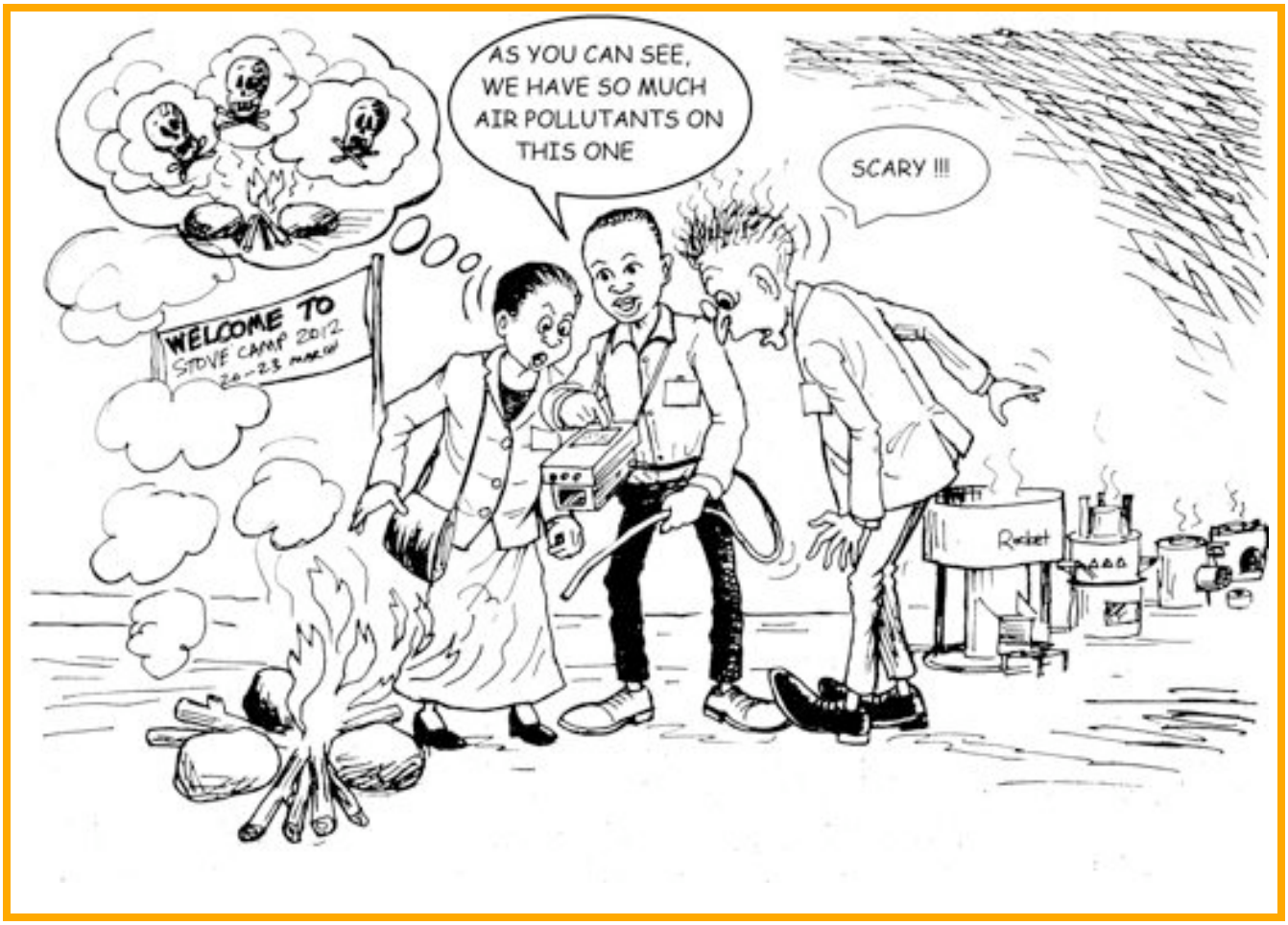

REPORT

STOVE CAMP 2012

MARCH 2012, LILONGWE, MALAWI

REPORT

STOVE CAMP 2012

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March 2012

STOVE CAMP 2012

BRINGING THE BENEFITS OF CLEANER COOKSTOVES TO MORE PEOPLE

Acknowledgments

Developing Innovative Solutions with Communities to Overcome Vulnerability through Enhanced Resilience (DISCOVER) Project, with support from Partnership for Clean Indoor Air (PCIA), organised a stove camp in Lilongwe from the 20-23rd of March 2012. DISCOVER is a project that seeks to work with communities and local government structures in order to bring about a tangible and significant increase in the resilience of the most vulnerable communities located in disaster prone districts in Malawi. It is being implemented by Concern Universal, Cooperazione Internazionale, Goal, Self Help Africa, SolarAid, Cepa, Cumo and Clioma Ltd with support from DFID, Irish Aid, and the Norwegian Embassy through the Joint Resilience Unit.

A warm thanks is made to the Partnership for Clean Indoor Air (PCIA), Brenda Doroski and John Mitchell, for their tireless effort to promote stove testing worldwide and making co-funding available for this Stove Camp. A word of thanks should also be made to Elisa Derby and Katie Gross from Winrock International who helped with the content of the stove camp and coordinated logistics for international facilitators.

Special thanks must also go to the participants and facilitators of the stove camp and open-day. The conversations and discussions on biomass energy, improved cook stoves and cleaner cooking that took place long beyond the planned time-table are a testament to the enthusiasm and interest of the participants. Such eagerness and commitment made the event more fruitful.

Objectives

The stove camp held in Lilongwe from March 20th to 23rd, 2012 had as its main aim to enhance awareness and improve understanding among stakeholders about the importance of biomass energy and improved cookstoves. During the first three days of the workshop, participants worked with members of PCIA's international team of biomass energy professionals to gain a deeper understanding on biomass energy and specifically on how to test the efficiency of improved cook stoves and the importance of quality control and standardisation. The final day of the stove camp was an open-day for a wider audience including decision makers of government and civil society organisations to share learning and promote collaboration.

1 – Introduction

The United Nations has designated 2012 as the International Year of Sustainable Energy for All. As part of promoting sustainable energy for all in Malawi, forty-seven participants from twenty-one organisations joined a team of five biomass energy professionals from Germany, Malawi, South Africa and Uganda in a stove camp held in Lilongwe from the 20th to 23rd March, 2012. The event was organised by Developing Innovative Solutions with Communities to Overcome Vulnerability through Enhanced Resilience (DISCOVER) Project with support from the Partnership for Clean Indoor Air (PCIA).

The stove camp focused on technical as well as social criteria for stove selection and adoption so that stoves that are disseminated are continually used in households. Participants and invitees included stove producers and builders, project implementers, field officers, representatives of organisations with an environmental focus, and representatives of government agencies. The participants practiced how to conduct Controlled Cooking Tests (CCTs), Water Boiling Tests (WBTs) and safety tests. They also learned about Kitchen Performance Tests (KPTs) and how to test the safety of stoves. In addition, many of these representatives expressed specific interest in learning about the various models of improved cookstoves (ICS) being promoted in Malawi, how to produce stoves, how to create partnerships with other organisations to promote ICS, learning about strategies used to promote stove adoption, challenges faced in stove promotion, and advocacy needs of the sector.

During this four day event, presentations and discussions went far beyond stove testing and covered a wide range of topics relevant to cookstove producers, implementers and the communities they work in and with – and highlighted issues such as the links between improved cookstoves and other sectors (health, nutrition, food security, energy and environment), with specific emphasis on the role of improved cookstoves and effective ventilation in reducing indoor air pollution; other topics covered included stove production costs and pricing; stove testing; and the importance of quality control, standards and monitoring.

This report seeks to highlight key messages of these presentations and the discussions which followed, and hopes to help stakeholders in rising to the challenge of achieving universal energy access by 2030, the goal identified by the United Nations Foundation. The report does not attempt to document the events of the stove camp in a sequential manner but aims to bring together many of the issues discussed. The report presents challenges of biomass energy in a Malawi context, and then proposes how sources of pollution can be addressed, how living conditions can be improved and identifies potential behaviour change interventions.

2 - Biomass Energy: The Challenges

Obtaining Solid Biomass – Physical Challenges

Almost three billion people burn solid biomass fuels for domestic cooking and heating worldwide. Where this biomass is collected, the responsibility falls mostly to women and children. In Malawi, some estimates stipulate that by the age of 8, a child can collect up to 10kg of firewood each week, while a woman can collect around 30kg of firewood twice weekly.[1] The physical effects of this are manifested through superficial and deep cuts, cumulative musculoskeletal injuries and degeneration, exhaustion, broken bones and increased risk of birth complications. To date, quantitative studies are lacking and remain a challenge given difficulties involved in measuring other contributing factors such as carrying pales of water and poor posture.

Other dangers of wood collection faced by women and children include rape, violence and assault – depending on the socio-political environment. Unsustainable use of biomass fuels has resulted in less wood being available, so women and children are walking increasingly long distances to collect their firewood. In some areas of Malawi, households stay without eating due to the absence of firewood and other solid biomass for cooking.[2]

Using Solid Biomass – Health Risks

The use of solid biomass fuels, particularly when burned openly in the traditional three stone fire, also poses a magnitude of health risks, again most affecting women and children. Exposure to smoke and particulate matter when burning biomass can lead to acute and chronic respiratory problems, heart disease, cancers, cataracts, DNA damage, low birth weight, and potentially have negative impacts on brain development. Respiratory infections from biomass smoke ranks fourth in the global health issues behind malnutrition, poor water supply and sanitation and unsafe sex; and second in Malawi, after water, hygiene and sanitation.

> "Cooking can feed you but cooking can also kill you." – *Donald Kamdonyo (DFID), Stove Camp Attendee*
>
> "No woman should die because of daily cooking for her family!" – *Christa Roth (Food and Fuel Consultants), Stove Camp Facilitator*

The World Health Organisation (WHO) asserts that every year over 1.5 million people, mainly women and children, die from diseases attributed to or aggravated by exposure to smoke, claiming more victims than breast cancer; and exceeding the burden of malaria in Malawi, with a conservative death toll estimated at 33,000 people each year. The true figure is thought to be much higher considering that post mortems are generally not conducted in Malawi; and while a person may be coughing and wheezing before death, these are most times symptoms and not causes of death. Connecting such symptoms to death by indoor air pollution is both expensive and difficult, given other aggravating factors such as poverty, malnutrition and HIV/AIDS.

The Global Alliance for Clean Cookstoves (GACC), which is hosted by the United Nations Foundation and is the entity that will take over the role of PCIA, is on a mission to improve health, livelihood, and quality of life through reduced exposure to indoor air pollution, primarily among women and children, from household energy use in developing countries. Many of the organizations that participated in this Stove Camp have expressed an interest to join the Global Alliance for Clean Cookstoves in achieving its goal to increase the use of clean, reliable, affordable, efficient, and safe home cooking and heating practices that reduce exposure to indoor air pollution. The aim is to foster the adoption of clean cookstoves and fuels in 100 million households worldwide by 2020!

[1] "Health Effects" presentation by Dr. Magi Matinga on March 22, 2012

[2] anon.

How can organisations work with households and communities in Malawi to contribute to the GACC's ambitious goal for 2020?

- Address sources of pollution – Cleaner and alternative energy sources, improved cooking devices;
- Improved living conditions – Improved ventilation, kitchen design and cooking locations;
- Behaviour change interventions – Fuel and kitchen management, keeping vulnerable household members away from smoke, debunking smoke related myths, awareness creation.[3]

> "*What is smoke?*
>
> Smoke is the visible phenomenon of incomplete combustion. It is affected by factors such as:
>
> - Firewood – too big, too wet;
> - Air – not enough, too cold;
> - Temperature – too cold;
> - The user/human factor.
>
> When poor conditions exist or the user has not been trained, even the cleanest improved cookstove can produce a lot of smoke!

3 - Addressing Sources of Pollution: Promoting ICS

A stove can be called an "improved cooking device" as long as it performs better than the baseline – in the case of firewood, the three stone fire. From a technical perspective, stoves can be classified as "improved" based on the following technical criteria:

- Efficiency
- Combustion efficiency - How completely fuel is burnt,
- Heat transfer efficiency – How much heat is actually utilised to cook the food;
- Fuel consumption;
- Fuel burn rate;
- Time to boil /speed of cooking;
- Emissions – mostly particulate matter and carbon monoxide;
- Turn down ratio – How easy it is to regulate/control the stove output.[4]

It is important to conduct stove testing to quantify these features and ensure that an "improved cookstove" is not actually worse than the baseline. Such tests include the Controlled Cooking Test[5] and Water Boiling Test[6]. An Uncontrolled Cooking Test protocol is currently being developed. It should be noted that the type of test to be conducted depends on the type of data required and for whom the data is intended. Based on these technical criteria, various stove producers and promoters may make claims to having the most efficient or most improved stove. However, it was unanimously agreed by the participants of the stove camp that a "best stove" that is not appropriate for use in a specific environment will not be used and will have little, if any, impact. It is much easier to change the technology than the users, and the resulting technology may not always be the best compromise – but rather, the most appropriate. It is always useful to look at the scale of impact you can make using various technologies.

[3] "Sustainable bio-energy use in Malawi makes sense" presentation by Dr Magi Matinga on March 23, 2012
[4] "Stove Selection Criteria" by Dr Magi Matinga on March 21, 2012.
[5] See protocol at http://www.aprovecho.org/web-content/publications/assets/CCT_simple.pdf
[6] See protocol at http://www.pciaonline.org/node/1048

What is a stove?

A stove is a structure which generates and transfers heat. Its form depends on the type of fuel being used and cultural factors – the meal being prepared, the cooking action (stirring with one hand or two-armed, full upper body motion), the pot shape and size used etc. Toasters, solar cookers, kettles, electric cookers, clay stoves and rice cookers are all different types of stoves for different uses.

Encouraging ICS Adoption by Households

Sharing Experiences...

On Day 1 of the Stove Camp, the following question was posed to the participants: "How did you choose the stove you are promoting or planning to promote?"

Some of the selection criteria mentioned by participants are listed below:

- Result of collaboration with older or more experienced organisations to find an "appropriate" technology;
- More efficiently using firewood;
- Easy to produce locally as an income generating activity;
- Commercially viable so they would be sold instead of freely distributed;
- Mobile, appealing to higher income households and more cost effective to construct than fixed stoves;
- Different to existing technologies in the area, to benefit from the extra value added by the community to a new technology;
- Fixed and suited for workers' housing so that if workers left, the stoves would remain

Dominant themes could be identified throughout many of the responses such as attention to the income level of the target households, appropriateness of the product for the specific community; ease of production; and commercialisation of the product. These address the social and economic criteria for stove selection and underscore that unless the user is happy to use the stove, it will not be used and the project impact will be exactly zero!

Experience has proven that to raise interest for a wood user to want to buy a stove, the stove should be:

- Better than the baseline option (whatever the baseline option may be; for 9 out of 10 rural households in Malawi it is the 3-stone fire)
- Safe;
- Easy to use and maintain;
- Durable;
- Aesthetically pleasing;
- Flexible and fuel tolerant (able to process different types and sizes of biomass);
- Affordable;
- Well suited to the cultural practices and local meals.

In addition, the stove should have a low hassle factor. For example, if the stove is highly efficient but has a feeding chamber for solid biomass which is only 5cm in diameter, the hassle factor of sizing the fuel to fit through a small hole is high and stove adoption may be low. Therefore, the overall impact of such a stove is likely to be low.

Why is stove adoption more challenging for wood users than charcoal users?
– Crossing psychological and economic boundaries

It is most times more difficult for wood users to adjust to the idea of purchasing a stove than it is for charcoal users. Many times, wood users are able to harvest their biomass energy at no cost (or for a very small fee), which they are then able to burn using three stones or bricks as pot support. Whereas, charcoal users are already in the habit of purchasing both the fuel and the device needed to burn it.

The first priority is the users' perception; to them efficiency is often secondary. Stove promoters should take time to work with communities to develop stove models best suited to the community's needs, noting that each community's needs will be different. This involves asking the right questions and therefore determining what those questions are, and what to observe. For example, in the urban areas where people may be more mobile, a portable stove may be better suited; while on an estate where there is staff housing and an existing kitchen, a fixed stove may be better suited. Effective means of obtaining user feedback and enhancing community awareness of a new technology include leaving the stove in a prominent, well frequented location – such as a hospital, school or chief's house – or disseminating several models in the community to monitor their uptake over a period of several months. Another approach is to conduct cooking demonstrations on several stoves which could potentially be promoted, preparing meals which are commonly eaten in the community. Have the community choose which stoves they prefer, and make deductions on their needs and preferences based on the selection(s).

Learning from stove blunders...

It should be noted that any stoves to be used for demonstration should be constructed well in advance to ensure that it is completely dry and ready to use – and ensure that you also have a good supply of dry firewood. From our experience, it is NEVER a good idea to light a stove for demonstration if these conditions are not met – unless you want to create a smoke cloud for your audience and deter them from using the stove!

It is equally important to objectively monitor usage of the stove to ensure that users are effectively using their improved stoves – in some cases, such as in staff housing, occupants may change and knowledge on how to use the stove not transferred. Monitoring can also provide feedback on how the efficiency of the stove is affected over time. Remember – perceptions change with experiences. User Surveys and the Kitchen Performance Tests may be used for monitoring stove and user performance. Migration of stove users, however, poses a challenge to the monitoring system and there exists a need to come up with creative ways of encouraging users to voluntarily provide their feedback.

Creating a sustainable supply of ICS

Standards

What is an improved cookstove? Improvements can be on the basis of design and performance. Stove testing can be used to determine efficiency gains (performance); however, standards are necessary for determining which stoves can be classified as a particular model of improved cookstove (design standards), and a system developed for rating stoves. The International Standards Organisation is currently collaborating with PCIA and GACC toward achieving the latter[7].

Cookstove Standards in Malawi

The Malawi Bureau of Standards is committed to design standards for improved cookstoves, and has the necessary equipment for basic stove testing. At present, emissions measuring equipment is lacking; and there is potential to enhance capacity to conduct stove testing. There is also a need for the Malawi improved cookstove industry to come up with standards for itself, through collaboration with various research organisations and engineers.

Quality Control

Stove promotion goes hand in hand with commercialisation of production: Producers need to be satisfied with the income they are generating from stove production, and households need to WANT to purchase the stoves (based on social and economic selection criteria). Therefore, producers must create good products, and need standards which tell them what a "good" product is, as well as the tools which help them to ensure that they are reaching these standards, i.e. quality control tools.

These tools can measure every aspect of a stove – height and thickness of the stove itself which contribute to the stove's weight, the length and width of the fire chamber, height and width of the pot-rests, distance between pot-rests, location of the handles and size of the fuel feeding chamber – and can be made of very simple and readily available materials such as bamboo and plastic plates, like in the case of the Chitetezo Mbaula stove.

Shared experience...

Even with quality control tools, there is room for error as time passes. Production trainers and producers may not accurately recall their initial training and the thought processes behind certain stove features. Thus, it is important to keep monitoring production groups, and maintain contact with trainers, to ensure that stove design optimizes its efficiency potential.

Pricing

Some challenges outlined by stove camp participants included the inability to establish a cost structure for producers which adequately reflects all production inputs, given that costs vary in each production area and with each production group. In general, the more expensive a stove is to produce, the higher its selling price will be. This will make it more difficult to sell, and there may be less people interested in purchasing it. The inability of production groups to adequately account for all of their inputs at the outset has resulted in many production groups ceasing their operations –

[7] For more information, read about the Lima Consensus at http://www.pciaonline.org/files/Lima-Consensus.pdf and the ISO International Workshop Agreement (IWA) on cookstoves in February 2012 at www.pciaonline.org/proceedings

with a noticeable impact on stove promoters. Some of the factors which may need to be considered when calculating the cost of production are:

- The type of stove being produced – mud, clay, cement or metal;
- Availability and ease of accessibility to key inputs;
- Cultural or religious factors at work, as well as land ownership – for example, if producing a mud or clay stove, is clay collected from land used for religious rituals? Who owns the land?
- Utility costs – electricity, water (more likely to be faced by urban producers);
- Costs of security;
- Firewood prices (if necessary for firing the stoves);
- Transport costs - if inputs need to be obtained from outside of the production area;
- Cost of labour – this will vary from place to place. A rural producer who was previously not engaged in any sort of income generating activity is likely to price his or her labour at a much lower value than an urban producer. It is important to bear in mind that money is a topic requiring the field officer to be sensitive during discussions with producers;
- Cost of disseminating the stove: Who goes the last mile? For example, with a fixed stove, the producer needs to bear the cost of installing the stove on site.

Shared experience...

One group of sellers was able to increase their profits by segmenting their market. They sold stoves to customers with regular salaries at a higher price. The lesson? Know your target!

How can stoves from various producers be identified?

Serial numbers detail the date of production, district in which the stove was produced, kiln/group, batch and stove number (kiln relevant to clay stoves which need to be fired), and producer. They foster accountability among stove producers and serve as sale receipts for users; and are particularly important if the stoves are part of a certified carbon trading project which requires an external auditor to verify that these specific stoves are actually in use by a specific individual.

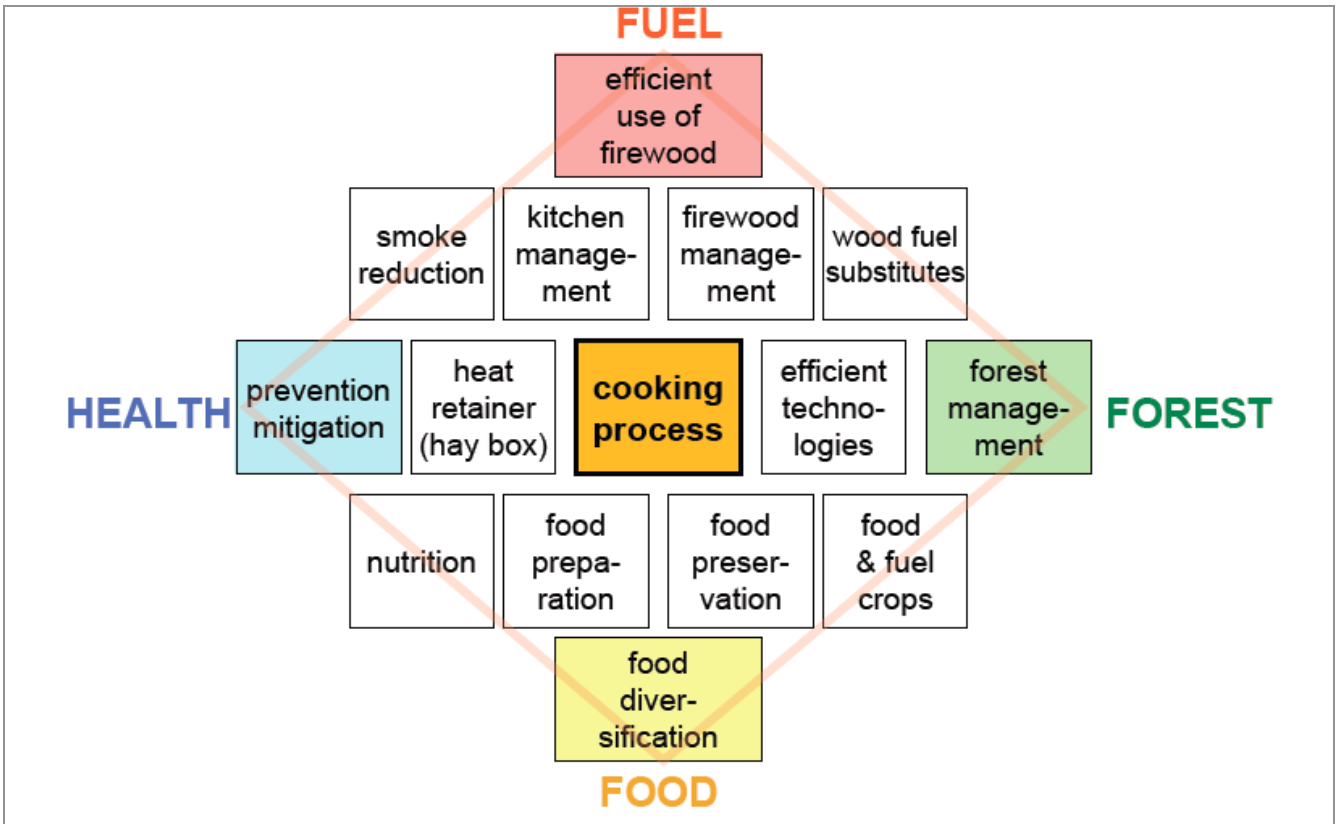
Each stove has a unique serial number, which in some cases adds intrinsic value to the stoves as households come to believe that stoves with serial numbers are better than those without. For clay stoves, serial numbers are etched in before firing. It is important that the serial number be placed in a position where it is not likely to be erased as the stove is continuously used. For example, on a clay stove where firewood is fed through an opening at the front of the stove, it would not be wise to etch the serial number above that opening, as this is the most likely place the stove will suffer the most damage. It may be wiser to etch the serial number into the back of the stove. Serial numbers are still a challenge for fixed stoves where they can be scratched into the cement. If the stove is maintained by the community, it is likely that the serial number will be later plastered over during maintenance.

As organisations increasingly collaborate – and more organisations work with stove production groups – there will be a need to implement a revised numbering system which does not confuse the producer or vastly differ from the current number system, but which also includes in the serial number the name of the organisation. Two options tabled during stove camp discussions are: Adopting a numbering system similar to licence plates for vehicles – beginning first with the district code – given that the implementers work in specific regions: District/Organisation/Group number/Batch/Stove number, e.g. BA/CU/10/81; or assigning numbers to each organisation and using that as the first number while the rest of the serial number uses the old numbering system.

Where is the magic of a stove?

Understanding why stoves must be made to certain specifications is all about understanding how biomass burns – you first need to generate enough heat to release the gases from the biomass, and you then need a good supply of oxygen to burn these gases in the second phase. If there is not enough oxygen for complete combustion or the fire is too cool, then you get smoke. The implication on cookstove design is that there must be insulation and ventilation – a fire chamber long and wide enough to allow all of these gases to mix well; the resulting flame must then be sheltered so that the heat is directed to the pot where it is needed (pot-rests are useful for this).

Linking ICS to Other Sectors



Cooking is central, source Dr. Christoph Messinger GIZ – HERA at http://energypedia.info/index.php/GIZ_HERA_Cooking_Energy_Compendium

As shown in the figure above, cooking is central within many other processes. Thus, ICS promoters need to find creative ways to mainstream stoves as a component of projects in all other sectors – such as health and nutrition, even hygiene and sanitation. This entails finding the right partners and – specifically where funding is involved – engaging with these partners well in advance of funding proposal deadlines. Stoves may be "creatively free" for communities if attached to other initiatives.

An exciting field to engage in is Integrated Food and Energy Systems – where households can be encouraged to grow their own food and fuel – such as the pigeonpea plant where seed can be eaten and stalks burned in an improved cookstove for cooking. In addition, there is scope for collaboration with the Ministry of Health/Community Health Services Unit to promote improved cookstoves for reducing indoor air pollution in the fight against childhood pneumonia

and other respiratory ailments.

4 - Improved Living Conditions: Reducing Indoor Air Pollution

Kitchen design in Malawi (if there is a kitchen at all) is generally neglected, even in new houses, with the most effort going to the main living spaces. Soot stained walls and ceilings are a common sight in the kitchen of a typical Malawian who uses woody biomass as energy for cooking. It points any observer to the most frequently used kitchen area for cooking. It is also a clear indication of the level of indoor air pollution to which the cook is exposed.

Soot is the visible product of incomplete combustion associated with inefficient biomass burning, such as on the traditional three stone fire. Soot never lies – where you see soot there has been smoke!

The soot and smoke produced from indoor burning of biomass are health threats, being major causes of respiratory problems, pneumonia, tuberculosis and eye infections. The women who are cooking, the babies slung onto their backs, and the children who play around them are most at risk.[8] It is an unproven prediction that the effect of cooking smoke on an infant could possibly have the same impact as if that infant were smoking two packs of cigarettes!

Such indoor air pollution can be significantly reduced by using improved cookstoves which burn biomass more efficiently, and by improving kitchen design to include ventilation slots throughout and at the highest point of the kitchen; a mono-pitch roof (instead of a gable or flat roof) to guide smoke out of the kitchen, and cross-ventilation if possible. A guide for ventilation is that the cook should be able to see out of the kitchen – because the nose is close to the eyes; so if the cook can see out of the kitchen, then smoke can be removed at that level and fewer pollutants are inhaled. A sand pit can also be installed for use in extinguishing flames and to stop incomplete combustion of wood after cooking. Otherwise, households normally leave the unused wood in the fire smouldering, and produce a large quantity of smoke in the process.

2007: Ventilation slots, new paint.

2011: Soot only above the stove + the wall on the right is still white = Sign of effective smoke removal

2007: Before and After refurbishment 2011: Still same paint

Observing the same kitchen over 4 years Improved kitchen ventilation to reduce air pollution levels from cookstove smoke in Thyolo District (photographs courtesy of Dekiwe Katsonga and Christa Roth).

[8] Smith KR, Mehta S, Maeusezahl-Feuz M. Indoor air pollution from household use of solid fuels: comparative quantification of health risks. In: Ezzati MLA, Rodgers A, Murray CJL, editors. Global and regional burden of disease attributable to selected major risk factors. Geneva, Switzerland: World Health Organization; 2004. pp. 1435–1493.

Ventilation features of a Simple Kitchen: Slots in walls at the height of people's noses when cooking – cook must see be able to see outside, photograph Christa Roth.

5 - Behaviour Change Interventions

It has been established that it is more difficult to change the user than the technology. Nevertheless, user training is very important when promoting improved cookstoves – because the stove is only as good as its user! User training may include the following firewood and kitchen management techniques for reducing biomass use, smoke and time spent in the actual cooking process:

Firewood Management Techniques

- Using dry firewood for cooking in an improved cookstove. Firewood can be dried in the sun during dry weather, on drying racks or in roof-spaces during wet weather, or left standing on the sides of walls inside the kitchen or storage room;
- Putting the fire out as soon as cooking is finished. Unburned pieces of wood can be removed after cooking and extinguished in sand so that there is little smoke and the wood can be used to cook another meal;
- Making use of the hot stove for heating water after the fire is put out;
- Growing fuel in the form of pigeonpeas, and using other crop residues such as maize cobs in improved cookstoves;
- Not using any firewood to finish cooking! The fireless cooker can be used for preparing meals which need to be boiled for lengthy periods and don't need to be stirred, such as rice, legumes, sweet potatoes and cassava. A lot of heat energy (achieved through burning biomass) is required to bring these foods to boil in a pot. Once boiling, only a little energy is needed to maintain the temperature and cook the food on a simmering level without removing the pot lid. The fireless cooker is made of insulating materials such as dry banana leaves or grass, maize stems, cotton wool or newspaper, which maintain the temperature inside the pot so that foods can go on cooking without need for firewood. Immediately after bringing your pot to boil on an ICS (with lid on), the pot and lid can be transferred to the fireless cooker for the remaining cooking period or until the time for eating. Food can even be kept warm for up to 6 hours if people return home late from the field or the market.

- Only using as much firewood as needed: One simple meal can usually be prepared with between three and six sticks of firewood. It is best to start with three sticks and remove one as soon as the food is boiling, so that the food will simmer until cooked. This both conserves firewood and results in the food being more healthy and nutritious;

Kitchen Management Techniques

Learning

"There is potential for men to take a more active role in firewood and kitchen management, and in the decision to buy better stoves for women." – *Francisco Munde (Concern Universal), Stove Camp Participant*

Before cooking:

- Planning ahead to cook meals for all members of the household at the same time;
- Keeping all utensils needed for cooking nearby and ready for use; and
- Preparing all the food being cooked before lighting the fire:
- Soaking peas and beans for several hours before cooking,
- Tenderizing meat and fish before cooking,
- Cutting meat, fish, etc. into small pieces, and
- Cutting staples such as potatoes and cassavas into small pieces.

During cooking:

- Mixing together foods in one pot if they will be mixed after cooking;
- Using pot lids while cooking to retain heat and keep out dust and ash;
- Cooking all dishes for the meal one after the other so the stove does not get cold;
- Not overcooking food;
- Using as little water as possible for cooking (having more water than necessary means taking longer to boil the water and wasting time and firewood); and
- Cooking last nsima and foods for boiling so that after the water comes to a boil, sticks of firewood can be removed as the food can be cooked with less heat.

Why Dry?

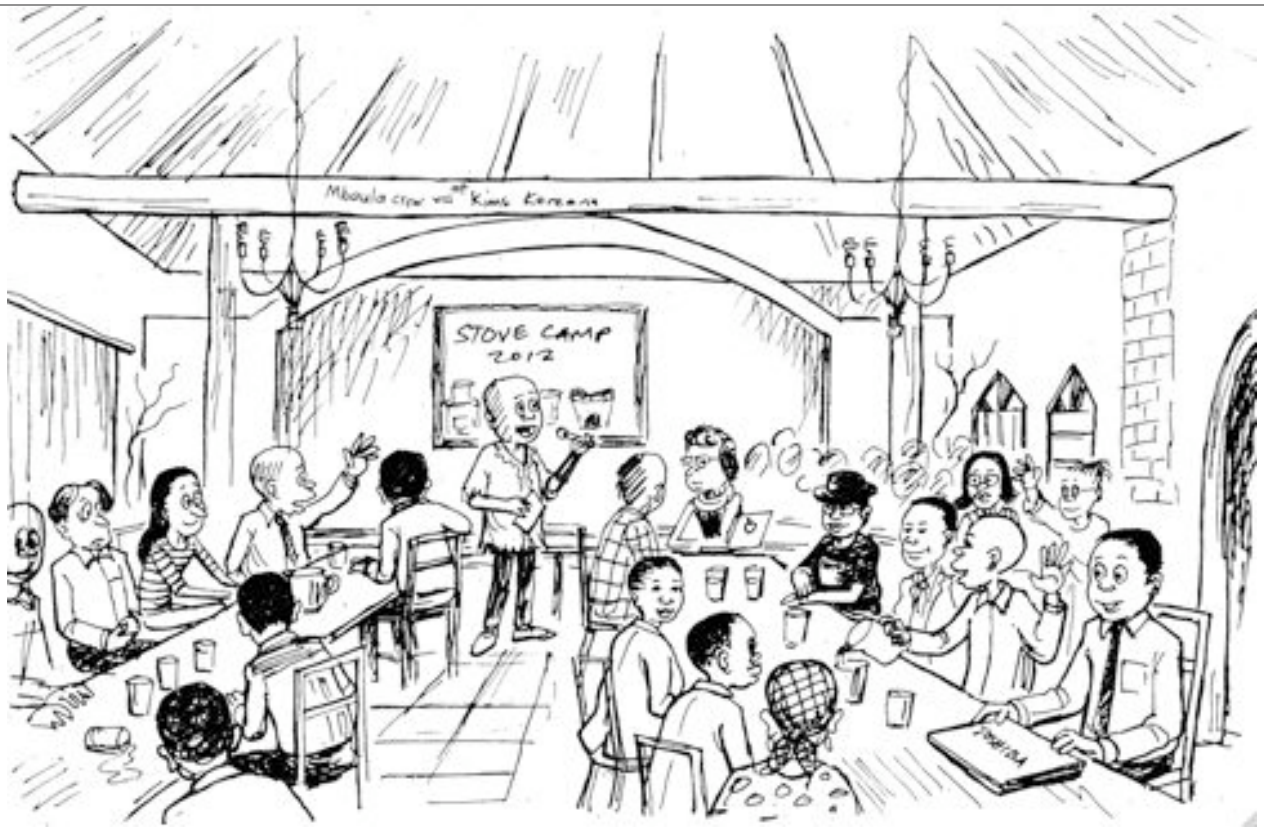
Some communities prefer to use wet firewood because they say it lasts longer than dry firewood. When firewood is wet, a significant percentage of the energy it contains will go towards drying the wood before it can be burned properly. Not only does this take a longer time, but less energy is available for the actual cooking.

6 - Conclusion

The PCIA-DISCOVER Stove Camp was a successful four-day event which drew on experiences from producers, promoters, government and donors to achieve all of the objectives outlined on its first day – and more! The final day of the stove camp saw the signing on to the Global Alliance for Clean Cookstoves by representatives of various organisations and the launch of MBAULA – Movement for Bio-energy Advocacy, Utilization, Learning and Action – a network for producers, implementers and stakeholders in improved biomass cookstoves in Malawi.

There was a consensus built to collaborate in addressing the issues surrounding biomass energy use in Malawi, and address the needs highlighted during the stove camp. These include the need for advocacy and good product placement of improved cookstoves in shops, markets and stores throughout Malawi; good monitoring of stove efficiency over time, eventual research into the health benefits of using improved cookstoves to reduce indoor air pollution; and collaborating on a new serial numbering system for stoves, better cost structures for producers, and improved system for tracking stove users who move houses from time to time.

The message of stove camp participants is clear: Biomass energy is here to stay – and renewable if we manage it appropriately. Approximately 96% of household energy in Malawi comes from solid biomass, with each household using approximately 10kg of wood per day. Smoke is a silent killer in the kitchens, so this biomass use is seriously affecting not only our climate and environment, but also our health. If each household can adopt one of the clean cooking technologies which are already available, we could save over 50% of firewood and make Malawi cleaner and healthier. To do this we need a change in mind-set, cleaner cooking in Malawi's three million households, political buy-in, financial support, and more players to join in these efforts.



Over 80 people from 39 organisations produced an interesting discussion and succeeded in enhancing awareness and improving understanding among stakeholders about the importance of biomass energy and improved cookstoves.

Annex 1: Stove Camp Agenda

Topics for Presentation, Discussion and Action at Stove Camp included:

- How biomass burns and implications for cookstove design
- Health effects of indoor air pollution and importance of kitchen ventilation
- Links between stoves and other sectors
- Importance of quality control and cookstove standards
- Stove Pricing
- Carbon markets and opportunities for improved cookstove projects
- Need for serial numbers and monitoring of stoves
- Stove testing: Controlled Cooking, Water Boiling and other tests

The full agenda and presentations may be viewed or downloaded from:
www.renewnablemalawi.org/knowtrans_stovecamp2012_docs.htm

More information on MBAULA can be sourced at www.renewnablemalawi.org/networks/MBAULA.

Annex 2: Stove Camp Facilitators, Participants & Open-day attendees

Facilitators & Trainers: Dr. CAPS Msukwa and Dekiwe Katsonga (DETAS), Dr. Magi Matinga (University of Johannesburg), Christa Roth (Food and Fuel Consultants), Jackson Mutegeki (Centre for Research in Energy and Energy Conservation, Uganda).

Speakers: Gloria Chaonamwene (Malawi Bureau of Standards), Norman Lufesi (Community Health Services Unit, Ministry of Health), Senard Mwale and Mwiriha Kapondamgaga (DISCOVER, Project Management Unit), Conor Fox (Clioma Ltd.), Yamungu Botha and Macfary Kapanga (Concern Universal), Martina Kunert (Renew'N'Able Malawi)

Stove Camp Participants:

Centre for Environmental Policy & Advocacy (CEPA)	Jackie Nankunda
Charles Construction	Charles Mlose
Christian Aid	Boniface Thawapo
Clioma Ltd.	Conor Fox, Cristel Cheong, Elizabeth Nyirenda
Concern Universal (CU)	Blackson Kumwela, Deborah Gondwe, Ellena Mphongozidana, Francisco Munde, Howard Banda, James Kachidiku, Langster Mchekalenso, Lusungu Ngulube, Macfary Kapanga, Maureen Musukwa, Yamungu Botha
Cooperazione Internazionale (COOPI)	Ben Namanya, Denis Kazembe, Joseph Joram, Linely Linachi
DISCOVER Project Management Office	Mwiriha Kapondamgaga
Eva de Maya	Brian Smyser (US Embassy), Ntula Mhango
Goal Malawi	Dorica Chibota
Hestian Rural Innovation Development (HRID)	Maggie Kaunde, Mirriam Phiri
Kauma Stove Company	Alfred Chisale
Malawi Bureau of Standards	Gloria Chaonamwene, Stephen Massah Kuyeli
Mary's Meals	Geofrey Tamayenda
MOBI+LISE	Nathaniel Nthala
Mulanje Renewable Energy Agency (MuREA)	Martin Ketembo, Vincent Gondwe
National Commission for Science & Technology	Fredrick Munthali
Phukaphuka	Aaron Kalamule, Isaac Salima
Renew'N'Able Malawi	Martina Kunert
Self Help Africa	Chimwemwe Mwafongo, Hope Chafutsa, Lovemore Chikalenda
Total Land Care	Hetherwick Mwale

Open-Day Attendees (not including stove camp participants and facilitators)

African Institute of Corporate Citizenship	Noel Msukwa Sangole
Care Malawi	Modester Nyirenda
Chokoma Pusepa Project - Salima	Davidson Katunga
Community Health Services Unit, Ministry of Health	Norman Lufesi
Concern Worldwide	Raphael Nkane, Akusitu Kaitano, Patricia Saukila
Concern Universal	Robin Todd
Cooperazione Internazionale	Alex Castellano
Department for International Development, UK	Donald Kamdonyo
Environment Africa	Barbara Banda
European Union	Simon Chirambo
Farmers Union of Malawi	Sungeni Ng'onamo
Food & Nutrition Consultant	Charlotte Warford
Goal Malawi	Ken McCarthy
Hestian Rural Innovation Development	Faith Chirwa, Faith Khonje
Irish Aid - Embassy of Ireland	Adrian Fitzgerald
Masomphenya Owala Group - Salima	Kenneth Botha, Nellie Chizenga
Mwanawaleza Ltd.	Marcel Westdijh
Oxfam	John Makina
Revel Innovation Ltd.	John Cass
Royal Norwegian Embassy	Monica Stensland
Self Help Africa	Amos Zaindi
Total Land Care	Macdonald Mlozi
United Nations Development Program	Blessings Mwale, Henry Sibanda, Michael Mmangisa
United States Embassy	Frank Kasonga, Sarah Oddo
USAID	Madalitso Chisale
World Food Program	Pamela Kuwali

Media: Elita Nkalo (Capital Radio), Jacob Nankhonya (The Daily Times), Sibangile Zgambo (Zodiak Radio)