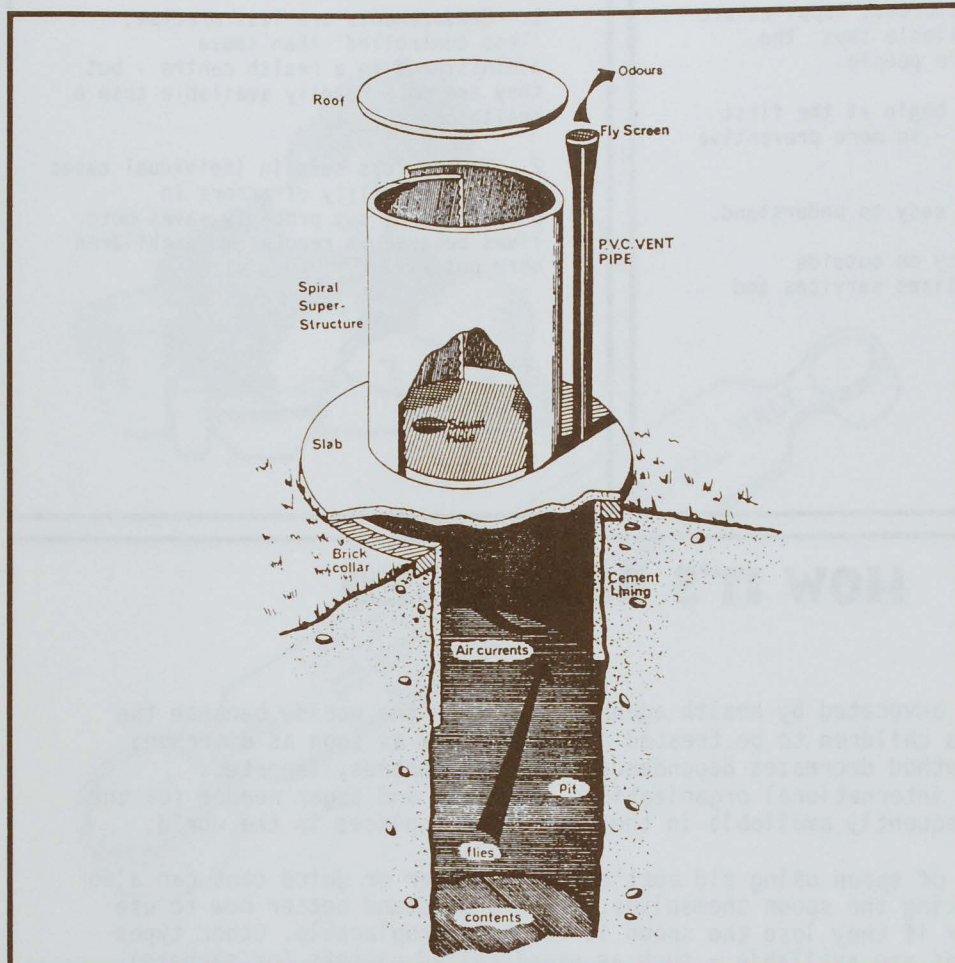
HOW IT'S BEEN USED

GLOBAL

This method is advocated by health agencies all over the world because the approach allows children to be treated in their homes as soon as diarrhoea appears. The method decreases dependency on health centres, imported medicines and international organizations. The salt and sugar needed for the solution is frequently available in the home in most places in the world.

A similar type of spoon using old bottle caps and beer or juice cans can also be made. By making the spoon themselves, users understand better how to use them. Moreover if they lose the spoon it is easily replacable. Other types of O.R. methods are available - such as standardized packets (or sachets). The sachets are reliable, but the contents must be mixed in one-litre containers of water which may not be available. Furthermore, the women may not understand the reasoning behind the sachets so are apt to make mistakes mixing the solutions. Additionally, sachets may be hard to obtain.

PIT LATRINE



	NO COST	
COST:	LOW COST	
	HIGH COST	✓
USE:	NO TRAINING NEEDED	✓
	TRAINING NEEDED	
	TRAINED OPERATOR NEEDED	
CON- STRUCTION:	SELF-BUILT	✓
	ARTISAN-BUILT	
	FACTORY-BUILT	
POWER SOURCE:	DIESEL/ ELECTRICITY	
	ANIMAL/ MANUAL	
	RENEWABLE	
PURPOSE:	LABOUR- SAVING	
	INCOME- GENERATING	
	DOMESTIC	✓
MAIN- TENANCE:	SIMPLE	✓
	TRAINING NEEDED	
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

The Blair Latrine is a latrine fitted with a ventilation pipe. It consists of a reinforced concrete slab placed over a deep pit lined with bricks or plaster. Two holes are cast in the slab, one outside the superstructure for the pipe, and the other within the structure for the squatting hole. The structure itself must be darkened inside; the most successful are cast in a spiral form without a door. The structure can be built from bricks but a popular method of building is to plaster a corrugated iron mould with a plaster mix using chicken wire as reinforcement. All ventilation pipes are fitted with flyscreens which prevent corrosion.

FOR MORE INFORMATION

WRITE: 1) UNICEF, Technology Support Section, Eastern African Regional Office, P.O.Box 44145, Nairobi, Kenya; 2) SARVODAYA, 98, Rawatawatte Road, Moratuwa, Sri Lanka; 3) YWCA COUNCIL OF ZAMBIA, Nationalist Road, PO Box RW 115, Lusaka, Zambia.

READ: 1) THE A.T. JOURNAL, Vol. 6, No. 3, Nov. 1979; Vol. 9, No. 2, Sept. 1982; 2) WATERLINES, Vol. 4, No. 1, July 1985.

STRENGTHS

1. Its popularity is due to its easy construction and maintenance.
2. The ventilation pipe makes the latrine nearly odourless and traps flies that might emerge preventing them from breeding.
3. The latrine does not need water to operate. This is particularly useful where water is scarce or difficult to pipe to ordinary water-based latrines.

WEAKNESSES

1. The pit is expensive for poor communities.
2. Regular maintenance of the fly screen is necessary. (Maintenance merely consists of throwing water down the pipe to avoid blockage.)

HOW IT'S BEEN USED

ZIMBABWE

After two years of testing, the system was put into widespread use in Zimbabwe in 1976. Ventilated pit privies have been in active service in Zimbabwe ever since. It is estimated that a maintained pit could serve a family for at least 20 years. The latrine is being promoted by the Ministry of Health in Zimbabwe. Numerous government health assistants and workers and builders have been trained in construction techniques and many demonstration units have been built in the provinces.

Currently, some provinces in Zimbabwe, under the supervision of the Ministry of Health, are constructing up to 6,000 new latrines every year for rural people. The latrines have also been introduced in Tanzania where a cheaper version using local materials is being developed.

NATIONAL YWCA - ZAMBIA

Pit latrines were introduced to the Zambia YWCA by colleagues in Zimbabwe. The National YWCA IN Zambia introduced the latrine to its member branches, trained staff to build them, held workshops to disseminate skills, and published information about it in their newsletter. Member branches raised funds locally to build latrines.

From information in the YWCA's newsletter and a workshop, the Ndola Branch started a programme of building latrines with women in shanty townships. The Chainda YWCA women's group built a latrine near the clubhouse. They made mud bricks themselves and employed a builder to dig the pit.

FOR MORE INFO

WRITE: 1) WATERLINGS
Technology Support
Eastern Africa
Office, P.O. Box 115,
Nairobi, Kenya
2) YWCA COUNCIL OF
SARAWAK, 55, Jalan
Road, Moratuwa,
3) YWCA COUNCIL OF
Nations 115, Lusaka, Zambia

READ: 1) THE YWCA
Vol. 6, No. 5, 1984
Vol. 9, No. 1, 1985
2) WATERLINGS, No. 1,
1, July 1985

PVC HAND PUMP



COST:	NO COST	<input type="checkbox"/>
	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input checked="" type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input type="checkbox"/>
	ANIMAL/MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input checked="" type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input checked="" type="checkbox"/>
	INCOME- GENERATING	<input type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

The PVC hand pump uses polyvinyl chloride (plastic) as a substitute for traditional cast-iron and steel. The result is a lightweight but sturdy pump which is easy to install and transport and which requires little maintenance. Many developing countries already produce PVC pipes for domestic use so that the cost is greatly reduced. Pumping is a simple straight up-and-down lifting and pushing motion. Small children can grab either side of the handle bar and help one another to pump up and down.

FOR MORE INFORMATION

WRITE: 1) INTERNATIONAL DEVELOPMENT RESEARCH CENTRE (IDRC), PO Box 8500, Ottawa K1G 3H9 Canada; 2) SARVODAYA, 98 Rawatawatte Rd, Moratuwa, Sri Lanka.

READ: 1) IDRC REPORTS, Vol. 13, No. 3, Oct. 1984 (IDRC, Ottawa); 2) WATERLINES, Vol. 3, No. 2, Oct. 1984.

STRENGTHS

1. Provides a quick water supply to about ten families.
2. Uses low-cost materials available in developing countries.
3. Use of PVC pipes eliminates corrosion problems and is rust-free.
4. Lighter and easier to operate than metal pumps - a blessing for women and children.

WEAKNESSES

1. Despite use of local materials installation of the pipe is still expensive for low-income families.
2. Deformities in locally produced PVC pipes may be a problem. However, repair of the pumps is simple when training and spare parts are readily available.

HOW IT'S BEEN USED

IDRC - SRI LANKA

The PVC pump used in Sri Lanka was the result of co-operation between Sarvodaya and IDRC. Sarvodaya introduced 21 pumps into 6 villages; they were to be used by 3 to 10 families. Most of the parts were obtained in Sri Lanka. Problems arose with the use of polythene rings in the design. However, these were replaced by leather rings which the villagers could easily and more cheaply obtain. The Sarvodaya project involved women, the primary users, in all aspects of hand-pump development - from manufacture to installation and maintenance. For example, twenty women trained in the village of Podyatalawa are now building wells and fitting pumps. The women have also set up a workshop to produce spare parts for the pumps. In addition, the women are using their skills and workshops to produce other equipment, such as tools for farmers.

IDRC - MALAYSIA

The PVC pump was also installed in Malaysia. The users were pleased with the pump. They found the water was always accessible; reliability was important to the villagers. The pumps were easier to use than metal pumps and were cheaper.

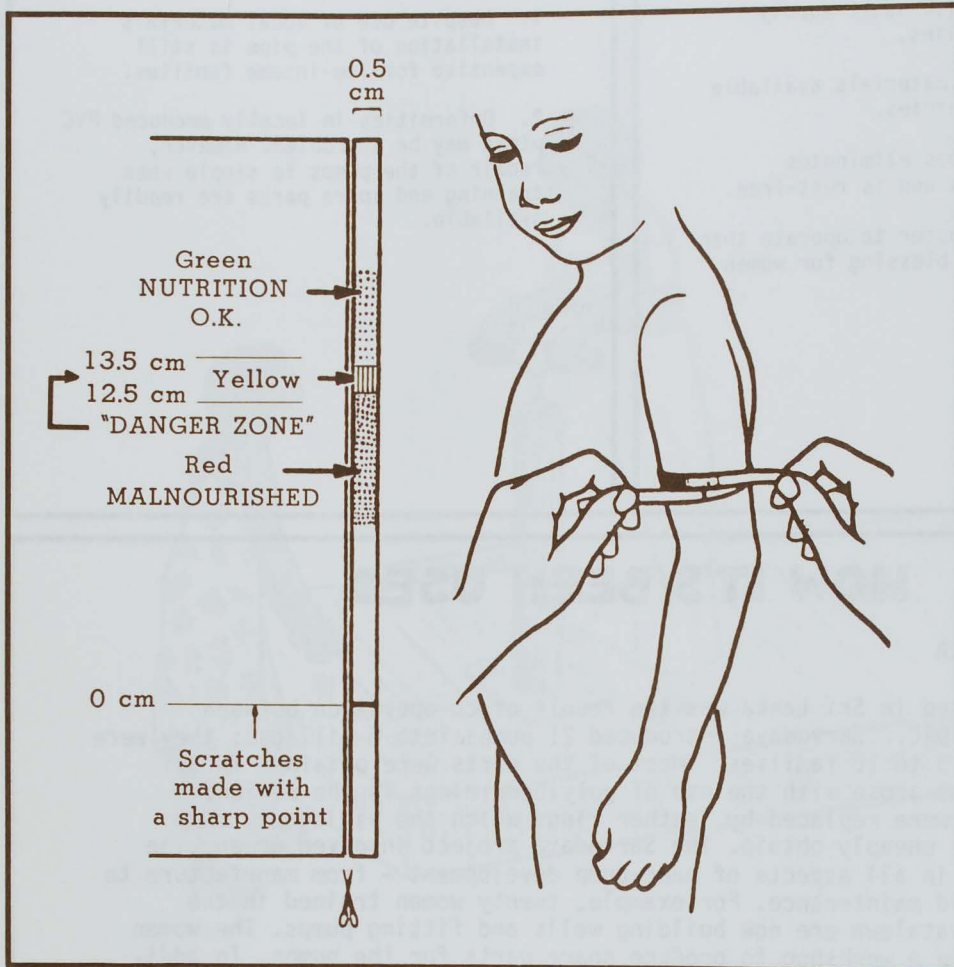
Their lower cost meant that more pumps could be installed and located closer to villagers' homes. The water from the PVC pumps was preferred to that from metal pumps because it was rust-free.

FOR MORE INFO

WRITE: 1) INTERNATIONAL DEVELOPMENT RESEARCH CENTER (IDRC), PO BOX 2500, K1G 3H9 Canada; 2) SARVODAYA, 38 Bannockburn Rd, Morattwa, Sri Lanka

READ: 1) IDRC WATERLINES, Vol. 13, No. 3, Oct. 1994.

SHAKIR STRIP



COST:	NO COST LOW COST HIGH COST	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
USE:	NO TRAINING NEEDED TRAINING NEEDED TRAINED OPERATOR NEEDED	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>
CON-STRUCTION:	SELF-BUILT ARTISAN-BUILT FACTORY-BUILT	<input type="checkbox"/> <input checked="" type="checkbox"/> <input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY ANIMAL/MANUAL RENEWABLE	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
PURPOSE:	LABOUR- SAVING INCOME- GENERATING DOMESTIC	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
MAIN- TENANCE:	SIMPLE TRAINING NEEDED SPECIALIST NEEDED	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/>

BRIEF DESCRIPTION

People living in rural villages often understand little about malnutrition, but they do know that children with very thin arms and legs have had too little to eat. A very good way to see if children have had enough of the right kind of food is to measure around the upper arm. The Shakir strip is a simple way to do this. The strip is marked by three colours - red, yellow and green. The strip is placed around the middle of the upper arm. If the measuring point reaches the green then the child is well nourished; if in the yellow the child is probably malnourished and if in the red the child is malnourished.

FOR MORE INFORMATION

WRITE: 1) INSTITUTE OF CHILD HEALTH, 30 Guilford St, London WC1N 1EH, U.K.

READ: 1) SEE HOW THEY GROW, Morley, D. and Woodland, M. (MacMillan, London, 1979)

STRENGTHS

1. A simple, convenient, portable and cheap method of measurement.
2. Can be used to determine broad categories of nourishment and/or malnourishment for children.
3. Strips similar to Shakir strips can be made locally using X-ray film.

WEAKNESSES

1. Users have to be aware that it is only a rough guide to malnutrition. Satisfactory to test for severe malnutrition, but not sensitive enough to register growth in length or height.
2. It can be an inaccurate measurement which relies on observer's knowledge. It needs a lot of practise to standardize the technique.

HOW IT'S BEEN USED

NEPAL

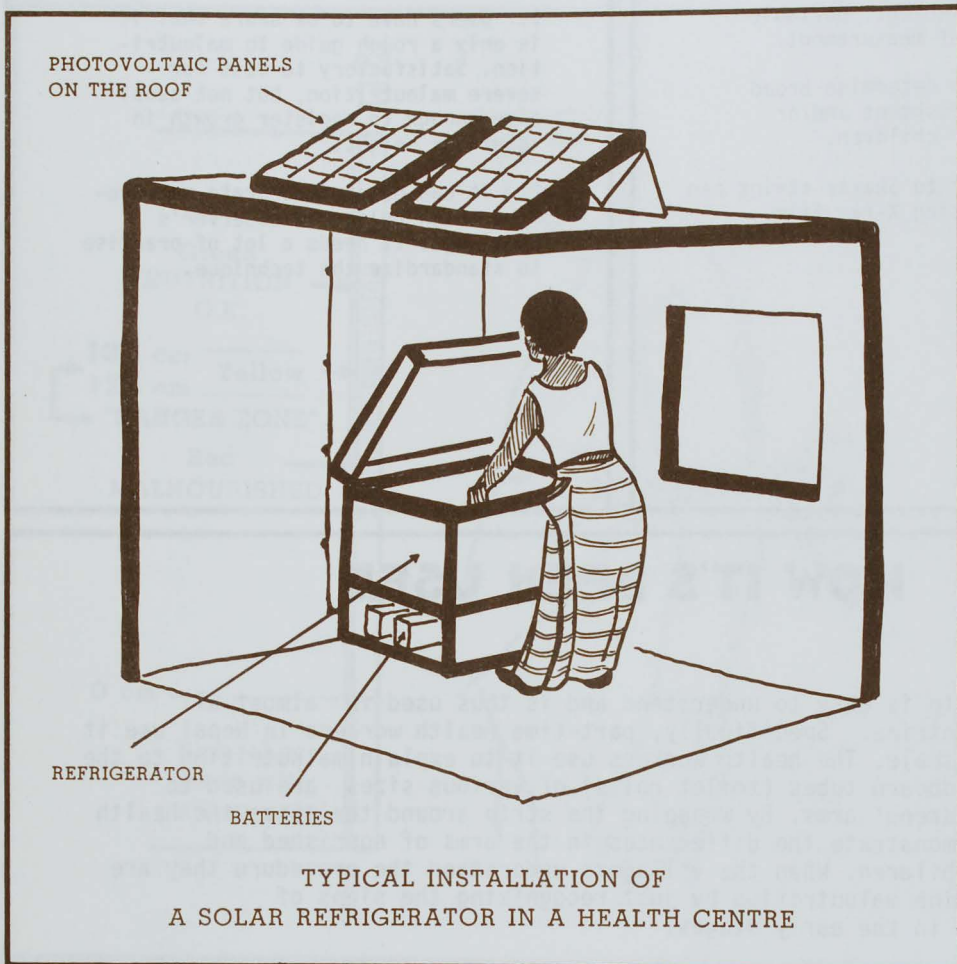
The Shakir strip is easy to understand and is thus used in almost all developing countries. Specifically, part-time health workers in Nepal use it on a national scale. The health workers use it to explain malnutrition to the villagers. Cardboard tubes (toilet rolls) of various sizes are used to represent childrens' arms. By wrapping the strip around the tubes the health workers can demonstrate the differences in the arms of nourished and malnourished children. When the villagers understand the procedure they are able to determine malnutrition by just recognizing the signs of malnourishment in the early stages.

FOR MORE INFO

WRITE: 1) DISTRICT
CHILD HEALTH, 30
St, London WC1N 3EJ

READ: 1) SEE HOW TO
GROW, Morley, D. ed.
Woodland, W. (ed.)
London, 1979

SOLAR REFRIGERATION



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input checked="" type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input type="checkbox"/>
	RENEWABLE	<input checked="" type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input type="checkbox"/>
	INCOME- GENERATING	<input type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

There is an urgent need for refrigerators to keep vaccines in good condition for children, as well as for other uses in health centres and hospitals. Small (household) refrigerators powered by photovoltaic cells have been proven technically viable and of a cost suitable for vaccine storage in remote areas. A photovoltaic 'array' (a series of photovoltaic cells) charges a battery which in turn drives a motor. Energy flow to the battery is controlled by a regulator to prevent the battery receiving too much power. The size of the photovoltaic array needed to power the refrigerator is related to the energy demand of the refrigerator and to how well it is insulated.

FOR MORE INFORMATION

WRITE: 1) INTERMEDIATE TECHNOLOGY POWER, Mortimer Hill, Mortimer, Reading, Berks U.K. RG7 3PG

CONSTRUCTION
USE
COM-STRUCTURE
POWER SOURCE
MAINTENANCE

STRENGTHS

1. Solar refrigerators seem to be more reliable than kerosene refrigerators.
2. There are not the fuel supply problems experienced with kerosene units or diesel electric generator power supplies.
3. Battery provides energy storage so that the refrigerator can be used on sunless days.

WEAKNESSES

1. Cost of purchasing a refrigerator is high. However, the cost is expected to fall as the equipment is sold more widely and people discover its reliability results in a more effective immunization programme - more doses of vaccine delivered per dollar invested.

HOW IT'S BEEN USED

ZAIRE

Most development and evaluation work has been aimed at developing a refrigerator to store vaccines (minimum capacity 30 litres) in small health clinics and also to produce ice for transport of vaccines from the clinic to the field. Several systems have been tested and installed for the World Health Organization. One of the world's largest photovoltaic refrigerator projects is currently underway in Zaire.

Photovoltaic power is not new to the health services of Zaire. The missions, which run over 80 per cent of the health institutions in the country, have up to five years of experience with photovoltaic-powered lighting in over 300 health centres and hospitals. Because of the generally good experience with photovoltaics, the Health Ministry requested that a large installation programme be financed by the European Community. A project to supply 100 photovoltaic refrigerators was developed. The refrigerators are to be installed with lighting systems in clinics and dispensaries throughout the country.

The programme is the responsibility of the Department of Public Health and is financed by the European Development Fund. The systems are supplied by Solarforce (France), working with a local company as a subcontractor. IT Power is providing fieldtesting and technical assistance to the Health Ministry.

OR MORE INFORMATION
 RITE: 1) INTERMEDIC
 CHNOLOGY POWER, Mort
 11, Mortimer, Reading
 rks U.K. RG7 3PG

SOYRICO



A HIGHLY NUTRITIOUS,
LOW-COST FOOD
FOR INFANTS
AND GROWING CHILDREN

28.7% CARBOHYDRATES
24% PROTEIN
11% FAT
16% MINERALS
16.8% MOISTURE
3.5% FIBRE

SOYRICO
100 GRAMME

COST:	NO COST	<input type="checkbox"/>
	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	EASY TO DO	<input type="checkbox"/>
	EASY AFTER TRAINING	<input checked="" type="checkbox"/>
	NEEDS SPECIAL OPERATOR	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input checked="" type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input type="checkbox"/>
	RENEWABLE	<input checked="" type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

Soyrico is a powdered cereal made purely from ground, roasted soya beans (50 per cent), rice (25 per cent), and corn (25 per cent). When cooked with safe, boiled drinking water, Soyrico is an excellent porridge which is highly nutritious and easy to digest. Soyrico provides as much protein as animal protein.

FOR MORE INFORMATION

WRITE: 1) KAHAYAG FOUNDATION, PO Box 208, Davao City, Philippines; 2) MUCARD, Linda McClintock-Tiongce, No. 18 5th St., Cagayan de Oro City, Philippines.

READ: 1) "Home Processed Weaning Foods," Capistrano and Labayen, ANG PAHAYAGANG MALAYA, Oct 9/16/23 1985.

STRENGTHS

1. Rich in all essential nutrients for the health of infants and children. Recommended as first solid food for infants and as supplementary food for growing children, as well as for pregnant and nursing mothers.
2. Costs much less than commercially-prepared cereal. Also has long shelf life (six months when stored in an airtight container).
3. Has no additives and, in particular, no sugar.
4. It is easy to prepare and there are many ways to serve it to infants.

WEAKNESSES

1. When introduced improperly to infants, it has been known to cause stomach upset and/or loose bowel movements.
2. It is very difficult to grind the roasted soya beans to the needed consistency.
3. The quality of Soyrico is affected by the quality of the soya beans, rice and corn used. Assurance of 100 per cent good grain is not always possible, especially when the product is manufactured in bulk.

HOW IT'S BEEN USED

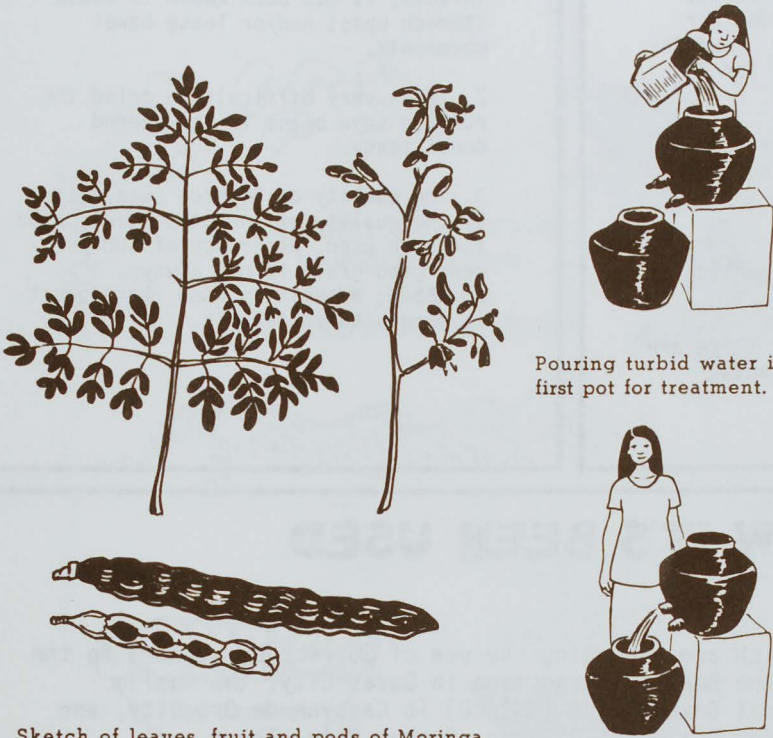
PHILIPPINES

There are three NGOs which are promoting the use of Soyrico by mothers in the Philippines. These are the Kahayag Foundation in Davao City, the Muslim Christian Agency for Rural Development (MUCARD) in Cagayan de Oro City, and the Women's Collective for Action in Diliman, Quezon City. These organizations train women to process Soyrico and to produce it in bulk for sale as an income-generating activity. Such funding agencies as the Canadian Embassy and Christian Aid have provided support for the organizations' work on production and promotion of Soyrico.

The major obstacle in the Soyrico promotion is the grinding machine used for milling the roasted beans and grains. Grinding raw materials is energy intensive and needs to be done by motorized grinders because it is too hard for women to grind manually. The farmers prefer to import soya beans for animal feed rather than plant them for Soyrico.

The groups mentioned above promote the use of Soyrico through seminars and publication of brochures explaining the product's use.

WATER PURIFICATION USING MORINGA OLEIFERA SEEDS



Sketch of leaves, fruit and pods of *Moringa oleifera*, or kelor. Each seed is composed of three paper-thin beige wings and a dark brown rounded shell.

Pouring turbid water into the first pot for treatment.

The bung is removed from the outlet of the first pot and clarified water is stored in the second. The lower outlet is used to drain the jar.

	NO COST	<input checked="" type="checkbox"/>
COST:	LOW COST	<input type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CONSTRUCTION:	SELF-BUILT	<input checked="" type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input type="checkbox"/>
	ANIMAL/MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input type="checkbox"/>
	INCOME- GENERATING	<input type="checkbox"/>
	DOMESTIC	<input checked="" type="checkbox"/>
MAINTENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

The *Moringa oleifera* seed, a fast-acting plant solidifying agent is used to provide purified water for domestic purposes. The crushed white powder of the seed is mixed in a small amount of water and stirred. The milky white solution is then added to a jar of turbid water and stirred quickly first and then slowly for about 12 minutes. After stirring, the treated water is covered and left to settle for at least one hour. The clarified water is then moved into a second jar and the solid matter separated from the water.

FOR MORE INFORMATION

WRITE: 1) YAYASAN DIAN DESA, Jaran Kaliurang KM7, PO Box 19, Bulaksumur, Yogyakarta, Indonesia; 2) GTZ, Post Fach 5180, D6236 Eschborn 1, Germany; 3) KENYA WATER FOR HEALTH, PO Box 61470, Nairobi, Kenya.

READ: 1) WATERLINES, Vol. 2, No. 3, Jan. 1984; Vol. 3, No. 4, April 1985; 2) TRADITIONAL WATER PURIFICATION IN TROPICAL DEVELOPING COUNTRIES - EXISTING METHODS AND POTENTIAL APPLICATION, Jahn, S.A., (GTZ, Eschborn, 1981)

STRENGTHS

1. The method is simple and uses equipment found in the house.
2. No side effects to health have been associated with use of *Moringa oleifera* seeds.
3. Only one seed is needed for one litre of turbid water.

WEAKNESSES

1. The water must be treated daily as it cannot be stored for the next day.
2. The treated water must not be moved for one hour or it may affect the purification.
3. Favourable ecological conditions are needed for the growth of *Moringa oleifera* - dry, hot areas but with no water scarcity.

HOW IT'S BEEN USED

DIAN DESA - INDONESIA

Dian Desa in Indonesia conducted a survey to assess villagers' perceptions about water. Results showed that few villagers realized the danger of consuming polluted water. A first step, then, was to introduce health education in the villages to make villagers aware of the dangers of consuming dirty water. The villagers were introduced to the treatment of water with *Moringa oleifera* seeds known as 'kelor' to the Javanese people. So far, the villagers have accepted the technique and are enthusiastic about practising it. A nursery for the seeds has been set up to support dissemination nationally.

GTZ - SUDAN

Water purification using *Moringa oleifera* seeds has been traditionally practised in the Sudan. The Sudanese women have a tradition of treating the muddy Nile water with Moringa seeds. GTZ carried out water treatment studies in the Sudan and found that the seeds could be used without health risks. As a result, several other East African countries where *Moringa oleifera* trees are grown have shown an interest in using the seed for water purification. Kenya Water for Health (KWAHO) has started to produce *Moringa oleifera* seeds on a large scale for domestic water treatment programmes.

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A SEEDS

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FOR MORE INFO

WRITE: 1) MORGINGA
Jaran Kalirejo
19, Bulaksumbu
Indonesia; 2) GTZ
5180, D6226 Eschwege
Germany; 3) KWAHO
HEALTH, PO Box 444
Nairobi, Kenya.

READ: 1) WATER
2, No. 3, Jan 1988
No. 4, April 1988
TRADITIONAL WATER
PURIFICATION IN THE
DEVELOPING COUNTRIES
EXISTING METHODS AND
POTENTIAL APPLICATIONS
S.A., (GTZ, Eschwege)

WHEELBARROW FOR CARRYING WATER



COST:	NO COST	<input type="checkbox"/>
	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	NO TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input checked="" type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input checked="" type="checkbox"/>
	INCOME- GENERATING	<input type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

The wheelbarrow replaces the traditional method of transporting water "jugs", usually carried by women on their heads. With this particular design, the weight of the jugs is evenly distributed, thus making it easier to push the wheelbarrow. The frame is made of welded scrap metal. The wheel consists of a used motorbike wheel, mounted on an axle with bearings. The wheelbarrows can be made locally in small welding shops.

FOR MORE INFORMATION

WRITE: 1) TECHNICAL CO-OPERATION FOR DEVELOPMENT, Enzo Fano, Rm DC1-754, United Nations, New York 10017 USA; 2) BURKINA FASO WOMEN'S ASSOCIATION, Ouagadougou, Burkina Faso.

STRENGTHS

1. Easily fabricated using scrap metal.
2. Facilitates the transportation of heavy loads.
3. Design results in less physical effort in carrying water jars.
4. Reduces the strain on women's spinal columns.

WEAKNESSES

1. Not very convenient for soft sand tracks.
2. Wheels must be acquired in the cities (used motorbike wheels are not widely available).
3. Repair requires welding torches not widely available.

HOW IT'S BEEN USED

BURKINA FASO

This kind of wheelbarrow was introduced in Burkina Faso as part of a project undertaken by the United Nations Department of Technical Co-operation for Development. The devices are specially designed to carry 4 to 6 water jugs instead of the traditional one water jug. The wheelbarrow makes it easier to transport the water because it can carry more than the operator could carry on her own. Thus, it eliminates the necessity of women having to make several trips to collect water.

The design for the wheelbarrow was developed with advice from women's organizations in the country. The women's association of Burkina Faso attended a seminar on the Hydraulic Year (1984) and presented their conclusion that several hundred wheelbarrows would be desirable. It is the responsibility of the women's organizations to construct and distribute the wheelbarrows amongst the women in greatest need. Specifically, they are to be given to women in remote water-shortage areas far from water points.

The long-term objective is to make available more and better quality water to families and to reduce the time women spend carrying water - in order to free them to be involved in income-generating activities. Similar models of the wheelbarrow are being developed in Niger and Mali.

INCOME-GENERATING TECHNOLOGIES: A SUMMARY

	Cost		Use		Construction		Power Source		Purpose		Maintenance			
	NO COST	LOW COST	SELF-BUILT	ARTISAN-BUILT	FACTORY-BUILT	DIESEL/ELECTRICITY	ANIMAL/MANUAL	RENEWABLE	LABOUR-SAVING	INCOME-GENERATING		DOMESTIC	SIMPLE	TRAINING NEEDED
BEEKEEPING	•		•		•				•					
MULTI-SPINDLE CHARKHA				•	•				•					
PALM-OIL PROCESSING (CAMEROUN)					•								•	
PALM-OIL PROCESSING (GHANA)					•								•	
SOAP MAKING														•
WORKSHOP EQUIPMENT														•

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INCOME-GENERATING TECHNOLOGIES

THE PROBLEM...

Increasing numbers of women are in charge of the economic well-being of their families. However, in many developing countries, their access to income-generating activities is decreasing with the trend away from rural enterprise and cottage industries and towards large-scale, urban production. When attempts have been made to reverse this trend by introducing measures to protect or promote small rural



industries, these have often been directed at men, with the result that men have taken over from women in many traditional women's industries once it has become profitable to do so. Examples of this include the involvement of men in rural food-processing industries following the introduction of grinding mills and oil presses; also, the involvement of men in pottery following the introduction of improved technologies and expanded product ranges.

There is a need to promote women's access to income-generating activities by developing and supporting small, decentralized enterprises and by ensuring that women are fully involved in and can benefit from such support measures.

THE ISSUES TECHNOLOGIES SHOULD ADDRESS...

Inadequate or inefficient technology hardware is not the only cause of failure in cottage-level enterprises. Other causes most frequently cited are: the lack of access of rural producers (and particularly women) to credit and training; and lack of the accounting and marketing skills which are critical to running profitable businesses. Economic analysis of many cottage level production units reveals that producers often fail to account for their own time or the full cost of their raw materials when pricing their products. This has particular relevance to women who have been socialized to perceive their own time as having no economic value. Without taking into account costs of time and raw materials, it is impossible to determine if rural enterprises are, in a strict economic sense, commercially viable.

Therefore, when introducing improved technologies for income generation purposes, attention needs to be given to addressing all the other factors involved in running a profitable business.

by Alyssa Posthelwaite and Marilyn Carr

BEEKEEPING



COST:	NO COST	<input type="checkbox"/>
	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CONSTRUCTION:	SELF-BUILT	<input checked="" type="checkbox"/>
	ARTISAN BUILT	<input type="checkbox"/>
	FACTORY BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input type="checkbox"/>
	ANIMAL/MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR-SAVING	<input type="checkbox"/>
	INCOME GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAINTENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

The Kenyan Top Bar Hive makes honey production much easier than the traditional method of using long, tree-hanging hives. The bees occupy the top bar and make honey in it. An improved smoker is used to calm the bees in order to collect the combs. The combs are then placed in a hand-held honey extractor in which the honey is removed by centrifugal forces. The honey that is removed is semi-refined and is left to settle for two days with scum forming at the top and honey settling at the bottom. Beeswax is also produced from the combs once the honey has been extracted.

FOR MORE INFORMATION

WRITE: 1) KIBWEZI PRIDE HONEY WOMEN'S GROUP, P.O. Box 162, Kibwezi, Kenya; 2) TECHNOLOGY CONSULTANCY CENTRE, University of Science and Technology, Kumasi, Ghana, West Africa.

READ: 1) THE GOLDEN INSECT, Adjare, S. (I.T. Publications, London, 1984)

STRENGTHS

1. Beekeeping using the improved hive is much simpler than the traditional method; also, the hive is moveable unlike the traditional long, tree-hanging hive.
2. With the improved smoker, the honey does not taste smoky.
3. There is a ready market for both honey and beeswax.

WEAKNESSES

1. Training is needed in beekeeping.
2. The initial cost of setting up a honey-making process is expensive due to the costs of the equipment. The payback period, however, can be short.
3. Transporting the honey from rural areas to urban markets may pose a problem.

HOW IT'S BEEN USED

KIBWEZI WOMEN'S GROUP - KENYA

The Kibwezi Women's Group, based in Machakos (Kenya), was formed as a co-operative between small villages producing honey. The group asked the Ministry of Agriculture for help in providing training and marketing. The Ministry additionally introduced the Kenyan Top Bar Hive and the smoker to the women. The women were involved at the same time in various other activities, (poultry, brick making, and goat keeping). With the new hive they could devote more time to these activities. A ready market exists for the honey; the profits made are returned to the business and used for personal income. The co-operative was a good idea because those groups which did not have an extractor had access to one through the co-operative. The only problem the women encountered was transportation of the honey to urban areas. The women recommend beekeeping as an excellent income-generating project. Although initial costs are high, loans are available and the payback period is short.

TECHNOLOGY CONSULTANCY CENTRE (TCC) - GHANA

In Ghana a similar type of hive and smoker is used. Here, beekeeping is found to be profitable for retired women, housewives and even business women - all of whom belong to a beekeeper's association. It is done on either a part-time or a full-time basis. The Technology Consultancy Centre, which promoted the project in 1975, described it as one of the centre's most economically viable projects.

MULTI-SPINDLE CHARKHA



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAIN TENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

Manually-operated charkhas have been developed over the past 30 years in India to spin cotton and woollen yarns. Peddle and hand-driven charkhas incorporate a varying number of ring spindles for cotton, the size of charkha ranging between six spindle hand-cranked to ten and twelve spindle peddle-cranked. Alternatively, the twelve spindle and twenty-four spindle charkhas can be driven by a small motor. The yarn produced ranges from fine muslin to coarse yarn suitable for bed covers. The yarn is suitable for weaving on hand looms.

FOR MORE INFORMATION

WRITE: 1) V. PADMANABHAN, GANDHIGRAM TRUST, Gandhigram 624302, Madurai District Tamil Nadu, S. India; 2) ITDG, Myson House, Railway Terrace, Rugby CV21 3HT, UK

READ: 1) NEW MODEL CHARKHA SETS, (Khadi and Village Industries Commission, Bombay); 2) THE A.T. JOURNAL, Vol. 12, No. 3, Dec. 1985 in "I.T. Highlights"

STRENGTHS

1. Higher productivity than the traditional single spindle charkha.
2. Can be used at home.
3. No electricity required.
4. Reasonably robust, durable machine.

WEAKNESSES

1. Requires periodic maintenance by semi-skilled mechanic.
2. The multi-spindle charkhas have to be fed with large quantities of raw materials which necessitate the existence of a service centre (or mill) close to the charkha.
3. The charkha must be manufactured by competent textile machinery manufacturers.

HOW IT'S BEEN USED

INDIA

The six and twelve spindle charkhas were developed by D. Balasundaram, IRIS Engineering, Coimbatore, South India and have been widely used throughout India for many years.

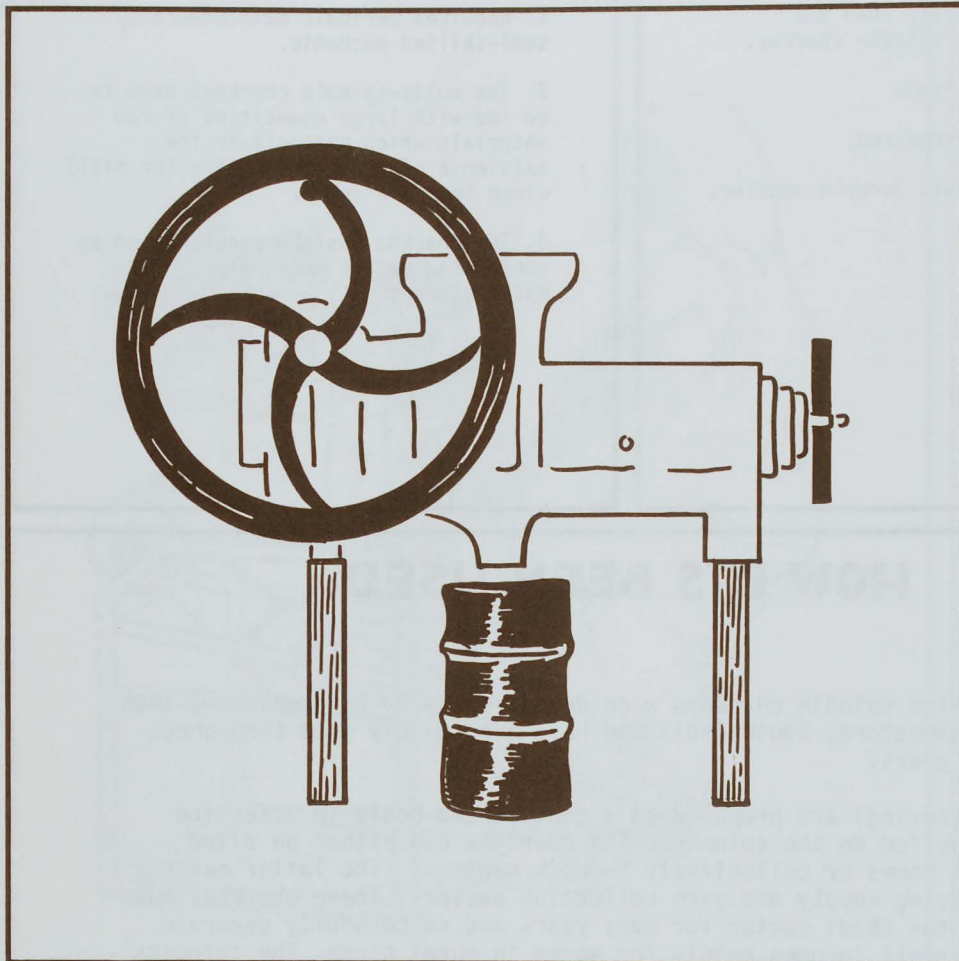
Raw materials (roving) are prepared on a centralized basis in a service centre and supplied to the spinners. The charkhas can either be sited individually in homes or collectively in work centres. (The latter makes maintenance, roving supply and yarn collection easier.) These charkhas have been in use in the Khadi sector for many years and successfully generate employment and small incomes mainly for women in rural areas. The spinners are paid piece rate for their work. One good example of a centre where the charkhas are widely used by women is in Gandhigram, Madurai District. The Khadi department at Gandhigram has yarn and cloth production centres in 60 villages around Madurai. There are three main centres in this area which organize and sell yarn and clothing produced in the surrounding villages. 1,422 spinners, 350 weavers and 70 workers in a pre-processing plant benefit from this successful cottage industry co-ordinated by Gandhigram Trust. All the spinners are women.

FOR MORE INFORMATION

WRITE: 1) V. PANDHARIPAN
GANDHIGRAM TRUST, Gandhigram
302, Madurai District
Tamil Nadu, S. India; 2)
G. Myson House, 12/10
Race, Rugby CV21 0HT.

READ: 1) NEW MODEL CHARKHA
S. (Khadi and Village
Industries Commission,
Bombay); 2) THE A.T.
JOURNAL, Vol. 12, No. 3,
1985 in "Rights"

PALM-OIL PROCESSING (CAMEROUN)



	NO COST	<input type="checkbox"/>
COST:	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	EASY TO DO	<input checked="" type="checkbox"/>
	EASY AFTER TRAINING	<input checked="" type="checkbox"/>
	NEEDS SPECIAL OPERATOR	<input type="checkbox"/>
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CON- STRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input checked="" type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input checked="" type="checkbox"/>
	ANIMAL/MANUAL	<input checked="" type="checkbox"/>
		<input type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input checked="" type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAIN- TENANCE:	SIMPLE	<input checked="" type="checkbox"/>
	TRAINING NEEDED	<input type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

An extraction unit, available in the Cameroun, is made up of three different pieces: (1) a hand-powered Colin Press to depulp and press the oil in one operation; (2) a bunch stripper to separate individual nuts from bunches in which they are harvested; (3) a clarifier to purify and stabilize the oil that is pressed. The unit improves upon and adds to the traditional technology. It is meant for collective use by 20 to 25 farmers.

FOR MORE INFORMATION

WRITE: 1) APICA, BP 5946, Douala-Akwa, Cameroun; 2) APPROPRIATE TECHNOLOGY INTERNATIONAL (ATI), 1331 H ST, NW, Washington, DC 20005, USA.

READ: 1) LE POINT SUR L'EXTRACTION DE HUILES VEGETALES (GRET Pubs, Paris 1984)

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Less time is r
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making soap.

Four people w
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APICA - CAME

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As of March
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STRENGTHS

1. Due to efficiency of Colin Press the extraction rate is 50 per cent greater than traditional methods.
2. Less time is required to process harvested palm-nuts resulting in a saving of time (i.e. 75 per cent less time is spent).
3. An increased quantity of oil is extracted; oil can also be used for making soap.
4. Four people without any previously acquired skills can operate the unit.

WEAKNESSES

1. It is expensive and would have to be bought on a co-operative basis.
2. The equipment has high capacity and would be unsuitable for small farms.
3. Availability of spare parts can present a problem.

HOW IT'S BEEN USED

APICA - CAMEROUN

The palm-oil processing unit is being introduced in the Cameroun through APICA and, as of late 1985, the project is still in its early stages. From tests previously conducted, the Colin Press has proved to be 50 per cent more efficient than the traditional method. According to the project plan, improved oil extraction units will be leased to farmer's groups of 20 to 25 members. The groups will make monthly payments on the units by retaining and selling 25 per cent of all oil processed. At the end of the lease, the contract will include a "buy-out" provision which will allow the group to buy the unit for a nominal payment.

The first unit was set up in a village in Cameroun in 1985 and the users seemed quite happy with it. They found that the unit could process up to 200kgs of nuts per hour; additionally, the extraction rate was impressive (16 per cent).

As of March 1986, none of the presses had been purchased by women's groups. However, the technology looks promising for women and APICA was trying to involve women in the project.

FOR MORE

WRITE TO:
Dona Le-Blond
APPROPRIATE
INTERNATIONAL
ST, NW, WASH
20005, USA

READ:
L'EXTRACTION
VEGETALES
1984)

PALM-OIL PROCESSING (GHANA)



COST:	NO COST	<input type="checkbox"/>
	LOW COST	<input type="checkbox"/>
	HIGH COST	<input checked="" type="checkbox"/>
USE:	EASY TO DO	<input type="checkbox"/>
	EASY AFTER TRAINING	<input checked="" type="checkbox"/>
	NEEDS SPECIAL OPERATOR	<input type="checkbox"/>
		<input type="checkbox"/>
CONSTRUCTION:	SELF-BUILT	<input type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input checked="" type="checkbox"/>
POWER SOURCE:	DIESEL/ELECTRICITY	<input type="checkbox"/>
	ANIMAL/MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input checked="" type="checkbox"/>
PURPOSE:	LABOUR-SAVING	<input checked="" type="checkbox"/>
	INCOME-GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAINTENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

An improved palm-oil process in Ghana uses five machines: palm-fruit boiling tank, palm-fruit pounding machine, palm-oil press, clarifying tank, and storage tank. Fresh palm fruits are boiled in the boiling tank by means of steam. The cooked fruits are transferred to the palm-fruit pounder and fibre is removed from the nuts. The hot pounded palm fruit is then placed in the oil press where the palm oil is extracted. Clear palm oil is obtained in the clarifying tank where the sludge oil is drained through a pipe at the bottom of the tank. The clear palm oil is then placed in the storage tank. The machines were designed by the Technology Consultancy Centre (Ghana) and are different from those introduced by APICA in Cameroun (see page 120).

FOR MORE INFORMATION

WRITE: 1) TECHNOLOGY CONSULTANCY CENTRE, University of Science and Technology, Kumasi, Ghana, West Africa.

SING

DESIGN	100
COST	100
OPERATION	100
MAINTENANCE	100
CONSTRUCTION	100
POWER SOURCE	100
PURPOSE	100
MAINTENANCE	100

STRENGTHS

1. The extraction time compared with the traditional method is reduced by 65 per cent while production is increased by 30 per cent.
2. Fuel (firewood) consumption is also reduced by 50 per cent.
3. The work load is decreased because the palm-fruit pounder replaces the traditional method of pounding with mortars.
4. Oil can also be used for making soap.

WEAKNESSES

1. The equipment is expensive and would have to be bought on a co-operative basis.

HOW IT'S BEEN USED

TECHNOLOGY CONSULTANCY CENTRE (TCC) - GHANA

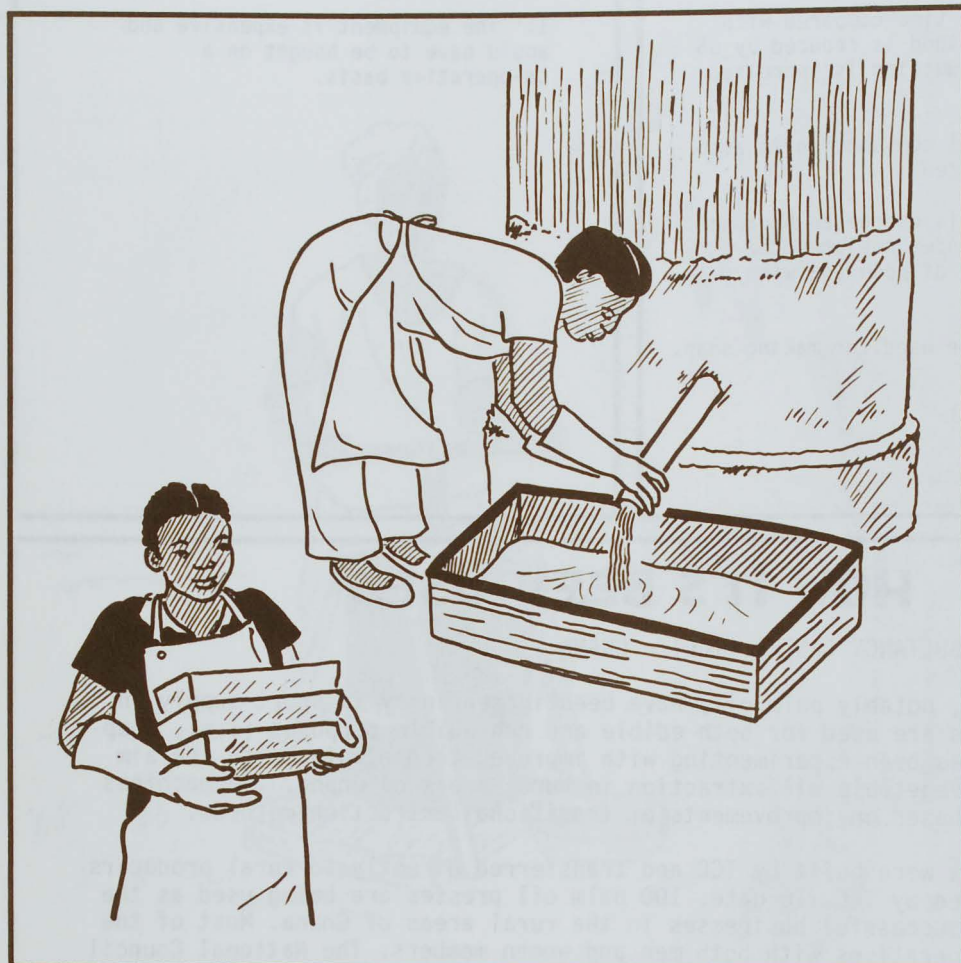
Vegetable oils, notably palm oil, have been increasingly in short supply in Ghana. The oils are used for both edible and non-edible purposes (i.e., soap making). TCC has been experimenting with improved technologies with the aim of promoting vegetable oil extraction in rural areas of Ghana. The machines developed are based on improvements of traditional extraction methods.

The new presses were built by TCC and transferred directly to rural producers who were trained by TCC. To date, 100 palm oil presses are being used as the basis of very successful businesses in the rural areas of Ghana. Most of the users are co-operatives with both men and women members. The National Council of Women in Ghana is the TCC's largest group of women clients.

An added advantage of palm-oil processing plants in Ghana is that some of them function as service centres. Women who are not part of the co-operative owning the plant can still use the equipment for a small fee. Because palm oil can be used to make soap, some co-operatives have extended into soap production as well.

FOR MORE INFORMATION
WRITE: 1) TECHNOLOGY CONSULTANCY CENTRE, University of Science and Technology, Kumasi, West Africa.

SOAP MAKING



	NO COST	
COST:	LOW COST	✓
	HIGH COST	
	NO TRAINING NEEDED	
USE:	TRAINING NEEDED	✓
	TRAINED OPERATOR NEEDED	
	SELF-BUILT	✓
CON- STRUCTION:	ARTISAN BUILT	
	FACTORY BUILT	
	DIESEL/ ELECTRICITY	
POWER SOURCE:	ANIMAL/ MANUAL	✓
	RENEWABLE	
	LABOUR- SAVING	
PURPOSE:	INCOME GENERATING	✓
	DOMESTIC	
	SIMPLE	
MAIN- TENANCE:	TRAINING NEEDED	✓
	SPECIALIST NEEDED	

BRIEF DESCRIPTION

There are three types of soap-making processes: cold, semi-boiling and full-boiling. The semi-boiling process is advocated because it requires the least amount of experience. In the semi-boiling process the right amount of oil or fat to be used is put in a boiling pan and heated slowly to melt at about 50°C. The oil is bleached in the boiling tank, and deodorized. The deodorized oil is heated gradually to a moderate temperature and caustic soda and kaolin (if available) are dissolved into the mixture. After about 4-5 hours of boiling, saponification is complete; the soap is then cooled and perfume is added. The liquid soap is drained into moulding boxes lined with polythene sheet and left to harden overnight or for 24 hours.

FOR MORE INFORMATION

WRITE: 1) TECHNOLOGY CONSULTANCY CENTRE, Univ. of Science and Technology, Kumasi Ghana, W. Africa; 2) RURAL DEVELOPMENT MINISTRY, Republic of Mali

READ: 1) SMALL-SCALE SOAP MAKING: A HANDBOOK, Donkor, P. (I.T. Pubs., London, 1986); 2) The A.T. JOURNAL, Vol. 7, No. 3, Dec, 1980.

STRENGTHS

1. A simple technology using locally available materials and equipment.
2. A better quality soap is produced which is not caustic and suits consumer taste for laundry and bathing purposes. Traditionally-made soap was found to be caustic; i.e., a substance that burns or corrodes.
3. In most countries, a ready market for the product already exists.

WEAKNESSES

1. Training of about 2 to 4 weeks is needed.
2. Initial capital is needed to buy the raw materials and utensils.

HOW IT'S BEEN USED

THE TECHNOLOGY CONSULTANCY CENTRE (TCC) - GHANA

TCC got involved in the problems of soap making in 1972 when it was approached by numerous soap makers with requests for the analysis of their products and advice on improving quality. Scientific research was carried out at the centre until a satisfactory formula was developed and a prototype plant installed by TCC. Different types of oils were used until an adequate mixture was found. The oils used included palm oil, coconut oil and shea butter.

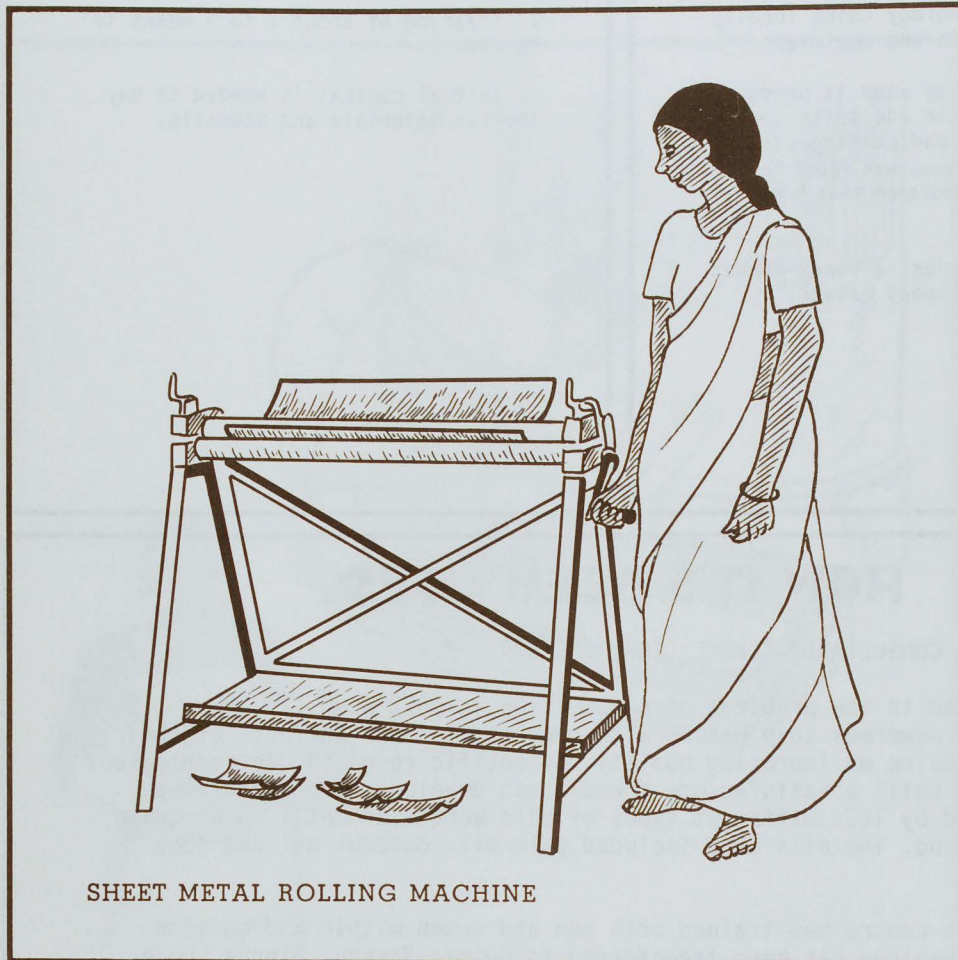
Since 1975, the centre has trained both men and women within and outside Ghana. The technology has been transferred to Guinea Bissau, Sierra Leone, Upper Volta, Mali, Togo and Mozambique. It is in the preparatory stages in Sudan.

MARKALA CO-OPERATIVE - MALI

TCC trained the Markala Women's Co-operative in soap making using the semi-boiling process. The Markala women were unaware of this process and were using methods that produced caustic soap. Because they used fish oil and shea butter, the soap had a strong odour. The TCC method uses less caustic soda and helps to reduce the strong odours.

The original group of three soap makers has expanded to 10 women who in turn call upon ten others on production days twice a week. The Markala Women's Co-operative is also helping other village groups to set up soap-making enterprises in Mali.

WORKSHOP EQUIPMENT



SHEET METAL ROLLING MACHINE

COST:	NO COST	<input type="checkbox"/>
	LOW COST	<input checked="" type="checkbox"/>
	HIGH COST	<input type="checkbox"/>
USE:	NO TRAINING NEEDED	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	TRAINED OPERATOR NEEDED	<input type="checkbox"/>
CON- STRUCTION:	SELF-BUILT	<input checked="" type="checkbox"/>
	ARTISAN-BUILT	<input type="checkbox"/>
	FACTORY-BUILT	<input type="checkbox"/>
POWER SOURCE:	DIESEL/ ELECTRICITY	<input type="checkbox"/>
	ANIMAL/ MANUAL	<input checked="" type="checkbox"/>
	RENEWABLE	<input type="checkbox"/>
PURPOSE:	LABOUR- SAVING	<input type="checkbox"/>
	INCOME- GENERATING	<input checked="" type="checkbox"/>
	DOMESTIC	<input type="checkbox"/>
MAIN TENANCE:	SIMPLE	<input type="checkbox"/>
	TRAINING NEEDED	<input checked="" type="checkbox"/>
	SPECIALIST NEEDED	<input type="checkbox"/>

BRIEF DESCRIPTION

Four hand-operated machines: a sheet-metal folding machine, a sheet-metal rolling machine, sheet-metal shears, and a pipe-bending machine. The machines are of use to blacksmiths, mechanics and community enterprises using sheet metal for the manufacture of stoves, flue pipes, gutters, fuel tanks, agricultural equipment and steel furniture. Local manufacture of these machines encourages self-reliance in addition to small-scale manufacture and repair of locally needed equipment. Local workshops need the machines because with them they are able to produce a wide range of products.

FOR MORE INFORMATION

WRITE: 1) ITDG, Myson House,, Railway Terrace, Rugby, CV21 3HT, UK; 2) BEDU, Private Bag 0014, Gaborone, Botswana; 3) BOTSWANA TECHNOLOGY CENTRE, Private Bag 0082, Gaborone Botswana; 4) UTOONI PROJECT, Utooni, Kenya.

READ: 1) Series of six books called WORKSHOP EQUIPMENT MANUALS, (I.T. Pubs., London, 1985/6)

STRENGTHS

1. Machines can be made of readily available steel sections; scrap can also be utilized.
2. Machines are cheap to build and produce high quality work.
3. Sheet metal shears can be used to cut to a point on a sheet rather than being restricted to cutting right across, as with guillotines.

WEAKNESSES

1. Generally shears are restricted to straight cuts and external curves.
2. Self-construction requires welding skills and access to welding equipment.

HOW IT'S BEEN USED

BOTSWANA

The machines were developed in the UK by ApT Design and Development for the Intermediate Technology Development Group and tested in Botswana, where they are now being manufactured by a local engineering workshop. Demonstrations of the machines were necessary to introduce them to rural artisans who had never seen them before. Workshop operators were quick to recognize the application of the machines to their particular products.

The machines are hand-operated, but allow both thin and thicker sheet metal to be cut and formed easily, and enable large pieces of metal up to one metre wide to be easily bent or rolled. This allows more durable items, such as stoves, rainwater gutters, etc., to be made from thick metal.

The machines can be built and/or used by women for income generation. In Botswana there are a number of women training as welders. One is already running her own business and is in the process of purchasing a set of sheet metal equipment.

KENYA

In Kenya, ITDG is hoping to assist a women's group to produce gutters using the machines. The gutters will be sold by the women for use in rainwater harvesting systems.

In Malawi, ITDG has held a training course at the Salima Youth Rural Trade School. A similar demonstration and training course is also planned for Sri Lanka.



FOR MORE INFO
 WRITE TO:
 House, 100
 Rugby, CV21 3JH
 BEDU, Private
 Gaborone, Botswana
 BOTSWANA
 Private Bag
 Botswana, 100
 Utomi, Kenya
 READ: ITDG
 books on
 EQUIPMENT
 Pubs., London

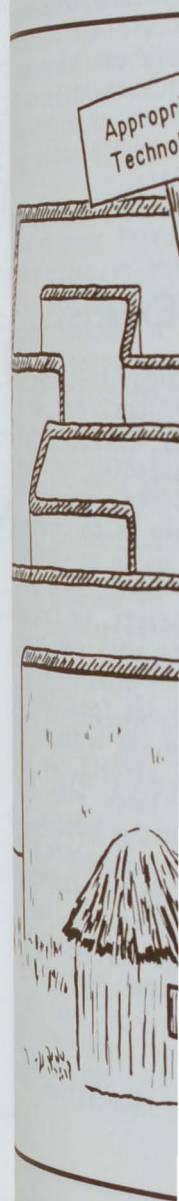
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<u>Technology</u>	<u>Publication and/or organization adapted from:</u>
Hand-held maize sheller	"A.T. Journal," March 1983
Sten-screen	<u>Low-Cost Printing for Development</u> by Jonathan Zeitlyn
Bakeries	UNICEF, Eastern Africa Regional Office
Heat storage cookers	"A.T. Journal," March 1983
Banana chips	<u>Community-Based Food Processing Industries for Papua New Guinea: The Situm Banana Chip Enterprise</u> (ATDI)
Cassava grater	"A.T. Journal," June 1985
Sago pops	"A.T. Journal," Sept 1985
Shea butter press	GATE
Bamboo-reinforced water tank	UNICEF
Cement storage jar	"Waterlines," July 1984
Oral rehydration spoons	"Dialogue on Diarrhoea" (AHRTAG)/Institute of Child Health (TALC)
Pit latrine	Prodorite (PVT) Ltd., Data Sheet
Shakir strip	Institute of Child Health
Water purification using Moringa oleifera seeds	"Waterlines," April 1985
Palm-oil processing (Ghana)	"Dossier #3," G.R.E.T.

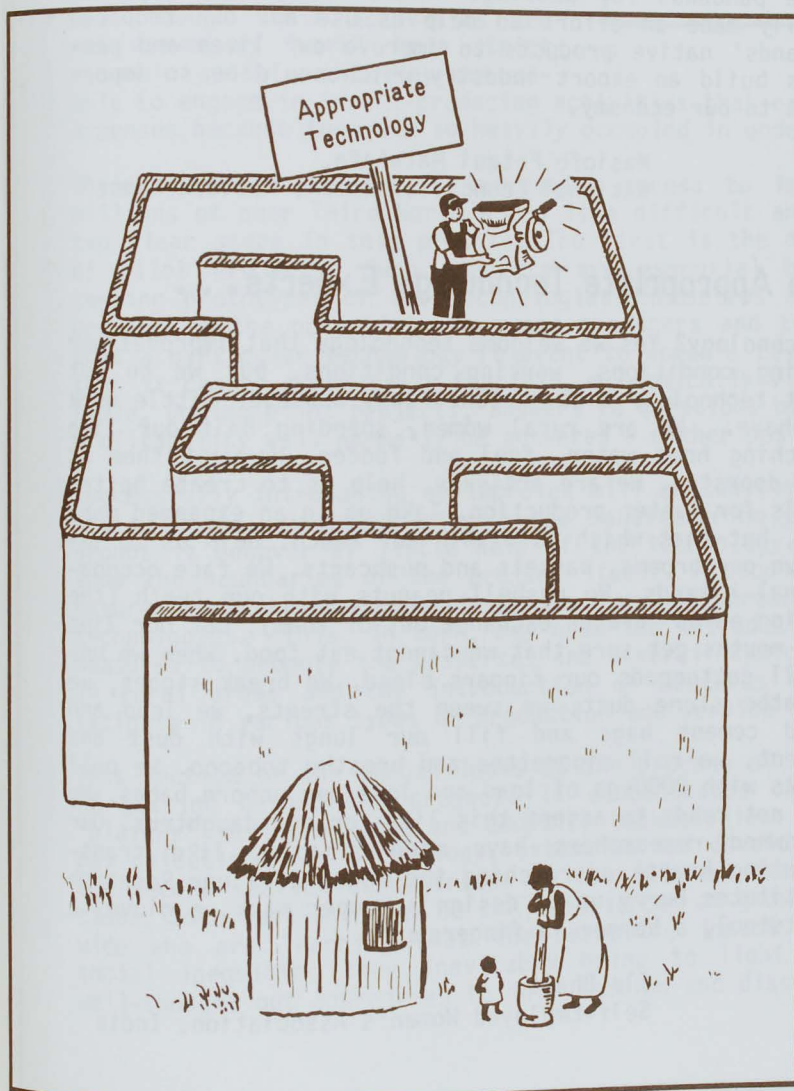
We apologize for any credit to an organization that originated a line drawing that we might have missed.

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PRACTICAL IDEAS FOR WOMEN'S APPROPRIATE TECHNOLOGY PROJECTS

2



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Introduction 131

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Development
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Women and
Women's
Organizations 146

A Sampling of
Women's
A.T. Projects 150

IS ANYONE LISTENING ?

1976—A Request to Appropriate Technology Experts...



"I would like to ask a question of you appropriate technology experts. Why have you never tried to help us improve our traditional crafts like making tapa cloth, finding more uses for tapa cloth, weaving of mats and baskets, use of the coconut shell which we have millions of in our village plantations? Show us how we can make coconut-shell buttons and pearl-shell buttons on a scale that suits our villages. For that matter, help us raise more mulberry trees for more bark for our tapa cloth, more pandanus for weaving. Nobody to my knowledge has really made an effort to help us use our own tropical islands' native products to improve our lives and perhaps build an export industry which could be so important to our economy."

Masiofo Fetau Mata'afa,
National Council of Women, Western Samoa

1985—A Request to Appropriate Technology Experts...



"Technology? Yes we welcome technology that improves our living conditions, working conditions, but we do not want technology that snatches away whatever little work we have. We are rural women, spending half our life fetching home water, fuel and fodder. We want them at our doorstep. We are artisans, help us to create better tools for faster production. Take us to an expanded market, but that which is within our reach. Help us to improve our brooms, baskets and pushcarts. We face occupational hazards. We unshell peanuts with our teeth (the nation earns foreign exchange out of them), but our lips and mouths get sore that we cannot eat food. When we unshell cottonpods our fingers bleed. We break stones, we breathe stone dust, we sweep the streets, we load and load cement bags and fill our lungs with dust and cement, we roll cigarettes and breathe tobacco. We pull carts with 2000kgs of load and lose our unborn babes. We are not ready to accept this life for our daughters. Our renowned researchers have made miracles like transplanting hearts or reaching the moon. Will our Research Institutes hurry up to design a proper mask, a glove, a footstool, a hammer, a fingercap?"

Ela Bhatt,
Self-Employed Women's Association, India

INTRODUCTION

There is no lack of equipment which would seem to be appropriate for women in developing countries. But the fact that the equipment exists is obviously not enough. Women processing crops in traditional time-consuming ways, and women walking long distances with heavy loads of water, fuel and other goods on their heads and backs are still very common sights. Women continue to be overburdened and overworked - even though their activities are not viewed as "work" in a strict economic sense - and they are unable to engage in income-producing activities that earn funds to cover family expenses because they are so heavily occupied in under-productive tasks.



Obviously, the process of increasing access to improved technologies for millions of poor Third World women is a difficult and complex one. There are two clear steps in this process. The first is the design and implementation of pilot projects. Such projects are essential both for developing and testing prototypes of the technologies themselves and at the same time for proving to the potential users and producers and to donors and governments that a particular technology relevant to women's tasks and needs exists, and that it can be technically feasible, economically viable and socially acceptable. During pilot projects, answers to questions of need, acceptability and profitability will normally be answered - either positively or negatively.

Successfully introducing an improved mill or sanitation system to women in a few villages, or introducing a new manufacturing process to a few women's groups is however of little help if the technology fails to disseminate beyond the boundaries of the project itself. A second step, therefore, is to ensure that the environment exists for widespread distribution of viable technologies. This, in turn, may need the introduction of government policy measures to promote the dispersal and diversification of productive activity in rural areas and the introduction of measures to enable women to participate in various types of production and service activities.

This section of the manual looks at the process of implementing projects and of getting beyond the project. It concentrates on the roles of two main "players" in introducing and adopting technologies: The first section provides guidelines for technology, extension and development-assistance workers; the second section concentrates on the role of women's groups and organizations. Both sections draw on the experiences of groups and individuals worldwide who are learning that the pervasive impact of technologies and the social inequities they inevitably bring to light necessitate careful and well-thought out approaches to introduction and dissemination.

GUIDELINES FOR DEVELOPMENT WORKERS

I. THE PILOT PROJECT

Pilot projects are usually intended to test new methods and technologies, determine their relevance, acceptability, viability and transferability and to explore alternative ways of delivering goods and services. Broadly speaking, there are four questions which need to be asked in the pilot phase of technology projects involving women:

1) Are the technologies really needed? Technologies such as those aimed at improving hygiene and sanitation often seem like priorities to development workers - but they may not be priority needs to women in Third World communities. Pit latrines, water filters and other sanitation technologies are not unimportant, but experience shows that they can be met with little enthusiasm at the village level while more pressing problems such as provision of water and fuel remain unsolved.

2) Are the proposed technologies acceptable? Often technologies are designed with real needs in mind but fail to gain acceptance by the women who are supposed to benefit because the people who are trying to identify, develop and introduce technological improvements do not consult and work closely alongside people who have a thorough knowledge of local customs and beliefs. Development workers are upset when their projects meet resistance from the supposed beneficiaries, and technologists complain about the conservatism of rural people. However, traditions cannot be changed overnight and, in any case, it has to be remembered that one of the basic premises of the Appropriate Technology movement is that technologies should be adapted to the needs of people, rather than people having to adapt to them.

3) Are the technologies better than existing practices? Some technologists believe that anything which is small, simple and low-cost will be appropriate to the needs of village women. Often, however, new 'appropriate' technologies - designed without investigating traditional processes or consulting the intended beneficiaries - turn out to be so small and of such low quality that they fail to provide any improvement in terms of time-saving or increased output and income. Many of the new devices rejected by village women can be seen to result in more work without adequate economic return, or involve additional expenditure without measurable benefit.

4) Are the technologies accessible? Evidence from many countries shows that a major constraint on the uptake by women of technologies relating to their tasks is that of 'access'. In many cases, women are completely unaware of the existence of improved technologies which could help them. When the information does filter down to the village level, it is usually men who receive it. This is because most extension agents are men, who by choice or custom, tend to communicate only with other men, even if the information relates to work carried out by women. When women do learn of the existence of a technology, further obstacles can be placed in their way. They are often denied access to credit facilities because the land and buildings which are needed as collateral are held in the men's names.

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Action Guidelines: The Pilot Project

WATCH, LISTEN, TALK AND WORK with women; project priorities must reflect women's needs, rather than the observations or priorities of extension and development agencies.

MATCH technologies to needs and resources. Don't be technology led.

DEVELOP technologies compatible with local customs through understanding and working with local people who know the problems.

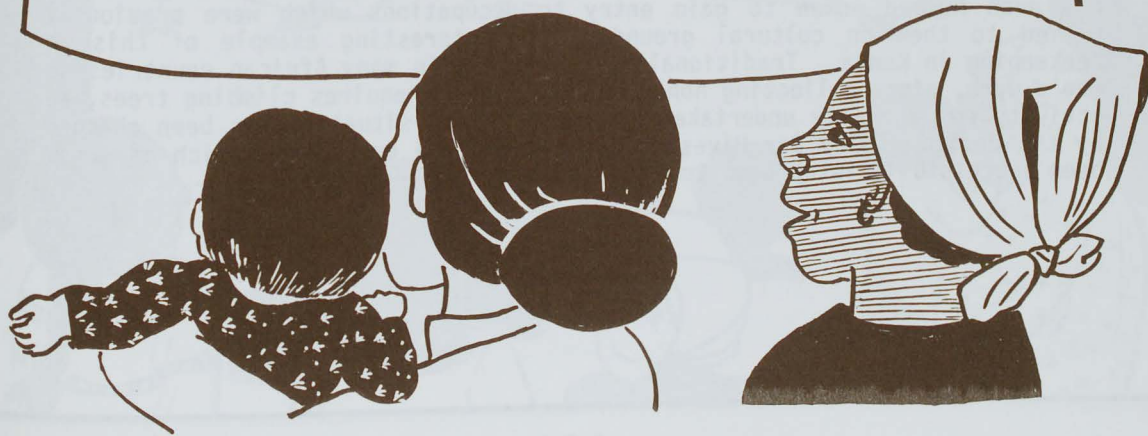
WORK towards technical solutions that offer significant improvements in terms of time-savings, increased output and labour. Small is not always beautiful!

ENSURE that higher-cost technologies give women and their families a measurable benefit in return.

DEVISE communications strategies to ensure that women nationally are aware of the technology or project.

SENSITIZE male extension workers to the importance of making contact and communicating with women.

REMEMBER, if it's not appropriate for women, it's not appropriate!



Needs, Markets and Technology Choice

Having asked these four basic questions, experience shows that it is critical to consider a number of other factors. In particular, needs and markets, technology choice and infrastructure, organization and the potential of technologies to be useful for income-production are essential elements.

Some attempt must obviously be made in the early stages of designing a pilot project to verify that the technology is actually needed and wanted and that a market exists for the goods or services it can help to provide. Many pilot projects fail because simple questions about needs and markets are not asked early on, because women are not consulted about priorities, and because no thought is given to whether intended users/beneficiaries will buy or can afford to purchase the technology or the end product. Rural women often have little access to or control over cash income. This means that women may have no cash to spend on meeting their perceived needs while their menfolk frequently see no point in spending cash on their wives' needs rather than on their own.

Obviously, a crucial factor in determining the success or failure of technology projects is the appropriateness of the technology or technique involved. Projects based on the re-popularization of traditional technologies (eg *Moringa oleifera*, medicines in south India) or on the introduction of improved traditional technologies (eg fish-smoking ovens) have a better chance of success because the basic technology is already well adapted to local skills, consumer preferences and established cultural mores.

When technologies are transferred from other countries, or are designed specifically to meet an identified need, success depends on the ability of local technologists to match technical design with local circumstances. In cases of transferred technology, this often requires adapting the technology so that, for example, it can be made from local rather than imported materials. It can also require provision of training to women so that they can use and maintain something which is totally new to them.

In cases of locally designed technology, success seems to be heavily dependent on the involvement of the women in the design process. A trend towards involvement of women in technology design is doing much towards reducing the incidence of people trying to introduce technologies which are unacceptable for socio-cultural or other reasons. In some instances, technology design has even helped women to gain entry to occupations which were previously denied to them on cultural grounds. An interesting example of this is beekeeping in Kenya. Traditionally, beekeeping in many African countries is men's work, since collecting honey from wild bees requires climbing trees, an activity not normally undertaken by women. This situation has been changed by the design of Top Bar Hives which stand on the ground and which have now been successfully introduced to several women's groups in Kenya.

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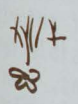
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Some Important Questions: Needs, Markets and Technology Choice

"Does a market for the technology or its end-product exist?"

"Will women be able to afford the technology?"

"Is the technology adapted to local skills, preferences and cultural mores?"

"Can women be included in the design or adaptation of technologies?"

"Are there engineers willing to work with and learn from women's organizations?"

"Will the technology help women gain access to a skill/industry previously denied them?"



Raw Materials, Energy Supply and Infrastructure

By definition, an appropriate technology should be based upon locally available materials and skills and should be suited to use and maintenance in areas which may lack access to electricity, roads and other facilities.

When projects have major or minor requirements for imported raw materials, their progress can be damaged if supplies dry up. In these cases, attempts are often made to guard against potential disruption by seeking out locally available alternatives (eg, ash pot to replace imported caustic soda in soap-making in West Africa; composite flour to replace imported wheat in bread baking in Botswana). Often these local alternatives can be produced by women's groups, thus providing another source of employment.

Even projects based on locally available materials can have problems. Many improved technologies increase productivity to such an extent that their introduction can cause a short term or long term strain on raw materials. In some cases, as for example with improved fish-smoking ovens in Ghana, supplies can quickly adjust to demand. In other cases, such as the introduction of improved textile technologies, limited supplies of raw material imply that some women will benefit at the expense of others, who are then displaced from a traditional activity.

Another important consideration when establishing a project is the requirement for infrastructural support - particularly power and transportation facilities. Technologies designed to be operated by hand or animal power are often well-suited to even the remotest of communities. In cases where a technology requires a source of power such as electricity or diesel, careful thought has to be given to the economic viability of the technology. One of the most common reasons for failure of projects based on diesel-operated mills or pumps is the non-availability, the irregular availability, or the unacceptably high price of fuel. Thus, extreme caution should be exercised before introducing a technology of this type - especially in remote areas. Sometimes, alternative sources of energy such as water power in Nepal and the Andes or solar power in the Sahel, can provide a solution, but experience shows that such alternatives are not without problems of their own.

Many surveys aimed at identifying needs of rural women have found that relief from the burden of carrying heavy loads is high on their list of priorities. As yet, however, little has been done to develop or make accessible technologies which could improve means of transportation in rural areas. Even less has been done to ensure that women have access to technologies which are available. For example, in order to improve access to farms, a major development project in The Gambia built causeways and bridges and introduced animal-drawn carts to assist with load carrying. An evaluation of the project found that women had started hiring donkey and horse carts to transport crops from their farms to home, paying for these in cash or by kind. They had not, however, used carts for carrying heavy seedlings to the swamps for transplanting since they were short of cash at that time of year. This was despite the fact that many of their husbands owned carts which had been distributed by the development project. Evaluators concluded that unless equipment is made directly available to women, they may not be able to take advantage of new investments and improved infrastructures.

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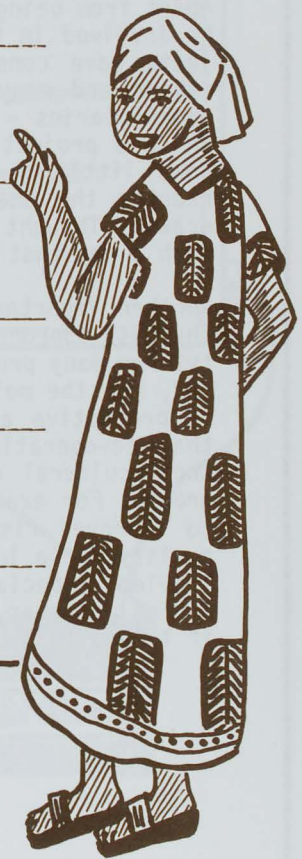
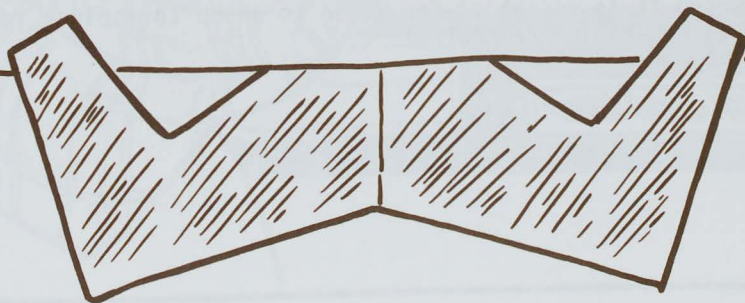
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A Checklist: Raw Materials, Energy Supply and Infrastructure

	Yes	No
Does the technology or product use local raw materials?	_____	_____
Are sufficient and affordable quantities of materials available?	_____	_____
Are there competing uses for raw materials which could affect price and supply?	_____	_____
Can additional projects be established which enable women's groups to produce raw materials needed by other women's groups?	_____	_____
Are there substitutes if raw materials become scarce?	_____	_____
Is electricity or diesel needed? Are they reliable sources of power in the area?	_____	_____
Can alternative energy sources be used?	_____	_____
If alternative energy sources are to be used, have they been tested?	_____	_____



Skills, Training and Organization

Although most appropriate technologies draw on local skills, some training will generally be required in use, maintenance and repair of a new product. Many AT projects have a training component, although the emphasis is heavily on teaching women how to use a new technology or master a new technique. Far less attention is given to training women in how to make improved tools and how to maintain and repair them - this, for some reason, being perceived by development workers as 'men's work'. Fortunately, there are a few exceptions such as women's involvement in making stoves, cement water-jars and solar dryers, and women's involvement in pump maintenance which show that women are perfectly capable of handling such tasks when given the opportunity to do so.

Most experience shows that women respond better to technical training when it is given by other women rather than by men and that, even in cultures where mobility is not a problem for women, training is more successful when undertaken within the community rather than in some other location. In addition, follow-up to training is nearly always required and this can best be ensured if the trainers live near or in the community. This is a strong argument in favour of identifying and training local women who can then act as trainers of other women.

Apart from being involved in the design of the technology, women need also to be involved in the design and implementation of the project itself. Few projects have consciously tried to involve women in management and decision making and many suffer from a "top-down" approach which tends to make the beneficiaries - the women - highly dependent on continued external support. While a project can operate 'successfully' for many years on this basis, it does little to increase women's self-confidence and self-reliance, and it reduces the chances of sustained activity after external support is withdrawn. Thought should always be given, therefore, to designing a project in such a way that women can control it themselves.

Another important question to be asked when designing a project is: what is the most appropriate form of organization for undertaking the project activity? For many projects, women will have to establish formal or informal groups and, for the main part, this does seem to work well - especially in the case of productive activities. However, it should not be automatically assumed that co-operation is the best way to work since instances do arise where socio-cultural or other factors make it unacceptable for women to work in groups. For example, some village women in Ghana are currently denied access to improved fish-smokers because they do not wish to form a group and thus qualify for a loan and for training. Careful thought should be given to this problem, especially in the case of larger technologies such as grinding mills and oil presses, where it is essential for women to group themselves together if they wish to have ownership and control.

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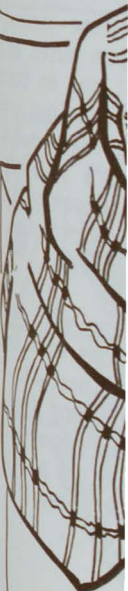
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Things to Think about: Skills, Training and Organization

What type of skills training needs to be provided?

Is complementary training in business skills, such as management, marketing and accounting needed?

Will training in how to make, use, maintain and repair the technology be provided?

What facilities exist or are needed to ensure proper provision of such training?

Do the women have to leave their villages, or can training be provided within the village?

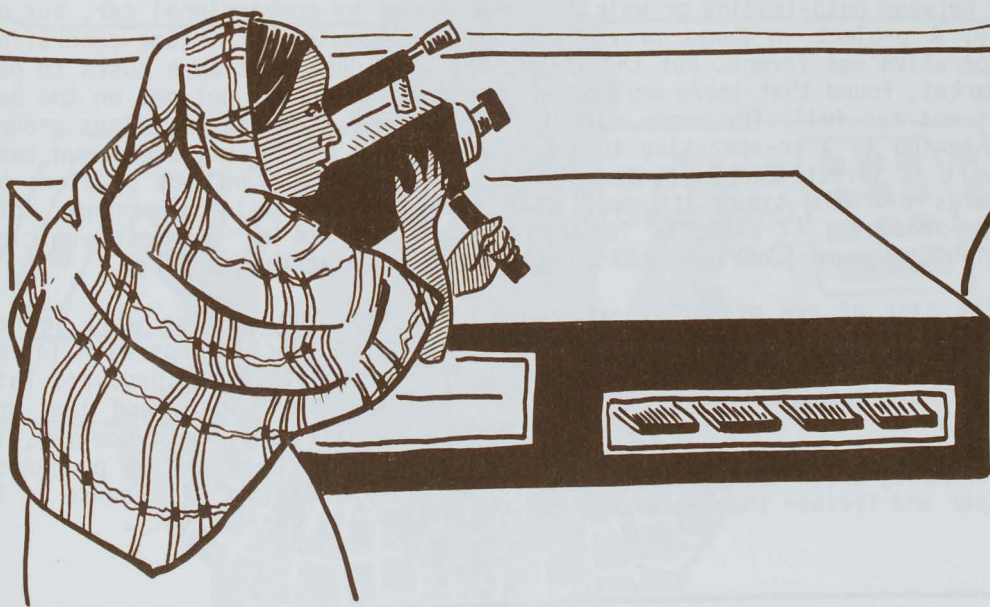
Are there any female extension agents?

Can employment be created for rural women as local trainers?

Will women be able to control the project themselves?

What is the most appropriate form of organization for undertaking the project?

If the project is dependent upon women organizing themselves into co-operatives, does a co-operative tradition exist?



Combining Appropriate Technology and Small Business Projects

Possibly because women's income-generating activities are seen as part-time, development workers have a tendency to fail to ask such questions as what is the optimum size of the unit, and its break-even point, profit margins and expected rate of return on investment. Commercial calculations such as these are simple enough to make and it is essential if the chances of financial success and failure are to be assessed. For example, a break-even analysis of the jam production project in Sri Lanka helped to show that quantities needed to be increased several times over if any profits were to be made.

Since many income-generating projects are based on some sort of loan facility or scheme, the reason for trying to ensure economic viability of businesses becomes evident. Loans are frequently handed out to women's groups without going through the normal investment practise of checking the likelihood of receiving a return on the investment. The development agency giving out the loan may not consider this to be a problem. To the women, however, a project condemned to failure can act as a blow to their self-confidence - and a failed project will reduce the chances of other women's groups securing loans through normal commercial channels to replicate similar projects.

Of course, production is of little use if the resulting product cannot be sold. Many projects involve the production of traditional commodities for local neighborhood markets and, as such, they avoid the major problems of consumer preference, transportation and distribution encountered when production on a regional, national or international scale is embarked upon. However, even in projects of this type, marketing problems can arise by, for example, flooding the market or raising prices too high. A simple market feasibility study before starting production is always advisable.

The difficulty of transporting commodities and products to markets is frequently overlooked in the planning stages of women's AT/small business projects. In many African countries, for instance, few alternatives are available between head-loading or walking and movement by conventional car, bus or lorry. A project in Kenya provides a useful example: an income-generating co-operative was formed, but the women, who were dependent upon buses to get to market, found that there were many days when they could not get on the bus as it was too full. The women solved the problem by forming a savings group, registering as a co-operative to take out a loan, and buying their own bus. As well as investigating the feasibility of remedying transport problems by measures of this type, it would seem important to build components into income-producing AT projects for increasing the range of low-cost vehicles available to women, and for assisting women to gain access to these.

In the case of new products, some sort of marketing technique will be required to attract consumers. One way is to approach local shops with introductory offers to encourage them to display and promote a new product. This was done, for example, with banana chips in Papua New Guinea, and jams and fruit drinks in Sri Lanka. Marketing techniques will only work, however, if the product is cheaper or in some other way preferable to competing products. For example, bread from the Botswana project has found a market because it is cheaper and fresher than mass-produced bread from the capital city.

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Key Factors: Appropriate Technology and Small Business Projects

Does economic viability require full-time operation?

What is the optimum size of the production unit needed to manufacture this project?

Have profit margins, rate of return on investments, potential markets, etc., been determined?

What type and size of loan/credit facilities are needed?

Are these available to women through normal lending channels?

What back-up services are needed to ensure investment and repayment?

Are local markets seasonal or permanent?

Are markets for certain products increasing or declining?

What is the price and quality of existing competing products?

What are the required standards of quality, packaging, etc.?

Can markets be found through government departments, schools or local shops?



2. BEYOND THE PROJECT

Due to a growing awareness of women's exclusion from technology access and decision-making, projects that increase women's involvement with non-conventional techniques such as blacksmithy and pump maintenance, as well as with new communications technologies, are beginning to be undertaken in countries worldwide. There is, as well, a growing literature in development journals, periodicals and reports, that gives evidence of past mistakes and offers a variety of prescriptions for success in more successfully integrating women into AT efforts. It is obvious that the staff of many implementing agencies have learned from the mistakes made during the pioneering days of Appropriate Technology and are consciously trying (and sometimes succeeding) to overcome the more common pitfalls. Even when they are successful, however, there is still a need to consider how projects can be widely replicated so as to benefit millions of women.

The Extension Route

There is a tendency to think in terms of diffusing improved technologies and techniques to poor people by means of training and government extension services. This 'extension route' is indeed the one most commonly used in disseminating improved agricultural technologies and for introducing improved water, health, sanitation and nutrition technologies and techniques.

Physically delivering goods or services to individual communities or households, or showing people how to make or do something for themselves, has its advantages and disadvantages. On the plus side is the fact that this 'extension route' can often take care of the needs of people who, because of poverty or location, have no access to the market place. This is a particularly important factor to consider when dealing with rural women who often have limited access to cash income. By the same token, the 'extension route' is a useful tool for introducing technologies such as pit latrines and water filters which give no obvious return on investment and are thus not normally purchased by the very poor.

On the negative side, this method of dissemination can perpetuate a welfare approach and a dependence on project personnel and resources. In addition, as experience with introducing improved stoves and ferro-cement water-jars has shown, there are very real problems involved in reaching large numbers of people in this way and in maintaining quality control. However, as projects around the world have shown, a well-organized and well-resourced extension service can help to get new technologies to large numbers of women.

In some cases, the training resources of governmental and non-governmental agencies have been successfully expanded by organizing peer training - whereby one group of women train their sisters from other regions. This may add some cost and require additional time allocations in the initial project, but the eventual benefit in terms of acceptance and understanding of the technology may well be worthwhile in the long term. It is important that these factors be considered at the inception of the project, so that they can receive the necessary budget and time allocations.



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Getting the Word out: The Extension Route



...Have traditional and innovative techniques of dissemination been explored?

...Does the extension strategy involve training to allow women to become independent from extension support in a defined period of time?

...Can significant numbers of people be reached using extension workers? If not, what other options can be explored?

...Have male extension workers been trained to work with and involve women in decision-making and other roles? Will women in the project work with male extension agents?

...Will women be trained as extension workers?

...Does the project include a plan to launch media campaigns or other informational strategies that will build awareness of the technology and project amongst women nationally?

...Do media strategies take into account the level of literacy and access to media channels that the women beneficiaries have?

...Would it be possible for extension workers, or other field personnel, to work with the women who are already using the technology and help them to develop informational and/or instructional materials about their experience in the project, as a training and information tool for other women's groups and communities?



The Commercial Route

Another way of disseminating goods and services to people on a widespread basis is through the commercial route. Because the Appropriate Technology movement grew out of a concern for people with little or no cash, there has been a tendency to ignore normal commercial routes to dissemination. However, if a technology such as a baking oven or a beehive is to reach the masses of poor women who could benefit financially from its use, then commercial channels will almost certainly need to be utilized - ideally in combination with consumer credit. Similarly, if women are to establish production units based on new or improved processes, a means has to be found to control the number of units established so that investments are protected.

The best possible function of a pilot project is to show that a technology or process is economically viable so that consumers are encouraged to buy and producers are encouraged to invest. Frequently, market demand will need to be fostered by means of advertising campaigns. In other cases, it may also need to be supported initially by a loan scheme. An example of the latter is the coconut grater in Guyana, where the women's movement had to secure enough funds to place an initial order for 5000 graters before a commercial manufacturer could be persuaded to start production. The graters were then made available to women's groups on a loan basis.

A related issue is that of the patenting of a technology or process and the licensing of production. A common reaction from development workers is to say that new technologies and processes should be freely available to whoever wants them and that to restrict access by patenting or licensing is counter to the development process. A tool or technique is sometimes so simple that there is no way that people can be stopped from copying it. Frequently, however, access to blueprints or special knowledge will be necessary before viable production can be considered. In other cases, access to know-how through a licence may be valuable (if not absolutely essential) in giving a producer an advantage over potential competitors who do not hold a licence. A variation on this is franchising - whereby small enterprises are able to secure access to know-how (as well as advantages such as a trade name) in return for payment to the franchise holder.

Experience indicates that some such form of protection may be necessary for two reasons. First, in cases where there is a limited market, potential manufacturers may require some guarantee of protection from competitors before they will contemplate starting production at all. Second, if production is not licensed in some way, quality can deteriorate with the result that everyone (producers and consumers) lose out because of inferior goods.

Economic policies and government development plans also have an important role to play in fostering the spread of appropriate technologies through commercial channels. Policies relating to taxation, industrial licensing, import and export licensing, etc., can and do have an effect on the scale and location of production by influencing investment decisions. These need to be considered carefully, as decisions by government to permit the construction of, for instance, a large bakery or a fruit/vegetable cannery could wipe out hundreds of small women's enterprises.

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Ideas to Explore: The Commercial Route

Does the commercial route have advantages for ensuring distribution of a technology to the people most in need of it?

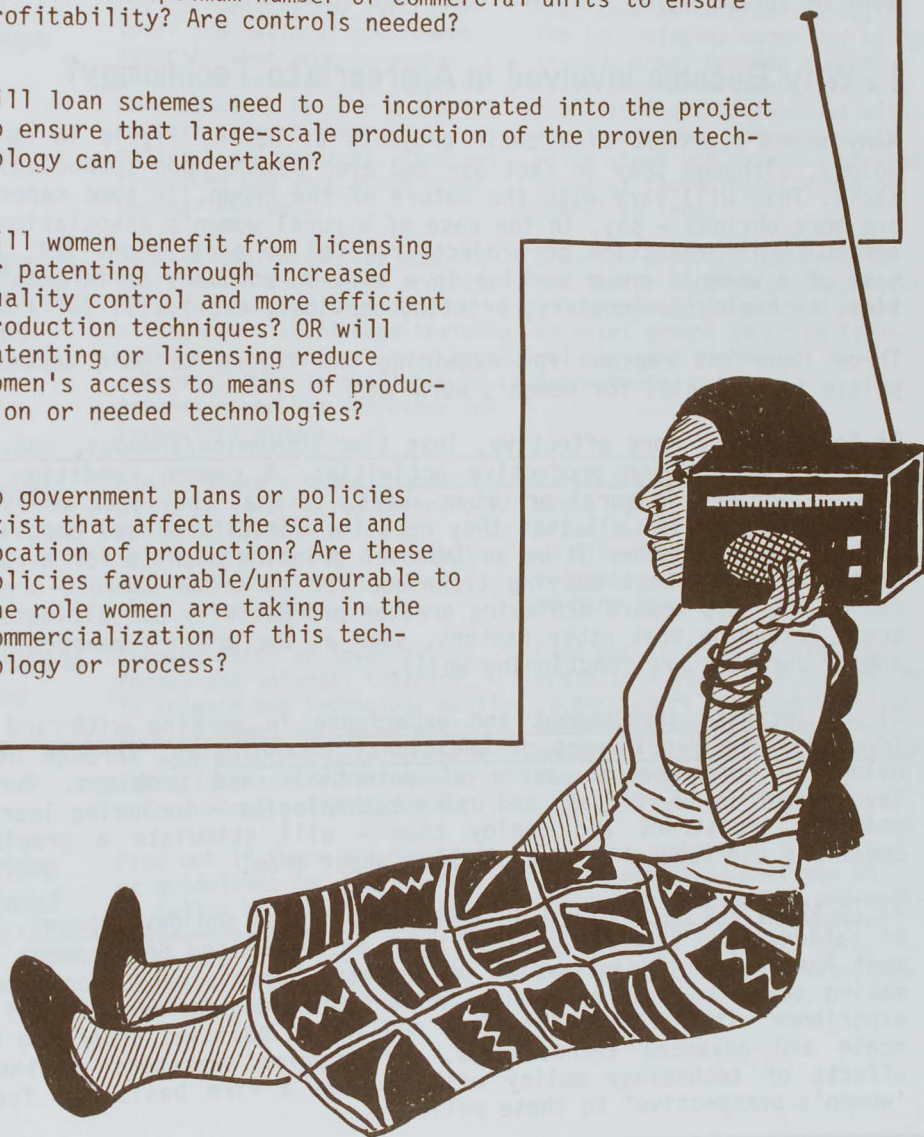
Will women profit from the commercialization of the technology? Will they be involved in production and management or relegated to the role of consumers?

What is the optimum number of commercial units to ensure profitability? Are controls needed?

Will loan schemes need to be incorporated into the project to ensure that large-scale production of the proven technology can be undertaken?

Will women benefit from licensing or patenting through increased quality control and more efficient production techniques? OR will patenting or licensing reduce women's access to means of production or needed technologies?

Do government plans or policies exist that affect the scale and location of production? Are these policies favourable/unfavourable to the role women are taking in the commercialization of this technology or process?



GUIDELINES FOR WOMEN AND WOMEN'S ORGANIZATIONS

With a growing awareness of the ways women have been excluded from technology development and deployment, there is hope that programmes and projects will now and in the future, incorporate women in the planning, implementation and evaluation of strategies. However, if a truly equitable approach to technology development and dissemination is to evolve, women in all facets of life - those in local, national and international organizations, those in local women's groups, those in mainstream and alternative media, and those in academia and research institutes - will need to direct their attention to identifying, articulating the need for, and becoming involved in the development of technologies that are important to women's lives.

1. Why Become Involved in Appropriate Technology?

Many women's groups view their projects as having little to do with technology, although they in fact use and even depend upon technologies for many tasks. This will vary with the nature of the group. In some cases, the links are more obvious - say, in the case of a rural women's association working in agricultural production or projects related to sanitation. Yet, even in the case of a women's group working in a city on advocacy or information activities, technologies (copiers, printing services, etc.) will still be used.

Three important reasons for examining and trying to gain access to appropriate technologies for women's work are:

1) To make work more effective, less time consuming/arduous, and, thus, provide time for other productive activities. A common condition of women's groups, whether in rural or urban areas, is that they lack money and woman-power to accomplish all that they need to. Identifying and choosing suitable technologies - whether it be an improved grinding machine for a rural women's group, or a low-cost copying technique for an urban women's organization - can be one step toward achieving greater productivity and ultimately reducing costs (assuming that other factors, such as the group's management abilities and/or purposes are functioning well).

2) To increase involvement and experience in working with and suggesting ideas for the development of additional technologies. Through use of technologies, women become aware of potentials and problems. Our conscious involvement in identifying and using technologies - including learning how to maintain, construct and deploy them - will stimulate a growing list of questions and suggestions we can make about them.

3) To stimulate involvement in technology policy and development. The effects of national and international policies on technology development and deployment have a significant impact on society. Women's exclusion from decision-making roles in this arena has in part been due to our limited access and experience with technologies. This applies to policies affecting both small-scale and advanced technologies. Our growing awareness of the pervasive effects of technology policy will provide a firm basis for formulating a 'women's perspective' to these policies.

2. What Can We Do To Become More Involved With Appropriate Technology?

The actions women and women's groups undertake will depend upon their capabilities and needs. Below is a chart that provides some initial ideas on what you can do. These are based on actual projects undertaken by women's groups worldwide. Part II of this section provides specific examples. Remember, this is just a beginning list, to stimulate your own ideas and initiatives.

	ONE IDEA	ANOTHER IDEA
Local/rural women's groups	Try to identify the various local and national government agencies that promote appropriate technology. Ask them to come to speak to your group to explain current government policies and projects. Find out from them how your group might become involved.	Undertake an informal survey of the technologies women are using in your area. Develop a short radio show or newspaper article that highlights interviews with local women and allows them to voice views and opinions on what types of technologies would be useful to them.
National women's advocacy/service organizations	Compile a directory of women's appropriate technology projects in your country, including a listing of short-term training courses and technical assistance agencies. Make it available to extension workers and other intermediary groups.	Organize a market day or fair and invite women's groups, technology manufacturers and other relevant groups to bring technologies and techniques to demonstrate.
Women involved in media	Find a women's group that is using an interesting technology. Write an article or do an interview with them for publication on a national radio show or newspaper.	Work with other women involved in media (graphic artists, writers, broadcasters, etc.) to develop an illustrated guide to technologies women are using in your country or region.
Women involved in research and education	Suggest doing an inventory of formal and informal training in science and technology available to women and young girls in your country. Make recommendations on training needed and curricular improvements.	Find out if it is possible to organize a study tour to another country where you have heard of an interesting training programme in science/technology for women and girls.
Women working in international development groups	Find out if there are questions or guidelines for field staff to follow as a means of ensuring participation of women in AT projects. If not, suggest that a task force be convened to develop simple guidelines.	Act as a 'watchdog' or monitor at international meetings on technology development and policy. Make sure that priorities and needs of women are taken into account during discussions and policy development.

3. How Can We Find Out About Technologies That Will Be Helpful In Our Work?

Whether you are just interested in learning more about technologies or have a specific technology that you are interested in, there are a number of steps you can take to become more familiar with what is available and how to acquire what you need. Below are some ideas on actions you can take immediately to educate yourself and your group, and to begin to develop linkages with a national and international technology community.

-Start receiving AT periodicals - These are an excellent source of current information on technologies, projects and sources of technical assistance. Many are available for free or on an exchange basis. A large number of the major AT periodicals are listed in Appendix B (see page 161). You can write to them and ask if they will add your name to their mailing list.

-Find out which ministries or government agencies are responsible for technology development, dissemination and policy - Frequently, such ministries as the Ministry of Agriculture, the Ministry of Rural Development, the Ministry of Land, or the Ministry of Small Industries (the names will change from country to country, but each country will have some equivalent), can provide assistance with information or supply technologies. Finding out about their policies and resources will provide a means of determining what requests you can make to them.

-Identify technical institutes and technology centres within your country's universities - The students and instructors of these centres may be able to provide a wide range of assistance, from helping you to adapt or acquire a specific technology, to providing students who may be available to do field work and offer technical assistance to your group. If you have seen a technology in another country that seems promising for your work, you might take this information to the technology centre and find out if they can develop a prototype or copy for your group. (Appendix A on page 157, lists technology centres and agencies in different countries worldwide. If one is listed for your country, you might want to make contact. If none are listed, this does not mean a centre does not exist. Other individuals involved in rural development should be able to provide you with information of this type.)

-Attend technology/rural development trade fairs and expositions - In many countries, there are annual fairs where manufacturers demonstrate and display current technologies. While these may often be too large-scale or expensive for your needs, attending these events will be a vehicle to identify different manufacturers and agencies that may one day be useful. Such events as agricultural expositions, small industry fairs and rural development expositions all may provide useful ideas and contacts.

-Begin a roster of women working in science and technology in your country - A lesson learned in many AT projects is that women benefit far more from advice and training provided by other women. Given women's exclusion from science and technology training in many countries, it is often difficult to locate women with the proper background...but they do exist. It might be a good idea to start a roster that includes women working in such fields as engineering, biology, agricultural development, education (related to science and technology), as well as including women in such fields as sociology and the Media who have dealt with technology issues in their work.

-Make contact with women's groups working with technology - Peer training has been found to be an effective means of transferring information and skills about technologies. Learning from other women will provide more than just technology information - such important issues as the effect of the technology on women's work, on home life, etc., will more likely be understood and conveyed by other women. You might find information of this type from newspapers and radios, or your government ministry or women's bureau might be a source of information on the activities of other women's groups working with technologies.

-Be on the lookout for meetings about women's access to and control of technology either nationally, regionally or internationally - There have been hundreds of meetings in the past 10 years worldwide that have dealt with issues of women and technology. (See Appendix E, page 171). These are a good source for contacts and information on current issues related to women and technology.

Finding technologies that are suitable for your work is only an initial step to becoming more involved in the whole appropriate technology issue. Women, possibly more than any other group, understand that finding a specific technology is only a partial answer to problems of productivity and development in general - more deeply rooted issues of the way work is divided, of cultural traditions and of national/international policymaking must also be confronted if social change is to take place. Nevertheless, women's greater involvement in using and directing the course of development of technology is one initial step toward increased participation in other critical arenas.

A SAMPLING OF WOMEN'S A.T. PROJECTS

The appropriate technology projects on the following pages describe efforts initiated and managed by women and women's organizations. While the majority involve co-operation and collaboration with other agencies, the distinguishing feature of these projects is that, in each case, women have played a dominant role in conceptualizing and implementing the project. The projects are included here as an example of the varieties of efforts that can be undertaken.

While some of the projects described in these pages involve direct work with technologies in low-income communities, also included are advocacy and training projects. For women to have greater access to and control over technologies, more will be required than just making technologies available. These projects are evidence of the breadth of concerns that women are addressing - they go beyond just disseminating technologies to include such innovations as publishing national directories of technologies women are using, organizing a global exchange programme for women to work on each other's projects in different countries, and forming a women inventors society.

In addition to a narrative description, each project listed includes a series of symbols which describe its characteristics and orientation. Below is a guide to the meaning of the symbols that appear next to the title and contact address for each project.



= International programme



= Regional programme



= National programme



= Documentation/Information/
Networking



= Training/extension



= Co-ordination/policy



= Research and development/
technology adaptation

The information on women's projects and efforts, included here as well as in Section I of this manual, represent a small fraction of the thousands of AT projects in which women are involved worldwide. Attempts to describe these and disseminate information about their successes and obstacles are a first step in encouraging technical co-operation between women - and, this is a form of technical co-operation that holds great promise if women are to become more fully involved in technological development and deployment.

WOMEN AND FOOD
(WAFET) PROJECT
Contact: Eva vo
United Nations
for Women (UNIF
104 East 45th S
New York, NY 100

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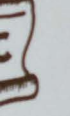
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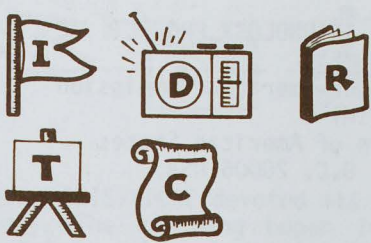
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WOMEN AND FOOD CYCLE TECHNOLOGIES (WAFT) PROJECT

Contact: Eva von Ditmar
United Nations Development Fund
for Women (UNIFEM)
304 East 45th Street, 11th Floor
New York, NY 10017 USA



UNIFEM, an agency within the United Nations which was established to provide funds to women's projects, has assisted in the transfer of technologies between women's groups in different parts of Africa and Asia, including fish-smoking technologies, palm-oil presses and improved stoves. Recognizing the important role women play in food production, preservation and marketing systems worldwide, UNIFEM has now developed a strategy for promoting national self-sufficiency in food through support of women food producers, processors and marketers in regions of the Third World.

The project will take place over 5 years, beginning in 1986, and will involve national governments, experts from the UN specialized agencies and private technology-oriented centres in developing a variety of programmes to disseminate tested food-cycle technologies to women. The initial phase of the project will be concentrated in African countries, but later phases will include the Asia/Pacific, Caribbean, Latin American and Western Asian regions also.

A first step in the project is to develop Technology Information Packets which describe the process of manufacturing, maintaining and utilizing tested food technologies. The packets will be prepared in English, Portuguese and French in the initial stages. They will include a wide range of information, including: Facts and figures on a range of processing and pre-processing equipment and methodologies; Case studies of experiences in introducing different types of technologies for the same end product; Checklists of questions to ask when planning a project which includes a technology component; Guides to further reading, and other useful resources. The packets will be disseminated to women's groups and technical assistance agencies as a means of promoting technology transfer and adaptation.

The project will concentrate, as well, on identifying countries where national policies are supportive of women's food cycle activities, with a view toward establishing pilot projects. The WAFT project will not provide financing for individual country projects, but will provide technical and information support in project and programme design - through suggesting consultants, providing Technology Information Packets, etc. - to those countries wishing to initiate a food cycle technology project.

A distinguishing feature of the WAFT Project is its recognition of the need for complementary supports in the introduction of technologies. Thus, it will also support such activities as developing community loan funds, assisting training programmes and helping to create infrastructures that increase women's abilities to successfully use and develop reliable food cycle technologies and projects.

APPROPRIATE TECHNOLOGY PROJECT
FOR RURAL WOMEN

Contact: Inter-American Commission
of Women (CIM)

Organization of American States
Washington, D.C. 20006 USA



In 1979, CIM initiated an Appropriate Technology Project for Rural Women in Bolivia and Ecuador, with the objective of assisting women to identify and use technologies that will help them create and maintain income-producing enterprises. From 1979 - 1982, the project was undertaken in eight communities in each country. Cheese-making and jam/jelly producing projects were amongst those that were taken up by the various communities.

During 1982/83, two volumes of an Appropriate Technology Manual for Women were developed, reflecting the processes that were most successfully employed during the pilot phase. The manuals describe the contexts in which the various projects were undertaken, as well as providing detailed illustrations of the technologies themselves.

Examples of the types of projects undertaken included:

- Construction of rabbit huts and rearing of rabbits
- Construction of solar greenhouses
- Diversification of crops
- Beekeeping
- Cheese-making
- Manufacture of jams and jellies
- Improvements in processing lambswool
- Construction and installation of windmills
- Creation of retail outlets for food products

In working with each project, the co-ordinators experimented with a variety of technologies and concentrated on ensuring that these technologies and processes could be maintained and easily used by the community. In some cases, they imported technologies from other Latin American countries. For example, for the cheese-making project, a technology was brought in from Peru. No major problems were encountered in using the imported technology.

By building the publication of manuals into the project, co-ordinators ensured that the results of the project could be disseminated beyond the groups that were involved in the pilot project. The two manuals (available in Spanish, English and French) provided the basis for a variety of training sessions in the two pilot countries and seven additional countries. Spin-off projects are now being considered in Argentina, Chile, Costa Rica, El Salvador, Guatemala, Panama and Venezuela. A major achievement of the project has been the development of community-level enterprises in 25 communities in Bolivia and 27 communities in Ecuador.

WOMEN AND APPROPRIATE TECHNOLOGY
EXCHANGE PROGRAMME
Contact: ISIS/WICCE
C.P. 2471, CH 1211 Geneva
Switzerland



As part of an ongoing exchange programme, ISIS/WICCE devoted its 1987 session to the theme of Appropriate Technology. The training began in Bangalore, India with a four week orientation course where women from around the world came together to discuss and explore issues related to women's access to and use of AT. Following the orientation, each participant spent 3 months with a "receiving" group that works on aspects of AT as applied specifically to women. These might be appropriate technology institutions, as well as activist and advocacy programmes within women's groups.

The objective of the ISIS/WICCE programme is to give women's groups an opportunity to learn by sharing skills and experiences with women from other cultures working in similar fields, and through this to strengthen women's networks and enable women to develop their own alternatives for positive change. ISIS/WICCE will accept nominations for participants, and would like as well to hear from groups that would like to be a "receiving" organization. It will be publishing four newsletters related to women and AT, as a product of the training and discussions amongst participants.

WOMEN'S DEVELOPMENT TRAINING
PROGRAMME (WDTP)
Contact: Monalisa Tukuafu
University of the South Pacific
Institute of Rural Development
PO Private Bag
Nuku'alofa, Tonga



The Women's Development Training Programme began in September 1984. It is a regional programme which covers the countries of: Cook Islands, Fiji, Niue, Kiribati, Nauru, Solomon Islands, Tokelau, Tonga, Tuvalu, Vanuatu and Western Samoa. It focuses on rural women's role in development and works with local, national, regional and international institutions to improve the conditions of rural living.

The WDTP provides training through regional and in-country workshops. Participants are women's community development workers and women's leaders from government and non-government sectors. Courses are tailored to meet the specific needs of the participants. At present, general areas of emphasis are improved subsistence agricultural techniques, nutrition and family health, appropriate village-level water supply and sanitation, household energy and small-scale craft production.

Funding for this programme is provided by the Australian Development Assistance Bureau and Soroptomist International of Australia and Tonga.

AD HOC COMMITTEE ON
APPROPRIATE TECHNOLOGY
Contact: Zambia YWCA
PO Box 50115
Lusaka, Zambia



The Ad Hoc Committee is a coalition of women's organizations in Zambia that was formed to explore and discuss women's access to and the dissemination of appropriate technologies countrywide. Coming together as women to discuss these issues has generated a variety of innovative projects to more widely share information about technologies that may be useful to women.

One such project was the organization of a national women's AT Fair, which took place during May 1985. Groups from around the country were invited to bring technologies so that rural and peri-urban women would have an opportunity to investigate and compare what was available to them. A result of holding the fair was the publication of an Appropriate Technology directory, which listed groups in the country that worked with appropriate technology, and also included illustrations and descriptions of technologies that were being used in different locations. The directory will be an important information resource for women's groups who want to be involved in the AT effort.

OXEN FARMING FOR CAMEROUN WOMEN
Contact: Gladys Ekwoje
Wum Area Development Authority
Cameroon



Most of the farming in the Wum area of the Cameroun is done by women who, up until now, have been using hand tools. The Wum Area Development Authority (WADA) has begun to introduce oxen to help with the ploughing, raking and other farm jobs. WADA has organized a two-month training course during which women work on both improved agricultural practices as well as learning to care for the oxen. WADA takes the women on field trips so that they can see oxen being used and dispel fears of working with oxen. WADA gives the women the oxen, tools, seeds and fertiliser on a loan basis, the sum of which is to be paid back within five years from income earned on crops grown. WADA staff follows the women's progress and helps with increasing the yield from planting. They also assist with identifying new crops, such as rice, wheat and soya bean, and give the women ideas for preparing new foods. (Information taken from BBC TOPICAL TAPES. See AT Journals, Appendix B.)

FILIPINO WOMEN INVENTORS
Contact: Filipino Inventors Society
Philtrade Cluster G-8
Roxas Boulevard, Manila, Philippines



Filipino women involved in producing new technologies for household and other tasks have banded together to form their own society within the Filipino Inventors Society. Filipino women inventors participating in the group have initiated a variety of inventions, including a clay stove, a cooking fuel made of alcohol, a diesel-like fuel extracted from the 'talisai' nut, new products made of sorghum and health products made from ginger root. (Information taken from DEPTHNEWS WOMEN'S FEATURE, 6 March 1983)

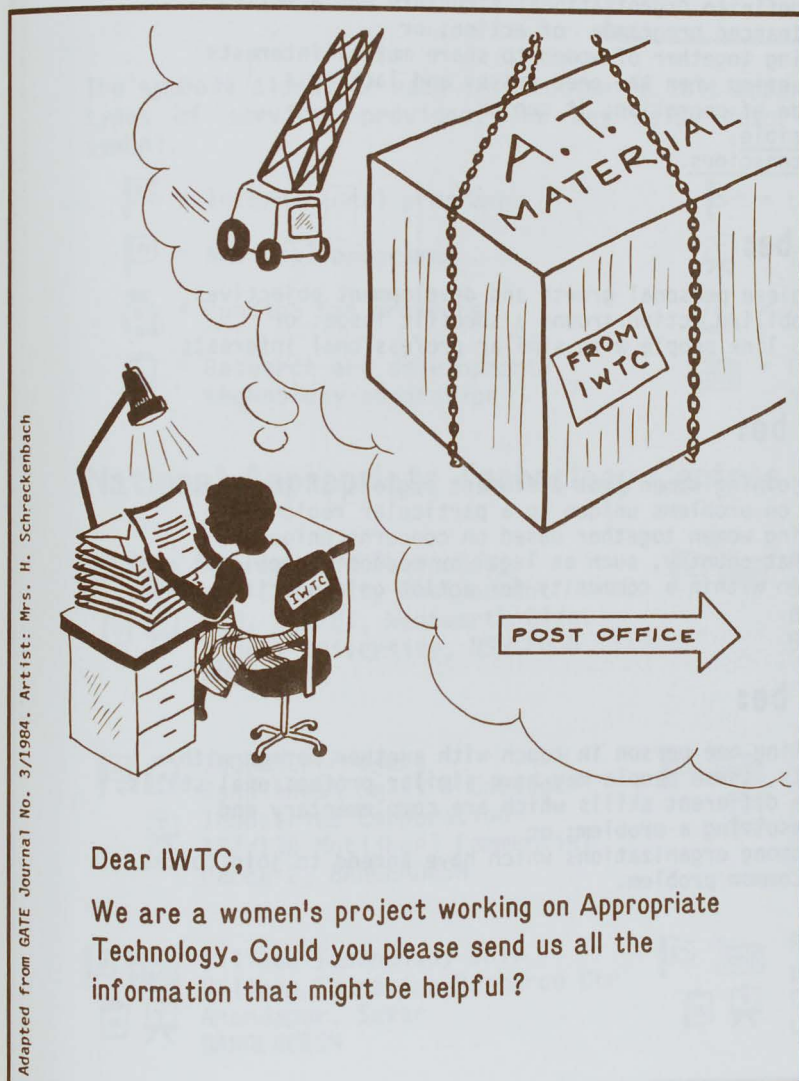
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RESOURCES FOR WOMEN'S APPROPRIATE TECHNOLOGY PROJECTS

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Adapted from GATE Journal No. 3/1984. Artist: Mrs. H. Schreckenbach

APPENDICES

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| F: Tech & Tools Resource People | 174 |

ARE YOU MAKING CONTACT ?

The appendices on the following pages provide a broad range of possible contacts and sources of information that may be useful in your work. By asking for information about the activities of the organizations and groups listed - and by providing them with information about your own interests - you will be starting what might become an ongoing process of exchange, sometimes known as "networking." For many groups - and women's groups in particular - finding time to network is difficult and the necessities of concentrating on a project or programme take priority. But networking offers long-term rewards and is well worth the effort. Below are some definitions and ideas on networking:

Networking can be:

- formal, with a definite organizational structure and a well-planned, well-financed programme of action; or
- informal, a coming together of women to share mutual interests and concerns, meeting when the need arises and lacking a structure or mode of operation; it can be,
- unseen and invisible;
- conscious or unconscious.

Networking can be:

- personal, to achieve personal growth and development objectives;
- political, to mobilize action around a specific issue; or
- professional, to link people with similar professional interests.

Networking can be:

- international, joining women from different regions of the world;
- regional, based on problems unique to a particular region;
- national, bringing women together based on concerns unique to conditions in that country, such as legal or economic problems;
- local, links women within a community for action on a specific issue of local concern.

Networking can be:

- individual, putting one person in touch with another person with similar interests, these people may have similar professional skills, or they may have different skills which are complementary and necessary for resolving a problem; or
- institutional, among organizations which have agreed to join forces in resolving a common problem.

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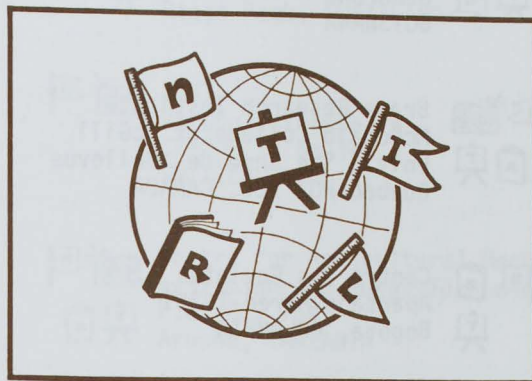
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
Village
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APPENDIX A: APPROPRIATE TECHNOLOGY CENTRES WORLDWIDE


There are organizations in nearly every country that work in the area of Appropriate Technology, or a related area. Different organizations, over the past few years, have compiled and published listings of AT institutions. Below is a selected list of institutions, updated from Appropriate Technology Institutions: A Directory (I.T. Pubs, London, 1983).




The symbols alongside each institution in this appendix act as a guide to the types of services provided. The key below describes the meaning of each symbol.

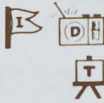
- | | |
|--|--|
|  = International programme |  = Local programme |
|  = National programme |  = Training/extension |
|  = Funding for projects |  = Co-ordination/policy |
|  = Research and development/technology adaptation |  = Documentation/Information/Networking |


National Appropriate Technology Centres

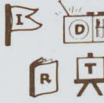
 Appropriate Technology and Community Environment
P.O. Box 81, Wentworth Bldg.
Sydney University, NSW 2006
AUSTRALIA


 Aangepaste Technologie voor Ontwikkelingslanden
Blijde Inkomstraat 9
B 3000 Leuven, BELGIUM


 ILO/UNDP Project
Bangladesh Small & Cottage Industries Corporation
137/138 Motijheel Commercial
Dacca 2, BANGLADESH


 Collectif d'Echanges pour la Technologie Appropriée (COTA)
rue de la Sabbonière 18
B 1000 Bruxelles
BELGIUM


 Village Technology Unit
Village Education Resource Ctr
Anandapur, Savar
BANGLADESH


 Proyecto de tecnologia apropiada para la mujer campesina
Casilla 1500
La Paz, BOLIVIA


 Botswana Technology Centre
P.O. Box 438
Gaborone
BOTSWANA


 Brace Research Institute
McDonald College of McGill
Univ., Ste Anne de Bellevue
Quebec HOA 1C0, CANADA


 Centro las Gaviotas
Apartado Aereo 18261
Bogota, COLOMBIA


 German Appropriate Technology
Exchange, GTZ-GmbH, Post 5180
D-6236, Eschborn
FEDERAL REPUBLIC OF GERMANY


 Groupe de Recherche et
d'Echanges Technologiques
(G.R.E.T.) 213 rue Lafayette
75010 Paris, FRANCE


 Department of Community
Development/Ministry for Local
Government and Land
Banjul, GAMBIA


 Technology Consultancy Centre
Univ. of Science & Technology
University Post Office
Kumasi, GHANA

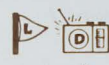
 Centro de Estudios Meso-
americano Sobre Tecnologia
Apropiada
18 Calle 22-25, Zone 10
Apartado Postal 1160
Guatemala City, GUATEMALA


 Institute of Applied Science
and Technology
University Campus, Turkeyen
P.O. Box 101050
Greater Georgetown GUYANA

 Appropriate Technology
Development Association
Post Box 311, Gandhi Bhawan
Lucknow 226001, Uttar Pradesh
INDIA


 Centre for Rural Development
and Appropriate Technology
Indian Institute of Technology
Hauz Khas, New Delhi 110016
INDIA


 Rural Technology Institute
Gujarat, 2nd Floor, 'C' Block
Patnagar Yohna Bhavan, Sec. 16
Gandhinagar 382016
Gujarat, INDIA


 Christina Aristanti
Yayasan Dian Desa
Jaran Kaliurang KM 7
P.O. Box 19, Bulaksumur
Yogyakarta, INDONESIA


 Christian Action for Develop-
ment in the Caribbean
P.O. Box 527, Kingston 10
JAMAICA

 Appropriate Technology Centre
Kenyatta University College
PO Box 43844
Nairobi, KENYA

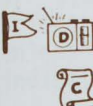
 Thaba Tseka Integrated Rural
Development Programme
P.O. Box MS 1027
Maseru 100, LESOTHO


 Malindi Rural Training Centre
Diocese of Southern Malawi
P/A Malindi
P.O. Mangochi, MALAWI


 Village Technology Unit
Women in Development Project
Box 26
Piggs Peak, SWAZILAND


 Research Centre for Applied
Science and Technology
Tribhuvan University
P.O. Box 1030
Kirtipur, Kathmandu, NEPAL


 SKAT
Varnbullstrasse 14
CH9000 St Gallen
SWITZERLAND


 Technische Ontwikkeling
Ontwikkelingslanden
Mauritskade 61a
1092 AD Amsterdam
The NETHERLANDS


 Centre for Agricultural Mech-
anization and Rural Technology
P.O. Box 764
Arusha, TANZANIA


 Relevant Technology Workshop
Integrated Education for Deve-
lopment, Private Mail Bag 2174
Jos, Plateau State, NIGERIA


 Appropriate Technology Assoc.
125/3 Soi Santhiphap
Suph Road, Sripahaya
Bangkok, THAILAND


 Appropriate Technology
Development Organization
Ministry of Science and
Technology, 1-A&B 47th St.F7/1
Islamabad, PAKISTAN


 Community Based Appropriate
Technology and Development
Services/ Population and
Community Development
Association
8 Sukhumvit Soi 12
Bangkok 11, THAILAND


 Appropriate Technology
Development Institute
P.O. Box 793
Lae, PAPUA NEW GUINEA

 Institute of Rural Development
Univ. of the South Pacific
Private Bag
Nuku'alofa, TONGA

 INADES: Institut Africain pour
le Developpement Economique
BP866
Kigali, RWANDA

 Intermediate Technology
Development Group (ITDG)
9 King Street, Covent Garden
London WC2E 8HW, UNITED KINGDOM

 Tikonko Agricultural Extension
Centre, P.O. Box 86
Bo, SIERRA LEONE

 Tropical Products Institute
Industrial Development Depart.
Culham, Abingdon
Oxfordshire, OX14 3DA
UNITED KINGDOM



Appropriate Technology Int'l.
1331 H Street, NW
Washington, D.C. 20036 USA



Hlekweni Friends Rural Service
Centre, P.O. Box 708
Bulawayo, ZIMBABWE



Volunteers in Technical
Assistance
1815 North Lynn Street
Rosslyn, Virginia 22209 USA



Technology Development and
Advisory Unit
University of Zambia
P.O. Box 2379
Lusaka, ZAMBIA

Regional Technology Centres

Christian Action for Develop-
ment in the Caribbean (CADEC)
PO Box 616
Bridgetown, BARBADOS

Approtech Asia
Philippines Business for Soc-
ial Progress, Yutivo Building
Dasmarias, PHILIPPINES

Pan African Institute for
Development (PAID)
Du Sautoy College
PO Box 133, Buea
SW Province, CAMEROUN

African Regional Centre for
Technology
PO Box 2435
Dakar, SENEGAL

Centre for Applied Studies in
Development
Univ. of the South Pacific
PO Box 1168
Suva, FIJI

Environment Development
Training Programme (ENDA)
PO Box 3370
Dakar, SENEGAL

UN/ESCAP Regional Centre for
Technology Transfer
Manickvelu Mansions
49 Palace Road
Bangalore 560 052, INDIA

Technonet Asia
1 Goldhill Plaza
Podium Block 03-35/37
Singapore 1130
REPUBLIC OF SINGAPORE

Technology Information Networks



Socially Appropriate Tech-
nology Information Services
(SATIS)
Mauritskade 61a
1092 AD Amsterdam, THE NETHERLANDS



Transnational Network for
Appropriate Technology (TRANET)
Box 567
Rangeley, Maine 04970 USA

APPENDIX B: APPROPRIATE TECHNOLOGY JOURNALS

There are numerous magazines, newsletters and information bulletins published by groups around the world that provide practical and current information about technologies, resources and projects. Below is a selected list. Names and addresses of publishers are included so that you can write away if you want to receive these. Prices are quoted in US dollars, unless another currency is indicated.



- ADAB NEWS, Agricultural Development Agencies in Bangladesh, 549 F, Road 14, Dhanmandi, P.O. Box 5945, Dhaka 5, Bangladesh Frequency: Monthly. Price: Unknown.
- AGRIPROMO, Inades-Formation, 08 B.P. 8, Abidjan 08, Ivory Coast. Frequency: Quarterly. Price: Varies.
- AIDS FOR LIVING, Appropriate Health Resources and Technologies Action Group Ltd, (AHRTAG), 85 Marylebone High Street, London W1M 3DE, UK. Frequency: Unknown. Price: Free (developing countries); £5.00 (All others)
- AIT REVIEW, Information Services Office, Asian Institute of Technology, G.P.O. Box 2754, Bangkok 10501, Thailand. Frequency: Quarterly. Price: Free.
- APACE NEWSLETTER, Sydney University, NSW 2006, Australia. Frequency: Quarterly. Price: \$10.00.
- AP-TECH, Appropriate Technology Development Association, P.O. Box 311, Gandhi Bhawan, Mahatma Gandhi Road, Lucknow 226001, India. Frequency: Unknown Price: Rs.18.00 (India); \$6.00 (All others)
- APPROTECHNEWS, Asian Alliance of Appropriate Technology Practitioners (Approtech Asia), 4th Floor, Yutivo Bldg., 270 Dasmariñas Street, Binondo, Metro Manila, Philippines. Frequency: Quarterly. Price: Unknown.
- APPROPRIATE TECHNOLOGY JOURNAL, Intermediate Technology Publications, Ltd., 9 King Street, Covent Garden, London WC2 8HW, UK. Frequency: Quarterly. Price: Surface mail: \$14.00 (Individuals), \$18.00 (Organizations); Air mail: \$19.00 (Individuals), \$23.00 (Organizations).
- APPROPRIATE TECHNOLOGY FOR HEALTH, ATH Newsletter, World Health Organization, CH-1211, Geneva 27, Switzerland. Frequency: Unknown. Price: Free.

- A/T 80, Communication Foundation for Asia, P.O. Box SM-434, Manila 2806, Philippines. Frequency: Unknown. Price: Unknown.
- BBC TOPICAL TAPES, P.O. Box 76, Bush House, Strand, London WC2B 4PH, UK. Frequency: Weekly. Price: Unknown.
- BLUE SHEET, The Developing Countries Farm Radio Network, 595 Bay Street, Toronto, Ontario M5G 2C3, Canada. Frequency: Irregular. Price: Free.
- BOILING POINT, ITDG, Myson House, Railway Terrace, Rugby CV21 3HT, UK. Frequency: Quarterly. Price: £7.00.
- CERES, FAO, Via delle Terme di Caracalla, 00100 Rome, Italy. Frequency: Bimonthly. Price: Free.
- CHANGE, The Science Policy Foundation, Benjamin Franklin House, 36 Craven Street, London WC2N 5NG, UK. Frequency: Quarterly. Price: Free (Developing countries); \$20.00 (All others).
- CHANGING VILLAGES, Consortium on Rural Technology, E-350, Nirman Vihar, New Delhi 110092, India. Frequency: Quarterly. Price Unknown.
- COMMUNAUTES AFRICAINES, Apica, B.P. 5946, Douala-Akwa, Cameroun. Frequency: Quarterly. Price: Unknown.
- COOKSTOVE NEWS, Aprovecho Institute, 80574 Hazelton Road, Cottage Grove, OR 97424, USA. Frequency: Quarterly. Price: \$10.00.
- DEVELOPMENT FORUM, DESI, C-527, United Nations, New York, NY 10017, USA. Frequency: Monthly. Price: Free (Developing countries); \$10.00 (All others)
- DIARRHOEA DIALOGUE, AHRTAG, 85 Marylebone High Street, London W1M 3DE, UK. Frequency: Quarterly. Price: Free.
- EARTHSCAN BULLETIN, International Institute for Environment and Development, 3 Endsleigh Street, London WC1H 0DD, UK. Frequency: Unknown. Price: Free.
- ECOFORUM, Environment Liaison Centre, P.O. Box 72461, Nairobi, Kenya. Frequency: Irregular. Price: Free (Developing countries); \$30.00 (All others).
- ENFO, Environmental Sanitation Information Center, Asian Institute of Technology, P.O. Box 2754, Bangkok 10501, Thailand. Frequency: Quarterly. Price: Unknown.
- FOCO DE TECNOLOGIA APROPIADA, CII-Viviendas-Cetavip, Ciudad Ganadera, Aptdo. Postal 20328, Santo Domingo, Dominican Republic. Frequency: Quarterly. Price: Unknown.
- FROM THE UNICEF WATERFRONT, UNICEF WET, Room A415, 866 UN Plaza, New York, NY 10017, USA. Frequency: Irregular. Price: Free.

- GATE, German Appropriate Technology Exchange, Dag-Hammarskjold-Weg 1, D-6236 Eschborn 1, Fed. Rep. of Germany. Frequency: Quarterly. Price: Free.
- HEALTH TECH, Program for Appropriate Technology in Health, Canal Place, 130 Nickerson Street, Seattle, WA 98109, USA. Frequency: Unknown. Price: Unknown.
- IDEAS AND ACTION, Freedom from Hunger Campaign/Action for Development, c/o FAO, Via delle Terme di Caracalla, 00100 Rome, Italy. Frequency: Quarterly. Price: Unknown.
- INFORMATIONS, Association de Bois de Feu, 28 Boulevard de la Republique, 13100 Aix-en-Provence, France. Frequency: Quarterly. Price: Ff 80.
- INTERNATIONAL PLANT PROTECTION NEWSLETTER, International Plant Protection Center, Oregon State University, Corvallis, OR 97331, USA. Frequency: Irregular. Price: Free.
- INVENTION INTELLIGENCE, National Research Development Corporation of India, 20-22 Zamroodpur Community Centre, Kailash Colony Ext., New Delhi 110048, India. Frequency: Monthly. Price: \$12.00.
- IRC NEWSLETTER, International Reference Centre for Community Water Supply and Sanitation, P.O. Box 93190, 2509 AD, The Hague, The Netherlands. Frequency: Irregular. Price: Unknown.
- IPRED FORUM, Case 116, 3 rue de Varembe, 1211 Geneva 20, Switzerland. Frequency: Quarterly. Price: \$15.00 (Developing countries); \$20.00 (All others).
- JOURNAL OF THE NEW ALCHEMY INSTITUTE, New Alchemy Institute, P.O. Box 432, Wood's Hole, MA 02453, USA. Frequency: Annual. Price: Unknown.
- KENGO NEWS, Kenya Energy Non-Governmental Organizations, Karuna Road, P.O. Box 48197, Nairobi, Kenya. Frequency: Quarterly. Price: \$4.50 (African countries); K.shs.48 (Kenya); \$5.00 (All others).
- MICROS IN MANAGEMENT, Microcomputer Clearinghouse, Thunder and Associates, 319 Cameron Street, Alexandria, Virginia 22314, USA. Frequency: Irregular. Price: Unknown.
- MINKA, Grupo Talpuy, Aptdo 222, Huancayo, Peru. Frequency: Quarterly. Price: Unknown.
- NETWORK, A.T. International, 1330 H Street, Washington D.C. 20036, USA. Frequency: Quarterly. Price: Free.
- RAIN: JOURNAL OF APPROPRIATE TECHNOLOGY, Rain Umbrella, 2270 N.W. Irving, Portland, OR 97210, USA. Frequency: Monthly. Price: \$10.00
- READING RURAL DEVELOPMENT COMMUNICATIONS BULLETIN, University of Reading, Agricultural Extension and Rural Development Centre, London Road, Reading, RG1 5AQ, UK. Frequency: Quarterly. Price: Free.

RED, CEMAT/R.E.D., Apartado Postal 1160, Guatemala City, Guatemala. Frequency: Bimonthly. Price:\$4.00 (Caribbean and Central America).

RERCIC NEWS, Renewable Energy Information Centre, AIT, PO Box 2754, Bangkok, 10501, Thailand. Frequency: Quarterly. Price: Unknown.

RESEAU, Groupe de Recherche et D'Echange Technologique (GRET), 30 rue de Charome, 75011 Paris, France. Frequency: Unknown. Price: Unknown.

SALUBRITAS: HEALTH INFORMATION EXCHANGE, American Public Health Association, International Health Programs, 1015 Eighteenth Street, NW, Washington D.C. 20036, USA. Frequency: Quarterly. Price: \$10.00.

SATIS NEWSLETTER, Socially Appropriate Technology Information Services, Mauritskade 61A, NL-1092 Amsterdam, Netherlands. Frequency: Irregular. Price: \$20.00 for 5 issues.

SEDME, Small Industries Extension Training Institute, Hyderabad 500045, India. Frequency: Unknown. Price: Unknown

SCIENCE FOR VILLAGES, Centre of Science for Villages, Magan Sangrahalaya, Wardha 442001, India. Frequency: Monthly. Price: \$12.00.

SOUNDINGS FROM AROUND THE WORLD, World Neighbours, 5116 North Portland, Oklahoma City, OK 73112, USA. Frequency: Quarterly. Price: \$3.00.

TECTOK, VIRTU, PO Box 14, Kieta, North Solomons Province, Papua New Guinea. Frequency: Monthly. Price: Free.

TRANET: A NEWSLETTER/DIRECTORY, Tranet, P.O. Box 567, Rangeley, ME 04979, USA. Frequency: Unknown. Price: \$15.00 (Individuals); \$100.00 (Organizations).

UNEP NEWS, Information Service of the UN Environment Programme, P.O. Box 30552, Nairobi, Kenya. Frequency: Bimonthly. Price: Free.

VITA NEWS, Volunteers in Technical Assistance, 1815 North Lynn Street, Suite 200, Arlington, VA 22209-2079, USA. Frequency: Quarterly. Price: \$15.00 donation.

VRAAGBAAK, TOOL Foundation, Postbus 41, 6700 AA Wageningen, The Netherlands. Frequency: Quarterly. Price: \$7.00 or 350 BFr.

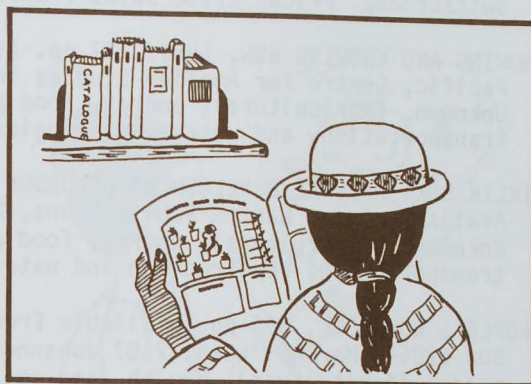
WATERLINES: JOURNAL OF APPROPRIATE WATER SUPPLY AND SANITATION TECHNOLOGIES, IT Publications, 9 King Street, London, WC2E 8HW, UK. Frequency: Quarterly. Price: \$14.00 (Individuals); \$18.00 (Organizations).

WORLD HEALTH, World Health Organization, Avenue Appia, CH-1211 Geneva 27, Switzerland. Frequency: Unknown. Price: \$15.00.

WORLD NEIGHBORS IN ACTION, World Neighbors, 5116 North Portland, Oklahoma City, OK 73112, USA. Frequency: Unknown. Price: \$2.00.

APPENDIX C: APPROPRIATE TECHNOLOGY CATALOGUES

Below is a listing of catalogues that describe a variety of technologies. The information in parentheses, after each listing, indicates the types of technologies described in the catalogue. Ordering information, where available, is included. For more specific information, you will need to write to the publisher. These are a good source of information on the range of low-cost, simple technologies available for women's projects.



APPROPRIATE TECHNOLOGY FOR AFRICAN WOMEN, 1978. 90 pp. Available from: UNECA, P.O. Box 3005, Addis Ababa, Ethiopia. Price: Unknown. (Food processing and home improvement technologies).

APPROPRIATE TECHNOLOGY: PRELIMINARY DIRECTORY FOR ZAMBIA. 1985, 158 pp. Available from: YWCA, Nationalist Road, Lusaka, Zambia. Price: Unknown. (Energy, food processing, health, income-generating, construction, transportation and water technologies).

APPROPRIATE TECHNOLOGY SOURCEBOOK, Volume I, 1976. 304pp. Available from: Volunteers in Asia, Box 4543, Stanford, California 94305, USA or I.T. Publications, Unit 25, Longmead, Shaftesbury, Dorset, SP7 8PL, UK. Price: US\$4.00; US\$2.00 for local groups in developing countries. (Agricultural, energy, food processing, health, communications, income-generating, construction, transportation and water technologies).

APPROPRIATE TECHNOLOGY SOURCEBOOK, VOLUME ONE, 1976. 304pp. Available from: (Same as above). Price: \$6.50; \$3.25 for local groups in developing countries. (Same as above).

APPROPRIATE VILLAGE TECHNOLOGY FOR BASIC SERVICES. 55 pp. Available from: UNICEF, Eastern Africa Regional Office, P.O. Box 44145, Nairobi, Kenya. Price: Unknown. (Energy, water and home improvement technologies).

FOOD PRESERVATION IN BANGLADESH, 1977. 51 pp. Available from: UNICEF, Women's Development Programme, Dacca, Bangladesh. Price: Unknown. (Food processing technologies).

GRAM PRAUDYOGIKI, Vol.2, No.1, March 1982. 114 pp. Available from: Centre for Rural Development and Appropriate Technology, Indian Institute of Technology, Hauz Khas, New Delhi 110016, India. Price: Unknown. (Agricultural, energy, health, income-generating, construction, water and home improvement technologies).

- IMPROVED VILLAGE TECHNOLOGY FOR WOMEN'S ACTIVITIES, 1984. 292 pp. Available from: ILO Publications, International Labour Office, CH-1211, Geneva 22, Switzerland. Price: 27.50 Swiss francs. (Food processing technologies).
- KNOWING AND KNOWING HOW, 1981. 137 pp. Available from: University of the South Pacific, Centre for Applied Studies in Development, Suva, Fiji. Price: Unknown. (Agricultural, energy, food processing, health, income-generating, transportation, and water technologies).
- LIKLIK BUK: A RURAL DEVELOPMENT HANDBOOK FOR PAPUA NEW GUINEA, 1977, 270pp. Available from: Wantok Publications, PO Box 1982, Boroko, PNG. Price: Unknown. (Agricultural, energy, food processing, health, income-generating, transportation, construction and water technologies).
- PEOPLE'S WORKBOOK. 560 pp. Available from: Environmental and Development Agency, Box 62054, Marshalltown, 2107 Johannesburg, S. Africa. Price: R11,00 (S.A. rands). (Agricultural, health, and construction technologies).
- POWER GUIDE, 1979. 240 pp. Available from: I.T. Publications, 9 King Street, London WC2E 8HW, UK., Price: £9.95. (Energy technologies).
- PROCESSING AND STORAGE OF FOODGRAINS BY RURAL FAMILIES, 1983. 129 pp. Available from: FAO, Via delle Terme di Caracalla, 00100 Rome, Italy. Price: Unknown. (Food processing technologies).
- SIMPLE TECHNOLOGIES FOR RURAL WOMEN IN BANGLADESH, 1977. 47 pp. Available from: UNICEF, Women's Development Programme, Dacca, Bangladesh. Price: Unknown. (Agricultural, energy, food processing, transportation, water and home improvement technologies).
- TEKNOLOGI KAMPUNGAN: A COLLECTION OF INDIGENOUS INDONESIAN TECHNOLOGIES, 1982. 154 pp. Available from: Volunteers in Asia, P.O. Box 4543, Stanford, California 94305, USA. Price: \$5.00. (Agricultural, energy, food processing, transportation and home improvement technologies).
- TOOLS AND MANUALLY WORKED EQUIPMENT IN AGRICULTURE. Appropriate Technology Development Association, India, 1984. Available from: ITDG, 9 King St., Covent Garden, London 8HW, UK. Price: UK £6.95. (Agricultural technologies).
- TOOLS FOR AGRICULTURE (Third Edition): A buyer's guide to appropriate equipment, 1985. 272 pp. Available from: I.T. Publications, Unit 25, Longmead, Shaftesbury, Dorset SP7 8PL, U.K. Price: UK £15.00. (Agricultural technologies).
- T-SHIRTS AND TAPA CLOTH: SMALL RURAL BUSINESSES FOR THE PACIFIC, 1979. 118pp. Available from: S. Pacific Commission, Noumea, New Caledonia. Price: Unknown. (Food, communications, and income-generating technologies).
- VILLAGE TECHNOLOGY IN EASTERN AFRICA, 1976. 62 pp. Available from: UNICEF, Eastern Africa Regional Office, P.O. Box 44145, Nairobi, Kenya. Price: Unknown. (Water and food processing technologies).

APPENDIX D: SOURCES OF ASSISTANCE FOR A.T. PROJECTS

If you are formulating an appropriate technology project, you may want to seek funding, technical assistance, materials or training from outside agencies. Appendix D provides a list of selected agencies in a variety of sectors. Each will require a different approach and you will have to research their criteria to determine whether your project meets their requirements.



1. Multilateral Donor Agencies

Multilateral agencies are those, such as United Nations agencies, which are made up of representatives of different governments. Most assistance from multilateral donor agencies is given via agreements between the agency and your government. However, these agencies can at times work with or through non-governmental groups, and provide monies, technical advice or training. You can write to the headquarters of agencies listed below to find out more about their priorities, their criteria for providing assistance, and the type of work their field offices are already doing in your country or region.

CENTRE FOR INDUSTRIAL DEVELOPMENT
Rue de l'Industrie 28
B-1040 Bruxelles, Belgium

COMMONWEALTH SECRETARIAT
Marlborough House, Pall Mall
London SW1Y 5HX, United Kingdom

FOOD AND AGRICULTURAL ORGANIZATION
Via delle Terme di Caracalla
00100 Rome, Italy

INTERIM FUND ON SCIENCE AND TECHNOLOGY FOR DEVELOPMENT (IFSTD)
United Nations
New York, NY 10017 USA

INTERNATIONAL LABOUR ORGANIZATION
Technology and Employment Branch
Employment and Development Division
CH-1211 Geneva 22, Switzerland

UNITED NATIONS DEVELOPMENT FUND FOR WOMEN, UNITED NATIONS, DC-2
New York, NY 10017 USA

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION (UNIDO)
Development and Transfer of Technology
Section, PO Box 707
A-1011 Vienna, Austria

UNITED NATIONS INTERNATIONAL CHILDREN'S EMERGENCY FUND (UNICEF)
Food Engineering and Technology
Section, United Nations
New York, NY 10017 USA

WORLD BANK
Office of the Adviser on
Science and Technology
1818 H Street, NW
Washington D.C. 20433 USA

WORLD HEALTH ORGANIZATION
Appropriate Technology for
Health Programme, Avenue Appia
CH-1211 Geneva 22, Switzerland

2. Bilateral Donor Agencies

The list below includes some of the government agencies that have funded appropriate technology and/or development projects in the Third World. Usually, government donors provide assistance through bilateral aid - that is, aid given from one government to another. For this reason, it is important to lobby your government to include women's concerns in their country projects.

Some donor governments can provide smaller funds directly, without host government approval. These funds are generally available through the country's mission or embassy in your capital city. These government embassies may have a discretionary fund which can respond fairly quickly.

Assistance from government agencies is available in many forms - from funding to technical training. A first step is to write away to the headquarters, listed below, for more information about their interests and funding requirements. It will also be helpful to find out names of the persons responsible at the embassy in your country and make contact locally.

AUSTRALIAN DEVELOPMENT ASSISTANCE
BUREAU, PO Box 887
Canberra City, ACT 2601, Australia

CANADIAN INTERNATIONAL
DEVELOPMENT AGENCY (CIDA)
200 Promenade du Portage
Hull, Quebec, Canada K1A 0G4

DANISH INTERNATIONAL DEVELOPMENT
AGENCY (DANIDA)
Asiatisk Plads 2
1448 Copenhagen K, Denmark

MINISTERE DE LA CO-OPERATION
ET DU DEVELOPPEMENT
20 rue Monsieur
75700 Paris, France

MINISTRY OF ECONOMIC CO-OPERATION
German Agency for Technical
Co-operation (GTZ)
Postfach 51 80
D-6236 Eschborn 1
Federal Republic of Germany

MINISTRY OF FOREIGN AFFAIRS
Technical Assistance Department
Muzenstraat 30
The Hague, The Netherlands

MINISTRY OF FOREIGN AFFAIRS
Dept of External Aid, Private Bag
Wellington, New Zealand

NORWEGIAN AGENCY FOR INTERNATIONAL
DEVELOPMENT (NORAD)
P.O. Box 8142
Oslo Dep, Norway

DIRECTORATE OF DEVELOPMENT CO-
OPERATION/Dept. of Foreign Affairs
Eigerstrasse 73
3003 Berne, Switzerland

SWEDISH INTERNATIONAL
DEVELOPMENT AUTHORITY (SIDA)
Birger Jarlsgatan 61
S105 25 Stockholm, Sweden

OVERSEAS DEVELOPMENT ADMINISTRATION
International Economics Division
Eland House, Stag Place
London SW1E 5DH, United Kingdom

UNITED STATES AGENCY FOR
INTERNATIONAL DEVELOPMENT (USAID)
Department of State
Washington DC 20523, USA

3. International NGOs

The foundations, churches and private agencies listed below may provide a variety of types of assistance, including monies, technical advice and training. Each generally has specific purposes and application procedures and you must research them to find out if your project falls within their area of interest and their average size of donation. A first step is to write away for their guidelines and to find out if they have field staff in your country, or if their field staff would be interested in visiting your project during a forthcoming trip. (Organizations marked with an asterisk also (*) have an interest in funding women-specific programmes.)

AFRICAN DEVELOPMENT FOUNDATION
1625 Massachusetts Ave., NW
Washington, D.C. 20036 USA

AMERICAN HOME ECONOMICS ASSOCIATION
1010 Massachusetts Avenue, NW
Washington, D.C. 20036 USA

AUSTRALIAN FREEDOM FROM HUNGER
CAMPAIGN
120 Bunda St., PO Box 395
Canberra City, ACT 2601, Australia

AUSTRALIAN COUNCIL OF CHURCHES
199 Clarence St.
Sydney, NSW, Australia

BROT FUR DIE WELT (BFDW)
PB 476
7000 Stuttgart 1, Germany

CANADIAN FREEDOM FROM HUNGER
FOUNDATION
323 Chapel Street
Ottawa
Ontario K1N 7Z2, Canada

CARNEGIE CORPORATION
437 Madison Avenue
New York, NY 10022 USA

CHRISTIAN AID
P.O.Box 1
London SW9 8BH, United Kingdom

FORD FOUNDATION
320 East 43rd Street
New York NY 10017, USA

INTERNATIONAL CO-ORDINATION COM-
MITTEE FOR DEVELOPMENT (ICCO)
P.O.Box 151
3700 AD Zeist, The Netherlands

INTERNATIONAL DEVELOPMENT RESEARCH
COUNCIL (IDRC)
60 Queen Street, PO Box 8500
Ottawa, Canada K1G 3H9

*MATCH
401-171 Nepean, Ottawa
Ontario K2P 0B4, Canada

PRIVATE AGENCIES COLLABORATING TOGETHER
777 United Nations Plaza
New York, NY 10017 USA

*STICHTING MELANIA
Jacob Jonkerlaan 5
3555 JW Utrecht, The Netherlands

*UNITED METHODIST CHURCH/BOARD OF
GLOBAL MINISTRIES-WOMEN'S PROGRAMME
475 Riverside Drive
New York, NY 10115 USA

*UNITED PRESBYTERIAN CHURCH
Women's Opportunity Giving Fund
475 Riverside Drive
New York, NY 10115 USA

(Appropriate technology organizations
in western countries are also often a
source of funds and technical assist-
ance. These are listed in Appendix A,
pages 157 - 160.)

4. Overseas Volunteer Organizations

The agencies listed below do not normally provide funding, but may be sources for technically-skilled volunteers who can work with projects for a short time. It is advisable to first contact the universities, technical institutes and appropriate government ministries in your own country. If you still feel a need for outside assistance, some of the organizations listed below may be able to help.

CANADIAN COUNCIL FOR INTERNATIONAL
CO-OPERATION (CCIC)
321 Chapel Street
Ottawa K1N 7Z2, Ontario, Canada

CANADIAN UNIVERSITY SERVICE
OVERSEAS (CUSO)
151 Slater Street
Ottawa, Ontario K1P 5H5, Canada

INTERNATIONAL VOLUNTARY SERVICE (IVS)
1717 Massachusetts Avenue NW
Washington DC 20036, USA

THE PEACE CORPS
806 Connecticut Avenue NW
Washington DC 20525, USA

VOLUNTEERS IN ASIA (VIA)
Box 4543
Stanford
California 94305, USA

VOLUNTARY SERVICE OVERSEAS (VSO)
9 Belgrave Square
London SW1X 8PW
United Kingdom

WORLD UNIVERSITY SERVICE (WUS)
5, Chemin des Iris
1216 Geneva, Switzerland

5. Women's International Non-Governmental Organizations (WINGOs)

Some WINGOs have worked with women's AT projects at the local level and may be able to provide advice, resources or personnel. Many may have branches or affiliates in your country. You can write to the headquarter offices of those listed below to find out more about their projects and services.

ASSOCIATED COUNTRY WOMEN OF THE
WORLD
50 Warwick Square
Victoria, London SW1V 2AJ, UK

GIRL GUIDES ASSOCIATION
Commonwealth Headquarters
17/19 Buckingham Palace Road
London SW1W 0PT, United Kingdom

SOROPTOMIST INTERNATIONAL
39 Parkside
Cambridge CB1 1PN, United Kingdom

WOMEN'S WORLD BANKING
684 Park Avenue
New York, NY 10021 USA

WORLD YWCA
37 Quai Wilson
1201 Geneva, Switzerland

APPENDIX E: A SAMPLING OF WOMEN'S A.T. MEETINGS

The Decade for Women stimulated a great many projects and activities related to women's access to and participation in science and technology, and also provided the impetus for a multitude of meetings on the issue in countries world-wide. Below is information on numerous meetings that have been held and are scheduled. This is in no way a complete listing, but represents the nature and scope of meetings that have taken place. ("Int'l" = International)



Where	When	Sponsor*	Title
Papua New Guinea (National)	1978 April	National Women's Workshop	"National Women's Workshop on Appropriate Technology for Trainers"
Egypt (Regional)	1978 July	ECA/ATRCW	"The Role of Women in the Utilization of Science and Technology for Development"
USA (Int'l)	1978 Sept	NGO Task Force for UNCSTD	"Roles of Women in Science and Technology for Development"
USA (Int'l)	1979 Jan	AAAS	"Women and Technological Change in Developing Countries"
Ghana (National)	1979	Ghana Home Science Assoc.	"Conference of Ghana Home-Science Assoc.- Focus: Appropriate Technology"
Austria (Int'l)	1979 Aug	United Nations	"Symposium on Role of Women in Science and Technology-UNCSTD"
Guyana (National)	1980 Jan	WRSM	"Women and Appropriate Technology"
Jamaica (National)	1980 April	WAND Unit	"Workshop on Appropriate Technology for the Rural Home"
USA (National)	1981 Oct	Women in Solar Energy	"Women in Solar Energy"
Pakistan (National)	1981 Oct	Women's Division, Cabinet Secretariat Gov't/Pakistan	"Nat'l. Conference on Women's Participation in Scientific and Technological Development"

Australia (Regional)	1982 Feb	University of New South Wales	"Women and Food: Feminist Perspectives"
France (Regional)	1983 March	International Fed. of Home Economists	"Appropriate Household Technology for African Women"
USA (Int'l)	1983 Aug	UN Cttee on Sci. & Tech. for Dev./AAAS	"Joint Panel of Experts on Science and Technology and Women"
Zambia (National)	1983 Sept	YWCA	"Appropriate Technology workshop"
Philippines (Regional)	1983 Nov	Approtech Asia/ World YWCA	"Women, Small Business and Technology"
Canada (Int'l)	1984 June	CCIC/Women & Dev. Working Group	"Women and Food Production: Canada and the Third World"
Norway (Int'l)	1984 June	NORAD	"International meeting on Women and Energy"
Philippines	1984 Sept	IDRC	"Women's Issues in Water Supply and Sanitation"
India (National)	1984 Nov	Indian Fed. of Univ. Women	"Seminar on Women and New Technology - Planning Towards 2000 A.D."
India (National)	1984 Nov	UNESCO/Nat'l Institute, Training in Ind. Engineering	"Role of Women in the Assimilation and Spread of Technological Innovation"
India (National)	1985 Mar	World Assembly of Small & Medium Enterprises/UNIDO	"Int'l Workshop for Development of Women Industrial Entrepreneurs"
Kenya (Int'l)	1985 July	IWTC/World YWCA/ ATAC	"Tech and Tools: An AT Event for Women at Forum '85"
Tonga (Regional)	1985 July	Univ. of the So. Pacific	"1985 Rural Training Workshop for Women"
USA (National)	1985 Aug	Portland YWCA	"Women and Technology: Changes in the Workplace"
Nether- lands	1986 April	International Labour Organization	"Women, Rural Energy and Income- Generation"
Zimbabwe (Regional)	1986 May	IRED	"Technology in the Service of Rural Women"

* Names and addresses of sponsors, where available, are listed on the following page. Write to them for conference reports and additional information on the meetings held.

Sponsors of
The organization
the way they a
African Train
Centre for Wor
Economic Comm
PO Box 3005
Addis Ababa, E
American Assoc
Advancement of
Office of Opp
1776 Massachus
Washington, D.
(Attn: Shirlej
Women's Revolu
Socialist Move
44 Public Road
Georgetown, Gu
(Attn: Ovril Y
Women and Deve
(WAND Unit)
Univ. of the I
Pine Lands, St
Barbados
Government of
Women's Divis
Cabinet Secre
Islamabad, Pa
International
Home Economis
5, Av. de la
75015 Paris,
World YWCA
37 Quai Wilso
1201 Geneva,
(Attn: Ruth L
Canadian Cour
Co-operation/
200 rue Isabe
Suite 300
Ottawa, Ontar

Sponsors of Women's A.T. Meetings

The organizations and addresses below are in the order that corresponds to the way they appear in the listing of meetings on the previous pages.

African Training and Research
Centre for Women (ATRCW)
Economic Commission for Africa
PO Box 3005
Addis Ababa, Ethiopia

American Association for the
Advancement of Science (AAAS)/
Office of Opportunities in Science
1776 Massachusetts Ave., NW
Washington, D.C. 20036 USA
(Attn: Shirley Malcom)

Women's Revolutionary and
Socialist Movement (WRSM)
44 Public Road, Kitty
Georgetown, Guyana
(Attn: Ovril Yaw)

Women and Development Unit
(WAND Unit)
Univ. of the West Indies
Pinelands, St. Michael
Barbados

Government of Pakistan
Women's Division
Cabinet Secretariat
Islamabad, Pakistan

International Federation of
Home Economists
5, Av. de la Porte Brancion
75015 Paris, France

World YWCA
37 Quai Wilson
1201 Geneva, Switzerland
(Attn: Ruth Lechte)

Canadian Council for International
Co-operation/Women in Development
200 rue Isabella
Suite 300
Ottawa, Ontario K1S 1V7, Canada

International Development Research
Centre (IDRC), 60 Queen Street
PO Box 8500
Ottawa K1G 3H9, Canada

Indian Federation of University
Women, Devonshire House
3, Westfield Estate
Bhulabhai, Desai Road
Bombay 400 026, India
(Attn: Minal Saran)

National Institute for Training
in Industrial Engineering (NITIE)
Vihar Lak, PO Nitie,
Bombay 400 087, India
(Attn: Madhuri Sheth)

University of the South Pacific
Women's Development Training
Programme, Institute of Rural
Development
PO Private Bag
Nuku'alofa, Tonga
(Attn: Monalisa Tukuafu/Sue Fleming)

IRED Development Innovations and
Networks
P.O. Box 8242 Causeway
Harare, Zimbabwe

APPENDIX F: TECH AND TOOLS RESOURCE PEOPLE

The nearly 70 people who held demonstrations and workshops daily in Tech and Tools represent a wealth of experience and perspectives on women's access to and use of technologies in their countries and regions. Their names and addresses are listed below, under the technology area in which they worked, in hopes that readers will make contact and continue the dialogue that was begun in Tech and Tools.

*Please note: Many of the names and addresses of individuals are followed by a specific technology or interest area placed in parentheses (). This indicates the specific technologies or techniques with which they worked within Tech and Tools. In most cases, however, their interests and experiences are far broader than the single technology listed.

Food Processing

Ms. Salome Anson
National Council on Women
and Development
c/o Ministry of Foreign Affairs
PO Box M53
Accra, Ghana
(Fish-smoking)

Yara Carafa
Proyecto Tecnologia Apropiada
para la Mujer Campesina
Casilla 1500
La Paz, Bolivia
(Cheese-making projects)

Itseng Chipendirwe
Botswana Technology Ctr
Private Bag 0082
Gaborone, Botswana
(Bakery projects)

Elizabeth Cox
PO Box 320
University PO, NCP
Papua New Guinea

Cynthia Ellis
Belize Org. for Women
and Development
Po Box 76
Dangriga, Stann Creek, Belize
(Banana flour processing)

Dr. Lila Engberg
University of Malawi
Chancellor College
PO Box 280
Zomba, Malawi

Ms. Urmia Johnson
Women's Revolutionary and
Socialist Movement
44 Public Road, Kitty
Georgetown, Guyana
(Coconut processing)

Kenya Girl Guides
PO Box 48636
Nairobi, Kenya

Ruth Mathai
Kenya YWCA
Nyerere Road
Box 40710
Nairobi, Kenya

Rashima New
Appropriate Technology
Development Institute
Private Mail Bag
Lae, Papua New Guinea
(Sago and banana-chip processing)

Marcella Pakua
Appropriate Technology
Development Institute
Private Mail Bag
Lae, Papua New Guinea
(Banana-chip processing)

Program Manager
Save the Children
27 Melbourne Av.
Colombo, Sri Lanka
(Jam and jelly making)

Ms. Annemarie Skeppare
Find Your Feet, Ltd.
Banergatan 85
115 26 Stockholm, Sweden
(Leaf-protein production)

Agnes Titus
PO Box 867
Panguna, NSP
Papua New Guinea

Ms. Ovril Yaw
Women's Revolutionary and
Socialist Movement
44 Public Road, Kitty
Georgetown, Guyana
(Coconut processing)

Health and Sanitation

Ms. Suzanne Fustukian
AHRTAG
85 Marylebone High St.
London W1M3DE, United Kingdom
(Maternal/child health)

Mr. Jean Gimpe1
Models for Rural Development
Flat 5, 11 Chelsea Embankment
London SW3 4LE, U.K.
(Sanitation)

Sita Rajasuriya
Sarvodaya Movement
98, Rawatawttie Road
Moratuwa, Sri Lanka
(Water pumps)

Rokiatou Tall
AFOTEC
Villa 8297, Sacre Coeur 1
Dakar, Senegal
(Improved water pumps)

Elly Utama
Yawasan Dian Desa
Jalan Kaliurang KM7, PO Box 19
Bulaksumur, Yogyakarta, Indonesia
(Water purification)

Abeba Wolderufael*
PO Box 41580
Nairobi, Kenya
(Rural health extension)

Energy

All India Conference of Women
6 Bhagwandas Road
New Delhi 110001, India
(Energy-efficient stoves)

Alpha Nguva Ltd.
Renewable Energy Systems
PO Box 45155
Nairobi, Kenya

Mr. Achoka Aworry
Mr. Wambuugu
KENGO
PO Box 48197
Nairobi, Kenya
(Training for improved stoves)

Col. P.C. Bhardwaj
APRO Energy Enterprises Ltd.
PO Box 11927
Nairobi, Kenya
(Improved stoves)

Frans Claassen
UNICEF, Eastern Africa Regional
PO Box 44145
Nairobi, Kenya

Sophia M. Kiarie
Bellerive/UNEP
Nairobi, Kenya

Ruth Lechte*
World YWCA, So. Pacific
region, Box 623
Nadi, Fiji
(Women's participation in
technology development)

Ms. Juliet Mokhoka
Maendeleo Ya Wanawake
PO Box 44412
Nairobi, Kenya
(Improved stoves)

Dr. Wangari Mathai
Greenbelt Movement
National Council of Women
of Kenya
PO Box 43741
Nairobi, Kenya
(Reforestation)

Ms. Shadia Nafradene Al Said
Ahfad University College for Women
PO Box 167
Omdurman, Sudan
(Improved charcoal stoves)

Dr. Heric Othieno
Kenyatta University College
Appropriate Technology Centre
PO Box 43844
Nairobi, Kenya

Mrs. Eunice F. Rono
GTZ/Maendeleo Ya Wanawake
PO Box 44412
Nairobi, Kenya
(Improved stoves)

Luise Schroll
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