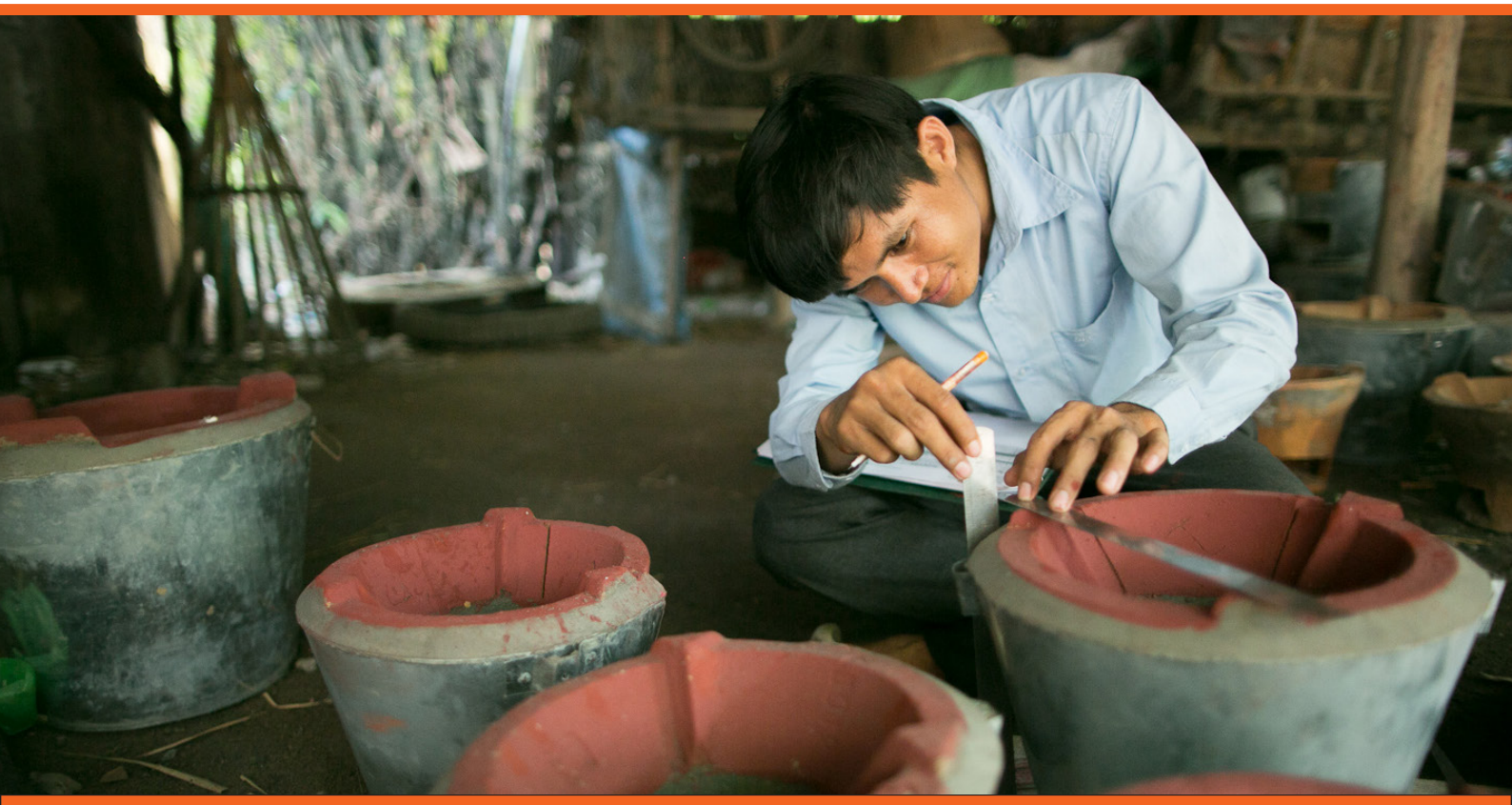
SMART VILLAGES
New thinking for off-grid communities worldwide

Sustainable Dissemination of Improved Cookstoves: Lessons from Southeast Asia



Workshop Report 13

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Smart Villages

We aim to provide policymakers, donors, and development agencies concerned with rural energy access with new insights on the real barriers to energy access in villages in developing countries—technological, financial and political—and how they can be overcome. We have chosen to focus on remote off-grid villages, where local solutions (home- or institution-based systems and mini-grids) are both more realistic and cheaper than national grid extension. Our concern is to ensure that energy access results in development and the creation of 'smart villages' in which many of the benefits of life in modern societies are available to rural communities.

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Summary

Despite substantial progress on achieving universal electricity access in the region, almost half the population in Southeast Asia continues to rely primarily on biomass to meet their cooking needs. On 2 December 2015, the Smart Villages Initiative together with GERES, Myanmar organised a regional workshop in Yangon, Myanmar to gather lessons about the sustainable dissemination of improved cookstoves. This was an important event in the Smart Villages Initiative's ongoing programme of events as it was the first time that the issue of improved cookstoves dissemination in rural areas had been addressed. The workshop brought together participants from Cambodia, Myanmar, the Philippines, Lao People's Democratic Republic (Lao PDR), and Vietnam.

The workshop garnered substantial interest among a wide range of stakeholders including representatives from the public sector, the donor community, non-governmental organisations (NGOs), the private sector, and academia. Workshop participants were informed about the efforts of the Myanmar government to ensure the sustainability of forest resources. The dissemination of improved cookstoves is one the main strategies being implemented nationally to improve environmental sustainability. While recognising that improved cookstoves reduce the amount of fuelwood gathered from forests, there was debate about the extent to which cooking is responsible for deforestation, and a call for better data to be gathered.

Within Southeast Asia there are a number of country-level initiatives that are aimed at the dissemination of improved cookstoves. Many of these initiatives, for example in Cambodia, Lao PDR, and Myanmar, are supported by international donors like the European Union. In Indonesia the World Bank has been working closely with the Indonesian government to support the dissemination of high-quality improved cookstoves.

A common theme to emerge in all these programmes is that they aim to take a holistic approach to the dissemination of improved cookstoves. Such an integrated strategy, though time consuming, includes the following common elements: providing technical support to cookstove producers to develop technical

John Holmes in discussion with Georgi Dzhartov and George Dura

expertise to develop products of uniform quality; ensuring affordability of the product especially for rural consumers who are very cost-conscious; running training programmes for potential cookstove producers and artisans; and, lastly, developing the local cookstove value chains by providing well-targeted financial and managerial support to actors at each stage of the value chain including producers, wholesalers, retailers and end-users. When designing initiatives, close attention should be given to the sustainability and scale-up of sales and the use of improved cookstoves after projects have ended. This requires the establishment of an effective ecosystem of value chain actors operating within a supportive framework.

The absence of enforceable standards and local stove testing facilities have been problematic for stakeholders across Southeast Asia involved in improved cookstove dissemination programmes. International and local NGOs have worked with national governments to develop such standards and facilities, which are vital in order to monitor the quality of improved cookstoves available in the market and to ensure that there is evidence of their benefits to present to local and international stakeholders, not least to support access to carbon credits and results-based financing. Testing methodologies need to recognise potential differences between performance in the laboratory and the home, and that the quality of manufactured products may deteriorate over time requiring repeat testing and accreditation.

A key lesson to emerge from the workshop is the importance of designing and promoting improved cookstoves that are in sync with the cooking requirements of the local population. If products do not meet the needs of consumers, their adoption is going to be much lower than expected and the impact of dissemination programmes is likely to be lower than desired. Also, people tend to how a low awareness of the benefits of cookstoves for health and time saving, and awareness raising initiatives continue to be needed. Another important lesson is that gender must be mainstreamed in improved cookstove dissemination programmes, and women's voices should be brought to the fore: women are key agents in household cooking practices and most at risk of being affected by indoor air pollution. Women's groups and unions can play a key role.

Introduction

The Smart Villages Initiative continued its engagement in Southeast Asia with a regional workshop held in Yangon, Myanmar on 2 December 2015. The workshop focused on the sustainable dissemination of improved cookstoves in the Southeast Asian region. It was co-organised with GERES, Myanmar, an NGO with extensive experience in the improved cookstove sector in Southeast Asia.

The workshop brought together more than 60 relevant stakeholders from across the region involved in the improved cookstoves sector in Southeast Asia. Participants came from Cambodia, Indonesia, Myanmar, Lao PDR, the Philippines, and Vietnam. It provided a forum for animated and fruitful discussions with important learning points for the Smart Villages Initiative and the participants.

This report summarises key points arising from the presentations and discussions. Copies of the presentations are available on the Smart Villages website (www.e4sv.org). A background paper was prepared by the Smart Villages team summarising key aspects of the energy situation in Southeast Asia, focusing on the cookstove sector. This report can also be accessed on the website. The workshop agenda and the list of participants along with their organisational affiliations are provided in Annexes 1 and 2 of this report respectively.

Session 1

Opening speech

U Khin Maung Yee, Ministry of Environmental Conservation and Forestry

U Khin Maung Yee, the Permanent Secretary of the Ministry of Environmental Conservation and Forestry opened the Smart Villages Initiative's workshop on cookstoves in Southeast Asia. He expressed his great pleasure and honour in opening this international workshop on a topic that affects almost half of the population of Southeast Asia. It is this continued dependence on biomass and traditional cookstoves that contributes to negative economic, social, health, and environmental impacts. It is through approaches such as the Smart Villages Initiative that a clean and green environment can be fostered.

The situation in Myanmar is similar to many other developing countries, with biomass playing an important role for both rural and urban areas as an essential source of cooking energy. With the annual consumption rate of fuelwood per rural household being estimated at 2.5 cubic tonnes, increasing fuelwood requirements presents a significant challenge to the sustainability of forest resources and to climate change mitigation and adaptation. The Ministry of Environmental Conservation and Forestry has a three-pronged approach: reducing the total biomass energy consumption from its current 76% of total annual energy consumption in Myanmar to 58% by 2020 and to 46% by 2030; supplying 25% of fuelwood needs through forest plantations and through reforestation; and distributing efficient cookstoves.

Distributing efficient cookstoves is an effective approach as an improved cookstove can be up to 40% more efficient than traditional open-fire cooking or self-made stoves. This can result in into up to one cubic tonne of fuelwood being saved per rural household per year. The Forest Research Institute of Myanmar has been producing and distributing A1 efficient cookstoves since the 1990s. Distribution is currently being conducted through the Ministry's own programmes, as well as through collaborating with NGOs.

U Khin Maung Yee concluded his opening speech with a call for change to a green growth approach that can make real progress towards sustainable development and poverty reduction. To this end, he expressed his appreciation to the Smart Villages Initiative for organising this important and topical workshop on improved cookstoves in Southeast Asia.

Keynote address

U Kyaw Kyaw Lwin, Ministry of Environmental Conservation and Forestry

U Kyaw Kyaw Lwin began his keynote address by emphasising that the common goal of our world is to achieve sustainable development. In order to achieve sustainable development, it is important to use our natural resources efficiently and reduce our negative environmental impacts. The Myanmar government is aware of this and takes an integrated approach to advance sustainable rural development. Its approach is reflected in the enabling frameworks of the Myanmar National Environmental Policy, Myanmar Agenda 21 and the National Sustainable Development Strategy.

Achieving sustainable development in Myanmar requires the maintenance of forest ecosystems. It is therefore imperative that Myanmar's forests are conserved. Fuelwood consumption is a major challenge to this, with annual fuelwood consumption estimated at 16.54 million cubic tonnes or 76.6% of total energy consumption for the whole country. To tackle this, the 30-year National Forest Master Plan aims to reduce the share of fuelwood to

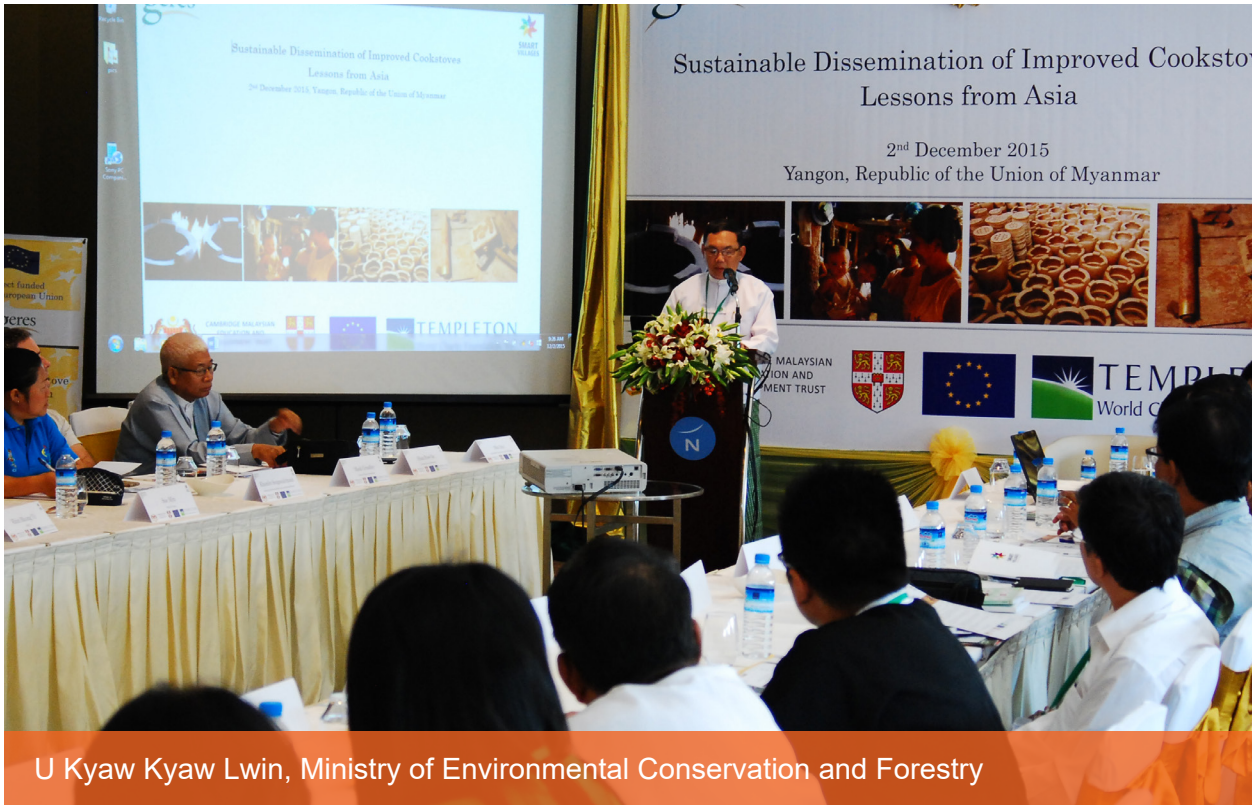
58% in 2020 and 46% in 2030. Recognising the important role of fuelwood in people's livelihoods, the Forest Department has implemented a multi-pronged and gradual approach. This approach consists of establishing fuelwood plantations, community forestry, agroforestry and farm forestry, while conserving natural forests and promoting the utilisation of efficient cookstoves.

U Kyaw Kyaw Lwin stressed the importance of an integrated approach to achieve sustainable rural development such as the concept of Smart Villages . In order for sustainable rural development to become a reality, however, he stressed the need to learn from the many valuable lessons and experiences in Southeast Asia with regards to improved cookstoves and their impact on environmental sustainability. U Kyaw Kyaw Lwin finished on a positive note emphasising his firm belief that by utilising efficient cookstoves, rural populations can reduce their fuelwood consumption and witness a host of benefits, such as saving time and money and improving health.

Opening Remarks

George Dura, European Union Delegation, Myanmar

George Dura spoke on behalf of the Delegation of the European Union (EU) to Myanmar and began by welcoming the efforts of the Smart Villages Initiative to increase the sustainable dissemination of improved cookstoves in Southeast Asia. He reiterated the importance of efficient cookstoves in countries such as Myanmar, where 2014 census data suggests 81% of households used fuelwood for cooking. In addition to the health benefits of improved cookstoves, they can reduce deforestation as reduced fuel consumption translates into less tree cutting. Reduced deforestation, in turn, would help combat climate change, which is a particularly important issue in Myanmar where communities are often poorly equipped to deal with extreme climate events. This is emphasized by Myanmar's rank as the second most vulnerable country in the world to climate change after adjusting for coping capacity.



U Kyaw Kyaw Lwin, Ministry of Environmental Conservation and Forestry

He also took the opportunity to explain the EU funded project: "Upscaling improved cookstove dissemination in Myanmar through replication of best practices from Cambodia and the region." Initiated in early 2014, the project is funded by the EU SWITCH-Asia programme, which aims to promote sustainable consumption and production in Asia. Specifically, the project aims to catalyse the improved cookstoves sector in Myanmar through an integrated approach to achieve higher added value for the local private sector, standardise the market and ensure product quality control, increase access to improved cookstoves markets, and inform policymakers' decision making.

George Dura voiced his hope for a sustainable development model that will achieve inclusive economic prosperity and environmental preservation and emphasised the role of advancing improved cookstoves within this. He concluded with the hope that the Smart Villages Initiative workshop would translate into tangible policy recommendations for Myanmar and the region.

The smart village concept

John Holmes, Smart Villages Initiative

John Holmes introduced the concept of smart villages as a rural analogue to smart cities. In smart villages, access to modern energy acts as a catalyst enabling the provision of key services, such as health, education, clean water and sanitation, and the productive use of energy, which brings additional income into the village and enables progression up the energy and development ladders.

The Smart Villages Initiative aims to provide policymakers, donors, and development agencies concerned with rural energy access with new insights on the real barriers to energy access in villages in developing countries— technological, financial, social and political—and how they can be overcome. This will be achieved through a three-year period of workshops and follow-up engagement activities in six regions (East and West Africa, South and Southeast Asia, and Central and South America) that bring together the diverse set of players—scientists and engineers, entrepreneurs, villagers and civil society organisations, NGOs, financiers, policymakers and regulators—who are actively involved in addressing the challenges of village energy for development.

Improved cookstoves can make an important contribution to achieving the smart villages vision. Currently, three billion people cook their food on open fires and simple stoves that burn solid fuels. 4.3 million people die prematurely each year due to indoor air pollution from cooking, and 25% of black carbon emissions come from burning solid fuels for household energy needs. The annual cost to health, the environment, and economies in the developing world because of solid fuel use for cooking is estimated to be US$123 billion. Improved cookstoves can do much to address these startling numbers through improving health outcomes due to reduced air pollution, saving time and money for households through improved fuel efficiency, reducing pressure on deforestation and black carbon emissions, creating employment opportunities, and empowering women.

John Holmes concluded by stating the aim of the Smart Villages Initiative's cookstoves workshop: to learn from experience in Myanmar and South East Asia and to inform policymakers and development agencies what more needs to be done to support the deployment of improved cookstoves in Southeast Asia.

Sustainable dissemination of improved cookstoves in Myanmar

Georgi Dzhartov, GERES

Georgi Dzhartov, the Myanmar country representative for GERES, presented on the SCALE (Strengthening improved Cookstove Access towards a better quality of Life and Environment)

project funded by the European Union and undertaken with support from the Myanmar Forest Research Institute and the Ministry of Environmental Conservation and Forestry. The project draws on best practices from Cambodia, where three million cookstoves were disseminated and the wider Southeast Asia region. Its objective is to catalyse the improved cookstove sector in Myanmar through an integrated approach to achieve add value to the local private sector, control product quality, improve access to improved cookstove markets, and inform policymakers' decision making.

In the first phase of the project in 2014, a stove testing and development facility at the Myanmar Forest Research Institute was established along with the drafting of a generic cookstove standard together with the Forest Research Institute and the Ministry of Environmental Conservation and Forestry. The cookstove standard is based on the A1 design with the first test batches produced and emissions tested in 2015. A stove-market assessment and baseline socio-economic survey were also commissioned in 2014. The second phase of the project in 2015 saw the assessment of policies and financial services (including the role of the informal sector), the ongoing drafting of a Strategic Action Plan and a Gender Action Plan as well as the selection of producers and technical and business training.

Session 2: Standardisation of improved cookstoves: Lessons from the field

Khamlet Sengsoulchanh and Ananh Xiayavaong, ARMI

The presentation on improved cookstoves (ICS) in Lao PDR by the Association for Rural Mobilisation and Improvement (ARMI) comprised two parts: the first provided an overview of a current initiative to distribute cookstoves in five provinces, and the second summarised lessons from the field in respect of standardisation of improved cookstoves.

Introducing the ICS initiative in Lao PDR, Ananh Xiayavaong and Khamlet Sengsoulchanh informed participants that it is funded by the European Union and is being undertaken over a 48-month period from 2013 to 2017. It aims to contribute to poverty alleviation, and seven outcomes are planned:

- 15 SMEs will be established producing 100,000 high quality ICS: so far, 19 producers have been established (of which seven are managed by women), which have produced 63,415 stoves.
- 150 SME retailers will be created and promote successfully ICS with improved marketing strategies: so far, 733 retailers have been established (of which 675 are owned by women).
- Lao Women's Unions in each of the five target provinces will act as effective promotional partners: so far, Women's Unions in three provinces are active.
- Access to clean and efficient ICS will be improved: the stoves are available and delivered to retailers at 35-50,000 KIP (US$4.50-6.00).
- Five testing agencies operational providing independent quality labelling: three laboratories have been established.
- National quality standard and trademark will be established: this was endorsed by the Ministry of Science and Technology in 2015.

- Multi-stakeholder partnership will be established involving stove producers, retailers, financiers, and authorities: in place in each province and holding monthly meetings for consultation, problem solving and experience sharing.

With regard to cookstove standardisation, testing facilities have been established and will test three stoves from each producer each month. A quality assurance and quality control system has been established comprising a three-stage process: producer accreditation, quality monitoring and corrective action. The producer accreditation stage ensures that producers can consistently make cookstoves to the quality standards. Key tests of quality standards include cookstoves that are produced to standard dimensions and pass the "adapted water boiling test". If a producer fails at the quality monitoring stage then refresher training is given.

Lessons learned so far from the field include:

- There can be challenges in sourcing raw materials of appropriate quality, for example clay in the dry season.
- New workers have to be trained.
- It can be difficult to ensure that cookstoves are produced to standard dimensions and quality over time.
- Consistent testing standards between testing centres need to be established and maintained.

There has been substantial progress: quality assurance certificates were issued to all ICS producers in August 2015 based on the testing protocols that have been established. Production and sales have gone up with increasing awareness and understanding of ICS throughout the value chain. Key factors in the success have been creating good relationships and building capacity.

Chen Cheth, GERES Cambodia

Reflecting on experience in Cambodia, Chen Cheth explained that production of the New Lao Stove had benefited from a voluntary carbon credit over the ten-year period 2003 to 2013. By contrast with traditional cookstoves, the New Lao Cookstove has a regular combustion chamber volume and a set number (37) of grate holes (improving combustion performance), a smaller gap at the pot rest (reducing heat losses), a full metal cover, and thicker insulation (reducing heat losses).

Evaluation of the fuel/greenhouse gas emission savings in order to gain carbon finance was done through laboratory tests (the adapted water boiling test) and field tests (the household fuel consumption test). Demonstrating consistent quality was important to achieve carbon finance. Quality monitoring is undertaken every 120 days, evaluating consistency with standard stove dimensions and performance through the adapted water boiling test. GERES has provided technical assistance to producers of New Lao Cookstoves through quality assurance and quality control support ensuring that stoves conform to the specification.

The following lessons have been learned from experience in Cambodia:

- There has been a high turnover of skilled workers, and most producers do not have the capacity to properly train new staff, sometimes assigning them to the production line without adequate training. Support has been provided through refresher training for skilled workers.
- Some producers cannot get raw materials (especially clay) of similar specifications all the time. Consequently, the mould must be adjusted in light of changed shrinkage characteristics in order to continue to meet the standard.

Chen Cheth, Improved Cookstoves Project Manager

- Challenges can arise if the production site is moved to a new location, particularly in respect of raw material supplies and the availability of skilled workers.

- As demand increases, there is a danger that producers relax their quality standards to increase production.

- Some moulds and templates are easily worn out within relatively short periods of utilisation: most cookstove produces were not aware that such worn out moulds and templates needed replacement or adjustments.

Chen Cheth concluded by indicating that if stoves are not produced to the standard, customers cannot be sure of quality, performance is difficult to monitor, fuel savings cannot be calculated correctly, and consequently CO2 emission reductions and the associated carbon credits cannot be claimed.

Ramil Allan Perez, PCWS

The aim of the Philippine Centre for Water and Sanitation (PCWS) is to bring clean water and sanitation to people in the Philippines through technologies and approaches that respect ecosystems and empower people. It has developed a low-cost alternative wastewater treatment system for communities and households, which includes a biogas digester, baffled reactor, anaerobic filter, gravel filter, and pond. Ramil explained that the biogas digester accepts solid and liquid wastes and prevents pollution of water bodies and ecosystems. The system produces a steady supply of biogas for cooking.

The biogas digesters can be designed in various sizes and capacities and can be built above or below ground according to user preferences. They use ferro-cement technology, which costs 65-85% less than conventional concrete construction. Reusable moulds make replication easier and cheaper, and curved shapes make the structure stronger. The

reusable mould sets cost 1000-2000 Philippine pesos per cubic metre (US $20-40), and the construction of the biogas digester costs 3000-4000 Philippine pesos per cubic metre (US$60-80). Five biogas digesters have been constructed in four provinces of the Philippines. The intention is to build 70.

A key advantage of the biogas digester system is that it uses bio-degradable matter such as kitchen waste, animal waste, etc. to produce methane gas which provides a clean burning flame for cooking. This reduces the need to cut down trees for fuel. The construction method is simple, and making and installing the biogas digester systems is a potential social enterprise creating new jobs in the community.

Ongoing issues and concerns include:

- The cost of the biogas digester systems may be beyond the reach of poor communities.
- Sanitation is often not a priority.
- There may be land tenure issues especially in poor urban areas.
- The cultural mind-set may not be accepting of harvesting biogas from human and animal wastes.

Low-cost projects are sometimes not attractive to local governments (which prefer big-ticket projects).

Q&A session

A lively question and answer session followed the three presentations. In response to a question about the biogas digesters, Ramil Allan Perez explained how they are constructed and indicated that most have been built underground. There is an external access point, which means that dung from animals can be added to the digester. Typically, the digesters serve a cluster of six households and are undertaken as a community project. The Philippine Centre for Water and Sanitation offers the help of a technical engineer who provides advice on the construction of the digesters.

With regard to how producers can be motivated to move to production of quality-assured improved cookstoves, initiatives in Lao and Cambodia explain to producers the benefits, provide training, help them to access finance, and in some cases provide finance to improve their factories. In Lao PDR , an assessment in 2009 revealed that only two producers made good quality improved cookstoves: that number has now increased to 19.

In Cambodia, in order to receive carbon credits, fuel saving tests were undertaken in 35 households, for one week as a baseline and then for one week with the new stove. This enabled calculation of the carbon emission savings. The carbon credits go to support training, quality control, and capacity building rather than to subsidise the producers.

With regard to promoting improved cookstoves to households, the initiative in Cambodia has gone out to communities to tell people about the differences and the improvements. Once people can see the benefits, they will decide for themselves. In Lao PDR, the initiative has worked closely with the women's unions: women are the people who will use the stoves, and the women's unions are influential. After one year they ring to ask what has been their experience of using the improved cookstoves. The improved Lao stoves should last for 3 to 4 years.

In Nepal, access to fuel for cookstoves is an issue, so reducing the requirement for firewood through improved cookstoves is

a tangible improvement for households. If improved cookstoves are a win-win proposition for all market actors, then they will be sustainable. If not, as soon as the project stops their sale and use will peter out.

It is important for government to provide an enabling environment to ensure the long-term sustainability of interventions. In Lao PDR, the government has set up a testing agency and gives stickers to producers who manufacture quality products, which should enable them to continue to progress when project support ceases. In Cambodia the government is supporting the formation of an association that will support quality control, marketing, etc. It is important also that international development agencies are involved: they have a big leverage on governments. Local governments can also play an important role as they will support projects that benefit their locality.

There was some debate about the extent to which fuel use for cookstoves contributes to deforestation in Myanmar. GERES is undertaking a study that should generate relevant data by July 2016.

Session 3: Transition to cleaner cooking fuels and technologies: Impact on rural communities

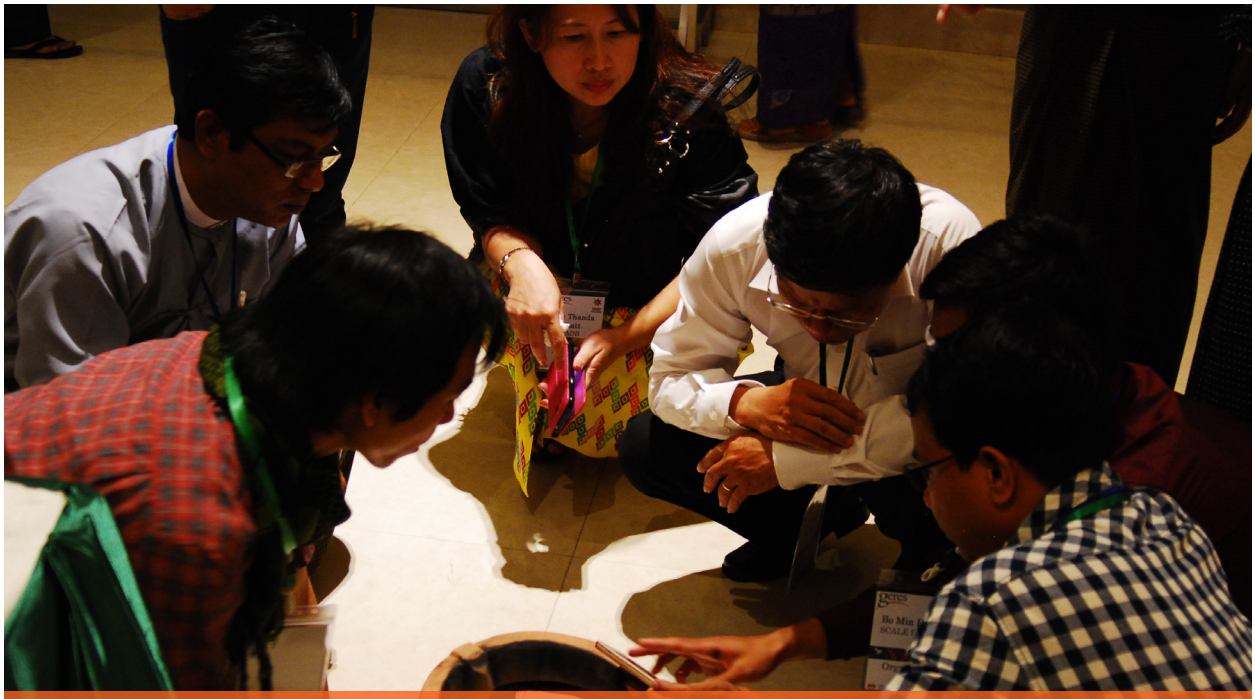
Christina Aristanti, Yayasan Dian Desa (Light of the Village Foundation)

In Indonesia, the earliest improved cookstoves programmes date back to the 1970s and started as small-scale, localised NGO initiatives. These projects had very limited success and did not have the scale required to successfully drive improved cookstove adoption by a large section of the population. Standardisation of various improved cookstove models was also missing and the quality of products was highly questionable.

To deal with these problems, Yayan Dian Desa started programmes to provide training to households to improve the construction of cookstoves. A part of the strategy also focused on the mass production of improved stove liners that could be used in conjunction with the stove body (which was manufactured by owners) so as to eliminate technical problems and bring about a certain standardisation in the cookstoves market. Based on a free-market strategy, there have also been moves to mass market the production and dissemination of improved cookstove models like the Anglo Supra and palm sugar stove liners.

In 2007, Indonesia launched a major programme to convert households using kerosene-based cookstoves to liquified petroleum gas (LPG)-based cookstoves. The programme has been extremely successful and from 2007-2012, 54 million LPG packages, which include cookstoves and cylinders, were distributed. Despite the success of the project, data collected in 2013 shows that 32% of households in the country (19.6 million households) still use biomass to meet their cooking needs. To further augment understanding of fuel choice by households, Yayan Dian Desa carried out a survey of 1400 randomly selected households in a peri-urban setting in Yogykarta. Results of the survey show that a quarter of those surveyed reported using firewood as the only fuel for cooking while almost 50% of households responded that they used both LPG as well as firewood to meet their cooking needs. This survey highlights fuel stacking by households and the importance of developing programmes for the large-scale dissemination of improved biomass based cookstoves.

In the case of biomass-based cookstoves, the Indonesian government worked on the dissemination of improved cookstoves; however, these



Workshop participants examine an improved cookstove design

projects were shelved. In 2012, the Indonesian government with the support of the World Bank aimed to launch a national programme for the dissemination of improved biomass cookstoves. The project called the Clean Cookstoves Initiative is currently at the pilot stage, and so far around 20,000 stoves have been distributed. In the medium term, the project envisages delivery of 10 million clean biomass cookstoves, while by 2030 the aim is to ensure universal access to clean cookstoves.

The Clean Stove Initiative aims to integrate the socio-cultural factors that represent the cooking habits of the target areas into the testing protocol so as to ensure adoption. The project uses a results-based financing framework which comprises three steps. The first step is aimed at defining and establishing a clean stove standard/rating system. This is followed by the development of a testing and certification protocol and the establishment of testing centres.

The development of standards is extremely important as in the past there was limited evidence about the performance of improved cookstoves. There was no stove testing facility before the Clean Stove Initiative was launched. A testing facility has now been setup in Yogykarta with technical support from Stove+ and the World Bank. The second step of the framework is based on results-based incentives. The level of subsidies has been linked to stove performance and the disbursement of subsidies is linked to the results of monitoring and verification. The monitoring and verification system looks at a number of key attributes including the number of stoves delivered, the number of stoves used for a sustained period of time, and the verification of actual stove performance.

Market aggregators will disseminate cookstoves. To receive the initial subsidy, market aggregators need to take the contact details of buyers and pass them on to the monitoring and evaluation personnel. They also need to visit the buyers after two months to ensure adoption and make sure that the performance of cookstoves in the field is consistent with laboratory results. The two-month inspection

is to be followed up by a six-month visit in order to ensure consistency and durability of the product. The distribution of subsidies is to be undertaken by banks after verification by an independent institution, in this case the Yogykarta Consumer Institution.

To be eligible for the programme, market aggregators need to be accredited according to the testing standards developed. A stove can only receive accreditation if it meets the minimum standards during the testing phase. Stoves are tested for thermal efficiency, emissions, and other attributes. Christina Aristanti informed participants that so far 14 stoves from Indonesia and other parts of the world have passed the standards test and have received accreditation.

To ensure the success of the initiative, there is a component built in for strengthening institutions and building actors' capacity in the cookstove value chain. As householders have limited information on the health impacts of using inefficient biomass based cookstoves, the project also aims to focus on an awareness raising campaign. This campaign aims to highlight cookstove emissions as a public health issue and sensitise the population about the adverse impacts, thereby driving adoption of clean cookstoves. Christina Aristanti also stressed the importance of continued public sector engagement and support to ensure the sustainability of the initiative and its long-term success in meeting the aims of the programme.

Louise Bott, SNV Lao PDR

Lao PDR has a population of 6.7 million people. A large majority of the population, around 90%, are based in rural areas and use solid biomass to meet their cooking needs in kitchens, which often have poor ventilation. Estimates suggest that household air pollution is the primary cause of almost 6,000 premature deaths annually in the country.

Louise informed the audience that in urban areas, there is a tradition of fuel stacking by consumers, and they tend to use both charcoal and firewood. The Thai Bucket stove is popular amongst urban consumers. In most traditional homes in the Lao PDR, kitchens are detached from the main house. On the other hand, in rural areas, consumers cook their food either on tripod open fires or build their own cookstoves. Kitchens are semi-detached with porous walls. This means that despite cooking being undertaken in another room, smoke permeates the living quarters.

SNV also undertook primary research for four weeks on the adoption of clean cooking stoves, in this case gasifier stove technologies. The object of this research was to understand whether the stoves meet local cooking needs. Primary research confirmed that households practice stove stacking. Consumers who were a part of the research observed that the gasifier provided easier cooking and had a positive impact on fuel consumption.

Another advanced stove called Biolite was tested in different settings including peri-urban and rural areas. The cookstove uses firewood as fuel. SNV gave the stove to some households and left it there for three weeks. Results of the research showed that 90% of recipient households used the stove daily. But there was negative feedback about the stove as it took a long time to cook the staple diet, sticky rice. Other users in the capital Vientiane, were given the ACE-1 manufactured by African Clean Energy. Results showed that users were more likely to use the ACE-1 as compared to those who were given the Biolite.

SNV also undertook a controlled cooking test of the ACE-1 and the Biolite. While there was no major change in fuel consumption, the ACE-1 performed better overall. Another study was undertaken by researchers from UC Berkley, which looked at the impact on household air

pollution, fuel usage, and consumer acceptance of improved cookstoves. The study showed that the ACE-1 had a high level of performance, contributed to fuel savings and also ensured quick cooking of food. It also showed that there was a reduction in deaths and disability adjusted life years (DALYs).

SNV has also established a manufacturers' association that targets distributors with the aim of increasing dissemination of improved cookstoves among end users. Results-based financing is being implemented to ensure sustainability and the initiative is being led by the private sector. The subsidy is given to market aggregators and is used to reduce the price of cookstoves. As dissemination projects for improved cookstoves are new, substantial efforts are required for their promotion.

Julien Jacquet, Stove+

Julien Jacquet started his presentation by providing a brief introduction to the activities of Stove+. The organisation supports and provides advice to cookstoves projects and programmes primarily in Southeast Asia and West Africa. There is a substantial impact of cookstoves on society and it remains a complex issue with multiple environmental, health and social aspects. Julien Jacquet highlighted the importance of bringing in a systems thinking approach when looking at the issue. Instead of focusing solely on the dissemination of improved cookstoves, it is important to understand the entire cooking system such as the layout of the house, cooking habits, and the kind of food that is being cooked. As there is substantial heterogeneity in the cooking and eating habits of people in different parts of the world, cookstove dissemination programmes have to ensure that they take on board the context specificity.

Biomass is likely to remain the primary fuel source for those at the bottom of the pyramid for the foreseeable future. While using biomass as fuel is not itself problematic, it is the way that the fuel is used in inefficient cookstoves that is a problem. The production of biomass-based cooking fuels like charcoal and firewood is often an important source of income for the extremely poor segments of society. Estimates suggest that the global market for firewood and charcoal has a value of US$33 billion.

Julien Jacquet also stressed that there is limited evidence regarding large scale deforestation or degradation due to firewood collection. A study by Yale University showed that in many cases, the impact is extremely localised and is context specific. The impacts on areas that are arid/semi-arid are going to be much more negative than greener areas like Southeast Asia.

The use of carbon finance for improved cookstoves programmes is also problematic, and there needs to be more research on the health impacts as well as the linkage with black carbon . Julien Jacquet concluded by stressing the importance of collecting more quality data on the cookstoves sector as many of the often-repeated statements are based on conjecture as opposed to hard evidence.

Mark Grindley, FFI

Mark Grindley talked about the experience of Flora and Fauna International (FFI) of designing and implementing a programme taking a participatory approach to deploying improved cookstoves in the Indawgyi Lake area of Kachin State in Myanmar. There are 11 different communities living around the lake, and biomass dependence is extremely high. The majority of the firewood comes from the chopping of mature Dipterocarp trees and this exploitation presents a threat to the local forest and biodiversity. Dependence on firewood collection also leaves less time for other livelihood activities and is unsustainable. Unlike most other areas, men are the ones who collect the firewood, and women are responsible for cooking.

Mark Grindley stressed the importance of demand- and supply-side solutions to dealing with the issue. While the design of stoves might be a technical issue, the use of stoves is driven by socio-cultural factors. The project therefore focused on a participatory approach that sought to work with cooks, i.e., local women. The project started with a review of the stoves currently used both in households as well as by small businesses like tea shops, restaurants, etc. The background research was extremely important as it gave an opportunity to understand the requirements of the local people. A number of focus groups were also organised to understand local requirements for improved cookstoves. The background research led to the development of the Indawgyi Stove, which was based on the requirements of the local people and was in sync with their cooking habits. The stove has a constant flow of air and uses less fuel than traditional cookstoves. It can be constructed from locally available materials including iron tripods, clay, straw, and ash. The design is robust and can be modified to meet the requirements of the household.

Improved cookstoves like rocket stoves are not able to meet the variety of needs in the project area as the size of the pot cannot be changed. For local businesses like tea shops, the original design has been modified to have three inlet channels to keep the tea warm. In the standard water boiling test, the Indawgyi Stove showed an improvement of 20% in efficiency. While rigorous data are not available, these improvements have also been witnessed in other settings. There are, however, some shortcomings as well. The Indawgyi stove is less movable than an open or three-stone stove. It does not provide heating during the winter and does not function as a social gathering point for locals.

The majority of the stoves that have been distributed to date have been free and fully funded by the project. Almost 3000 stoves have been disseminated with 1000 plus stoves distributed in the basin area. All the cookstoves have been built by users themselves or their peers. Mark Grindley observed that the 3000 cookstoves distributed will translate into savings of 870 mature trees per annum and have a positive impact on conserving the local eco-system.

Indira Shakya, ENERGIA

ENERGIA is an NGO based in the Netherlands and has been working in the fields of gender, energy, and sustainable development since 1996. It is currently focusing on three regions of the world: Latin America, Africa, and Southeast Asia. Indira Shakya informed participants that while energy poverty affects those at the bottom of the pyramid, its impact on women is disproportionately greater. Their labour is not valued, even though in most cases the activities that they undertake are highly time- and labour-intensive. Access to productive resources is also much lower for women as compared to men. They are likely not to have a voice on energy-related decisions such as buying new appliances. Women are also likely to be more affected by health risks due to cooking with solid fuels such as heart and lung diseases as well as burns.

Fuelwood collection in countries like Nepal is also the responsibility of women, and studies show that in many cases they spend on average four hours per day on cooking when using traditional cookstoves. Their consequent lack of time for other activities reduces their opportunity to engage in market employment and has a negative impact on their economic position within the household. It also reduces the leisure time available to them. Indira Shakya also identified a number of other social effects of the dependence of cooking on traditional cookstoves using biomass. An important impact is the reduced access to education due to negative health impacts of smoke inhalation and fuelwood collection. There is also an impact on poverty in urban/peri-urban areas

because scarce resources are diverted towards buying fuel for cooking.

On the experience of the biogas programme in Nepal, Indira Shakya highlighted that 300,000 biogas systems have been installed in the country. A number of advantages have come to the fore such as reduced requirement for firewood as fuel, time saving, health benefits, and operational convenience. The programme also involved women training as masons so that they could generate income. Women have also been trained in other functions including community mobilisation and training. Gender mainstreaming in improved cookstoves programmes is necessary to ensure that women's voices are brought to the fore. They should not be seen as meagre beneficiaries. Projects aimed at improving access to improved cookstoves must give them a voice as well as offer a choice to rural women.

Session 4: Breakout Groups

Developing business models for improved cookstoves and the role of stakeholders within a gender mainstreamed framework

After the presentations, the participants divided into two groups. Two moderators were selected from the participants: Nhat Quang Do from PED, Vietnam and Shoon So Oo from the World Wildlife Fund, Myanmar. The discussion session focused on developing business models for dissemination of improved cookstoves and the role of stakeholders in promoting uptake within a gender mainstreamed framework.

To structure discussion, participants were provided a list of questions as follows:

- What steps should stakeholders take to promote the development of a domestic improved cookstoves manufacturing sector?
- What financial services need to be made available across the improved cookstoves value chain to increase uptake?
- How do cooking norms, local customs, and resource availability affect the adoption of improved cookstoves?
- How do gender relations within the household affect the adoption of improved cookstoves?

Breakout Session–Group 1

Moderator: Nhat Quang Do, PED, Vietnam

The breakout group participants brought to the fore the importance of primary data collection and more research by academic institutions in order to raise stakeholders' awareness of the issues. There are a number of practical difficulties that are encountered in the development of improved cookstoves. An essential feature that is missing in many cases is that the technology is culturally inappropriate and is not in sync with the cooking habits of locals, which leads to low levels of adoption.

While participants acknowledged the value of local manufacturing of improved cookstoves, they also commented on the importance of developing technological and industrial expertise in the field of cookstove manufacturing, which is often missing in many developing countries. Governments need to support the private sector in these endeavours. Support could include allowing raw materials to be imported to manufacture better quality products. Participants stressed the importance of developing the supply chain: without the basic raw materials, the best designed cookstoves cannot be manufactured. That is one of the problems associated with manufacturing improved cookstoves in

Nhat Quang Do, PED, Vietnam

many countries of the region as a lot of the material required is not available locally and has to be imported.

There were calls for sustained long-term support to manufacturers and the development of training programmes for local stove builders, especially in rural areas. There is also a question about whether local manufacturing is more feasible than importing, as in many cases the value added by importing the stoves could be greater than undertaking local manufacturing.

For cookstove manufacturers and organisations or individuals willing to invest in setting up manufacturing facilities locally, it is important to develop mechanisms aimed at reducing financial risk. This financial support has to be extended across the entire value chain. Sharing their experience, participants from Lao PDR observed that one of the challenges facing the scale-up of improved cookstoves projects is the cost of the product, which is higher than the locally available cookstoves. At the retail level, as the cost of the local traditional cookstoves is lower, retailers are keener to stock them rather than the improved cookstoves. To deal with the problem, the local sponsors of the project, SNV, have set up a revolving fund for improved cookstove manufacturers where they can borrow money and pass the funding on to retailers so that they can stock and sell the improved cookstoves. This is seen as a way of pushing the stocking and uptake of improved cookstoves and to deal with the liquidity issues.

For consumers, paying upfront for improved cookstoves is a challenge and micro-finance institutions do not generally want to be involved in dissemination projects for improved cookstoves. Therefore, for many sponsors of improved cookstoves projects, it is important to develop in-house financing mechanisms that are aimed at retailers who can then pass credit to consumers who cannot afford upfront payment. Participants also highlighted the key role played by wholesalers as important actors in the dissemination of improved cookstoves. It is important to guarantee margins for them: this could galvanise the adoption of improved cookstoves.

In countries like Cambodia, stove manufacturers have come together and established a loan system whereby the association gives loans to members based on their requirements. Each member of the association contributes to the fund every month and can access it as per requirements. The loans can be used to expand production capacity or to improve the downstream supply chain. Industrial level production of improved cookstoves requires access to higher levels of finance, and the problem of attracting private capital is that the rate of return is quite low. Potential manufacturers are dissuaded from entering the market due to the high cost of capital and low returns. To solve this issue, subsidies are important, which amplifies the importance of government support.

There are a number of other factors that need to be understood regarding household adoption of improved cookstoves. Most important is that the cooking habits of people need to be understood and improved cookstoves should match these habits. Solutions should ideally build on the incumbent technology being used by the majority of households, otherwise uptake will remain low. Improved cookstoves have to provide some commercial benefit or fuel savings to households. People in local communities also need to be given information about the time savings that can be attributed to the adoption of improved cookstoves. Households' fuel stacking behaviour is also an important area that has to be understood. Instead of looking at the cookstove only, the cooking process needs to be seen as a part of a system where habits, power asymmetries, and household dynamics are deeply embedded.

Speaking about gender relations within the household, some participants observed that experience shows that women are likely to make their own decisions regarding the adoption of improved cookstoves. In the case of a community forest project, which has been working since 2009 and in which community members were given cookstoves free of cost, results have shown that women are likely to be more careful about the use of cookstoves. This example highlights that sustainability of improved cookstoves is driven primarily by women and if improved cookstove dissemination projects are aimed at men, the success of these projects is likely to be lower. If the price of improved cookstoves is high, then affordability is an issue. However, if women can see the benefits and they are given adequate credit support, then this will drive adoption of improved cookstoves.

Breakout Session–Group 2

Moderator: Shoon So Oo, WWF, Myanmar

The group agreed that start-up costs are a barrier to the development of a domestic improved cookstoves manufacturing sector. In order to overcome this, there was a consensus on the need for the government to create an incubator for start-up firms in the sector. The second point made by the group was that demand and supply have to go together in order for a domestic improved cookstoves manufacturing sector to be sustainable. The government should play a large role in this by establishing standards and quality controls as well as creating demand through raising awareness. The largest barrier to demand was seen to be the cost associated with improved cookstoves, as firewood tends to not be monetized in rural areas. Importantly, the group was in agreement that improved cookstoves should not be given out for free as households will take the cookstoves but not use them properly. Lastly, a point was made that manufacturers need to provide an after-sales service.

With regard to the second question, the discussion focused primary on financial services for the end users: the rural poor. Group members stressed the need for a balancing act with prices being affordable for the rural poor while being high enough for producers to operate with healthy profit margins. Suggestions from the

group included clamping down on organisations currently giving out improved cookstoves for free while advocating for a targeted subsidy for end users to purchase improved cookstoves. The targeted subsidy, however, would need to have robust selection criteria. The potential for carbon credits to stimulate the market was debated with doubt being cast on their potential impact on the sector due to the high transaction costs involved.

Put simply, the group stated in response to the third question that if the cookstove does not suit cooking norms and local customs, it will not be used. Participants mentioned that cookstoves fulfil other needs beyond cooking, such as providing light and heat and repelling insects. Furthermore, many rural households have a preference for their cookstoves to emit a strong flame. Issues of improved cookstoves being unable to cook certain foods were mentioned. All of this pointed towards the need for more localisation of improved cookstove design.

Finally, participants reflected on the observation that generally men do not cook in rural areas in Southeast Asia. There was some agreement, however, that if cooking took less time more men would participate. A significant issue brought up by the group was that dissemination of information on all new technologies is provided to men. In the case of improved cookstoves, this results in men gaining the information but not passing it onto women—the actual end users. As a result, women find improved cookstoves difficult to use and, consequently, do not use them. A suggestion was made to stress the health impacts that improved cookstoves have on children to get the men sufficiently interested so as to pass information to women. A stronger solution of using “middle-women” instead of middlemen by having women disseminate information to other women was advanced as a more effective solution. This solution could harness pre-existing networks in rural areas.

Session 5: Concluding Session

Summary and concluding comments

John Holmes, Smart Villages Initiative

John Holmes began his concluding comments by thanking the presenters and workshop participants for their valuable contributions. The day had been information rich: too much to attempt a comprehensive summary. Rather, he highlighted what were for him a few key "take home" points as follows:

- Testing of the performance of cookstoves is important and methodologies need to recognise the potential differences between what is measured in the laboratory and the reality of practices in the home: stove design is technical, whereas stove use is socio-cultural. We should think in terms of cooking systems rather than just cookstoves.
- Ensuring the quality of cookstoves and their consistency of manufacture over time requires ongoing performance monitoring supported by standards that are effectively enforced.
- Mechanisms also need to be in place to enable practical experience with the use of cookstoves and of the needs of households to be translated directly into improved designs through an organic process of design modification.
- Key issues are ensuring the sustainability of the sales and use of improved cookstoves after projects or interventions have ended, and providing for scale up of the deployment of improved cookstoves. Establishing an effective ecosystem of local entrepreneurs and market aggregators operating within a supportive framework is the best bet for addressing these issues.
- Levels of awareness of the negative health impacts of traditional cookstoves are low, even among some local doctors: there is consequently an important continuing role for initiatives to raise awareness.
- There are several areas where more research and better evidence are needed, including exposure of householders to smoke inhalation and environmental impacts and in particular forest degradation. Research and better evidence to support applications for financing is also needed, for example, for results-based funding schemes and carbon finance.
- A proactive approach is needed on gender recognising that women are key agents in household cooking practices and are most vulnerable to the negative health impacts of traditional cookstoves.

John Holmes finished his summing up by thanking GERES for its invaluable partnership in organising and running the workshop.

Annex 1: Workshop agenda

Wednesday, 02 December 2015

0830 **Registration**

Session 1

0915 **Opening speech**

U Khin Maung Yee, Permanent Secretary, Ministry of Environmental Conservation and Forestry

0930 **Key note address**

U Kyaw Kyaw Lwin, Deputy Director General, Forest Department, Ministry of Environmental Conservation and Forestry

0945 **Opening remarks**

George Dura, Deputy Head (Cooperation), EUD in Myanmar

1000 **Smart Villages concept**

John Holmes, Co-Leader, Smart Villages Initiative (SVI)

1015 **Sustainable dissemination of improved cookstoves in Myanmar, Georgi Dzhartov, Country Representative, GERES in Myanmar**

1030 **Break**

Session 2: Standardisation of improved cookstoves: Lessons from the field

1115 Ananh Xaiyavong/ Khamlet Sengsoulchanh (Association for Rural Mobilisation and Improvement, Laos)

Chen Cheth (GERES, Cambodia)

Ramil Allan Perez (Philippine Centre for Water and Sanitation, Philippines)

Q&A session

1230 **Lunch**

Session 3: Transition to cleaner cooking fuels and technologies: Impact on rural communities

1345 Christina Aristanti (YDD, Indonesia)

Louise Bott (SNV, Laos)

Julien Jacquet (Stove +)

Mark E. Grindley (Flora and Fauna International, Myanmar)

Indira Shakya (ENERGIA, Nepal)

1500 **Break**

Session 4: Breakout Groups

1530 **Breakout groups and plenary feedback: Developing sustainable business models for improved cookstoves and The role of stakeholders within a gender-mainstreamed framework**

Session 5: Concluding Session

1700 **Summary and Concluding Comments**

John Holmes, Smart Villages Initiative

Annex 2: List of participants

Name	Organisation
Khamlet Sengsoulchanh	Association for Rural Mobilisation and Improvement, Laos
Ananh Yaiyavong	Association for Rural Mobilisation and Improvement, Laos
Dr M. Tayyab Safdar	University of Cambridge and Smart Villages, UK
Seint Sandar Hlaing	Agency for Technical Cooperation and Development, Myanmar
U Hla Myo	Master of Ceremony
Dr John Holmes	University of Oxford and Smart Villages, UK
Dr Terry van Gevelt	University of Cambridge and Smart Villages, UK
U Soe Min	Forest Resource Environment Development & Conservation Association
U Khin Maung Yi	World Health Organisation, Myanmar
U Min Swe	Border Areas, Development Association
Oliria Franck	European Union
U Myo Lwin	Early Childhood Development
Wing Aung	Blue Moon Fund
Julien Jacquet	Stove+, Cambodia
Phyo Min Swe	GRET, Myanmar
Dr Kyaw Khaing	Ministry of Health, Myanmar
Yin Yin Aung	World Vision, Myanmar
Nilar Shwe	Care International, Myanmar
Htun Paw Oo	Myanmar Forest Association
Soe Min	Wo orld Vision, Myanmar
Louise Bott	SNV, Laos
Khine Khine Swe	Friends of Wildlife, Myanmar
Cao Duy Pho	Population, Environment Development
Ramil Allen Perez	Philippine Centre for Water and Sanitation, Philippine
Dr Myo Thant Tyn	Myanmar Ceramic Society (MCS)
Chen Cheth	GERES, Cambodia
U Min Aye	Renewable Energy Association Myanmar
Min Htwe Naing	World Vision, Myanmar
Johannes Widijantoro	Yogykarta Consumer Institute, Indonesia
U Saw Tun Khaing	Biodiversity and Nature Conservation Association, Myanmar
Bo Min Hein	GERES, Myanmar
Aung Myo Thaik	DE DE Safe, Myanmar
Dr Kyaw Tint	Myanmar Environment Rehabilitation-Conservation Network,
Dr Soe Soe Khine	Deputy Director, Government of Myanmar
Dr Vinh Truong	Ho Chi Minh City University of Agriculture and Forestry, Vietnam
Nhat Quang	Population, Environment Development
Anuj Dhoj Joshi	Practical Action, Myanmar
Aye Myint	Director, Government of Myanmar
Kyaw Kyaw Lwin	Ministry of Environmental Conservation and Forestry, Myanmar
Khin Mg Ye	Ministry of Environmental Conservation and Forestry, Myanmar
Daw Nang May Thet Khaing	Department of Research and Innovation, Myanmar
Saw Khu Say	Department of Research and Innovation, Myanmar
Dr War War Moe	Department of Research and Innovation, Myanmar

U Win Sein Naing	Mangrove Service Network, Myanmar
U Htay Lin	Mangrove Service Network, Myanmar
Mark Grindley	Fauna and Flora International, Myanamr
U Win Oo Naing	Forestry research Institute, Myanmar
U Shoon So Oo	World Wildlife Fund, Myanmar
Reenka John	Myanmar Marketing Research and Development
Christina Aristanti	Yayasan Dian Desa, Indonesia
Yo-Yo	Myanmar Marketing Research and Development
Hang Za Dal	Infra Capital, Myanmar
U Hla Myint	Renewable Energy Association Myanmar
Lin Thanda Latt	Asian Development Bank Consultant, Myanmar
Dr Chaw Chaw Sein	Forestry Research Institute, Myanmar
U Kyi Thein	Renewable Energy Association Myanmar
U Tin Maung Win	GERES, Myanmar
Georgi Dzhartov	GERES, Myanmar
U Aung Kyin	GERES, Myanmar
Indira Sthapit Shakya	ENERGIA, Nepal
Thet Hnin Aye	GERES, Myanmar
George Dura	European Union
May Mar Lwin	GERES, Myanmar
Zun Pwint Aye	GERES, Myanmar
Saw Ka Paw Phlo	GERES, Myanmar
Kyaw Min Tun	GERES, Myanmar

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SMART VILLAGES

New thinking for off-grid communities worldwide

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