VUKA ENERGY SAVINGS

HERMANUS WOMENS' ACTION GROUP FIELD GUIDE

SPREADING ALTERNATIVE ENERGY COOKING

OVERVIEW

This guide is for people and organizations who wish to spread alternative energy cooking to benefit people and environments. It tells how to introduce new ways of an interested community. Local participation and empowerment are keys to success and avoiding waste of scarce resources.

This guide draws on the experience of many grassroots projects around the world. It discusses technology transfer methods, realistic time frames and patterns of acceptance. It includes language-free diagrams and describes hands-on learning activities. Each area is unique in needs, climate and habits, so this guide- like food preparation for solar cooking and the solar cooker itself- may need modifying for best results.

It includes checklists for organizing a community project: choosing sites and partner agencies, setting clear goals, finding adequate resources, and adapting well-tested teaching activities and alternative energy cookers to local needs. It also includes checklists for setting up support services for an extended period of promotion and trouble-shooting.

A NEW CASE FOR ALTERNATIVE ENERGY COOKING

1. ONE-FOURTH OF HUMANITY SUFFERS FUEL SCARCITIES

Half of the world cooks with wood. In recent years wood shortages in many developing countries have added hardships to already-burdened families, particularly in eastern and southern Africa.

- Families must be fed, and each year women and children walk farther and pay more for less wood.
- Many families are unable to cook nutritious foods such as beans and maize, which require hours of cooking, and substitute less nutritious faster cooking foods such as pasta.
- Rural women of all ages – including those who are pregnant, have infants, are elderly, and the very young girls who should be in school – spend more time and walk ever-longer distances to find, and then carry heavy loads of wood.
- Urban families in many developing countries now spend up to a third of their income for cooking fuel.
- Fuel-gathering is one factor in the tide of migration to cities. A rural Zimbabwean, seeing a solar cooker demonstration, summed up the possibilities: "Today many young Zimbabwean women don't want to stay in rural areas because gathering fuel wood is so difficult and time consuming. Alternative energy cookers can make rural life easier for women so they'll want to stay there."

2. OTHER COSTS OF UNSUSTAINABLE ENERGY CONSUMPTION

- The annual per capita wood consumption for cooking in most parts of the world is about 0.5 ton (1.32kg per day), or about 3 tons per family of six people.
  About 90% of most families' cooking fuel needs are for midday and evening meals. If meals are solar cooked on most sunny days, families could theoretically reduce electricity, gas or paraffin consumption for cooking by 90% on 2/3 of the days. Studies of solar cooking use in India and Costa Rica confirm fuel savings of 30-50% per family.
- Cooking with fire means fire hazards and dangers of burns for small children.
- Smoke causes lung and eye diseases.

3. NEW SOLAR COOKERS

Historically most solar cookers have been either curved parabolic reflectors focusing intense heat onto a single pot, or heat trap boxes with a window on the top and one o r several flat reflectors. Box-type cookers do slower, gentler cooking, and most of them allow unattended cooking without food burning or sticking to the pot. Generally women have preferred the box-type cooker for home use.

The curved reflectors provide much higher temperatures, exceeding that of fires, and cook very fast, but need fairly constant attention and can be dangerous to unprotected eyes. These are found more often in schools and institutions where there is direct, constant supervision. Most previous solar cooker projects around the world involved devices of one or both types that required subsidies and/or charity, were cumbersome to move and inconvenient to use.
A wide variety of new solar cookers are now more convenient and also competitive in price with less sustainable alternatives such as wood, charcoal and wood stoves. A few are

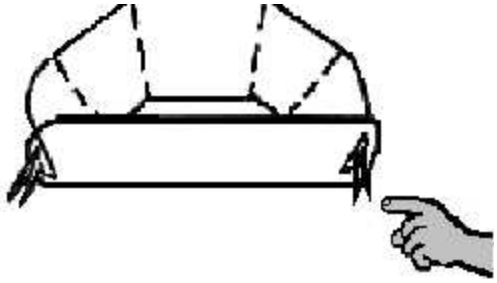
being commercially produced in several countries. These attest to the flexibility and versatility of this simple, passive technology. Once the idea is introduced, local ingenuity takes the idea and modifies it to meet local needs. Several combine features of both the parabolic and box-type cookers.

One such model uses an open reflector and is compact and affordable. It has recently proven useful to some of the world's neediest people in Kenya and Zimbabwe. Developed in 1994 by an international team of volunteers and dubbed the "CooKit," it is convenient for household use and ideal for introducing the basics of solar cooking. It is easily hand-made and has also already been mass-produced in USA, Kenya and Zimbabwe with a variety of materials and sizes to suit local needs and climates. Most importantly, it is affordable, paying for itself in fuel savings in two months or less.

The technology is simple:
A dark pot turns sunlight to heat.

The heat is held around the pot by a transparent polypropylene bag.

A shiny reflector captures extra sunlight, raising the heat to cook a large pot of food.



Comparing this latest device to concentrator type solar cookers: it doesn't need frequent moving to follow the sun, no stirring is needed, foods never burn, and flat reflectors are

safer for eyes. Compared to a box cooker: it folds flat and needs no window or insulation; instead it uses a dozen plastic bags per year.

Handy for household use, solar cookers also have many uses in small businesses:

- Extracting wax from honey (Belize, Uganda)
- Heating dyes for wool (Lesotho) and basket materials (Kenya)
- Heating paint in a bicycle factory (Belize)
- Heating hot dogs for beach vendors (USA)
- Baking bread, cakes and cookies to sell (Chile, Kenya, Canada, Cuba)
- Restaurant cooking (USA)
- Pasteurizing potting soil (USA)
- Building and selling cookers
- Disinfecting medical supplies in field conditions

Compared to tradition cooking with wood, solar cookers:

- Use free fuel requiring no gathering,
- Produce no smoke, lung problems, risk of fires or serious burns,
- Keep kitchens cooler,
- Don't require governments to import and subsidize foreign fuels,
- Allow families diets to include nutritious foods that require many hours cooking, such as beans and maize, and
- Can disinfect medical supplies

The challenge of technology transfer
(Note: Read 'Alternative Energy Cookers as well as Solar Cookers)

(Reasons not to distribute alternative energy cookers off the back of a moving truck)

1. ACCEPTANCE FACTORS

Two essential factors in acceptance (usefulness) of alternative energy cookers are: appropriate climate and a strong motive for women to seek new cooking methods, such as local fuel shortages. These and other important factors discussed in Section III include affordability of alternative energy cookers and appropriate site-specific adaptations. Adequate instruction is critical. There is a common tendency to distribute solar cookers, wonderboxes, etc. "off the back of a moving truck," and, when they aren't accepted, to rush back and re-design the device. Most often what is lacking is adequate instruction and help with new cooking habits.

2. REALISTIC TIME FRAMES

One other essential factor is a realistic time frame. Expecting dramatic, early results often leads agencies to think they have failed and to abandon a project when it has barely started. Long-term, community-wide benefits of alternative energy cooking, such as cleaner air, fewer illnesses, less demand for wood, electricity, gas or paraffin for cooking, are noticeable only when cooking is widely practiced in the community.

Pattern of uptake

The pattern of uptake of new technologies and the fact that cooking is so central to daily survival cause the normal uptake of alternative energy cooking to be much slower than expected. The least expected and counter-intuitive fact is that various segments of any population take up new ideas in sequence and at different rates:

- About 2% of any group take up new ideas immediately but tend to be viewed as "off-beat" and others don't follow their example.
- About 15% are natural opinion leaders, who are somewhat willing to explore new ideas and many will try them in the first year. Their opinions are valued by most others in the community.
- In the second year another group will begin: mainstreamers. About 1/3 of any population, they try new ideas only after natural leaders do.
- The rest of any population – about half – won't try a new idea like alternative energy cooking until about the third year, after many mainstreamers are using alternative cookers regularly. The neediest are usually in this last group; to survive they avoid risks, especially with scarce food.

Alternative energy is a new way of cooking that requires habit changes. At the point when people in each of the above groups decide to try alternative energy cooking they need affordable supplies and clear instruction. After that the shift from old cooking habits to new ones still takes several months. For individual cooks, frequency of alternative energy cooking tends to increase gradually over a year or more. Important long-term, community-wide benefits of alternative energy cooking, such as cleaner air, fewer illnesses, less demand for wood or other fuels for cooking, are noticeable only later, after alternative energy cooking is widely practiced in the community.

Planning a Community Project

1. SITE ASSESSMENT

   Solar

   Solar cooking is useless in some areas, life-saving in others, and its potential usefulness in a given area can be predicted. Two key questions are:

   1. Is the climate good for solar cooking?
   2. Are there problems with current cooking methods so people would spend time, energy and scarce resources to try solar cooking? Compatible cooking habits and other resources also help

Climate

- Climate is sunny and dry most of the year. Note: There may be different micro climates within a small region.
- Fog, dust storms, or high winds are not common most of the year.
- There are open, sunny spaces near homes, where solar cooker and food can be safe from stealing, tampering, or damage.
- If there is rainfall it is brief and comes about the same time every day.

Problems with current cooking methods:

- Local women tell of problems related to cooking methods and give high priority to exploring alternatives. (Often in regions of fuel scarcities women also face other problems that are even more urgent and need addressing first.) For a large project a baseline survey of interest, need and fuel consumption is a good idea.
- Costs of cooking fuels are high.
- Diminishing wood supplies require many hours to gather from ever-longer distances.
- People are burning green wood or dung.
- Kerosene, gas and electricity are unavailable, unreliable or expensive.
- Depletion of wood, brush and dung is causing soil erosion.
- Children miss school to gather fuel.
- Families are malnourished from inability to cook food and/or are avoiding nutritious foods like maize and beans which require long hours to cook.
- People suffer intestinal diseases from unsafe drinking water.
- There is air pollution from cooking fires, and lung and eye diseases are common from hours tending hot, smoky fires.
- People suffer injuries from carrying heavy loads of fuel.
- Open fires are a special hazard for serious burns to small children.
- Cooking needs frequent attention over long periods to prevent food from burning.

Cooking and eating habits:

- Cooking is often usually done outside.
- Black cooking pots are already commonly used or are available and affordable. If not pots can be painted black on the outside.
- Main meal(s) are around noon and/or around sunset or soon after.
- Common main dishes require long, slow cooking rather than, for example, stir-fry.

Resources:

- The area has adequate transportation and communication systems.
- There is relative political stability, allowing people to travel and exchange information.
- Gender roles allow/encourage women to participate in community groups and allow women some decision-making in family financial matters.
- There are few families whose livelihoods depend heavily on the status quo, such as wood gathering or charcoal production.
- Public policies encourage – or at least don't discourage – sustainable technologies like solar and alternative energy cooking.

PARTNER ORGANIZATIONS

Most consumers need sustained consumer support services: training, affordable cookers, and an extended period of coaching and problem-solving by experienced alternative energy cooks. These are difficult for individuals to provide – especially those who visit temporarily from outside the community.

Thus, each project needs a local development group for training and consultation, and a donor source of start-up money. Mass media and marketing can help spread awareness about alternative energy cooking, as can schools, colleges, technical institutes, youth groups, religious groups, environment and energy groups, and health programs.

Integrating alternative energy cooking education into broader development programs is desirable, even though alternative energy cooking can get lost among other priorities of an agency, making the resolve to support a project hard to maintain over several years. Also, in an effort to be cooperative, organizations sometimes initially do not agree to tasks which they would choose nor have the capacity to do well. Careful negotiations are thus important for clear, manageable commitments by all.

Sample job description for local development group:

- Have needs that an alternative energy cooking project may address.
- Works with women to address issues that women themselves have chosen.
- Is respected in the community and understands local concerns and cultural values.
- Involves staff and intended beneficiaries in project planning.
- Modifies projects in response to frequent feedback.
- Is able to communicate regularly with all other participating groups.
- Has interest and capability to manage and oversee human and financial resources.
- Hires and supervises a local project coordinator.
- Can make a multi-year commitment.

Sample job description of group with alternative energy cooking expertise:

- Conduct initial site assessments.
- Work with partner agencies to set goals and develop project plans.
- Provide clear instructions and training plans that don't require literacy.
- Help with logistics of initial project supplies, including painting of pots if needed.
- Oversee initial adaptation of alternative energy cookers, instruction methods, and alternative energy cooking to local foods and customs, working closely with initial local volunteers.
- Oversee initial training of first alternative energy cooks
- Train the most enthusiastic of these pilot alternative energy cooks to train others.
- Provide ongoing consultation to partner agencies and project staff as needed.

To find a partner agency:

- Create opportunities from which partnerships can emerge, e.g. offer a workshop or seminar of interest to prospective partners.
- Ask for recommendations of likely partner NGOs from others.
- Explore suitability and compatibility among prospective partners by discussing their purposes, values, strategies, needs, views of partnership, and what they would hope to gain from a partnership.

2. CLEAR GOALS AND PROGRAM GUIDELINES

PLANNING:

All partners participate in a thorough planning process

- Local women help plan the project.
- For larger projects a local advisory committee of leaders, staff and beneficiaries is useful.
- Larger projects need baseline data on needs, fuel consumption, and possibly a market survey to assess potential markets.
- Jointly define program goals, evaluation criteria, and implementation strategy and tactics. Unique factors in each location and varied partners can lead to quite diverse projects.
- Take time to develop the project together so strong interest is confirmed.
- Conduct joint field visits and work sessions to design the project, and discuss with donor agencies as a team to try out working together.
- Check whether all agree on how to work with other community groups.
- Where feasible, establish guidelines for how the budget and finances will be managed and monitored to ensure mutual financial accountability.
- Discuss a program monitoring system – how each is accountable to the others, to other community groups and to intended beneficiaries.
- Discuss how to maintain open communication on a regular basis, so all operations are "transparent" to all others and both problems and good news are shared by all.
- Agree to meet regularly to review project progress and address problems.
- Agree on a system where the donor agency is kept informed and all partners know what goes to the donor.
- Jointly develop the capacity to provide training to other future partner organizations on planning and management of projects like this.
- Discuss thoroughly and agree on the tasks to be done by each.

Goals:

Partner organizations spell out specific, compatible goals for this project. They include:

- The stated needs of intended beneficiaries, e.g. to reduce their need for wood, to spend less on wood, to spend less time gathering, spend less on expensive fuels such as electricity, gas or paraffin, etc.
- Realistic estimates of how many of those reached will find alternative energy cooking useful; use it frequently and save fuel/money/time.
- Long range sustainability.

Guidelines: All partners agree to the following:

- Specific participation and support will be committed for several years.
- Since actual use usually grows slowly at first, regardless of initial enthusiasm, realistic expectations are defined at the beginning so no one sees slow acceptance as failure of the program.
- Consumer instruction and follow-up encouragement will always accompany sales of alternative energy cookers and be part of all dissemination strategies.
- The project will gather frequent feedback from users and trainers to modify and adapt the project.
- Formal, periodic assessments will observe actual use, pattern of spread, actual savings in fuel and labour, etc., related to project goals.
- Regular communications is important with alternative energy cooker users, trainers, key staff in partner agencies, local leaders and institutions, and funding sources.

Guidelines also spell out:

- Whether families pay for cookers and bags – both initially and for replacements – and if so with time or money or bartered items?
- Special policies for elderly, handicapped, large families, etc.
- Who provide foods to be cooked at workshops?
- How, when and by whom trainers are periodically recertified.
- A clear, written agreement is signed by all participating organizations. It includes goals; guidelines and division of responsibilities among partner agencies (see samples above).

3. LOCAL ADAPTATIONS

Is it worth going slow at this point to identify and address as many potential obstacles as possible before starting workshops?

MATCHING NEEDS AND SOLUTIONS

1. *A perfect match is UNLIKELY. Adaptations are usually needed.*

2. *Trying to alter needs to fit a fixed solution is usually UNSUCCESSFUL.*

3. *Adapting solutions to fit needs through cooperation is UNCERTAIN, UNWIELDY, TIME-CONSUMING AND* ***USUALLY SUCCESSFUL.***

Experienced alternative energy cooking trainers work with 6-8 local women leaders to:

- Try alternative energy cooking methods for all local staple foods and identify adjustments needed in food preparation so they come out the way local people like them. (Often adjusting the amount of water is all that is needed.)
- Discuss women's daily tasks and what changes are needed in daily schedules for longer cooking times.
- Identify and address potential concerns about food safety, family acceptance, other.

- Check for modifications in alternative energy cookers for family size, types of pots and other local preferences, such as portability & compactness versus immovability.
* Cookers must be easy to operate, durable, safe, available and affordable.
- Have a practice workshop, with local women suggesting changes for local needs.

4. SUPPLIES

A challenge unique to each region is to find local sources for suppliers and/or arrange production and transport.

- Initial supplies such as reflectors, transparent polypropylene bags, polystyrene bead, isotherm, etc may be brought from elsewhere for initial training.
- If women don't already use lidded, dark pots a source is found for paint and brushes.
- Sources are found for future supplies, after considering cost, timelines of production and delivery, quality, durability. If local pots aren't already black on the outside, paint may also be needed.

5. **COMMUNITY SUPPORT**

- Contacts are made with important local leaders to enlist their support of alternative energy cooking activities in the community, perhaps cooking them a meal of favourite local foods.
- Raise public awareness and interest by demonstrating alternative energy cooking at public gatherings and other means. Attractive displays and handouts help people get more information.

Learning Exchanges

Alternative energy cooking spreads best where the intended users are actively involved in two-way learning exchanges with experienced alternative energy cooks. Pooling everyone's wisdom benefits all and encourages honest, mutual assessment of the potential value of alternative energy cooking in a specific region.

At first, women who are illiterate and inexperienced in community decision-making are sometimes fearful and reluctant to participate. Their efforts to please may mask honest responses. They may be shy in the presence of authority, fearing criticism for overstepping customary roles. They may feel powerless, distrust the motives of alternative energy cooking promoters, and hesitate to take risks.

Traditional teaching sees people as passive, empty vessels into which the teacher pours knowledge. When it comes to cooking, women already have abundant skills which need to be adapted for alternative energy cooking.

This section describes learning exchanges that encourage equality and mutual respect: Hands-on workshops to begin adapting cooking habits, home visits to give/gather feedback, group meetings to solve problems, and ongoing feedback and encouragement.

All participants are both teachers and students, and speaking and listening are equally important.

- Trainers bring alternative energy cooking experience, enthusiasm, workshop supplies, and skills to draw out others' questions and experience and help them enjoy the workshop.
- Participants bring a reason to try alternative cooking, a willingness to actively participate, traditional cooking experience to compare with alternative energy cooking to decide its usefulness, and leadership skills to be nurtured.

1. Workshops

Groups of 8-10 women adapt alternative energy cooking to their needs by "doing," not just listening and watching. The first workshops in a new region may take 2 or 3 days. Later when many local people are cooking with alternative energy products one-day workshops may be enough. Workshops start early in the day and cover each important point three times.

Sample outline of a 1-day workshop

A. Set up demonstration
B. Prepare food
   (These are done before introductions to teach the importance of starting early.)
C. Introductions
D. Basics #1 Why alternative energy cooking,
   2 What you need,
   3 How to set up
   4 differences in food preparation for alternative energy cooking.
E. Sample food or tea
F. Fill in workshop form: name, cooking fuels used, her goal
G. Basics #5 Differences in time it takes to cook foods,
   6 Other helpful ideas
H. Review
I. Discuss possible problems, home visits, time and place for group meeting
J. Close – Share goals, distribute supplies, and celebrate

2. Home visits

Home visits a few days after the workshop and record what foods she has tried, discuss her first alternative energy cooking result, and gather feedback on problems and the usefulness of alternative energy cooking. **Trainers visit each home to help, not to judge.**

3. Group meeting

The same group meets again for a half day about one week after the workshop. If women brought foods to alternative energy cook, put them out. Have each tell what their families say about alternative energy cooked food. Discuss problems mentioned at home visits and how they might be solved. Review basics. Women take turns explaining diagrams. Ask women to discuss their own goals related to alternative energy cooking and whether they still seem do-able.

4. Ongoing feedback, advice and replacement supplies

Support Services for Trainers and Consumers

As interest in alternative energy cooking grows in a community, there must be available training, educational materials, alternative energy cooking supplies, and ongoing encouragement. Other support services may include periodic training updates, cooking new recipes, development of educational materials in local languages, and management training. Ideally there is a project coordinator for every 10-15 trainers to coordinate the following support services.

CHECKLIST FOR SETTING UP AND FOR PERIODICALLY REVIEWING SUPPORT CENTRE

A. Supplies:

- Per family: Check what methods they are using
- Ensure supplies are always available to trainers when needed**.**
- Arrange secure storage that protects from damage.
- Maintain inventory records including quantities distributed, to whom.
- Organize means for families to get replacements.
- Periodically check if trainers' kits are still useful and in good condition.
- Observe condition of consumers' cookers and bags after several months, a year.
- Trainers meet regularly with Project Coordinator to trouble-shoot any problems.
- Periodically discuss with trainers whether changes are needed in distribution, sale price, and storage, record-keeping.

B. Personnel

- Trainers have clear job descriptions.
- All trainers receive initial training and periodic updates (technical, teaching, management) for re-certification.
- Each trainer covers all key points in workshops.
- Each trainer is skilled at getting participation in learning exchanges.
- Each trainer completes record forms. Illiterate trainers are assisted as needed.
- Each trainer gets feedback, with deficiencies noted, together with efforts to address them.
- If efforts fail, trainers are replaced.
- Do trainers use alternative energy cookers? If not, are they still effective trainers?
- Pay schedule provides fair pay appropriate for local similar work. Are trainers paid a regular salary, per workshop or?
- There is an agreed-upon pay schedule – weekly? Bimonthly? Monthly- and people are paid on time.
- Conflicts are resolved promptly.
- Trainers who must travel long distances have transport – bikes/vehicles. Responsibility for maintenance is clearly assigned.
- Trainers have uniforms or some sort of identification.
- Trainers meet together periodically to share experiences and do group problem solving.

C. Records and Communications

- There are scheduled, periodic communications with key people in partner agencies.
- Reports include # workshops, # trained, observations on actual use, problems identified.
- Unusual happenings are also reported so there are no big surprises at evaluations.
- Workshop records are filled out completely so there are clear records of which households have participated in workshops, had home visits and attended group meetings, also information about problems they encountered, comments etc. Forms are replenished and revised as needed.
- Inventory records are kept current.
- A mapping system tracks areas of target communities that are served and unserved, so workshops are equitably distributed in target neighbourhoods.
- Trainers meet periodically to review progress, trouble-shoot.
- Problems are addressed by group problem-solving.
- Proposed solutions are recorded and followed up for results.
- Project results are shared with donors, board, partners, and project staff.
- The project is accountable to donors and partners, with periodic reports and timely renewals of grants and agreements.

D. Finances

- There is secure storage of money and full accountability so no one could be accused of unauthorized spending or access.
- A standard accounting system assures a clear record of all pay-outs.
- Staff are paid promptly.
- Monitoring assures expenses remain within budget.
- Budget is revised by agreement of all partner agencies.
- Coordinator has a petty cash fund if needed for miscellaneous project related expenses.
- If cookers or other supplies are sold, sales moneys and records related to them are separate from any cash used for project expenses and are securely stored.

E. Program

- There is prompt review of feedback from consumers by trainers and of feedback from trainers by coordinator and partners.
- When program changes are recommended, all partner organizations are informed.

Evaluations

The ultimate measure of success in promoting alternative energy cooking is how many people

- Find alternative energy cooking truly useful?
- Use alternative energy cooking frequently?
- Save time/fuel/money?
- Achieve their own goals for alternative energy cooking?

There may also be measurable benefits

- To trainers such as income and empowerment
- For partner agencies such as budget savings and progress toward mission
- To environment: reduced wood or fossil fuel consumption, less air pollution.

Define clear purposes for each evaluation: e.g.

1. Baseline data for later comparison
2. Improving cookers, education process and dissemination strategy
3. Data on acceptance and benefits for marketing the idea of alternative energy cooking to development and refugee organizations and funding agencies.
4. Comparing fuel consumption to existing baseline data and/or other data on alternatives such as rocket stove fires and fuel-efficient stoves.

Gather frequent feedback from users and trainers. Use this improve project through discussions with trainers.

Schedule periodic formal assessments by independent persons.

Select items related to project goals to measure: Some examples:

Pattern of spread, actual savings in fuel/labour/money, frequency of use, numbers and per cent using after 1,2,3 years, market success without subsidy, how many buy, cooker durability, health benefits, wood savings, positive cost/benefit analysis, air quality, community-wide benefits, time savings, nutrition, empowerment, gain for women.

Decide type of data:
A little data from large numbers, in-depth data from a few
Decide appropriate data-gathering methodology:
Observation, interview of participants and/or trainers, focus groups
Develop measurement tools (samples available on request).

Collect, collate and analyze data and prepare a report that compares results with stated goals of project.

Share results with all parties involved, including donors.