Consensus reached by participants at the International Workshop on Rural Energy, Stoves, and Indoor Air Quality in China

For further information contact: Madam Deng, Keyun (China Association of Rural Energy Industry) Email dkk@public3.bta.net.cn; Professor Smith, Kirk R. (University of California Berkeley) Email krksmith@berkeley.edu; Professor Zhang, Xiliang (Tsinghua University) Email xiliang@dns.inet.tsinghua.edu.cn

A workshop, held in Beijing in January 2005, brought together representatives and experts from universities, research institutes, non-government organizations, provincial and national government agencies, rural energy industries, and international organizations from China, South Asia, Europe, North America, and Africa. They came together to discuss the results of an independent study and evaluation of the Chinese National Improved Stove Program (NISP) conducted by the University of California, Tsinghua University, Renmin University, and the Centers for Disease Control of China.

As with other developing countries, most of the Chinese rural population relied on biomass fuels (wood, crop residues, and animal dung) for their household energy about 20 years ago. Such fuels are traditionally used in inefficient stoves that waste resources and produce substantial amounts of indoor air pollution. NISP, which operated from the 1980s through the 1990s, was the largest and most successful improved stove programme ever implemented anywhere in the world. Similar successful programmes were initiated at provincial and local levels in many parts of the country. Nearly one thousand million rural Chinese citizens have benefited from improved efficiency and reduced indoor air pollution from the improved stoves promoted by these programmes.

Biomedical research in recent years in China and elsewhere, however, indicates that indoor pollution caused by incomplete burning of solid fuels – both biomass and coal – is still an important factor threatening the health of rural residents. Thus, although the high pollution levels caused by traditional biomass stoves seem to have decreased, remaining pollution from coal and biomass stoves needs to be brought down further to reach health standards, including the new national indoor air pollution standard.

Having reached consensus on these points, the workshop proposed recommendations to the relevant agencies of China.

- The successful undertaking initiated and implemented by the Ministry of Agriculture and its Rural Energy Offices should be widely acknowledged and highly praised.
- There were many new technologies developed largely by the private sector in China, offering possibilities for using biomass fuels in a much cleaner and more efficient way. Such advanced biomass stove technologies should be encouraged, and new policies should be formulated to deploy such technologies on a larger scale.
- As China has changed since the initial stage of NISP in the early 1980s, there is a need now to find ways to promote sustainable commercialization of the stoves in the private sector, rather than relying on direct intervention by the government, except in the poorest areas. The China Association of Rural Energy Industry (CAREI) can play an important role in this effort.
- As important players, the central and local governments need to continue their efforts in many areas, including the development and enforcement of energy efficiency and environmental standards, protection of intellectual property of advanced technologies, public education regarding health hazards, training of technicians, and support for focused health and environmental studies.
- From the viewpoint of health, it is necessary to speed up the development and dissemination of improved coal stoves with chimneys if coal is to be used as fuel for rural communities for a prolonged period.
- As time goes on, and expectations of rural residents for environmental and health protection continue to rise, there will be a need to provide high-quality fuel to all users that can be efficiently and cleanly burnt in household stoves.
- There is an urgent need to address the serious problems created by use of poisonous coals in the country. This should be addressed through an inter-ministry effort of the Chinese Government: in the short term by immediately providing improved stoves with chimneys, and as soon as possible, by banning the sale and use of coal from the most poisonous coal deposits, and by providing access to alternative clean fuels to the local populations.
- Taking advantage of significant progress made by NISP and other past successes, China should re-emphasize the importance of modern energy supplies, especially gas fuels and electricity, for all households as part of its laudable efforts to bring the benefits of economic development to all of its people.
- The participants of the workshop agreed that China should work collaboratively with other developing countries to assist them in achieving similar successes, including providing an ongoing compendium of new biomass and coal stove technologies and working to share those technologies and lessons for organizing development and dissemination programmes.

Monitoring the charcoal production of an area under a sustainable licensing system in Masindi district, Uganda

by Stijn Cleemput[1], Caroline Moreau[2] , Cornelia Sepp[1]
[1]ECO Consulting Group, D-36280 Oberaula – Germany, Tel.: +49 (0)-6628–8373, Fax.: +49 (0)-6628–8016
Email: stijn@cleemput.com, Cornelia.Sepp@eco-consult.com
[2]Caroline Moreau, consultant, Email: caro_moreau@hotmail.com

This article has been adapted from a final report supplied to the Energy Advisory Project (GTZ) of the Ministry of Energy and Mineral Development, Kampala, Uganda within the frame work of the Knowledge Network on Energy for Low-income Households in Southern and Eastern Africa (www.sparknet.info)

Introduction

Large parts of Kampala's population are using charcoal for heating and cooking. One of the main charcoal supply areas is situated in the Masindi, Luwero, Nakasongola triangle; more specifically in the Masindi district (National Biomass Study (NBS) 2002; NEMA, 2001). This region supplies the main urban centres of Kampala with 250,000 tonnes of charcoal per annum (Energy for Sustainable Development, 1994 data). The region's natural resources are quickly depleting due to increasing population pressures and action is urgently needed in order to protect and restore these remaining woodfuel stocks.

The Ministry of Energy and Mineral Development of Uganda, supported by the GTZ-Energy Advisory Project, introduced a pilot taxation system in Masindi district, commonly known as the Sustainable Charcoal Production and Licensing System (SCPLS). In this system, taxes are collected according to the quantities of charcoal produced and transported. There are no production limits on private land. Tax collection is based on the biomass resources at parish level, so detailed information on biomass stocks and yield is required to determine the levies. Biomass regeneration (distribution of seedlings, tree nurseries . . .) will be financed from these revenues, and it is expected that this will be an effective means to sustain the biomass reserves.

This article describes the findings from the biomass standing stock estimation study. Although the inventory of the available woody biomass in Masindi came from the former National Biomass Study (now part of the National Forest Authority of Uganda) this article is not part of a project evaluation. The objective is to present a recent monitoring study for the forested lands of Masindi district (Uganda) to contribute to its further development.

In this article, the term 'biomass' is limited to the total living woody natural vegetation found above ground. This includes stems, branches and twigs. The term biomass refers to their air-dry mass, measured after drying the wood for up to 15 days, until the mass is constant (NBS, 2002).

Study area

The Masindi district is located in the most Northern part of the Western region of Uganda. It is famous for its forested areas; woodland, bushland, grassland and tropical high forests. Most of the land is privately owned. Subsistence farmers concentrate mainly on growing maize, groundnuts and tobacco, supplementing their income by burning charcoal. The study area where the licensing system has been introduced consists of 20 administrative units, called parishes. There are some areas that are owned and managed by the National Forestry Authority where people are not allowed to practice charcoal burning.

Method

A first estimate of the national biomass stock was undertaken by the Forestry Department in the late 1980s (NBS, 2002), resulting in the classification of the land cover. With the help of this classification, and recent remote sensing data from the FAO Africover Project (Landsat images of 2001), the distribution of land cover was updated. To refine and update the 1980's biomass data, a ground survey was conducted by the former Forestry Department of Uganda in July 2003, and in more detail, in spring 2004. The methodology for determining yield was used in the National Biomass Study (2002), looking at two scenarios; undisturbed and disturbed land (Table 1). As shown in this table, the undisturbed situation is calculated from the theoretical age of the tree (rotation age); this method is preferable for plantation forestry. The disturbed situation is used for natural forests, where forestry growth on private land is influenced by the actions of man, rather than by natural factors. These figures are derived from national level surveys, and do not reflect the specific growth rates of the study area.

By revising the biomass data for specific land cover, it is possible to predict yields for the administrative units that fall under the sustainable charcoal production and licensing system. The main output was to produce updated quantitative biomass stock and yield data at parish level. This biomass standing stock data gives an idea of the status of depletion and biomass shortage in the parishes. In combination with the available yield figures, the biomass standing stock data can be used to determine the tax levied for each parish.

Results and discussion

This study provided highly detailed and up-to-date biomass stock information and yield data at parish level for the area under the licensing

Table 1 Land use, undisturbed situation and disturbed situation

Land use	Undisturbed situation Annual increment (current) *Tonnes per hectare (air dried)*	N	Disturbed situation Annual rate of change *Tonnes per hectare (air dried)*	%
Woodland	5	30	−1.9	−5%
Bush	1	13	−1.0	−4%
Grassland	1	50	0.0	0%
Subsistence farming	1	195	0.1	1%

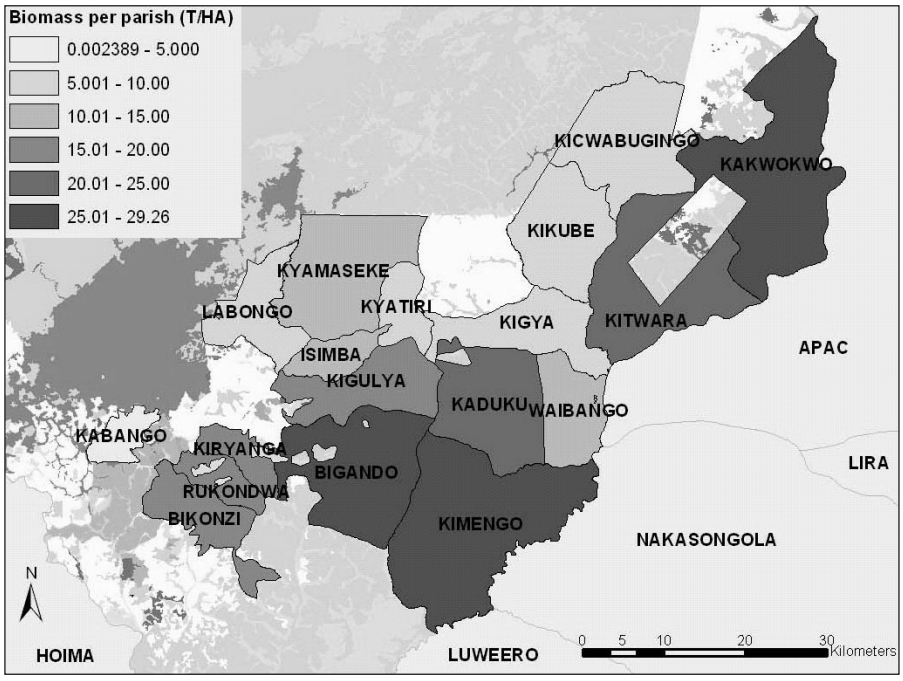

Figure 1 Quantities of biomass per parish under licensing system (Map: Moreau and Cleemput)

system. Figure 1 shows the quantities of biomass per parish that fall under the licensing system.

Parishes inside protected areas are patrolled by forest rangers and are not accessible by road. Thus they cannot be used by charcoal producers, and are currently recorded as having zero biomass available. In future inventories, however, it is recommended that data from these natural reserves be recorded, as it can serve as a reference for comparing the impact of charcoal production on forest land with the natural situation.

Within the parishes surveyed, the average standing stock of biomass ranges from around 5 tonnes/ha to 26 tonnes/ha of biomass. Ranking these values helps to identify the low-ranking parishes that need the most attention. The annual gross yield figures for the disturbed situation reflect the shortfall of natural production capacity of the different land cover areas. For the disturbed situation, the SCPLS region has a deficit of approximately 170 thousand tonnes of biomass per year. Since the protected areas are not included in the survey outputs, the whole loss is on private lands. The undisturbed situation shows the theoretical yield when no encroaching, cutting and grazing activities take place. Based on this figure, the overall yield of the different types of land cover in the SCPLS area is around 600 thousand tonnes of biomass per year.

Finally, wood supplies were compared with wood consumption and charcoal production in Masindi district. Kisakye estimated (2004) that approximately 9162 tonnes of charcoal were transported from Masindi to Kampala. In addition, the population of the SCPLS region consumes about 66 639 tonnes of firewood annually; and 93 151 tonnes of charcoal (converted to wood weight). Aggregating the local consumption and the production for Kampala results in a total 251 411 tonnes per year of wood for domestic purposes within the SCPLS region.

Conclusions

These methods for assessment of biomass resources and yield can be efficient for setting up further forest management planning and licensing systems in the region. A direct link with the planning of sustainable forest management allows the taxation system to influence the charcoal production quota of the SCPLS area.

To monitor the development of the biomass resources, and to test effectiveness of the licensing system, the yield data should be assessed regularly, e.g. every 1–2 years.

The balance between the production of charcoal and the vegetation yield should be interpreted carefully. These scenario analyses allow the effects of different governmental policy actions in the district to be interpreted.

The authors wish to acknowledge the project coordinator Philippe Simonis, and the teams who were involved in this study. The teams comprised: John Kuteesakwe, Mr. Paul Drichi, Mr John Ayongera, Mr John Diisi, Christopher Mukwaya, Alfred Macapili, Edward Damulira, John Ongodia. Special thanks is extended to Mr Solomon Kaahwa, Vice Chairman of Masindi district.

References

National Biomass Study 2003, Technical Report, Forestry Department, Ministry of Water Lands and Environment, Kampala Uganda

National Biomass Study 2002, Technical Report, Forest Department, Ministry of Water Lands and Environment

Kisakye Richard 2004, Final Report: Study on the establishment of Quantity of Charcoal Produced per Parish and Recommended Reserve Prices for Masindi District. Ministry of Energy & Mineral Development supported by the GTZ, Kampala, Uganda

NEMA 2001, State of Environment report for Uganda 2000/2001, Kampala, Uganda