

# Good technologies...but do they really work?

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## Good technologies – but are they working?

There is a property that is common to every successful technology, which is that people use it. Although this seems obvious, one has only to look around to find the world littered with well-meaning but inappropriate technologies.

Although improving the livelihood of the entrepreneur is important, at household level, the prime focus of the technology should be to enhance the lives and livelihoods of those using it. Particularly where subsidies are given, respecting the wishes of the cook and her family is particularly important. For example, if an entrepreneur gets a good subsidy for a particular stove, they will naturally be inclined to promote that stove rather than one that might be more appropriate. On the other hand, the subsidy may make it possible for a more desirable product to reach a greater number of people... but who should decide which product is best? How can we be sure that we are making the right choices if we do not live in the recipient household and cook their food each day? What criteria should we be using to make sure that the technology not only works... but is put to work? The only way is to consult the recipient families and make sure one is getting it right for them.

## Key factors for a working technology

For a technology to be acceptable it needs to exhibit 'desirable product attributes' – characteristics that make it so much better that people are not only willing to accept it, but really want it at a price which they can afford. Some key attributes include:

### Effectiveness

A project may set out, say, to alleviate smoke, but through the participatory process it becomes evident that the key criterion for the cook is to save fuel. Thus, the final design must save fuel if the cook is to use it - but does it still

### Box 1: Smoke hoods

Practical Action worked with communities in Nepal to find a technology that would remove smoke whilst keeping the room warm, as people like to sit around the fire. Their traditional stove was a metal tripod and the smoke had nowhere to escape, making the room smoky and the walls black (Figure 1). Insulating the dry-stone walls kept some of the heat in, and stopped the wind blowing through them, the tripod stove is partially built in with mud, whilst smoke is vented through a smoke hood – hinged at the sides so that the fire can be opened up in the cold evenings once it is burning fiercely and less smoke is being emitted (Figure 2). There are also bars inside the hood to allow people to smoke meat, and the flue, which vents through the roof, has a small, protected vent in the roof space to allow some of the smoke to escape into the roof space to preserve the timber roof tiles.



Figure 1 Family close to traditional fire; house with non-insulated walls (photo: Practical Action Nepal)

reduce smoke? It is important that in the participatory process, the key objectives are not lost.

### Prestige

Does the product look attractive? If we want to improve a kitchen, then the cook may want it to look modern, to make the kitchen more welcoming, to keep the place tidier and cleaner. Even if we are installing an 'off-the-shelf' stove, we may still welcome advice on how to install it so that it enhances the appearance of the kitchen. If you were the cook, would you want to invite people in to see it?

### Time-saving

A stove which requires constant tending, or needs a lot of fuel preparation will take much longer overall to use. It will only be acceptable if some other



Figure 2 Woman sitting beside improved stove with smoke hood: house with insulated walls (photo: Practical Action UK)

factor (such as cost or availability of fuel) means people are willing to take this extra time. If a chimney stove is used, it will not be cleaned unless it is easy to clean, and good training and instructions are part of the package.

### Quality

For some people, buying a technology will be a major investment relative to their income. Are we confident that the product will last? This is vital, both to ensure that people with little money are satisfied, and to maintain the market for that product – bad news travels fast, so high quality training is important (Figure 5).



Figures 3 & 4 Woman cleaning the flue from a HELPS stove in Guatemala (photos: Don O'Neal, HELPS International)

### Box 2: HELPS stove

The ONIL stove, disseminated widely in Central America, is a chimney stove with a difference. It uses Rocket stove principles (see BP47 page 36, and BP52, page 8), and also has a chimney that is easy to dismantle and clean. This latter point is hugely important. Don O'Neal, the founder of the organisation, explains 'training, training and more training on chimney cleaning' is one reason why this stove works so well and is extremely popular with those who use it. The chimneys are cleaned every couple of weeks (Figures 3 & 4) – but it is easy to do. In return, the stove uses around 70% less wood, so much less time spent gathering, the cooks experience around 99% less smoke, and children do not get burnt due to the increased cooking surface height.

### Accessibility

Where can I buy one? For those without access to public transport, a few miles can be an insuperable barrier to buying a new household technology. Are there local outlets that allow people to discuss products before purchasing them? Access to fuel is another issue that can affect the purchasing of a technology – can I buy or get fuel easily? In the Sudan study shown in Box 3, a kiosk selling bottled gas could not be installed until thirty households had gas. Early adopters frequently reverted to woodfuel when they ran out of gas as the walk with a heavy bottle was too long. Once the kiosk was installed, the situation improved.

### Spare parts and maintenance

What happens if something goes wrong? If some small component breaks, is a 'spare' available? Is someone there who can fix it safely? Is the model one that has a good policy of spare parts being available for several years...? If something goes wrong,

do people know whom they should contact?

### Safety

Burning fuels, and houses made of thatch and wood are a dangerous mix. Any fire that is out of control has the potential to cause injury and destruction. Those using new technologies should expect that their safety has been considered very carefully, and that it is easy for the product to be used correctly. Have good instructions for the use of the technology been given? Have



Figure 5 Training entrepreneurs to make smoke hoods in Kenya (photo: Practical Action East Africa)

community and individual demonstrations been planned?

### Familiarity

People with very little money cannot afford to make the wrong choice. Thus some communities will only make small changes in their cooking practices. The best technology for them may therefore not be the best technical choice. The more expensive, or different, the technology that is being introduced, the greater is the risk. The Nepal case study in Box 1 below is a good example. In this project, several hoods were installed that adhered exactly to the demands of the community even though the team felt that they would only remove some of the smoke. Once the rather indifferent findings were discussed with the community, they were happy to install much more effective smoke hoods as they were active participants in the initiative and felt more comfortable with the technology.

### Affordability

The greatest barrier to improving household energy provision is undoubtedly the 'up-front' cost of the product – thus cost and availability of credit will be key factors. People's 'willingness to pay' and the way they prioritise what they buy means that our technology has to have 'Desirable Product Attributes' if it is to be an asset. Since men often have more available money than women, does our technology appeal to them too? A marketing survey commissioned by Practical Action as part of its smoke alleviation project showed that this was the overwhelming barrier to purchasing products. Making revolving funds available made a substantial increase in market size.

### Consumer-driven technologies

Technology has the potential to change people's lives for the better, but if we start with the technology, there are real dangers that we will not get the best results from our efforts. The evaluation involving the World Bank, TERI, and Winrock-India in collaboration with the Ministry of Non-Conventional Energy Sources, Government of India

### Box3: Introducing LPG stoves to displaced communities in Kassala, Sudan

Woodfuel is both scarce and expensive in Kassala region, and women have all elected to use bottled (LPG) gas which is cheaper, cleaner and more environmentally friendly. Practical Action is supported by the government-run Civil Defence in training women to use bottled gas safely (Figure 6). Many houses are made with walls of woven reeds, and the women smear the walls with mud to prevent sparks from igniting them (Figure 7). Some of the women also lock the gas bottles into cages to prevent small children from tampering with them.



Figure 6 Safety training involving the local civil defence (photo: Ahmed Hood)

indicated that stoves need ‘better adaptation to user needs’.

Imposing solutions can create dependency rather than independence, and the same study shows that people purchased stoves if they were subsidised, but did not replace them when they wore out. An approach that starts with people and stays with them will do more than just introduce a technology – it will provide a framework for future participation and development. Looking at the factors that have been identified above – are the important ones all there? Who knows? The only way to find out is to ask representative groups from within the community what they feel is important and to ensure that those needs are met (Figure 8).



Figure 8 Community meeting, Nepal – people should feel comfortable to express what they themselves want (photo: Practical Action Nepal)



Figure 7 Woman using LPG stove safely, with mud smeared on walls behind to prevent ignition (photo: Practical Action UK)

Do the appliances work? Appliances which work beautifully using standard tests in a laboratory test rig may not work well in the field, so although background studies are valuable, the only way to get a true picture is to install them in people’s homes and ask them to use it and comment on them. This could be due to chimneys getting blocked, people using fuel that is not exactly the same shape, fuel that is damp, whilst others may be much more experienced at feeding the fuel well than the researcher.

Feedback can be useful to those making the technologies, so making feedback known to the entrepreneur can benefit both households and manufac-



Figure 9 Opening celebrations for LPG bottle exchange following agreement with gas company to supply a safe storage cage for bottles (photo: Practical Action East Africa)

urers. The GTZ team in Malawi asked the entrepreneur to accompany them on their reviews and it proved very successful. The best demonstration of whether the technology really works is when there are more consumers waiting for appliances than there are entrepreneurs making them – and a growing sustainable market develops. Good news also travels fast.

Supply chains for goods and services can provide new jobs and income. Do the gas companies provide low-cost loans for gas bottles? They make their money out of the sale of gas – has anyone discussed the benefits to them of making gas bottles easily available? Could energy outlets be set up in local stores or markets to sell stoves, spare parts, fuels for lighting, solar cookers, gas bottles and to provide information on maintenance, safety issues, and where to get help. In Kenya, the local store is now able to sell LPG (among other energy goods) thanks to the Practical Action staff lobbying the gas company to provide a safe storage cage (Figure 9).

In the end, the end-users are the people who will decide if a technology really works, and when one hears people say ‘but how do you get people to use them...’ then something is going wrong. If one starts with people, provides information so that they can make informed decisions, and respond to the requirements they desire, then we can be very confident that we have helped to provide technologies that really work.

### Profile of the author

Liz Bates has worked in the household energy field for several years. Currently, she is managing an international project on reduction of indoor air pollution for Practical Action. Until very recently, Liz was editor of *Boiling Point* and enjoys writing and editing. Liz continues to be very active in the HEDON Household Energy Network, having contributed numerous Knowledge Base articles on Indoor Air Pollution, and being the founding moderator of the Cooking and Carbon Special Interest Group (CarbonSIG). She is now actively involved in the Clean Air Special Interest Group.

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