THE SPECIAL CHALENGES OF SOLAR COOKING

It is often reiterated that solar cooking can bring about energy, social and environmental benefits to society. Indeed, solar cooking can support all eight millennium development goals (MDGs).

The question then arises as to why solar cooking is not as widespread as it should be?

Many solar cooking projects have had great success in many parts of the world, but here have been cases where the special challenges have not been adequately addressed, resulting in failures.

Many promoters of solar cooking have not been familiar with the technical and non-technical issues involved in introducing solar cooking to new users. Uncertainties have inhibited further investments in appropriate systems and projects.

This paper describes the key factors that need to be in place to maximize the possibility that a solar cooking project will succeed.

CONSTRAINTS TO REALIZATION OF PROJECT GOALS

Technological

This refers to the common scenario in which the solar cooking technology is not adapted to the socio-economic background of the users.

Because it is a characteristic of solar cooking technologies that they vary widely in scale and sophistication, technical competence and even the experience of promoters is usually not enough to guarantee success. It is in most cases necessary to demonstrate that the unique social challenges and opportunities that arise in real programs have been addressed.

According to Sebastian Goltz of the Fraunhofer Institute, social factors such as educational background, income and cultural appropriateness of models and technologies are crucial. Anyone who wants to introduce technology that was previously unknown needs to be psycho-socially competent', explains Goltz.

Although it was otherwise competent, the stoves movement of the 80's withered because it failed to address the unique social challenges that attempting to replace the 3-stone fire posed.

It is now accepted that the 3-stone fired isn't just a stove, it provides light and warmth, keeps insects away, is used to preserve seed, and provides the occasion for' family bonding' in the evenings (***The Use & Abuse of Stoves, UNEP***).

Similarly, promoters of solar cooking must ask why, in some societies, for example, expensive parabolic cookers lie in waste while in others, people enthusiastically convert old satellite dishes into solar cookers.

Because technology can be intimidating to the uninitiated, the technological simplicity or sophistication of the solar cooker should match the background of the prospective user as closely as possible to avoid 'socio-technologic disconnect'.

Cognitive

Cognitive constrains refer to low levels of awareness of the appropriate insights both with the promoters and users, and also to prejudices against solar cooking in general and/or against some technologies in particular.

The global solar cooking fraternity, it can be argued, is yet to attract the critical mass of expertise, and the absence of reliable data and information still misinforms the decision-making process at the project level.

Accordingly, project managers still feel obliged to chose between one technology and another, rather than promote an appropriate mix of technologies (see later).

Where promoters of particular technologies aim to justify their choices by playing down the role of other technologies in the appropriate technological matrix, the end result usually is an overall loss of faith in the entire process of solar cooking amongst the intended beneficiaries.

Institutional

Because solar cooking is still a non-commercial, evolving technology, it is mostly promoted by development organizations and non-commercial establishments, which are mostly not 'cut out' for the nature of the task at hand, in one way at least.

For example, a high as possible input of local and technical content is usually desirable for sustainability and growth. However, this requirement is usually scaled down to user training and the involvement of the users in the assembly of imported systems as a means of getting them to identify with the technology of choice.

Where development organizations are bereft of technical capacity, partnerships with both the formal and informal engineering sectors should provide a solution.

Where development organizations and donors cannot be around for long enough to see the realization of long-term objectives relating to broad development goals, local organizations should be brought in from the very beginning to see the project through to its logical conclusion.

Success Factors

1. Fits the Medium Term Framework

It is axiomatic that all projects in a program must contribute to the overall aims of the program. This is only possible if the program fits into a medium term strategic framework with suitable milestones on the road to a well-defined end-point. In commercial programs, the often-unstated end –point is market convergence.

However, in non-commercial programs, if 'regular use of a solar cooker of a particular type' can be achieved, then it can be reasonably hoped that the extended benefits towards to the attainment of project goals will be achieved with time.

It is not possible to determine that 'regular use' has been achieved within one month, and likewise that infant mortality has fallen within, say, six.

2. The Need Exists

The need here refers to the 'need for a solar cooker of a particular type' (see later) and usually goes beyond the scarcity and/or cost of fuel generally. Genuine effort to involve the intended beneficiaries and an enlightened self-interest in decision-making are key.

Examples of assessment criteria

Example of Goal	Example Of Assessment Criteria	Inference?
Eradicate extreme poverty and hunger	Will solar cooker replace gathered or purchased wood fuel or charcoal? To what extent will entrenched cultural practices, capacity, features and user friendliness of the solar cooker ensure sustained regular use over a significant period of time?	If wood fuel is gathered free of charge, for example, by children while tending cattle, the motivation to make economic use of a free solar cooker may be weak. The traditional three stone- fire may be more than just a stove to its users. It may also provide light and warmth, keep insects out of the house, provide a means of preserving maize seed etc., and thus be difficult to replace.
Ensure environmental sustainability	To what extent is charcoal produced from deadwood vis-à-vis freshly harvested trees?	Clearing of forests for new settlements and agricultural activity, overgrazing etc., may be the real cause of environmental degradation.

Selection of the Appropriate Solar Cooking Technology Matrix

1.5m^2 Scheffler cooker with fixed focus – notice 2 pots

a. Capacity and Speed of Solar Cooker

Although cook kits and box cookers require more time than parabolic cookers (2-4 hours) to prepare a meal, speed and/or efficiency alone should not be the overriding factor when choosing between solar cooker types. Because they can burn food and require tracking every 30 minutes or so, parabolic cookers require continuous attention, unlike box cookers and cook kits that can be left unattended while one attends to other matters outside the homestead.

Further, box cookers may be constructed to carry 2 or 3 pots at a time, in which case they will actually cook faster than a parabolic cooker with the capacity to hold only one pot at a time.

Finally, because a solar cooker will not meet the household's entire cooking energy requirement, firewood will still need to be gathered to meet the shortfall. Users may therefore be required to find the time to gather or the money to buy firewood and be around to watch the progress on the parabolic cooker, a requirement that may be overwhelming to the unsophisticated user, who might then 'throw out the baby with the bath water'.

b. Project appropriately diversified

Designing a project in a set of independent phases can be crucial to the very success of the entire project. Initial results can be very disappointing at times, and in such cases the flexibility to try out new combinations of cooker types, manufacturers and approaches could be key to the overall success of the project.

Phasing the project allows for continuous assessment of some or all aspects of the project before it is concluded, and avoids the scenario in which one is stuck with the same choices even after taking cognizance of initial weaknesses.

Flexibility will allow for appropriate reactions as may be dictated by review results. New awareness and experience with one type of solar cooker may stimulate demand for other models/types.

c. Market Support

Such support structures have to cover a wide range of topics, particularly those relating to the availability of suitably qualified staff and arrangements to access a range of compatible spares and services. For solar cooking projects, ***'develop simplest and/or cheapest first'*** remains the best policy, because it keeps costs, logistical requirements and technological risks (of a backlash) to a minimum.

Once a project runs into problems, it is difficult to raise the enthusiasm for solar cooking back to initial levels.

d. Real Incentives

If the program relates to the development of energy markets, the users must place a value on the commodities traded - free gifts reduce the value of the commodity. The lack of incentive to make economic use of gifts is a classical pitfall that requires one to innovate around. Incorporating related goals at the stage of giving the donation can make a big difference, for example, getting the intended beneficiaries to plant a specified number of

tress or build pit latrines in their homesteads before qualifying for a free solar cooker or upgrade will have multiple environmental and health benefits.

Summary of insights

	Possible Reason for Non [regular] use of solar cooker	Possible Inference	Possible Solution
Panel cookers	Promoters Low power rating/too slow Users Low power rating/too slow Too delicate Short lifespan	Promoters Needs assessment process 'top-down'. Supply driven promotion of single technology solution. Users Insufficient user training Users exposed to only one type of solar cooker/model.	Promote all types, let users decide
Box cookers	Promoters Low power rating/too slow Users Low power rating/too slow Too heavy	Promoters Needs assessment process 'top-down'. Supply driven promotion of single technology solution Users Insufficient user needs assessment & training. Users exposed to only one type of solar cooker/model/size	Promote all types, let users decide Supply box cookers with wheels to allow ease of movement
Parabolic cookers	Promoters Low power rating/too slow Too expensive Users Low power rating/too slow Too delicate/difficult to wash, maintain Too much glare in use	Promoters Needs assessment process 'top-down'. Supply driven promotion of single technology solution Targeting one/all social segments with single technology. Users Insufficient user training, poor orientation resulting in low speeds and glare. User background does not match type of solar cooker Users not exposed to all	Promote all types/sizes, let users decide Try different reflective surfaces – foils, glass, other Fix solar to the ground to eliminate the need for alignment by user, etc.

		models available	

CONCLUSION

The low levels of awareness of solar cooking technologies, their characteristics and benefits make it difficult to' ask people what they want so you can give it to them'.

Project planners and managers therefore need to carry out comprehensive base-line surveys and needs assessment, demonstration and pilot projects before moving into the project proper, an option that has not been fully exercised in the past

Single technology, supply driven, top-down approaches continue to result in missed opportunities that would otherwise make a remarkable difference – creating broader awareness, stimulating growth and building local capacities.

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References

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2. *The Use & Abuse of Wood Stoves. UNEP*