A PUBLICATION OF THE ASIA REGIONAL COOKSTOVE PROGRAM

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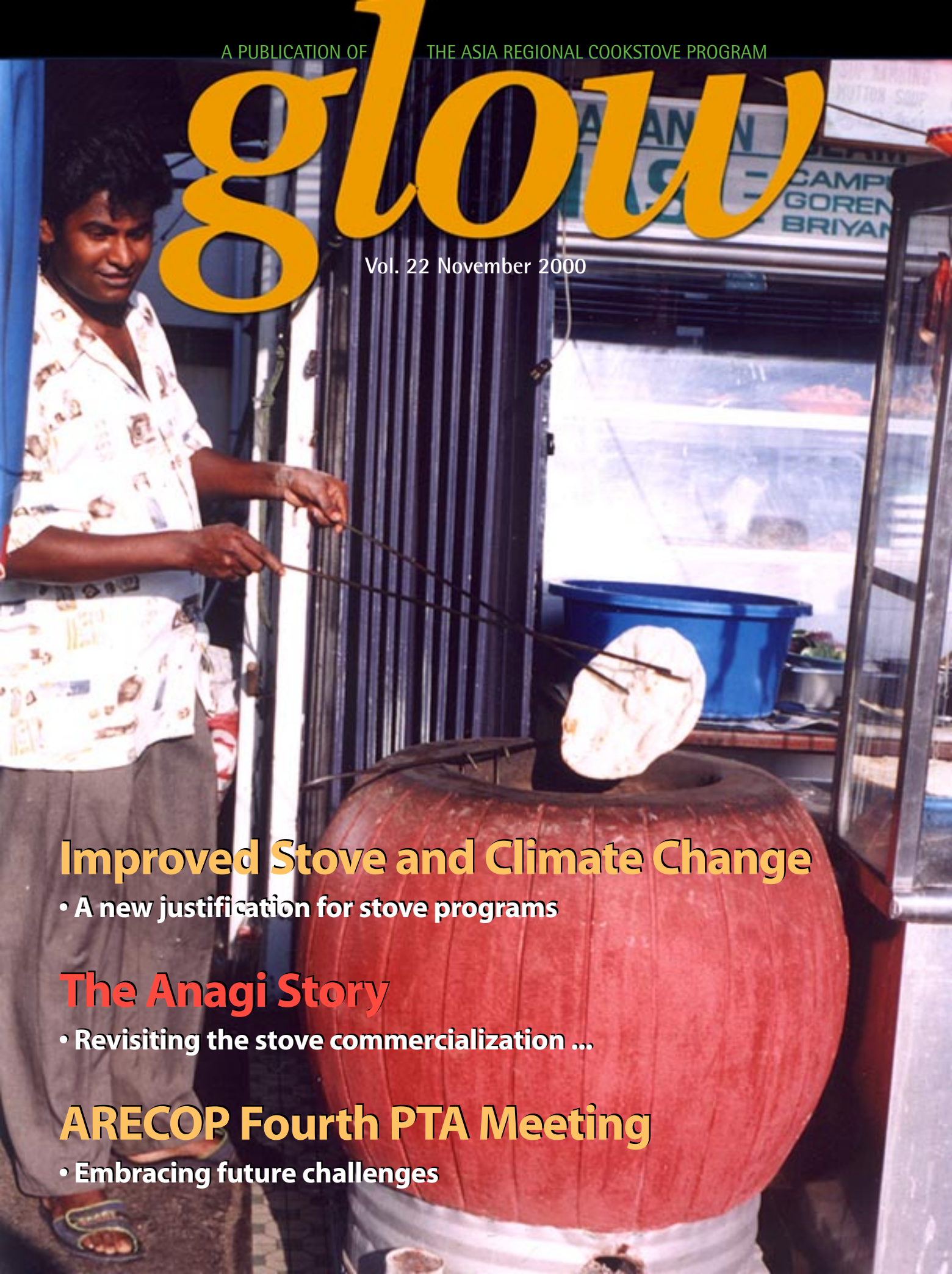

Improved Stove and Climate Change

• A new justification for stove programs

The Anagi Story

• Revisiting the stove commercialization ...

ARECOP Fourth PTA Meeting

• Embracing future challenges

DEAR READERS

Glow as Our Networking Media

We are pleased to bring you the second issue of *Glow* in ARECOP's Phase II.

During the last few months there were several important events in ARECOP's calendar. In July, the ARECOP secretariat organized the Fourth Planning Technical Advisory meeting. Readers will be able to know further about the meeting from the report on the event published in this issue of *Glow*.

Presently, five of ARECOP's focus countries (Bangladesh, Nepal, Sri Lanka, Indonesia and the Philippine) have started their national networking programs on improved cookstove. Picking up from the Phase I, we have continued the national training series on improved cookstove selection and dissemination which is (at the time of the writing) being held in Cebu, Philippine.

Additionally, we have also reestablished links with several important contacts, with whom we had lost touch, as well as trying to establish new contacts in order that our network grows.

As a networking media, it has always been the aim of *Glow* to try to bring up various issues from various places in the region.

First, we are pleased to publish a paper entitled, "Improved Cookstove and Climate Change", which discusses the role of biomass use in climate change and how improved stove could alleviate the problem. The paper further discusses greenhouse gas reduction as a new justification for improved stove programs.

In this issue, we also put out a short article on the unique pumpkin stove from Malaysia. There is also an update from Sri Lanka on the successful stove commercialization there. From our Indonesian CCP, we received a feature article on kitchen for small-scale brown sugar production.

The primary function of *Glow* is to facilitate information traffic on cookstove and related issues in Asia. Whether *Glow* fulfills its role depends very much on the contributions of readers who are actors in cookstove and relevant fields. Once again, we invite all our readers to contribute to *Glow* (please see page 5 for contributions).

For those of you who are unaware, for the last two issues, *Glow* has a readers column. The column is a forum for readers to communicate their ideas, exchange information, express their opinions and make inquiry on all aspects of cookstoves and associated issues.

Finally, as part of the network, we would like you to share your thoughts on future contents and directions of Glow.

We look forward to your active participations in Glow and in the network.

The Editor

glow

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ARECOP

ARECOP (Asia Regional Cookstove Program)

The Asia Regional Cookstove Program is a forum for voicing the concerns of improved cookstove programs in the Asia Region. It influences and facilitates effective and efficient programs in improved cookstove issues.

Improved Cookstove and Climate Change

Reducing greenhouse gases – a new justification for stove programs

(This is part of a longer paper, entitled 'The Role of Improved Cookstove in Wood/biomass Energy, Climate and Health,' presented at the Asia Regional Cookstove Program, Planning Technical Advisory Meeting, 26-28 June, 2000, Bangkok, Thailand)

BY: ZHENG LUO, ENVIRONMENTAL CONSULTANT - RWEDP/FAO

Stoves, being an implement in which combustion is performed, contribute to the release of greenhouse gases. Smith et al. (1998a), estimate that biomass combustion contributes as much as 20-50% of global greenhouse gas emissions, though a large percentage of the emissions is from large scale open combustion (forest burning, et cetera).

The study of greenhouse gas emission of stoves is a recently explored and a potentially exploitable aspect of future stove programs. Putting stove in the carbon market, as it is called, is becoming a much delved into subject, as much as the rising tide of global concerns on climate change call for the reduction of greenhouse gas emissions. Putting stove in the carbon market is cited to be a potential justification for future stove programs.

Here, the article brings forth an overview on the role of cookstove and biomass use in changing the climate and how can stove programs be implemented with greenhouse gas reduction as a justification ***(The Editor)***

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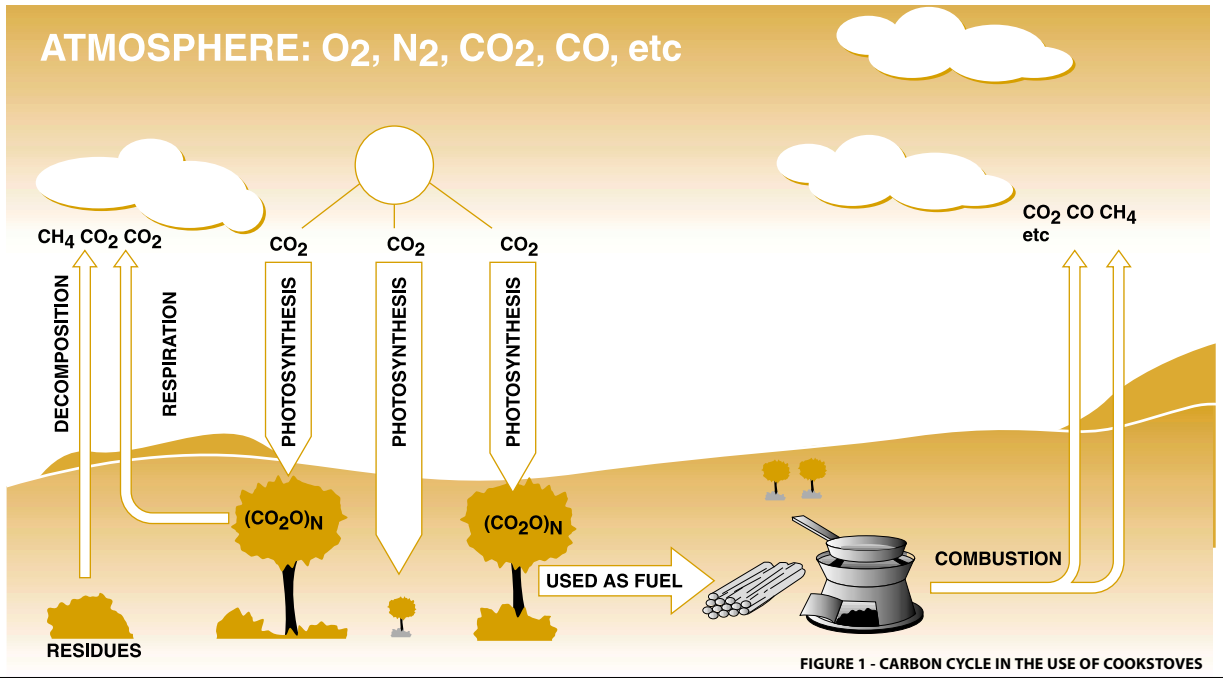

FIGURE 1 - CARBON CYCLE IN THE USE OF COOKSTOVES

Biomass and Greenhouse gas (GHG) emissions

If biomass is harvested in a sustainable manner (i.e. with regeneration of harvested areas), it is a carbon neutral energy source, neither adding nor subtracting carbon from the natural carbon cycle (see figure 1) (Luo, 1998). The same amount of carbon removed by harvesting will be needed for the growth of new biomass.

However in reality biomass is often burnt with cookstoves with poor combustion, which means CO, CH_4, and other products of incomplete combustion are released.

These non CO_2 compounds cannot be absorbed by plants and may remain in the atmosphere for a long time before it converts to CO_2 (and be removed by plants eventually). Thus poor biomass combustion contributes to GHG emissions. [CH_4 is the most important GHG after CO2 and CO and other products of incomplete combustion affect GHG levels through atmospheric chemical reactions (Smith *et al.*, 1998b) Ed.].

There have been studies on GHG emissions from biomass in some countries in the Asia region. Results from a study conducted 1990 are analysed and presented in table 1.

The data suggest that in most countries biofuels account for more than 60% of total carbon emissions. It is further known that biofuels in these countries are mainly consumed in the household sector as cooking fuels, thus household should be considered as one of the main target groups for GHG emission reduction in the region.

Reducing Greenhouse gases – a new justification for stove programs

As mentioned above, poor combustion is responsible for GHG emissions. Therefore improving combustion technology will help reducing GHGs. Naturally improved cookstoves is an important option in

Table 1 - Total GHG emissions from biofuels and fossil fuels in selected countries

Country	Fuel	Emmision (GG Carbon)	Emmision as % of Total Fuel
Bangladesh	Biomfuels	8,673.0	63
	Fossil fuels	5,039.5	37
Bhutan	Biofuels	285.2	91
	Fossil fuels	27.0	9
Cambodia	Biofuels	1,322.6	55
	Fossil fuels	1,067.7	45
China	Biofuels	167,679.1	19
	Fossil fuels	717,257.0	81
India	Biofuels	121,586.9	43
	Fossil fuels	159,600.7	57
Indonesia	Biofuels	19,640.6	29
	Fossil fuels	47,169.0	71
Laos	Biofuels	563.3	92
	Fossil fuels	47.6	8
Myanmar	Biofuels	4,475.1	83
	Fossil fuels	947.3	17
Nepal	Biofuels	3,375.1	93
	Fossil fuels	271.9	7
Philippines	Biofuels	5,186.9	34
	Fossil fuels	9,920.6	66
Sri Lanka	Biofuels	2,065.1	65
	Fossil fuels	1,118.0	35
Vietnam	Biofuels	8,826.7	62
	Fossil fuels	5,382.6	38
Total	Biofuels	343,679.6	27
	Fossil fuels	947,848.9	73
Total excl. China	Biofuels	176,000.5	43
	Fossil fuels	230,591.9	57

Table 2 - Efficiencies and Emissions of typical household stoves in Asia

Fuel	Combustion efficiency (%)	Heat transfer efficiency (%)	Overall efficiency (%)	Emission factor on energy basis (g/MJ) CO_2	CO	CH_4	NMOC	N_2O
Biogas	99 %	58 %	57 %	81.5	0.11	0.06	0.03	0.0054
LPG	98	55	54	67.3	0.33	0.00	0.41	0.0032
Kerosene	98	51	50	70.2	0.41	0.01	0.35	0.0018
Fuelwood	90	26	23	90.7	4.34	0.26	0.53	0.0059
Crop residues	85	16	14	89.4	4.53	0.52	0.58	0.0034
Dung	85	13	11	87.3	4.25	0.51	1.60	0.0263

NMOC : NON METHANE ORGANIC CARBON
SOURCE : ADAPTED FROM SMITH, 1999, HOUSEHOLD STOVES IN INDIA

the household sector.

Switching to liquid and gaseous fuel, like kerosene and LPG, is certainly another option. However due to various constraints, these fuels are not easily accessible to rural population. Moreover a few studies have revealed that in terms of GHG emissions, they are not necessarily a better choice. Against a common thinking, data based on situations in India indicate that both kerosene and LPG has higher greenhouse impacts than fuelwood (Smith 1999).

From these general options it can be said that improving stove efficiency is the most feasible and preferable solution in most situations. Furthermore it has been predicted by many authorities that fuelwood together with other types of biomass will remain as the source of fuels for millions in years to come.

Improved cookstove contributions to reduce GHG emissions should moreover be considered from two point of views; (i) the development of combustion technology for cookstoves, (ii) GHG emission reduction as the new justification for stove program.

Cookstoves used currently, even improved ones, remain to have low efficiency. Table 2 lists efficiency and emission figures for various fuel/stove combinations.

It shows that for biomass cookstoves, both combustion and heat transfer efficiencies are fairly low, and consequently very low overall efficiency. If emissions are compared on the actual delivered energy, the figures for biomass will become relatively high due to low heat transfer efficiency.

On the other hand, it has been demonstrated that great improvement can be made for biomass cookstoves. Traditional stoves have about 10-15% efficiency, while currently improved ones reach over 20%. Some of the improved stoves are reported to achieve more than 40% and very low CO/CO_2 ratio. With necessary adjustments to suit local requirements these already developed stoves may be promoted widely and greatly reduce emissions and improve biomass utilisation.

Recently wood gas stove has been developed such as the 'turbo' stove. Earlier Turbo wood-gas stove is based on the inverted down draught principle, and a later design uses a forced draught. Although further improvements are needed, it gives satisfactory results and shows a promising future for a new type of cookstove with high efficiency and low emissions.

Due to small scale and area based characteristics of stove design and production, it is difficult to evaluate and standardize technical and other criteria and requirements for cookstoves. Furthermore, standard testing methods of stove performance including efficiency and emissions, will also be necessary to ensure the realisation of emission reduction.

From the other point of view, in the coming years GHG reduction may provide a new justification for ICS program, and moreover the new justification can be purely a financial one.

Under Kyoto Protocol, a Clean Development Mechanism (CDM) was accepted and which has been further defined in the follow up meetings. Briefly CDM allows GHG emissions trading between Annex 1 countries (most of the OECD countries and states of Eastern and Central Europe) with non annex 1 countries (i.e. developing countries). Figure 2 gives a simple explanation of GHG emission trading (also known as carbon trading) under CDM.

Besides all the details and uncertainties that are currently under process, this mechanism gives carbon trade an even larger market and open another investment channel to developing countries where emission reduction costs are relatively low. The article

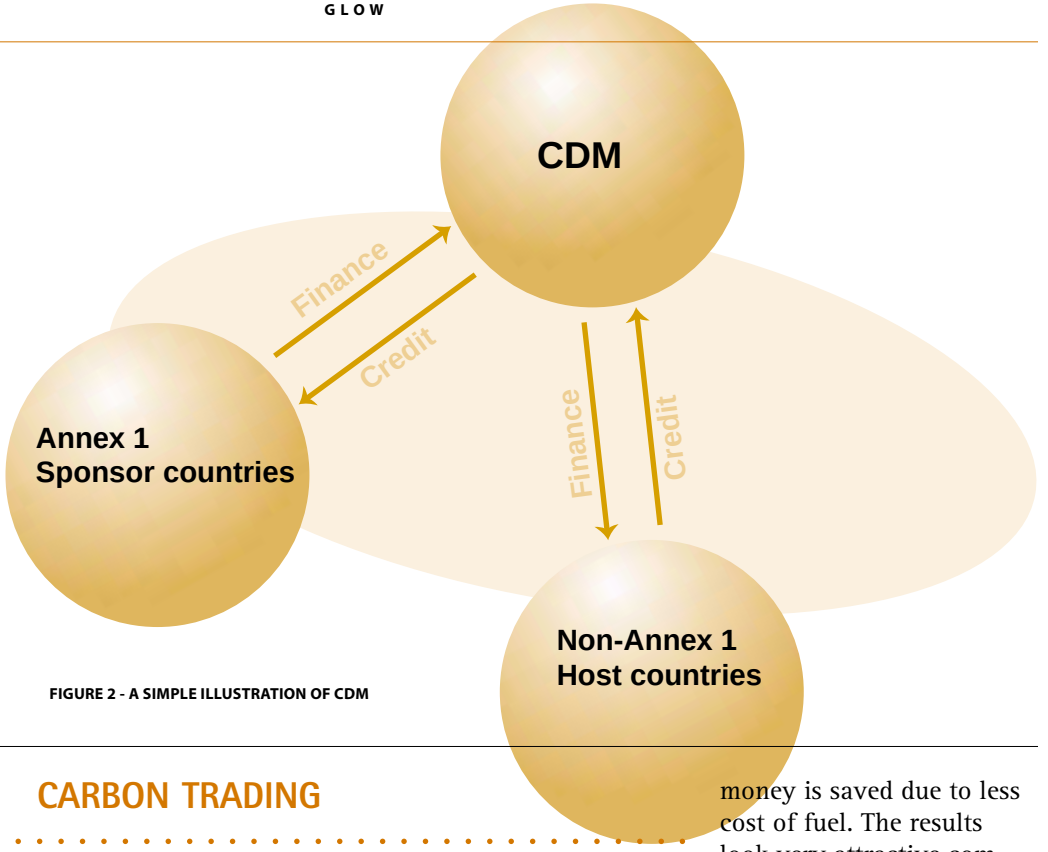

FIGURE 2 - A SIMPLE ILLUSTRATION OF CDM

CARBON TRADING

Carbon trading involves countries from industrialized world funding GHG emission reductions in the developing world, and being credited with some of the pollution reduction themselves. This reduction can be costed in terms of the number of dollars it takes to prevent one tonne of carbon dioxide from being produced ($/tonne CO2).

(HULSCHER, W. 2000, CARBON TRADING : A NEW ROUTE TO FUNDING IMPROVED STOVE PROGRAMES ?, BOILING POINT, 44 : 17-18).

will not go into details about CDM. The question here is, how it works for a stove project ?

FIRST the cost has to be reasonable. We made fairly detailed calculations in five different cases (Hulscher *et al.*, 1999); the use of woodstoves in North East Thailand and certain areas of India where fuelwood was scarce; the use of woodstoves in India where fuelwood use was sustainable; the use of charcoal stove in Thailand with sustainable fuel use and; the substitution of coal stove with woodstove in China. Table 3 summarizes the findings in the above case studies.

The emission reduction costs range from 1-2.7 US$ per ton CO_2. In coal substitution case, reduction cost gives a negative figure which means while gaining emission reduction by switching to woodstove, money is saved due to less cost of fuel. The results look very attractive comparing with many projects under AIJ*, of which reduction costs are 5 US$ per ton CO_2 or more.

With assumptions on staffing and activities costs, the overhead cost is estimated to be 800,000 US$. Thus plus the compensation on stove marginal cost, the total budget for such project is about 3.3 million US$ [(0.8+2.5) million]. The

*AIJ (Activities Implemented Jointly): Joint activities engaged by some developed countries in order to gain experience or to prepare for international carbon trading.

Table 3 - Summary of cases

Case	Improvement	Fuel supply	Country	CO2 reduction (ton/stove lifetime)	CO2 reduction (US$/Ton)
I	Wood stove	Scarce	Thailand	2.5	1.0
II	Wood stove	Scarce	India	3.3.	1.5
III	Wood stove	sustainable	India	1.8	2.7
IV	Charcoal stove	sustainable	Thailand	1.8	2.0
V	Wood for coal	sustainable	China	3.0	-2.9

Implementing Stove on the Carbon Market (a step by step example)

1. Emission data will be established for traditional and improved stoves
2. A 'baseline' will be implemented showing current stove use in the region
3. Stove producers would be compensated for the extra costs of producing improved stoves on the understanding that they charged the traditional stove price. The agreement would also require the manufacturers to cease production of the traditional type.
4. During start up production and marketing, records and regular checks on stove quality would be made by project experts
5. The payback period could be ascertained by a project team. A realistic figure (e.g. 75%) should be set for improved stoves to be still in use after two years.

(HULSCHER, W. 2000, "CARBON TRADING: A NEW ROUTE TO FUNDING IMPROVED STOVE PROGRAMES?", *BOILING POINT*, 44 : 17-18).

CO_2 reduction cost, which includes the project overhead, will then be 1.8 US$/ton, which is still very attractive, compared to AIJ costs.

SECOND, methods of defining the baseline for a project start up and the carbon credit should be reliable and easy. This will be a real challenge for stove projects. Unlike other types of energy, biomass is both a carbon emission source and sink. Every step in the entire carbon cycle, from planting, harvesting to burning, affects the determination of the baseline emission. Moreover, possible technology, market and social changes and other potential use of biomass resource will also complicate the estimation of baseline. It would require profound method and case study design to formulate a baseline framework for stove project, for which more researches are on their way.

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Contributions

Glow is a forum for exchange of experiences and ideas on cookstoves and related issues. Glow wants to share your work and discoveries with our readers. Let us know about your work as well as the obstacles you face. Send us your articles, news items, books, review materials, announcements and pictures.

Contact the editorial staff with your submissions.

Subscriptions

Glow appears quarterly and is distributed free of charge. Please contact the ARECOP secretariat to be put on our mailing list.

The Pumpkin Stove

A Souvenir from Malaysia

1. PREPARING THE DISC- SHAPED DOUGH

2. 'PLOP', THE COOK SLAP THE DOUGH ON THE WALL OF THE STOVE

3. *NAN* BREAD, READY AND CRISPY, IS WITHDRAWN FROM THE STOVE

BY EDWIN SUJARWO

IF YOU HAPPEN TO BE STROLLING ON THE SIDEWALKS OF KUALA LUMPUR City, do visit an authentic Indian eating house and treat yourself to the Nan bread. The round bread is delicate but tasty and is usually eaten with chicken curry or peanut butter spread. The Nan bread is made of wheat flour with several other ingredients mixed into a dough and baked in an oven stove. The oven stove used to bake the bread is unique; it is a round shaped vessel. Glowing charcoal is arranged inside the stove and the dough is stuck on the wall of the stove. The bread is then ready shortly afterwards.

The Pumpkin Stove

The stove is named for its unique shape that resembles a pumpkin. It is usually found in Indian eating-houses all over Kuala Lumpur City.

Its operation is also unlike conventional stoves. It is fuelled with charcoal arranged on the stove's base. Glowing charcoal will then heat up the stove's wall. The bread is baked using the heat transferred onto the wall of the stove.

Baking Nan bread with the Pumpkin stove

The dough, made of wheat flour and other ingredients is shaped into discs which are 20 cm in diameter and at 1 cm thick. The dough is first stuck on plates wrapped with a cloth. The cook, with his hand will slap the dough, 'plop', and it will stick on the stove's inner wall. Within a minute, the bread is ready. A pair of metal rods, about 8 mm in diameter and with pointed ends, are used to withdraw the bread from the stove. Nan bread is best eaten with curry or spread.

Stove construction

Commonly the Pumpkin stove is made of ceramic liner which is coated with mortar. Expert builders for this unusual stove were known to come from Pakistan.

First a round shape liner is made from clay materials. The clay liner needs to be soaked in water for approximately 2 months. Mortar, roughly 10-12 cm thick, is then applied to both the outside and the inner walls of the stove.

The mortar mixture includes ingredients such as fire-proof cement, red clay and lime soil. Other secret ingredients are also required in order to build a stove that is durable and free of cracks for many years. The Pumpkin stove was marketed for RM 700 half a year ago.

Using the oven Stove

Ash from the combustion needs to be cleaned daily. Wood charcoal could be fired inside the stove or outside, and put in once it glows. Between 15-20 minutes is required to heat up the wall before the stove is ready to be used for baking.

Besides used for baking bread, the oven stove could also be used to roast chicken, lamb, beef, et cetera.

Meat is hooked to a rod and lowered into the heated stove. One end of the rod is used to hook the meat, the other end is hooked on another rod placed horizontally at the mouth of the stove. The meat is turned continuously to prevent burning. It takes about 40 minutes for the meat to be completely roasted.

4. ROASTING MEAT USING THE PUMPKIN OVEN

The Anagi Story

Revisiting the Stove Commercialization Scene in Sri Lanka

BY ERWAN KOW

Much has been discussed on the stove commercialization in Sri Lanka. Recently we visited the Central & North Western provinces in Sri Lanka and witnessed the significance of stove commercialization there.

WE MET UP WITH MR. SUBASINGHE, one of the potters who owned several vehicles, a pottery boutique and a grocery store. "I owed all these (economic successes) to the (*Anagi*) stove ", remarked Subasinghe with his hand pointing toward a billboard advertising the stove.

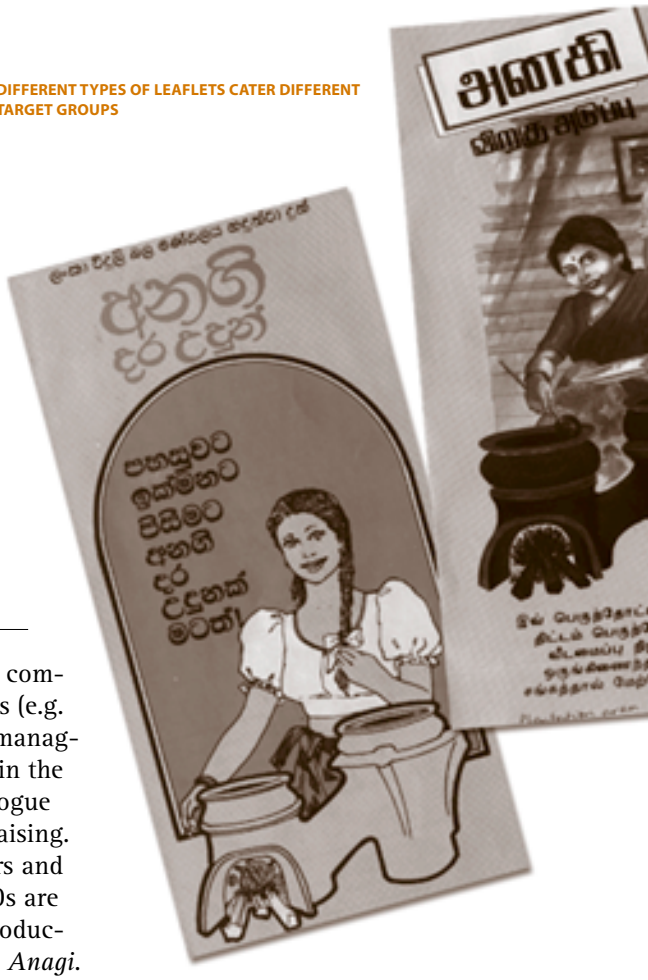
The next morning we got further acquainted with stove production in Kumbukgete, a pottery village in the Puttalam district, of the North Western province, one of the largest stove production centers in the country. This was also an opportunity to learn more about the history of the successful stove commercialization there.

The path to commercialization

The history of stove commercialization in Sri Lanka goes back to the period between 1974 and 84, at the time when UNDP and Ceylon Electricity Board (CEB), first distributed the '**Sarvodaya two piece**' at subsidized prices (Appleton et al., 1996). CEB, Intermediate Technology Development Group (ITDG) and Sarvodaya spurred the development of improved cookstove program (ICSP) in Sri Lanka, especially the push for commercialization, with their introduction of an improved stove, called the ***Anagi*** II circa 1986 (Gunasekara, 1996).

THE ANAGI II, A STOVE WHICH CONSUMERS ARE HAPPY TO USE AND PRODUCERS ARE HAPPY TO PRODUCE

DIFFERENT TYPES OF LEAFLETS CATER DIFFERENT TARGET GROUPS



A more strategic commercialization initiative was taken by Integrated Development Association (IDEA), formed in late 1990 under the guidance of National Firewood Conservation Board. At this stage, the commercialization project was prioritized as a strategy for sustainability (Gunasekara, 1996).

What makes commercialization a success

Sri Lanka's stove commercialization bears witness to successful intervention by community based, national and international non-governmental organizations as well through governmental supports. Producers, communities and other stakeholders (e.g. community leaders, tea estate manager) are addressed concurrently in the program through training, dialogue and exchange and awareness raising.

Potter training - Tile makers and potters identified by NGOs/CBOs are given special training in the production of the improved stove, the *Anagi*. Lamasena, Senior Technical Officer of IDEA, who has been involved from the very beginning in the country's stove commercialization program, described such training as a process that takes time and perseverance from trainers, as they must first convince potters on the benefits of producing *Anagi* before they could even start the training (Lamasena, 2000). The training itself is carried out in the potter's own workshop using her or his equipment. Trainers work with potters on stove making, check their progress and carry out quality control on a regular basis (Appleton et al., 1996). Another component of the training is the business skill workshop, which takes place after the stove production training.

Designing with users and potters – Experiences in Sri Lanka have shown that the process of redesigning the improved stove, which was carried out in close co operations with users, increased the acceptability of the stove (IDEA, 1992). The case of Sri Lanka demonstrates that the intensive dialogue which was carried out with potters resulted in a stove design which potters are happy to produce (IDEA 1992).

Awareness program – A significant element of commercialization is the creation of the need for ICS through awareness programs. Awareness creation involves elements such as the training of stove promoters, active promotional campaign, stove introduction/integration in relevant programs (e.g. nutrition, poverty alleviation, forestry, and credits and savings).

Stove promoters or mobilizers from local NGOs and CBOs are trained to acquire stove dissemination skills. Awareness raising sessions with communities are conducted by the mobilizers. They may also become trainers

Producers, communities and other stakeholders (e.g. community leaders, tea estate manager) are addressed concurrently in the program through training, dialogue and exchange and awareness raising.

A TYPICAL ANAGI PRODUCTION WORKSHOP

in their organizations or localities.

Active promotional campaigns involve using television advertisement, video production, billboards, leaflets and posters in awareness raising for the communities as well as for other stakeholders (e.g. community leaders, tea estate managers or government officials).

Cultural sensitivity is essential for a successful campaign. Promotional materials used in awareness raising are usually pre tested for acceptance and clarity, and then adjusted accordingly. These materials are produced in different languages and pictorial settings to suit target groups of different cultural and social backgrounds. For instance, leaflets are disseminated at users' levels, which are produced in Sinhalese, Tamil and a Tamil variation spoken in High Country tea areas. The leaflets also project images of different cultural settings, one of a modern woman and the other depicting a 'typical tea picker family'. For the tea estate areas, special type of leaflet is produced to cater for the estates' managers, who hold a key role in deciding whether to support stove programs.

Financing program - Especially during the early stages of stove commercialization, various financing schemes were and remain of importance in terms of facilitating stove commercialization.

Leaflets are disseminated at users' levels, which are produced in Sinhalese, Tamil and a Tamil variation spoken in High Country tea areas.

Potters may form a co-operative which operates credit and savings programs. A widely practiced savings system in rural areas of Sri Lanka is known as *seettu*, in which goods could be used as a currency instead of money.

For instance, ten stoves are collected from each member every fortnight. The stoves are then sold at a set rate (for example, at 45 Rs for each stove). A portion of the 45 Rs (e.g.4.5 Rs) is credited to the cooperative society's fund and the rest of the money is given to a member in rotation. Through the rotating fund, potters are able to obtain more capital to increase production. Besides, the cooperative society functions as a savings center in the village (Gunasekara, 1996).

A cooperative society also often functions as a mediating agency between potters and institutions such as banks. Through such a society, potters would be able to obtain credits more easily. Politically potters are able to raise their collective bargaining power. For example they could get the assistance of local politicians to provide infrastructures such as a meeting hall or a sales center (Gunasekara, 1996).

Those societies and other community based NGOs also provide micro credits with low interests to potters who produce stoves. As stove making is considered a relatively capital intensive activity and retailers are not willing to grant credits for stove production, such credits help to boost production.

The stove commercialization scene in the Central and North Western provinces at the present

Producers told us that demand is always strong. On one occasion, we were told that stove middlemen had come earlier with three lorries to purchase *Anagi* but returned empty, as there was no stove available for sale.

A SIMPLE KILN, A SIGNIFICANT IMPROVEMENT OVER THE BON FIRE METHOD

ANAGI STOVES RETAILED IN A POTTERY BOUTIQUE

While we saw stacks of *Anagi*, we were told that they had already been sold.

The above scenario could be true for the situation in Kumbukgete, which is considered as one of the most successful stove producing villages and where there are several large producers.

Nevertheless, there may be factors which deter producers from increasing their production. For some smaller scale potters, the lack of improved technology, for example clay mixer and improved pottery wheel, is an obstacle to increase production. Appleton *et al*. (1996) also suggested that existing potter marketing channels, especially those of smaller producers, might not be adequate for the distribution of a relatively new product, such as *Anagi* stove. As a result, smaller producers find it difficult to increase production in the absence of a relatively secured market. Other reasons which contributed to the 'shortage' of stoves include, the high production costs involved and at the same time the unwillingness of retailers to give credits to potters for stove production (as they are more willing to give credits for the production of pots) (Appleton *et al*., 1996).

There are various distribution points for the *Anagi*. Most distribution is done by middlemen who purchase stoves from producers and distribute them to retailers. Other distribution points include potters' cooperative societies, governmental and non-governmental organizations which purchase stoves directly from producers to either resell or distribute them in stove related programs.

Production rates range, from small production producing under 20 stoves a day to big producers with output up to 50 stoves daily which means up to 1500 stoves a month. A stove production team might involve somewhere between 2 to 8 people. The production process involves throwing, assembling, plastering, drying and firing. Smaller scale producers tend to conduct the firing using traditional bonfire method instead of more fuel-efficient kilns used by larger producers.

Several potters have focused most of their production on stoves, while others produce stoves less regularly and are more involved in producing other products. Producers may also switch production lines (from pottery to stove or the other way round), depending on incoming orders from customers. Small-scale producers might sometimes sell their stoves to larger producers for distribution or sale to middlemen.

Retailers usually obtain their stock from middlemen or straight from bigger producers who are also distributors. The *Anagi* is sold at various retail points; the grocery shops, furniture stores, the pottery shop, et cetera. On average, an outlet may sell around 5 stoves per week, around 30 stoves a month. Poor sections of the community can purchase the *Anagi* in installments through credits and savings program established by various local NGOs and CBOs.

Consumers like the fact that *Anagi* was saving them time and fuel. Due to the efficiency of the stove and the two-pothole design, they can cook two types of food simultaneously and quickly. Furthermore, stove promotion programs also highlight the presti-

Consumers like the fact that Anagi was saving them time and fuel. Due to the efficiency of the stove and the two-pothole design, they can cook two types of food simultaneously and quickly.

A BILLBOARD PROJECTING THE MODERN IMAGE OF ANAGI STOVE

PERMANENTLY INSTALLED ANAGI COULD LAST UP TO SIX YEARS

gious and modern image of *Anagi*, which consumers were pleased to identify with (Appleton *et al*., 1996).

The *Anagi* which retails from 80-120 rupees apiece, could last up to six years if installed permanently and about a year if used without installation. Trained workers could install a stove for around 20-40 rupees. According to a stove worker, installation service became an important income generation activity in some regions (Amarapathydevi, 2000).

Some measures to maintain a level of customer service and the quality of *Anagi* in the market are also standardized.

The sale of a stove is supposed to be accompanied by a leaflet that has been designed by IDEA, explaining the stove's advantages and providing a guide to stove installation and use. Leaflets were also supposed to be supplied by producers to retailers. However such leaflets might not be available all the time. Hence consumers are not getting their access to the important information.

The earlier stove commercialization project endeavored to maintain the quality of *Anagi* sold. Formally, stove quality is assured by the presence of the *Anagi* seal and the producer code on stoves which are sold by trained producers.

A 'problem' which arises was the *Anagi* lookalike, which are stoves produced by untrained potters. As the name implied, the stoves look similar to the *Anagi*, but often with features that are not built properly or built disproportionately.

However such a strong tendency to duplicate *Anagi* was just a manifestation of the stoves's popularity. And that producers were willing enough to produce the lookalikes showed that there was a strong financial incentive in producing *Anagi*.

Earlier trained potters obtained a set of moulds and templates which assist in making stoves of correct dimension. Now that these production aids have either worn out or no longer in use, we noticed that some producers were producing stoves that were not in their correct dimensions and proportions. IDEA is already planning the training for the production of stove production aids.

Maintaining the quality of stoves available in the open market hence becomes a pressing issue in the current stove commercialization in the country.

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ARECOP Fourth PTA Meeting

Working out strategic plan of actions, Embracing future challenges

BANGKOK, 26-28 JUNE, 2000

A Planning Technical Advisory (PTA) meeting was held in Bangkok from 26-28 June, 2000, in conjunction with ARECOP phase II program consolidation. Throughout the three days, participants shared their ideas, discuss current issues and present recommendations to the ARECOP secretariat on the direction of its phase II program.

IT WAS A GET TOGETHER FOR TWENty eight participants, from eleven ARECOP member countries (Nepal, Bangladesh, Indonesia, China, The Philippines, Sri Lanka, Vietnam, Cambodia, Laos, Bhutan, and Myanmar). Additionally ARECOP also hosted partner organizations; Directorate General of International Cooperation (DGIS), the Netherland which funds ARECOP, Regional Wood Energy Development Program (which has been ARECOP's regional partner for years) and ITDG Bangladesh, ARECOP,s country partner in Bangladesh.

ARECOP's manager, Ms. Christina Aristanti opened the meeting, after which followed a keynote address by Mr. Auke Koopman of FAO-RWEDP, Bangkok. Mr. Koopman stressed the economic as well as the social importance of biomass fuel for many in the region, while also highlighting the local and global environmental implications of unsustainable biomasss energy use. Following that, in his inaugural speech, Mr. Julio D Castro, representing DGIS, recounted the contributions of improved cookstove programs in improving women's welfare and in easing local and global environmental pressures. He also pointed out the fact of biomass as the 'forgotten' renewable energy that should be given the 'necessary political weight on the national scale.'

The day was continued with an update on ARECOP and a series of country paper presentations from network members.

On the session on the second day, representatives from ITDG and RWEDP presented profiles of their organizations. This was continued with sessions on special issues in improved cookstoves (ICS), conducted by several regional experts. Ms. Zheng Luo of RWEDP discussed the role of improved cookstove in the context of wood/biomass energy, climate and health. A presentation on the concept of stove ladder was later made by Mr. Kayeswar Man Sulpya of RECAST, Nepal. Ms. Christina Aristanti delivered a lecture and conducted a workshop on gender and participatory approach in ICS. Then there was a short presentation on ARECOP's information management.

Group discussion/ brainstorming session on ARECOP's future trends and activities began on the second half of day two. At the end of day the participants presented the results of their discussions.

The drafting of recommendations to ARECOP was carried out on the last day of the meeting. An evaluation session ended the three-day meeting.

Overall the meeting served as a discussion forum for ARECOP's members and partners, in giving direction to ARECOP's Phase II. Specifically the participants in the meeting shared their thoughts on the *roles of ARECOP regionally* as well as *nationally, ARECOP's plan of actions* and on *regional issues that ARECOP should address*. The recommendations resolved by participants also provided ARECOP with an understanding of members' aspirations and specific needs.

Recommendations

To establish programs that are relevant, effective and beneficial toward regional ICS and to be able to meet future challenges, it is essential for ARECOP's plan of actions to address problems and needs felt by regional stakeholders by means of discussions/ sharing. In light of the earlier discus-

sions, participants pointed out several areas (information, funding/resources, monitoring and evaluation, capacity building and networking) in ICS/ICS program (ICSP), that should be addressed by ARECOP activities.

Below are recommendations to ARECOP that were suggested by participants during the meeting.

1. On information, ARECOP should:

- collect, compile and disseminate information on ICSP (basic information on ICP, development of ICSP in new member countries, health and environment, economic benefits, simplified M&E tool, gender, approaches, technologies)
- strengthen ICS information center
- document and publish best practices
- create a database of expert in member countries
- support country contact points (CCPs) in the production of publications (newsletter, translations, case studies, etc).

2. On donor/funding/resource, for resource allocation ARECOP could:

- match resources with suitable programs/activities
- provide information on international resources / share information about different donors
- integration of ICSP in other development programs.

ARECOP could also:

- organize a donor forum
- facilitate a dialog between donors and ARECOP members
- lobby among international and regional donors to provide financial supports to national ICSP
- provide back up support for development of good proposal.

3. On Monitoring & Evaluation (M&E), specifically ARECOP could:

- develop general/standard guideline/manual on M&E which can be adapted by member countries
- conduct a regional workshop on standard M&E indicators for ICSP.

4. On Addressing common regional issues, ARECOP could:

- facilitate the linking of national health studies with international research agencies
- assist member countries to get access to information/ know how
- facilitate members links to resources that will enhance funding for climate change activities
- provide training
- facilitate ICS programs related to environment and health
- provide guidelines, document regional experiences (from member countries) and organize training for integration of various issues (health, gender ,climate) into ICSP.

5. On Capacity building, ARECOP should:

- conduct training/seminar /workshop and facilitate the exchange of expertise,
- facilitate the transfer of technologies/disseminate various technologies among members,
- support CCPs in the establishment of ICS testing center
- support CCPs to undertake innovative programs
- support CCPs in undertaking researches/studies.

6. On Networking - ARECOP could play a role in:

- Facilitating institutional cooperations (national, regional and international)
- Strengthening networking on ICSP (expanding membership)
- Helping to establish national network centers on ICS and facilitate exchange of information through various media.

7. Future – it was suggested for ARECOP to start thinking beyond 2002, which is the year when ARECOP phase II ends.

Kitchen Improvement in Small Scale Brown Sugar Production in Kulon Progo, Yogyakarta, Indonesia

BY : PRIANTI UTAMI, INDONESIAN STOVE NETWORK

When designing for kitchen improvement, there are several aspects that need to be considered, such as safety, comfort, health and hygiene and energy efficiency. More attention should be paid to these aspects when a kitchen is concerned with commercial food production.

IN THE VILLAGE OF HARGOREJO IN Kulon Progo district, kitchen improvement is implemented in small scale brown sugar production. Prior to the introduction of brown sugar production, the villagers produced only palm sugar from coconut sap.

For many rice farmers, palm sugar production was a secondary occupation that provided them with fast cash. However palm sugar fetched very low prices due to the presence of *ijons*. [*Ijons* are money lenders who tied farmers to loans, in return they will require farmers to make a payment in installments (e.g. palm sugar), at values determined by them. Ed.]

Brown sugar production was introduced to communities in Hargorejo in 1997 by *Perkumpulan untuk Kajian dan Pengembangan Ekonomi Kerakyatan* (PKPEK) - Union for the Research and Development of Peoples' Economy. Actually the Department of Industry had earlier (in 1985) introduced brown sugar production, however, it was not readily taken up by the villagers.

Unlike the Department of Industry, PKPEK did not just train people in the production of brown sugar, it further assisted them in the marketing of the product. Some of the groups assisted by PKPEK have now been able to create their own market for the product.

There are two methods by which brown sugar could be produced. With the **first method**, brown sugar from individual producers is pooled before it is further processed into herb flavoured brown sugar. In the **second method**, palm sugar is first collected from individual producers. It is then processed into brown sugar.

A kilogram of brown sugar bought from a producer will cost 3,500 Rps (rupiah). The same product, if marketed in an attractive packaging will fetch 2,000 Rps for a 0.2 kg packaging – which means 10,000 Rps for each kilogram of the product. Meanwhile, palm sugar costs only between 2,000-2,300 Rps per kilogram. For a comparison, 5.4 kg of brown sugar could be produced from 6 kg of palm sugar.

Kitchen Improvement and Improved Stove

Both, palm sugar and brown sugar industries need to observe health and hygiene aspects during the production process. As business enterprises, the industries are also concern with minimizing production costs. It is therefore appropriate to acquaint kitchen improvement and improved stove in the industry. Improved kitchen and improved stoves are expected to save on fuel, promote more efficient production, improve qualities of the products and improve the health and hygiene in the kitchen.

Improved stove was introduced in 1987 by Yaysan Dana Pratama with techical supports from Yayasan Dian Desa. Later in 1997, Dian Desa in collaboration with the ARECOP organized a Kitchen Improvement Training in palm sugar producing areas. The training was attended by staff members from PKPEK and a number of palm sugar producers. From then onwards PKPEK begun to introduce and implement kitchen improvement programs in Hargorejo village.

Profile of a kitchen for small scale brown sugar production

The producer surveyed had a daily production capacity of 30- 40 kg of brown sugar. The kitchen had an area

THE DRYING RACK USED FOR OPEN AIR DRYING

of 5.66 m X 8.71m and a height of 3.5m. The kitchen walls and floor were made of concrete and the roof was made of ceramic tiles without panel. There were three doors providing passages out of the building and two other doors that lead to other rooms and a window. There was also an additional washing space measuring 0.97m X 1.71m and a water tank measuring 0.92m X 1.71m X 0.75m. A dish rack, a table for the preparations of the ingredients and several other tables for placing bamboo baskets and other utensils were also present in the kitchen.

There were two stoves in the kitchen, each with two potholes. The stoves were made of bricks, concrete, clay and sand with chimneys made of ceramic. Utensils such as big pans, each measuring 22 cm in diameter, clay vessels (*genthong*), a sieve, pan holders to hold the pans after they are lifted from the stoves, baskets to store palm sugar, a weighing scale, a packing machine, herb shredders, herb pressing equipment and other production tools were also stored in the kitchen.

The packing room was only about 4 m^2 (2m X 2m), from a total room area of about 6,44m X 5,66m.

We then evaluated whether the kitchen has met the criteria of an improved kitchen, i.e., a kitchen that is comfortable, safe and which facilitates efficient production:

Safety – This could be considered from the stove aspect. The flame was enclosed and controlled and there was no excessive heat coming from it. Furthermore the kitchen wall was made of concrete with lockable doors and windows.

Comfort – In addition to what is already discussed above, the stove was also equipped with a chimney which assisted in venting the smoke.

Health and hygiene – The chimney assisted in stabilizing the flame intensity. With the chimney, soot production is also reduced and this helped to keep the brown sugar clean. It has been noticed that soot could be eroded by wind and would fall into the sugar mixture during the cooking process. Workers are also less exposed to smoke when they work with chimney stoves.

Efficiency –The placement of production tools has not been done according to the flow of the process. The dish rack needs to be positioned in between the water tank and the stoves to facilitate more efficient move (*see Figure 1 - Motion Study*).

PROCESS IN THE PRODUCTION OF BROWN SUGAR:

1. Tapping coconut flower to obtain the sap
2. Filtering the sap
3. Heating the sap in the pan
4. Adding the herb extract
5. Continuous heating until a brown color is obtained
6. Stirring
7. Grinding sugar crystals into fine granules
8. Sieving the sugar
9. Drying in the open air
10. Putting the sugar in the oven

HERB EXTRACTION PROCESS

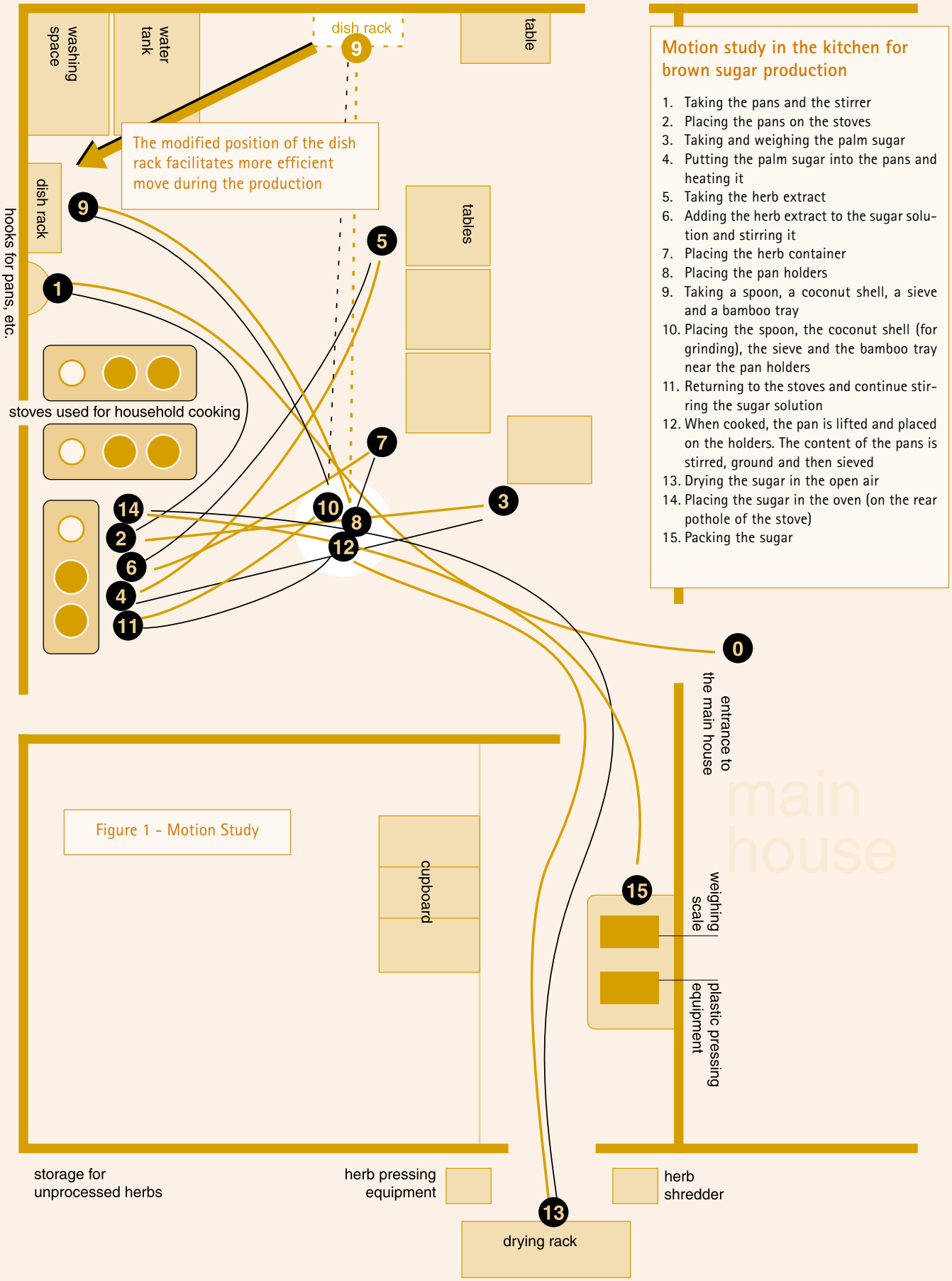

Figure 1 - Motion Study

Motion study in the kitchen for brown sugar production

1. Taking the pans and the stirrer
2. Placing the pans on the stoves
3. Taking and weighing the palm sugar
4. Putting the palm sugar into the pans and heating it
5. Taking the herb extract
6. Adding the herb extract to the sugar solution and stirring it
7. Placing the herb container
8. Placing the pan holders
9. Taking a spoon, a coconut shell, a sieve and a bamboo tray
10. Placing the spoon, the coconut shell (for grinding), the sieve and the bamboo tray near the pan holders
11. Returning to the stoves and continue stirring the sugar solution
12. When cooked, the pan is lifted and placed on the holders. The content of the pans is stirred, ground and then sieved
13. Drying the sugar in the open air
14. Placing the sugar in the oven (on the rear pothole of the stove)
15. Packing the sugar

THE NAN BREAD, FRESH FROM THE PUMPKIN STOVE

BOOKS, PUBLICATIONS AND RESOURCES

BOOKS & MAGAZINE

Energia News
Energia News is a newsletter of Energia, an international network on woman and sustainable energy and is distributed free of charge. The publication, is established as a vehicle to strengthten the role of women in sustainable energy development.
Contact : Energia News Secretariat, Sheila Oparaocha, Kastanjelaan 5, 3830 Ab Leusden, The Nethrelands.
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www.energia.org

Bioenergy News
A quarterly newsletter of the National Bioenergy Board, Ministry of Non Conventional Energy Sources, Government of India.
Contact:
bioenergynews@mnes.delhi.nic.in
www.eco-web.com/register/01575

Wood Energy, Climate and Health – International Expert Consultation (7-9 October 1999)
An expert consultation was convened by the RWEDP from 7-9 October, 1999. The consultation was aimed to critically compare wood energy with other alternative fuels on:
• the emissions in the context of both climate and health concerns;
• the economic, social and environmental implications.
This report is a collation of papers presented at the consultation which address diverse issues mentioned above. It is available through the RWEDP address.

National Workshop on Development and Implementation of ICS Programmes
In response to the problems of the lack of familiarity among stove workers in Asia in building and disseminating improved cookstoves, RWEDP and ARECOP jointly embarked on developing training modules for use by trainers and trainees. The implementation of this module is to be realized in national training which have been conducted and will continually be conducted in countries in the Asia region. Here is a recount of the event which informs readers of the training components and how it was carried out. Copies of the publication is obtainable from the RWEDP.

INTERNET

Bioenergy – the mailing lists for the discussion of biomasss as a sustainable energy source which intend to involve the industry, the academia and the government. The discussions are about the current state of the art and future directions of biomass energy industry and research. You can subscribe to the list by sending a blank e mail to the following email address *stoves-request@crest.org* for discussion list on stoves or *bioenergy-request@crest.org* for general discussion on biomass energy.

APEC Energy Database
(http://ns.ieej.or.jp/apec/database/)
The APEC (Asia Pacific Economic Cooperation) Energy database establishes a comprehensive and consistent energy database within the APEC region. The database provides significant trends in energy supply, demand, market and process information for member countries of APEC.

The Household Energy Development Organizations' Network (HEDON) is an informal consultative forum of diverse organizations working in this field. The site offers access to electronic network, chance to comment on circulated papers written by members working in household energy and information and links to many useful internet sites.
http://www.energy.demon.nl/hedon/docs.htm

MULTIMEDIA

Palm Sugar Stove – User Built Stove Manual for Stove Promoters and Users (VCD)
Cambodian Fuelwood Savings Project with the support of European Comission produced a video manual for the construction of an improved stove used in the palm sugar production. The video is meant to compliment the printed manual, which will be published soon.
The palm sugar stove has now been widely used in southern Thailand and some parts of Cambodia. Using the improved stove, palm sugar producers would be able to cook faster and produce better quality palm sugar.
ARECOP wishes to introduce the stove to the region and funded the translations of the video manual which was originally in Khmer and made it available in the VCD format. For copies of the VCD, please contact the ARECOP Secretariat.

Samaki Stove – User built Stove Manual for Stove Promoter and Users (VCD)
Samaki Stove is a user built mud stove developed and disseminated by the Cambodia Fuelwood Savings Project. It is a permanent stove and can be built either with single or double potholes, and with or without chimney. Samaki has now been widely accepted by many families in Cambodia.
The VCD is meant to accompany the printed step by step manual on the construction of the stove. The original manual is in Khmer and was produced by CFSP with European Commission's support. The English version is supported, multiplied and disseminated by the ARECOP.