



# Malawi Policy Brief No. 1

## Sustainable charcoal production by and for local communities

### 1. Charcoal as a biomass fuel

Almost 60% of Malawians live below the poverty line (Energy Department, 2000). Only 14 % of Malawians live in cities (NSO 1998). But population growth in cities is 8.5 % (compared to an average 1.9 %) (UN, 1999). Poor people (both rural and urban) need energy to cook their food.

#### 1.1 The importance of biomass fuels

Only 4 % of households nationally are connected to the electric grid and only 10 % of urban households use electricity as their main cooking fuel (Arpaillange 1996). Energy for cooking in rural areas comes from biomass fuels (firewood and charcoal). In cities, biomass fuels make up more than 90% of energy production (ESU, 1984; Arpaillange, 1996). Charcoal use is particularly high in Blantyre. Rural households in Malawi are known to use crop residues, but not much dung, as a seasonal substitution for some of their firewood needs (ESU 1984).

Production and trade of biomass fuels was estimated to employ over 40 000 people full-time and to make up 2.2 % GDP in 1996 (Openshaw 1997a). But biomass fuels are expensive in comparison with electricity (DCDM, 1999) and consume 33% of the income of the lowest income group (Arpaillange, 1996). There is little comparative data on preferences and volumes between firewood and charcoal. In general, women are responsible for cooking and purchase of fuel (Vermeulen, 2000).

#### 1.2 Energy use efficiency

Malawi has a long promoted fuel-efficient stoves (Nkaonja, 1990). Mud stoves promoted in the 1970s and 1980s turned out to be inconvenient and inefficient (Energy Division, 1991). But

ceramic stoves produced under the Malawi Stoves Programme in 1986 were apparently so well accepted in Blantyre that a survey found 79 % of charcoal-using households owned one. This figure is thought to have declined since then.

Biomass fuels from indigenous hardwood species are consistently preferred to exotic hardwoods (e.g. eucalyptus) and softwoods (e.g. pine). As a result, charcoal from plantations will not compete where there is easy access to indigenous species (Vermeulen, 2000).

#### 1.3 Biomass collection

Malawians rank food security as their major constraint. Energy supply is not ranked as highly (Brouwer et al. 1996; Nelson and Braden 1998a). But in rural areas, women spend 1-8 hours per week collecting firewood (JICA, 2000) and may travel further to find preferred species or larger pieces (Brouwer et al. 1997).

Few city households collect biomass fuels. All urban charcoal and 90 % of firewood is purchased (Openshaw 1997), mainly from traders who operate as small self-owned businesses employing one to three people. Using estimates of wood stocks, growth rates and consumption, Openshaw (1997) concluded that there was a surplus of wood in the Mzuzu area, a balance around Lilongwe and a deficit around Blantyre / Zomba – but the figures are questionable (Vermeulen, 2000). For example, between 6-10,000 tonnes per year are being extracted from the Thuma forest reserve near Lilongwe – leading to 700Ha deforestation in the reserve.

The latest global review of biomass fuels (Arnold et al. 2006) concludes that biomass fuels are seldom a primary source of forest removal. There

is usually no need for large scale interventions to maintain biomass - but rapidly increasing urban demands for charcoal may cause transitions in land cover in the vicinity of its production – concentrated along roads and around villages. Land cover transitions are often not because total charcoal supply is out of balance with wood stocks – but due to failures to provide incentives to manage wood production in a manner that allow regeneration in and around charcoal producing areas (Arnold et al. 2006).

## **2. Charcoal and the forest resource**

The conversion of forest land for agriculture is perhaps the most important pressure on forest resources. Rates of land clearance have been estimated at up to 3.5 % of national forest area per year (FAO data quoted in Tambula 1994). In addition to firewood collection, tobacco, charcoal and brick industries also have a major impact on domestic fuel supply.

### **2.1 The tobacco industry**

Tobacco estates use less than 23 % of national consumption of biomass fuels (World Bank 1986a). In 1986, 85 % of tobacco estates had planted trees, but only on a small scale (ESU, 1986). But firewood from government plantations was too cheap for it to be worth using their own wood. Ng'ong'ola (1993) found that very few estates maintained the required 10 % of land under trees.

A charcoal pilot for the industry failed in 1990 due to the investment costs needed to modify the fireboxes in tobacco barns (IPC, 1988 and WAG, 2005). Wood use for flue-curing used to be highly energy inefficient (Fraser, 1986), but the average of 40 m<sup>3</sup> per t of tobacco (ESU 1986) fell to 20 m<sup>3</sup> per t in 1991 due to low cost efficiency measures (Energy Division 1991) and by 2000 was perhaps 15 - 18 m<sup>3</sup> per t on average (Vermeulen 2000 quoting ARET data). Similar efficiency gains could potentially be made in the charcoal industry. For example, 200% efficiency gains have been estimated for charcoal production using the Brick Beehive Kiln system (WAG, 2005).

### **2.2 The charcoal industry**

For charcoal production around Blantyre, 20 % of households rated charcoal-making as their main

source of income (Mawaya et al. 1986). Sale of firewood is clearly less profitable - only 4 % of households said that it provided their main income source. But JICA (2000) found that the proportion of households manufacturing charcoal in their mid-Shire study site had declined to 6 % over time because insufficient wood was available. In a case study in Thuma it was found that 90% of charcoal producers sold to middlemen who then sold to city vendors. Almost 80% of the total sales price accrued to these middlemen and vendors (Sibale and Banda, 2004)

A common belief among experts that there is an extensive illegal charcoal trade (e.g. UNDP-ESMAP 1998) but this has little evidence to back it up. A private sector concession to carbonise dead wood from Dzalanyama Forest Reserve using inefficient carbonisation technology was stopped by Government in the early 1990's when the resource it was based upon became depleted and the business switched to illegal felling of live trees (WAG, 2005). A government-led commercial charcoal project led by a German consulting firm, IPC, attempted to use pine thinnings at Viphya and Mulanje, but the charcoal broke down during transport (IPC 1988).

## **3. Charcoal production policies**

Under the Section 81 sub-section 1 of the Forestry Act, charcoal can be produced only under a Forestry Department licence dependent on a forest management plan. The complexity of writing a management plan, and the lack of clarity over who has the right and responsibility to produce, it has effectively criminalised all charcoal producers. Even in Malawi's 78 Forest Reserves, only one management plan exists (Sibale and Banda, 2004).

### **3.1 The National Forest Programme**

The National Forest Programme (NFP) advocates that specific forest areas should be managed by and for local villages and should ultimately work to enhance supplies of firewood to local residents. Village Natural Resource Management Committees (VNRMCs) have been shown to be able to control access to biomass resources (Milner, 1998, Nelson and Braden 1988a). But sustainability issues remain.

Of central concern to all is that any charcoal licence would require communities to have a

dedicated forest area of sufficient extent and suitability; and be able to establish annually enough trees as biomass to meet the current level of charcoal production (WAG, 2005).

At present, the NFP prescription is not widely applied, partly because of insufficient information and forestry staff on the ground (Vermeulen, 2000). Villagers are unaware of the present policy and do not believe that they have secure rights over local trees and forest areas (Nelson and Braden 1998). Most local forestry institutions such as the (VNRMCs) lack formal legitimacy under the Forestry Act and are often not accountable to the communities they are intended to represent – sometimes in conflict with traditional authorities.

### **3.2 Past development policies**

Donors pushed a number of major tree planting programmes in Malawi (e.g. Energy I and II). They failed largely because communities saw few market incentives for cultivating firewood – especially of fast growing species such as Eucalyptus (World Bank, 1989a, 1989b). Tree-planting under Energy I did little to retard cutting of wood from natural woodland (Nkaonja 1990).

### **3.3 Lessons learned**

Lessons can readily be drawn from Malawi and elsewhere:

- Charcoal production is among the only mainstream commercial activities that poor rural communities can use to improve their income. As a critical source of energy for the poor, banning it is counterproductive. Not only is it morally questionable (under the UN Declaration on Human Rights), it is also likely to promote widespread illegality and reduce government revenues.
- Charcoal market chains often reduce the proportion of true value that poor community-based producers receive (Sibale and Banda, 2004). Decriminalising charcoal production would promote greater market chain transparency that could solve this .
- Returns from biomass crops are insufficient to provide an incentive for maintaining plantations on their own. People are only likely to plant trees that have a primary

commercial value beyond biomass production (Vermeulen, 2000).

- Community forest management works! Community capacity develops if there is clarity over the rights and responsibilities of community institutions such as VNRMCs (see Carter and Gronow, 2005).
- It is easy to calculate the quantity of wood required to produce a unit of charcoal. It is therefore easy to prescribe the quantity of forest that must be managed and / or planted in order to supply charcoal sustainably. Quotas based on areas of forest or plantation – monitored annually by district forest authorities could replace complex management plan requirements.

## **4. Urgent priorities for action by the Forestry Department**

Four priority actions by the Forestry Department are needed:

- Clarify the rights and responsibilities of the VNRMCs to produce sustainable charcoal through a regulation under the Forestry Act.
- Remove for charcoal production the requirement for a forest management plan – replacing this with a simple annual quota system based initially on the area of community forest cover and then added to in subsequent years by further community plantation (e.g. monitoring to be done on an annual area basis).
- Support community led programmes to provide seedlings of trees that serve dual functions (both commercial use and potential for charcoal production)
- Assign immediate responsibility at district level for the monitoring and maintenance of publicly available data on the volumes of charcoal traded and the prices at each stage of the market chain – with the long term aim of increasing the proportion of that income going to poor producers.

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