www.sparknet.info

Knowledge network on sustainable household energy
in Southern and Eastern Africa

Scenario Analysis

Forestry Issues

Cornelia Sepp, Eco Consulting Group

Working draft

An initiative of

Intermediate Technology Development Group – UK, East Africa (Kenya) and Southern Africa (Zimbabwe/Mozambique)

Eco Ltd – UK

Eco Consulting Group – Germany

Energy and Environmental Concerns for Zambia – Zambia

Makerere University, Women and Gender Studies Department – Uganda

Rural Area Power Solutions (Pty) Ltd – South Africa

Scientific and Industrial Research and Development Centre, Energy Technology Institute – Zimbabwe

TaTEDO, Tanzania Traditional Energy Development and Environment Organisation – Tanzania

University of Twente, Technology and Development Group – Netherlands

University of Liverpool, Department of Public Health – UK

In association with

HEDON Household Energy Network – www.hedon.info

Supported by

The European Commission, International Co-operation (INCO), FP5

Part I: Constraints and issues to be addressed

Constraints for forestry measures to contribute to household energy supply

In nearly all “Sparknet countries” (except the Republic of South Africa), fuelwood and charcoal (hereafter referred to as “woodfuels”) have remained the dominant sources of household energy supply. Woodfuel ratios in household energy supply range from 35 % (RSA) to over 90 % (Mozambique, Tanzania), with measurable regional as well as urban-rural stratification. More than any other, low income households in rural areas are dependent on woodfuels. In all Sparknet countries there are to be found

- regions with acute firewood scarcity, predominantly in arid and semi-arid areas and in densely populated areas,
- regions with a firewood deficit, often in fertile agricultural production areas with a high population growth or in densely populated lowlands,
- regions with an expected deficit in the near future, in areas with a fast-growing population and expanding agricultural activities,
- regions with firewood surplus in areas with a high coverage of natural forests and low population density.

Country strategies largely depend on the prevalence of any of these situations. The specific issues forestry interventions must address will therefore be identified on a sub-national scale rather than country-wise. Nationally, however, the political and economic framework and general market conditions will be decisive factors.

Generally, there are several constraints that need to be addressed by the forest sector in order to secure household energy supply. Constraints may first of all concern information gaps about the actual situation and trends. These must be closed before deciding where action is to be taken. Others concern difficulties to stop a rapid deforestation that cuts short the woodfuel resource base. Another bunch of constraints refers to implementing measures in order to increase fuelwood production. And, lastly, the efficiency of wood utilisation (including conversion into charcoal) can be addressed. Other, contextual constraints tend to be of biological, economic, social, cultural or political kind.

Information gaps about woodfuel provision

Forestry can only contribute to solve household energy problems in regions where a current or predicted scarcity of fuelwood and/or charcoal (woodfuels) is documented. However, the balance between demand of woodfuel and its supply is not always known. If at all, such information tends to relate to the national level. Since woodfuels, however, cannot be transported over long distances, due to their limited energy content and related economic factors, a sub-national/local perspective is asked for.

What signifies a surplus or a deficit area depends on complex factors and relates to dynamic processes. On the demand side, such factors are population growth, the availability (including affordability) of alternative energy sources, and national energy policies. On the supply side the size of the area under forest, the natural growth potential, and forest political provisions are examples in case. Areas in which the supply of

fuelwood is continuously outbalanced with the demand only exist for certain periods of time, mainly as transition zones from surplus to deficit areas. There is a considerable knowledge gap - from the conceptual side – on how to calculate and how to predict woodfuel availability, and a lack of reliable and timely data.

Deforestation and its underlying causes

In fuelwood-deficit regions with a number of people dependent on woodfuels, deforestation can pose a severe threat to the household energy supply. In order to plan and implement mitigating measures the causes and the multifaceted effects of deforestation must be known.

In general, direct and indirect causes of deforestation can be observed. Direct causes are:

- the extension of arable land for subsistence or commercial purposes, mainly through shifting cultivation practices. Even though, poor soils that are very common in the tropics are suitable for agricultural utilization only to a limited extend. If fallow periods are shortened too much, soils became poor within a few years.
- Livestock: Overgrazing (forest pasture), damages through hoof steps and pollarding can result in a gradual degradation of forests
- Forest fires: Due to anthropogeneous impacts, forest fires have enormously increased since the last century. They cause a continuous destruction of natural regeneration and, thus, an over-aging of the forest stands.
- Industrial timber logging and logging of tropical precious wood: Access roads built for wood transportation are used by incoming groups (settlers) to cultivate formerly inaccessible regions, mainly in dense tropical forests.
- Infrastructure measures: road construction, dams and industrial complexes and the exploitation of mineral resources (mining) also contribute to forest destruction.
- Collection of fuelwood and production of charcoal: Commercial utilization, in particular widespread charcoal production, causes dramatic effects. In the production process more than half of the wood's energy tends to get wasted. Collecting fuelwood for subsistence, on the other hand, will only lead to notable forest loss when accompanied by extreme conditions (high population density, unfavourable conditions of growth, etc.).

As underlying causes, the following aspects are crucial:

- Rapid population growth. In Sparknet countries the annual growth rate is between 1.4 % (Zimbabwe) and 2.8 % (Uganda). The resulting high woodfuels demand has negative consequences for the forest stands.
- Increasing number of poor, displaced persons and refugees: Frequently, forests are the only remaining unsettled areas that are free to access and utilization. For people stripped of any resources and with no access to capital, charcoal production often remains the only way to gain income.

- Undesirable political development: Aspects to be mentioned here are the allocation of forest concessions allowing the logging of large forest areas, a prices and fiscal policy that makes alternative energies unaffordable for the majority of people, and prejudiced regulations for land distribution and land acquisition.
- Lack of alternative sources of energy: In a large number of developing countries, charcoal and also wood are used as sources of energy for commercial and industrial purposes for lack of sufficient alternatives. In Malawi and Kenia, for instance, 30 % and 26 %, respectively, of the total fuelwood logging are used by the tobacco, tea and coffee processing industry (Oesterdiekhoff 1991, p. 16).

Constraints to increase woodfuels supply

If the woodfuels supply is to be increased, it is not enough to tackle related issues by isolated measures. All factors are interrelated with forest management, forest policy, even land use policy, and land-ownership in general. One frequent limitation is the scarcity of land available for forestry measures. Usually household energy problems occur where there is high demographic pressure – resulting, among others, in competing land use claims, chiefly for agricultural purposes. The above mentioned economic, as well as ecological transport limitations, on the other hand, do not allow fuelwood production sites to be too distant from the demand centres.

Most frequently, fuelwood production is not immediately targeted by forest management – particularly with alternative forest products in place that are economically more attractive, such as lumber. But fuelwood can be a by-product of several forest activities (natural forest management, lumber plantations, afforestation, farm (agro)forestry and the like). Technically, one can observe a certain shift from high-input afforestation to **natural forest management**, supporting the regeneration of forests (fire protection, cattle protection, regulations for land use, etc.) and harvesting in a sustainable way. A further promising approach is the introduction of **social forestry programmes** which strive to improve the sustainable use of existing resources by including the population in planning, implementation, monitoring and evaluation.

- Social forestry/farm forestry: In Zimbabwe approaches of tree planting on individual farms have shown promising results. But for lack of systematic support up to date, such efforts can but little contribute to alleviate the fuelwood problem.
- Promising approaches were made by shifting the responsibility for sustainable forest management to local communities. This entails the following preconditions:
- clarified land properties and use rights,
- independent implementation of all steps of planning and realisation by the population with only loose external advisory services,
- the population’s opportunity of value-adding and marketing of all products (timber, charcoal, honey etc.)
- political support on all levels.

Experience has shown that – at least in arid zones of Africa – pure fuelwood plantations did not meet the expectations, mainly due to the following factors:

- Limited natural increment: In areas with high demand soils of good conditions are usually pivotally demanded for agriculture and infrastructure
- In fragile ecosystems monocultural stands bear a high risk of biotic and abiotic damages.
- Unsatisfactory economic turnover.
- Limited acceptance by the local population, who instead prefer multi-purpose stands (utilised e.g. for grazing and collecting non-timber forest products).

A common constraint of various fuelwood production systems is that

- in most cases market prices only reflect exploitation and transport but no production cost.
- the distribution of benefits stays mainly with the transporters and middlemen. Producers only obtain a small share.

In any way, **forestry and particularly afforestation measures alone are no means to guarantee sustainable supplies of fuelwood.** Integrated, multi-disciplinary approaches that address the fuelwood problem from different angles, are indispensable.

Part II: Country-wise situation

In the following an attempt is made to pin down country-specific issues. Being of exemplary character they need to be complemented, refined and prioritised in the development of scenarios.

Kenya

70 % of all Kenyan households rely on biomass (primarily fuelwood and charcoal). Alternative energy sources are restricted. It is estimated that, in midterm perspective, woodfuels will remain the prime source of energy.

Issues to be addressed: elaborate/refine/use information about current and future deficit/ surplus areas.

In most rural areas collecting fuelwood is free of charge. Where fuelwood has already become very rare it has sometimes been commercialised. Charcoal is widely produced illegally and commercialised through the informal market (91% of users purchase charcoal). Law provides for forms of logging for charcoal production, but this is seldom known. Due to subsidies, official market prices are low. This has made it difficult for the private sector, to grow and profitably operate commercial fuelwood plantations.

Issue to be addressed: analyse the informal market and create incentives for the transfer to legal activities and formal market. Disseminate information about legal logging options. Analyse the formal market and check if royalties and market prices are an incentive or disincentive.

Deforestation due to charcoal production for urban centres.

Issue to be addressed: Household energy supply plans are needed for urban centres, improve charcoal making techniques and organisation, sensitisation and training of charcoal producers.

Compared to the other Sparknet countries, Kenya holds a relatively large area of forest plantations (232.000 ha).

Issue to be addressed: Explore potential of these plantations to contribute to fuelwood supply.

Agroforestry has had some success.

Issue to be addressed: Lessons learnt have to be elaborated and disseminated. Analyse need for capacity building.

For the private sector, favourable conditions for fuelwood production must be created.

Tanzania

Wood is used by more than 90% of the Tanzanian population. Alternative energy sources are restricted. It is estimated that, in a midterm perspective, woodfuels will remain important sources of energy.

Issue to be addressed: elaborate/refine/use information on current and future deficit/surplus areas.

In most rural areas collecting fuelwood is free of charge. Where fuelwood has already become very rare it has sometimes been commercialised. Charcoal is widely produced illegally and commercialised through the informal market in urban centres (85% of urban households use charcoal).

Issue to be addressed: analyse the informal market and create incentives for the transfer to legal activities and formal market. Disseminate information about legal logging options. Analyse the formal market and check if royalties and market prices are an incentive or disincentive.

Deforestation due to charcoal production for urban centres.

Issue to be addressed: Household energy supply plans are needed for urban centres.

Where forests are managed by the forest administration, fuelwood is, under certain conditions, sometimes handed out to the nearby population. Participatory approaches in forestry are still limited. More experience exists in participatory wildlife management.

Issue to be addressed: Analyse possibilities to intensify participative forest management and support favourable conditions for fuelwood production.

While forest policy and law provide a relatively favourable theoretical framework, in practice law will need to be enforced.

Issue to be addressed: Build capacities for law enforcement and information/sensitisation of the population.

Uganda

Uganda has the richest resource base in terms of wood volume per ha (133m^2/ha) and biomass per ha (163 tonnes/ha). Large parts of these resources are under protection. Only a limited area of the remaining surface is sustainably managed.

Issue to be addressed: Make better use of the potential and include fuelwood supply considerations in forest planning.

100 % of low income households use wood. Only 15 %of total energy consumption is charcoal. An official marketing system yet remains to be established.

Issue to be addressed: Support participatory approaches in forestry. Improve charcoal-producing technology and organization.

Mozambique

In Mozambique energy is drawn to 83 % from wood, to 17 % from charcoal. Wood has become commercialised in urban areas and to a lesser extend in rural areas. Supply of fuelwood in towns is entirely provided by professional producers. To them, charcoal production is a means for economic survival. Within the private sector, charcoal sustains an important commercial trade chain of producers, transporters, middlemen and sellers. The supply is distributed through formal and informal markets. Technologies are not performing well.

Issue to be addressed: Create favourable conditions Regulate the market, find possibilities for more efficient charcoal production.

With 25m^3 per ha standing volume the resource base is markedly weak. In some areas deforestation has grown a major problem.

Issue to be addressed: arouse motivation for the development of alternative energy sources.

A policy working group on woodfuel is in place.

Issue to be addressed: The working group should be strengthened.

Republic of South Africa

24 % of the population use woodfuel. There is a formal and an informal market in place. Charcoal is mainly channelled through the formal market. Its dominant use is in recreation, not so much as domestic fuel.

In several rural areas more than 50 % of the wood used for electricity are purchased

Issue to be addressed: Check wood potential for energy.

No data are available about the relevance of charcoal for low-income households.

Issue to be addressed: collect data on low income household energy supply.

Zambia

Through overharvesting natural forest wood without restocking and with the government unable to manage the fuelwood supply the country has a documented total deficit of 3,8 million tonnes per year. Zambia has the countries' highest rate of deforestation. Some areas will run out of biomass within a few years. Commercial farms (tobacco, tea) collect wood from their own farms and use it for drying. Stronger members of communities sell collected wood to more underprivileged members. In areas in which wood must be purchased grid connection is sometimes used for cooking.

Charcoal production trade and use is a large – uncontrolled and unmanaged – industry.

Issue to be addressed: Regulate market, increase forest management and reforestation.

Zimbabwe

Commercial wood stems mainly from exotic trees plantations. Charcoal which, in the country abundant with biomass, altogether plays a minor role is sold for the richer households at gas stations and supermarkets.

Issue to be addressed: Assess present and future role of charcoal for household energy.