

**FUELWOOD AND POVERTY ALLEVIATION**  
**IN SOUTH AFRICA:**  
**OPPORTUNITIES, CONSTRAINTS AND**  
**INTERVENTION OPTIONS**

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## 1. INTRODUCTION

The energy sector in South Africa has both first world and third world elements. On the one hand South Africa produces and consumes over 60 % of the electricity on the African continent and is the twelfth highest carbon emitter in the world. On the other hand, well over half of South Africa's rural households use fuelwood energy to a greater or lesser degree (ranging from a few times per month to daily), as do numerous urban households. Even with the substantial household electrification programmes in the last ten years and one of the lowest electricity prices in the world to consumers, most newly electrified households continue to use fuelwood because they cannot afford the appliances and/or the monthly costs (Howells *et al.* in press). The latter have been reduced by the national Government's policy of a Free Basic Allowance (FBA) of 5 – 6 kWh per household per month. Yet, in 2003 approximately 30 % of households in South Africa still did not have access to grid electricity supplies (DME, Draft Free Basic Electricity Policy for SA, June 2004). This represents some 3,4 million households (13,5 million people). The actual application of the FBA varies between municipalities, but is generally still not enough for all household cooking needs. Consequently, even electrified households make use of alternative fuels, including fuelwood, for part of the month or for certain meals. It is expected that a significant number of households will continue to use fuelwood to some extent for decades to come.

The use of and reliance on fuelwood is not uniform across geographical areas or within individual communities. Typically the poorest and most vulnerable communities and households make most use of fuelwood with only limited use of other energy forms. Remote rural communities still rely extensively on fuelwood. With increasing modernity and household income, there is a gradual shift towards more modern fuels such as paraffin, gas and electricity. The last is only available to those households and communities on the national grid. Electricity provision external to the national grid plays only a small role in South Africa. The fact that many electrified households cannot afford the necessary appliances, and that many other households have no access to electricity at all, means that the FBA has little benefit to them, further marginalizing some of the poorest and most neglected people; the very ones the FBA is supposed to assist. Additionally, cheaper commercial alternatives can frequently pose significant health risks to these vulnerable households.

The use of fuelwood offers both opportunities and constraints. In terms of the national priority on poverty reduction, it is desirable to optimize the opportunities and minimize the constraints. On the one hand fuelwood is a renewable resource. If managed and harvested sustainably it will continue to serve the energy needs of the rural and peri-urban poor for decades. Simple technological interventions such as improved stoves with chimneys can reduce fuelwood consumption (to a limited extent) and the health hazards associated with smoke inhalation. Maintenance of trees in the environment and on people's farms and homesteads for sustainable fuelwood harvesting also has environmental, economic and socio-cultural benefits. Of particular interest is the carbon sequestration potential, and the move towards international trading of carbon credits (Smith & Scherr 2002, Scholes 2004). Thus, the challenge is how to channel these benefits to the rural and peri-urban poor, especially since they are currently excluded from the FBA of electricity, either because they do not have access to grid electricity, or the FBA is insufficient, or they do not have electrical appliances, especially for cooking. What interventions, if any, can Government make to reduce poverty through improved access to and sustainable use of fuelwood?

On the other hand, use of fuelwood poses both health and environmental hazards. The opportunity costs associated with harvesting fuelwood also need to be considered. Poor households have a higher risk of respiratory ailments correlating with the higher use of fuelwood or coal (e.g. Eberhard & van Horan 1995, Mishra *et al.* 1999, IEA 2002). This is more marked in peri-urban communities where cooking fires are often made in poorly ventilated shelters. In rural areas of South Africa, many households make cooking fires outside which helps reduce the health hazards. Other health problems are associated with the carrying of large bundles of wood. From an environmental perspective the unsustainable harvesting of trees results in the reduction or loss of many ecosystem goods and services, which only serves to further exacerbate local poverty. Thus, whilst trying to contribute to poverty alleviation in these areas through a national fuelwood programme, such a programme must seek to minimize these potential negatives. These challenges are not unique to South Africa. Approximately 60 % of southern Africa's energy comes from fuelwood or charcoal, and the absolute number of people using biomass fuels in southern Africa is expected to increase by as much as 50 % within the next 25 years (Biggs *et al.* 2004). Thus, South Africa can learn from neighbouring countries whilst simultaneously leading the way.

Within the context of the above, the Department of Water Affairs and Forestry (DWAF) convened an expert workshop to consider in detail the opportunities and constraints to making

interventions in the fuelwood sector to help alleviate poverty. The workshop was held on 26<sup>th</sup> October 2004 in Pretoria (see Appendix 1 for participant details), and had the following purpose:

- i) To briefly profile the use of fuelwood energy in South Africa.
- ii) To briefly profile the status of fuelwood energy supply in South Africa.
- iii) To identify the key governance opportunities and constraints to increase the contribution of fuelwood energy to free basic energy and renewable energy in terms of Government policies and international commitments.
- iv) To identify practical options and tactics for overcoming the constraints and seizing the opportunities.

## **2. A PROFILE OF FUELWOOD SUPPLY**

Recent descriptions of the fuelwood supply situation in South Africa can be found in Williams & Shackleton (2001), Biggs *et al.* (2004) and Shackleton *et al.* (2004), although some aspects rely on dated information. In summary:

- The primary source of fuelwood is from the woodland biome that covers 34 % of South Africa, and is home to over nine million people.
- Other sources of fuelwood include indigenous forests, community woodlots, off-cuts from commercial plantation forestry, and trees growing in people's fields and residential plots.
- At a national scale sustainable annual production of fuelwood is sufficient to meet annual demand.
- However, much of the national annual production is on State or private lands where it is unavailable, or too far away from, fuelwood reliant communities.
- At local scales the situation is extremely variable, with some communities and households enjoying adequate supplies within easy collection distance, whilst others have to walk several kilometers to access very meager supplies and of poor quality species. Others still, have no local access to fuelwood supplies and either buy fuelwood and/or substitute it with other fuels such as dung or paraffin.
- Nationally, there has been a general decline in woody biomass as a consequence of increasing human population and land transformation to arable and residential purposes, with 10 % of the savanna biome fully transformed and 11 % partially transformed (Thompson *et al.* 2001).

- Rural people actively participate in tree growing, albeit rarely specifically for fuelwood, and use the deadwood produced for kindling and fuelwood.
- The majority of preferred species coppice after cutting, especially woodland species.
- There is an increasing network of informal fuelwood markets, where small-scale traders harvest and transport wood from areas of adequate or excess supply to areas of shortage.
- These fuelwood markets help alleviate energy poverty in some areas, and provide local employment, although wages and profitability are low.
- In some places these commercial activities undermine local fuelwood security by steadily reducing the biomass resource available to domestic users.
- Local and traditional institutions are generally weak and unable to manage, guide or police local woody resources and harvesting.
- The Working for Water programme has increased short-term supplies of fuelwood in many areas, but in the long run may exacerbate energy poverty in areas reliant in alien species for the bulk of their fuelwood needs.

### **3. A PROFILE OF FUELWOOD DEMAND**

Full descriptions of the fuelwood demand situation in South Africa can be found in Williams & Shackleton (2001) and Shackleton *et al.* (2004), although some aspects rely on dated information.

In summary:

- The national demand for fuelwood was pegged at 13 million m<sup>3</sup> in the mid-1980s and has never been updated since then.
- Fuelwood use is widespread with over 90 % of rural households using it to some degree.
- In 2001, 20,5 % of households used fuelwood as their main energy source for cooking, compared with 51,4 % that used electricity, 21,4 % paraffin, 2,5 % gas, 2,8 % coal and 1,4 % other sources. According to the same census 24,6 % of households used fuelwood as their main energy source for heating, compared to 49 % that used electricity, 14,6 % paraffin, 1,1 % gas, 6,6 % coal and 4 % other sources (Statistics South Africa 2001). These data report main energy sources and hence represent the minimum numbers, as most households use a mix of energy forms.
- The use of fuelwood is most prevalent in the poorest and most rural provinces in South Africa. In 2001 59.5 % of all households in the Limpopo Province used wood as their main

source for cooking, followed by the Eastern Cape at 35,9 %, Kwazulu-Natal at 27 %, Mpumalanga at 23,3 %, North West Province at 18,3 %, Northern Cape at 15,3 % Free State at 7,9 % Western Cape at 2,9 % and Gauteng at 0,7 % (Statistics South Africa 2001).

- National demand is unlikely to grow from the current levels in light of (i) the HIV/AIDS pandemic which has stagnated population growth for the next 10 – 20 years, (ii) increasing urbanization and hence distance from wood stocks, and (iii) large-scale electrification programmes. At the same time, because of the widening gap between rich and poor, the number of households that rely on fuelwood for cooking and heating is unlikely to decrease significantly in absolute terms below the current figures of approximately 2,3 – 2,8 million households (9 – 11 million people) over the next decade or more.
- With rapid urbanization, urban and peri-urban demand are an increasing share of the national fuelwood need.
- Newly electrified and /or urbanized households tend to continue to use fuelwood for a variety of reasons (including its low price or ‘free’ availability, cultural reasons, lack of cash to buy alternatives, lack of cash to buy appliances for other energy forms, general preference, etc.), but in the longer term per capita consumption does decline, although rarely to a zero base.
- The gross, annual value of demand to the national economy is estimated to be R3 – 4 billion.
- At the local-level demand is extremely spatially variable, but does tend to be higher in areas with greater biomass resources.
- Estimates of household consumption rates range from 0.6 tonnes per year to over 7.5 tonnes per year, with a mode of between 3 and 4 tonnes per household per year. The gross monetary value is variable because prices differ widely in different parts of the country, with a mean of approximately R2 000 per rural household per year.
- There is competition between use of woodlands and forests for fuelwood, and use for other purposes such as livestock grazing, use of wood for construction, clearance for fields, etc.
- Where woody biomass stocks are reasonable or plentiful, there is active selection for preferred species and size classes. Selectivity declines as total woody biomass declines.
- Fuelwood users have a variety of reasons for using fuelwood, of which its ‘free’ availability is paramount. Preference is frequently expressed for electricity but is not implemented due to meager cash resources. It is a common scenario that electrified households use more fuelwood as the month progresses as funds for electricity and paraffin dwindle. In such instances fuelwood is a vital fallback resource.
- In areas where fuelwood markets are well established, users perceive fuelwood to be a cheap resource relative to other energy forms.

- Collection of fuelwood for domestic purposes is generally undertaken by women and children, whereas men dominate the marketing of fuelwood.
- Households are adaptable in meeting their energy needs. They will change the quantities and types of fuels that they use in response to their relative availability, prices and preferences.

#### **4. OPPORTUNITIES ASSOCIATED WITH USING FUELWOOD WITHIN POVERTY REDUCTION STRATEGIES**

##### **4.1. The poverty-fuelwood nexus**

- The primary users of fuelwood are the poorest of the poor, which corresponds with the concerns of national government and other agencies.
- Poverty alleviation is high on the government's agenda, which will enhance buy-in and political will from politicians and government from all departments.
- Poverty subsidies offering free basic services exist, which could be a source of commitment and funds for a fuelwood subsidy in poor rural areas.
- Fuelwood is considered as a cheap or 'free' energy source.
- Harvesting and transport of fuelwood offers job opportunities.
- The rural poor in South Africa are concentrated in the wooded biomes, especially woodlands.
- The national fuelwood resource is extremely valuable, representing billions of Rand annually that can be sustainably harnessed.

##### **4.2. The nature of the resource**

- Fuelwood is a renewable resource and thus has potential to be harvested and managed sustainably.
- Fuelwood is abundant in many areas.
- Fuelwood is an established energy source, with cultural values.
- There is a lot of discarded wood from State and private lands under plantation forestry and bush-clearing, although often not close to the areas of demand.
- Savanna species generally coppice easily, providing an opportunity for rotational harvesting.
- Global elevation of atmospheric CO<sub>2</sub> levels will favour tree growth.

### **4.3. Fuelwood supplementation**

- A range of energy options is available for energy security which means policies can be flexible, especially at the local level, so ‘one-size’ doesn’t have to fit all, but rather tailor made to fit local conditions and preferences.
- Rural communities have an inherent interest in growing trees. Although rarely specifically for fuelwood, it is perceived as an important by-product.
- There is a vibrant and growing small-grower forestry sector, which can support local-level supplies of fuelwood from off-cuts and thinnings.
- New *Eucalyptus* clones are extremely fast growing, and therefore could be used in a rapid and focused woodlot and household tree-planting programme in needy areas.
- Large-scale electrification offers opportunities for diminishing fuelwood use in the long-term, and income generation projects based on electricity as an energy source. This link between electrification and reduced fuelwood consumption is not however definite; much depends on if and when related economic development happens, local abundance or scarcity of fuelwood and the relative pricing of electricity.
- Government and other parties are currently looking at alternative commercial or more modern fuels very seriously (such as LPG, ethanol gel). There are also options to use hay boxes, solar stoves to reduce wood fuel requirements.

### **4.4. Available information and models**

- There are existing models (e.g. Howells *et al.* in press) and scenario frameworks (e.g. Banks Appendix 3) around fuelwood to guide decision making and interventions.
- There are several national multi-sectoral initiatives that could have a more explicit fuelwood component (e.g. Working for Water; Extended Public Works Programme, Land Care Programme).
- There is a wealth of information and lessons learned from previous initiatives, especially the Biomass Initiative of the late 1980s and mid 1990s, that can be accessed, synthesized and updated.
- Second generation models and pilots of public-private sector partnership in energy issues are emerging.
- Existing outreach and education programmes of the DME on energy access, safety and relative efficiencies.

#### **4.5. Institutional framework**

- Local management and zoning of land, and thus resources, is mandatory in IDPs.
- There is strong government commitment to raising the profile of gender imbalances in all spheres, and since fuelwood access and use is predominantly a female role, this could be a good sphere for intervention.
- The new Tenure Reform and Rights Act means that some of the uncertainties regarding fuelwood resource tenure and access may be resolved when adequately implemented.
- Growth of area of land under communal or collective tenure as a consequence of the land reform programme.
- Growing models and pilots of public-private sector partnership in energy issues that may be useful templates for interventions.

#### **4.6. International trends**

- The growth of trees for fuelwood or other purposes is a carbon sink and therefore important as one mitigation of global climate change.
- Renewed interest in biomass energy in the developed world because it is a carbon sink, renewable, and has biodiversity benefits. Carbon trading is a reality and will grow. Thus there are opportunities to develop funding and technology partnerships.
- A move away from viewing fuelwood problems as simply an issue of augmenting supply (usually as woodlots) to ecosystem restoration and holistic management.

### **5. CONSTRAINTS ASSOCIATED WITH USING FUELWOOD WITHIN POVERTY REDUCTION STRATEGIES**

#### **5.1. The poverty-fuelwood nexus**

- There is a lack of a uniform view in government re the opportunities around fuelwood. For example, some stakeholders seek to reduce the use of fuelwood as much as possible due to health impacts, social stigma, and environmental concerns, whereas others see it as a renewable resource with considerable value and benefits for the rural poor.
- Not all role players agree on the role of subsidies in poverty alleviation.
- HIV/AIDS impacts on poverty, household labour and hence reliance on fuelwood.

## **5.2. The nature of the resource**

- Extremely high spatial variation in supply and demand curves, and thus generic models have only limited value.
- A strong conservation lobby against the harvesting of fuelwood, even though it is a renewable resource.
- Diminishing access to local supplies of fuelwood by expanding urban communities.
- Gender based power imbalances in the fuelwood sector at household level. Women harvest fuelwood for domestic use; men harvest it for income generation.
- Localized critical shortages of fuelwood in many rural areas.
- Fuelwood resources on private and State land are often not close to the areas of high demand, requiring that it has to be transported, which is expensive and cannot be done profitably over long distances.

## **5.3. Agroforestry and woodlots**

- The permit system around afforestation and water resources hinders the development of woodlots in areas with limited natural woody resources.
- Alien plant legislation limits the planting of fast growing alien species in areas with acute fuelwood shortages.
- Limited availability and access to large numbers of tree seedlings for large-scale interventions.
- Limited success of nursery programmes in addressing fuelwood shortages.
- Communities are frequently willing and eager to plant trees (although rarely for fuelwood purposes directly) but are unable to do so because of a lack of inputs such as seedlings, water and fencing.

## **5.4. Available information and models**

- Consumer behaviour is complex and consequently not always predictable.
- Extremely high spatial variation in supply and demand curves, and thus generic models have only limited value.
- Institutional memory is short, especially re the lessons from the Biomass Initiative.
- Limited funding for fuelwood related research, because it is not seen as a government priority.

## **5.5. Institutional framework**

- Local governance and institutions are frequently weak, lacking in skills, capacity and adequate finances, especially in rural areas, and therefore will be hard pressed to manage any energy security strategies or the fuelwood resource even if identified as a priority.
- Widespread confusion between municipal and traditional roles in land management with disempowerment of traditional authorities and community members as landowners, resource managers and custodians.
- Fuelwood issues are rarely addressed in IDPs, and even when they are, implementation is weak or non-existent.
- Limited access by the poor to support services such as training, information, etc.
- Neither passive nor active energy planning are considered as part of RDP housing programmes.
- Fuelwood has to compete with other more modern energy fuels, and thus it is difficult to get energy suppliers to tackle fuelwood supply issues.
- Tenure reform legislation and implementation thereof is slow.

## **6. POTENTIAL OPTIONS FOR INTERVENTION**

The lessons from previous work in South Africa and internationally are varied and context specific. Very few were learnt within a context of approaches for poverty alleviation, but more aligned with the paradigms of the fuelwood crisis and social forestry. Some of these could be applied directly to a poverty alleviation and energy security approach, but others will require adaptation. Drawing on these lessons from South Africa and internationally, a menu of twenty-one options are available to DWAF to make a difference through harnessing the opportunities and minimizing the constraints. These options are outlined below, grouped into five themes. It will be beyond the mandate and resources of DWAF to implement all of these alone and simultaneously. Yet, no single option implemented alone will have a significant impact countrywide on energy security for the poor. Rather, several options will have to be integrated and pursued in collaboration with other role players, including other government departments. Precisely which suite of options DWAF selects from the twenty-one listed, and develops further will be informed by interpretation of their national mandate, the financial and human resources available to them, and the partnerships they already have or develop. It is anticipated that for each option selected, further work will be required to assess over feasibility and develop a specific implementation

strategy based on current knowledge of successes and failures, and resources available. This needs to take into account regional variations in fuelwood supply and demand situations.

## **6.1. Improving institutional frameworks**

### **6.1.1. *Creation of sub-directorate in DWAF regarding a fuelwood programme***

Since the early 1990s there has been relatively little attention given to fuelwood issues in South Africa, paralleling trends internationally (Arnold *et al.* 2003). If real progress is to be made in using this valuable resource in a sustainable fashion for enhanced benefits to poor households, it will require political will, direction and funding. For this to be achieved it is necessary that a sub-Directorate be created in DWAF to provide the necessary vision, impetus, advocacy and liaison with other government sectors. Given that it is more than just an energy issue (it relates to poverty alleviation, tree establishment, woodland management, subsidies, changing mindsets, etc.), it is appropriate that the sub-directorate be housed within DWAF, but it will require committed networking with other departments, including DME, NDA, NLA, DEAT and local government.

### **6.1.2. *Examine and treat the issue in a holistic manner***

Most energy crisis interventions in Africa over the past two to three decades have attempted to deal with the issues in a very sectoral fashion, which was one of the reasons for their limited success (Williams *et al.* 1996). Any meaningful intervention will have to recognize and make provision for the multiple dimensions of the problem, multiple sources of fuelwood, multiple uses of wood resources and the multiple stakeholders involved. It is not simply a matter of making more wood available. Nor is it simply a matter of reducing demand so biomass stocks are retained longer for poorer households and communities. It is not solely an energy issue, but also one with health, social, economic and environmental dimensions. There is a need for an inter-sectoral approach between the relevant Government departments, including DWAF, DME, NDA, DLA, DEAT and NDH, along with local government, research agencies and NGOs. This is compounded by the extreme local variability of biomass energy supply and demand along with poverty status and availability of alternative energy forms. Therefore, priority areas need to be identified, and then for each area local-level solutions found in a multi-sectoral fashion building on existing infrastructure and support services, in conjunction with local government. In other

words, a holistic rural energy policy needs to be developed, in conjunction with strategies and targets. This would be a joint initiative of DME and DWAF.

### **6.1.3. *Increase the capacity of local government***

Energy poverty and tree/woodland management are generally low on the agenda of local government. There is often a lack of awareness, compounded by constraints on funding and capacity. There is a need for education and training, with backup funding, to raise the profile of biomass energy as a crucial resource for poor households, and to inform local government that fuelwood sources are commonly from municipal or communal land under the jurisdiction of local government. Frequently, intervention is limited to simply fining harvesters for cutting trees. Local-level land use zoning processes must also take into account biomass energy supplies. Repeatedly, new infrastructural developments result in clearance of all woody resources to be replaced by housing estates, dams, golf courses, recreation/conservation areas, and poor households are forced to walk further and further to locate fuelwood for their basic needs. Local government must be given the capacity and funding to develop and monitor appropriate fuelwood strategies and programmes especially targeted at the poor. In particular local government must work with local communities to effectively manage and police fuelwood resources, and reduce competition for the resource between local domestic users and commercial interests located within the community and elsewhere. Local government agencies must be able to enforce local user rights. National government needs to catalyze a mind-shift by local government, away from purely infrastructural development to local integrated development and IDPs. Natural resources need to be regarded as valuable local capital that needs to be used sustainably and leveraged to support rural development and poverty alleviation.

### **6.1.4. *Differentiate rural requirements from peri-urban/urban ones***

The situation around supply and demand of fuelwood in urban and peri-urban areas is different to that of remote rural areas. For example:

<b>Urban/peri-urban</b>	<b>Rural</b>
<ul style="list-style-type: none"><li>• Frequently limited or scarce fuelwood stock in immediate vicinity</li><li>• Relatively high disposable incomes to spend on energy needs, including fuelwood</li></ul>	<ul style="list-style-type: none"><li>• Variable situations with some areas having plenty of fuelwood close by, whilst others experience critical shortages</li><li>• Limited cash resources, which increases the comparative advantage of collecting 'free' wood</li></ul>

- Usually better developed fuelwood markets
- Limited access to land to grow own trees
- Lower mean per capita consumption of fuelwood
- Rapidly changing situations in supply and demand
- Better access to inputs such as water and fencing to support tree planting
- Development of fuelwood markets is variable, usually in response to localized scarcity
- Greater access to land for tree growing
- Higher mean per capita consumption of fuelwood
- Local situations evolve relatively slowly
- Poor access to water and fencing, constraining tree planting

Consequently, different policies and strategies will be required for the two settings, which need to be appreciated by both planners and implementing agencies.

## **6.2. Improving management of fuelwood stocks**

### **6.2.1. Clarify roles, responsibilities and rights**

Local communities, stakeholders and leaders will not manage fuelwood resources until there is certainty with regard to ownership, responsibilities and rights, between stakeholders, traditional authorities and local government. In most areas local government has not taken responsibility for these resources (due to lack of awareness, experience, capacity or finances), but the land allocation and management functions of traditional authorities have been weakened, or completely eroded, with the democratic transition. With a lack of clarity on the ground between the roles and rights of the two institutions resource management has suffered. There is an urgent need to ensure informed leadership is provided and enforced. This requires development programmes and awareness campaigns. In the absence of efficient regulation access to fuelwood by the poor will be persistently undermined by local elites who will capture a disproportionate share of the benefits through controlling access to land or extraction of fuelwood stocks for their own gain.

### **6.2.2. Provide incentives to private land owners to maintain pockets of natural woody vegetation on their land, and allow sustainable harvesting of fuelwood**

A key driver of the decline in biomass resources is land transformation, typically from natural land to agricultural and urban lands. When new agricultural or urban lands are created the

majority of, if not all, existing woody biomass is cleared. The initial clearance provides fuelwood for a time, but once used there is no more from that land. As neighbouring land users successfully clear more and more land, entire landscapes are converted, with negative environmental, aesthetic and social implications, in pursuit of economic benefits. It is recommended that government seek ways to encourage land users and developers to adopt a more conservation friendly approach, especially by maintaining viable patches of natural woody land on parts of their properties. Examples include shelter belts of natural vegetation between orchards/fields, maintenance of riparian fringes, natural belts along one side of service roads, delineation of farm boundaries with belts of natural vegetation, neighbouring farmers cooperating on identifying and maintaining adjacent patches of natural land (and hence creating a large and more viable unit). It is recommended that DWAF collaborate with the DLA, NDA and DEAT to provide incentives (such as tax deductions or exemptions) to land owners for maintaining areas of naturally wooded land on their properties, and allowing sustainable harvest of wood from these lands. The Conservation Farming project of the National Botanical Institute is such an example. The new legislation permitting municipalities to levy rates from agricultural land is an opportunity to guide land owner behaviour.

### **6.2.3. *Promote closer cooperation between the DWAF and the National Dept of Agriculture in terms of maintaining trees in the environment***

As mentioned in 6.2.2 above, farming activities are one of the key drivers of decline in biomass resources. This includes small-scale and large-scale, commercial agriculture. Yet there are farming models that seek to optimize trees in the environment, which will provide biomass as well as other important environmental and social services. There needs to be an education programme aimed at farmers and extension officers, coupled with an incentive system for maintenance of trees and patches of natural, wooded land. For example, stop clearing of all mature trees when making new fields; maintaining belts of natural vegetation between fields or along farm boundaries, and planting of indigenous trees in pen areas.

### **6.2.4. *Development of an effective woodlands extension service***

Until promulgation of the NFAP (1997) and National Forest Act (1998) the woodlands of South Africa, its largest biome, did not fall under the jurisdiction of DWAF. Since then they have assumed nominal responsibility for them, but have been hindered in playing a leading role by lack

of experience and capacity. There is a clear need for a woodlands extension service operational at the local level, supporting local municipalities, landowners, farmers, traditional authorities and individual households. The key mandate of such an extension service would be to promote the sustainable use of woodland resources, of which fuelwood is a key one, through (i) dissemination of technical information and management options to land owners and institutions regarding sustainable use and management of woodlands and trees, (ii) monitoring and feedback, (iii) facilitation of case projects and directed research, and (iv) identification and reporting of persistent unsustainable practices.

#### **6.2.5. *Promotion of rehabilitation forestry***

There are significant areas of the country that have been subjected to different scales and intensities of land degradation that require rehabilitation. Yet, frequently the costs of rehabilitation out-weigh the possible economic returns from the land, or the value of the land itself, and hence it is frequently delayed. A national programme of rehabilitation forestry, probably through the national Land Care programme, and Extended Public Works Programme, could have the triple of benefit of combating degradation, providing fuelwood sources and carbon sinks, and environmental benefits through improved supply of ecosystem goods and services. Priority areas for such a programme could identified as part of 6.5.2.below.

### **6.3. Improving fuelwood supply**

#### **6.3.1. *Support fuelwood marketing***

There is a growing local-level trade in fuelwood as entrepreneurs transport wood from areas of abundance to areas of scarcity. The source of the wood varies from region to region, including communal lands, off-cuts from commercial forestry plantations, wood from clearing operations by Working for Water or bush-clearing operations. In doing so they help alleviate energy poverty and provide jobs. Yet on the basis of very limited research, the profitability of these micro-enterprises seems to be in question (Gandar 1994, McConnachie *et al.* 2004). Whilst their trading operations generate cash flow, it is rarely sufficient to provide for replacement capital costs once their vehicle needs to be replaced. This may also be a reflection of insufficient business skills by many of the traders. Economies of scale are crucial as fuelwood is a bulky product and cannot be

transported far at a profit. The larger the vehicle used the greater the profitability per kilometer traveled. The relevant Government departments should consider supporting these micro-enterprises through one or a combination of (i) business skills training, (ii) a recapitalization programme modeled on the one for the taxi industry, (iii) direct energy subsidies per tonne of wood delivered (provided that it is certified to come from a sustainably managed resource), or (iv) sourcing fuelwood supplies from State lands, WfW and offcuts from commercial plantations.

### **6.3.2. *Better cooperation with WfW to supply wood***

The Working for Water Programme is the most successful public works programme in South Africa's history, and has even accrued considerable international acclaim. It has had large-scale impacts on alien invasive plants, providing skills and employment to thousands of poor households, whilst simultaneously promoting environmental benefits and improved water yields. The very nature of the project is that it results in significant volumes of wood that can be made available to fuelwood users. In some areas small-scale entrepreneurs pay a small fee to access the felled timber and sell it as fuelwood to rural communities or as braai wood in urban markets. In other areas, the wood is left *in situ* and local people come and collect it for free. There has also been experimentation with manufacturing and selling charcoal from the wood. On the down side has been the removal, in some areas, of very precious wood stocks, especially in areas not naturally wooded, and so rural communities no longer have the option of sustainable use of groves of alien trees for fuel and construction wood. Thus, there is an opportunity for a coordinated programme with WfW, drawing upon their experience, expertise and infrastructure to: (i) make stronger efforts to ensure the wood generated benefits the rural poor in most need – this might include subsidizing transport of the wood to such communities at an affordable price to the end consumers, and (ii) geographical prioritization of WfW operations so not to clear aliens in the short-term from around communities that are still strongly reliant on those aliens for fuelwood. This is not to say that WfW operations should be halted, but rather they should in the short- and medium-term focus their efforts in areas where communities are not so reliant on the aliens for wood.

### **6.3.3. *Advocate for access to State lands for sustainable harvesting of fuelwood***

Whilst national demand for fuelwood is less than the national supply, much of the supply is unavailable as it is on private or State lands. Whilst government can only encourage certain land

uses and practices on private land, it has greater opportunity to lead the way in use of State land. The DWAF needs to actively engage with national and provincial government department and parastatals with significant land holdings (e.g. NDA, SANDF, DWAF, DEAT, conservation boards, Eskom), as well as large corporations (commercial forestry companies, mining houses) to implement sustainable harvesting of fuelwood resources. This can be though allowing controlled and agreed access of local communities, or use of own employees to harvest wood and transport it to areas available for the rural poor. If the latter model, employment creation grants could be provided. This strategy will only be worthwhile where such lands are within 20 – 25 km of high density rural settlements.

#### **6.3.4. *Develop and implement a national tree planting incentive programme***

Rural people in many areas plant trees, typically for the provision of fruit, shade, aesthetics and cultural services. This has numerous social, economic and environmental benefits. A key one is the provision of fuelwood as a by-product, which is a primary source of fuelwood for many households. DWAF and DEAT actively encourage tree planting, with the successful flagship programme being National Arbor Week held annually in the first week of September. Public education and communication around National Arbor Week is widespread, but most interventions are focused on schools and institutions, rather than individuals. It is proposed that the focus be widened to more actively include tree planting in individual homesteads. This can be achieved by:

- Suitable adverts and education initiatives.
- Financial and other support to established environmental and agricultural NGOs promoting tree planting.
- A national, provincial or district incentive scheme for tree planting by individual households. This might include a cash payment for the planting and care of trees until they attain a certain size. This would require an annual inspection and inventory.
- Liaison with relevant government departments to accelerate the adoption of agroforestry practices in South Africa.
- Assisting households or communities to address the constraints to planting, primarily the lack of fencing and secure water supplies.

**6.3.5.** *Liaise with the Dept of Housing around fuelwood needs for peri-urban and low-cost housing programmes*

There are large-scale programmes for the provision of housing to poor families in both rural and peri-urban settings. It needs to be mandatory that the issue of energy efficiency is considered in planning the location of housing developments, as well as the design of individual housing units. It is recommended that DWAF engage with the Dept of Housing around (i) promoting energy efficient designs to low-cost housing, (ii) if housing developments are in fuelwood dependent areas, to include a well ventilated cooking shelter, with a chimney in the design and tender specifications, and (iii) ensure that zoning of areas for housing development does not occur in primary sites for the collection of fuelwood by existing communities, without adequate planning and implementation around substitutes sources or fuels.

**6.3.6.** *Amend legislation to facilitate greater ease in establishment of woodlots of fast-growing alien species*

The ability to establish small-scale woodlots for fuelwood is seriously hindered by legislation around water permitting and alien plant species. Whilst the history of woodlots in South Africa shows that they have never met their potential in terms of productivity and easing biomass supply problems (Ham & Theron 1999, 2001) they are important at the micro-level for individual households. In other words, they might not yield as much wood as conventional forest models say they should, (based on commercial forestry yields), but the wood that is produced is vital for the poorer sectors. However, current legislation limits the ability to do this. Two pieces of legislation are in question. One is the National Water Act (no. 36 of 1998), which requires that people or companies wishing to plant new land to trees require a permit, the granting of which will be largely on the basis of the anticipated effects on stream-reduction of the new plantings. The second is the 2001 amendment to the Conservation of Agricultural Resource Act (no. 43 of 1983), in which alien plant species are categorized into three groups depending upon their invasive ability and control measures stipulated. Those falling into Category 1 must be controlled and cannot be planted (e.g. long-leaved wattle (*Acacia longifolia*)). Category 2 plants can be grown in controlled area (after a permit is granted), and relevant mechanisms are in place to ensure they do not spread (e.g. black wattle (*Acacia mearnsii*), several pine (*Pinus spp.*) and blue-gum (*Eucalyptus spp.*) species). It is recommended that DWAF advocate for amendments to this legislation to allow establishment of small-scale woodlots of fast growing alien species in areas

with severe shortages of biomass supply and where communities request it. It is crucial that it is community requested and driven and not delivered as a national, top-down approach. But if and where communities request support to establish woodlots, DWAF needs to be able to respond positively. Concomitantly, undertake trials with indigenous species suitable to specific climatic areas.

#### **6.3.7. *Increase the Free Basic Allowance of electricity***

Significant numbers of rural and peri-urban households that receive the FBA also make use of fuelwood. Use of fuelwood typically increases towards the end of the month as cash resources become short. Therefore, there is potential to reduce fuelwood demand by increasing the FBA so that it potentially covers needs for the entire month. This could potentially reduce overall fuelwood demand, but would require further investigation as many households use the FBA primarily for lighting, refrigeration and entertainment. Relatively few use it for cooking.

#### **6.3.8. *Consider a basic energy grant***

National government provides a number of social grants to poor households, including pensions, disability grants and child care grants. There is also much current debate around the feasibility of a general poverty reduction grant known as the Basic Income Grant. It is feasible that an energy grant could be paid to poor households instead of the FBA. Such an energy grant could then cover all poor households equally, whereas the FBA assists only those connected to grid electricity. Each household could then use the energy grant to purchase the most accessible or affordable fuels in their area, whether it is fuelwood, paraffin, gas, or electricity.

### **6.4. Improving effective use of fuelwood**

#### **6.4.1. *Develop and implement a national biomass stove programme***

There have been a number of biomass stove projects in South Africa over a long period, led by research agencies or NGOs. There has never been strong commitment from, or involvement of, national government departments. This is in contrast to some Asian countries (e.g. India) where national or provincial governments have been actively involved in promoting stoves as a means

of reducing fuelwood demand rates and health hazards. Typically, the biomass savings from the introduction of stoves have been poor, and much lower than research trials predict, if any at all. In southern Africa and Asia, the beneficial impacts of stoves seems to be higher in peri-urban communities than strongly rural ones (Munslow *et al.* 1988, St Clair *et al.* 2001). Currently cultural and economic factors hinder the large-scale adoption of biomass stoves by the rural poor, and will require greater consideration and innovative marketing to address this. The real advantages of stove programmes are more at reducing health hazards than extending the life of meager fuelwood resources. Especially when respiratory disease is the second highest cause of infant mortality in the country, seemingly correlated with inhalation of smoke from cooking fires (Eberhard & van Horan 1995).

There is a regional initiative operating in several southern African countries known as PROBEC (Programme for Biomass Energy Conservation), supported by GTZ in Pretoria (Appendix 3). Initiatives in South Africa lag behind those of other participating countries. It is recommended that the national and provincial governments seriously examine PROBEC, or similar initiatives, with a mind to (i) giving strong and loud endorsement to their activities, (ii) providing significant funding for stove projects, or (iii) seeking means to subsidize the costs of stoves to make them accessible to the rural poor. If the stoves are locally manufactured this will also provide jobs. Well-targeted educational initiatives could play a large role in assisting adoption. Key messages would be the reduction of health hazards of poorly ventilated fires, and promoting sustainable use of biomass for “tomorrow’s needs” and a “healthier environment”.

## **6.5. Improving information**

### **6.5.1. *Identify and address information gaps***

There is much information on fuelwood supply and demand in South Africa, as well as on the profiles and location of chronic poverty. However, much of the former is seriously dated, most being 15 years old or greater. There is a need to (i) pull together the existing information into a single volume, (ii) assess its broad-scale validity against the few more recent studies, (iii) draw explicit links with poverty profile data and understanding, and (iv) identify and prioritize immediate information gaps that could be addressed in a short and focused research programme. This process of collation of old information and generation of new should result in products

accessible to the wide range of stakeholders, not just academic journals. There must be policy briefs, empirical research papers, synthesis volumes, a section on the Forest Resources Information System, manuals for local government, comparative case lessons for success, and local-level implementation guides. This information must be used for greater advocacy at all levels of policy- and decision-making around the management and use of fuelwood stocks. There needs to be a mindset change around the opportunities that fuelwood offers to the poor. A key information gap is to develop and communicate a concise understanding on the opportunities around carbon trading, as well as the impacts of electrification on fuelwood use.

### **6.5.2. *Prioritization of local-level hotspots for intervention***

The large numbers of households involved, plus the extreme local variation in fuelwood supply and demand ratios, means that a ‘one size fits all’ strategy would be inappropriate. A prioritization system is required to allow identification of (i) whole geographical communities experiencing or facing energy poverty, and (ii) individual, poor households struggling to meet energy requirements already within serviced communities. Whilst not neglecting the needs of the second group (individual poor households with FBA via grid access), concentration of intervention resources on the first will result in the best scales of efficiency, i.e. meeting the needs of the most people in the shortest time and at the lowest unit cost. These geographical communities could be identified through GIS mapping on the basis of (i) poor availability of, or access to, woody biomass stocks, (ii) high rural population densities, (iii) isolation from the national electricity grid in the medium- to long-term, and (iv) location in poor municipalities, already partially achieved in the recent work of the Southern African Ecosystem Millennium Assessment (Biggs *et al.* 2004). Once energy poor communities have been identified strategies of intervention at the local level can be devised on the basis of the local-level situation.

### **6.5.3. *Develop long-term plans for use of fuelwood as a national resource***

The above strategies relate to the use of fuelwood to contribute to alleviation of energy poverty. Yet in the very much longer-term, with economic growth, increasing education and modernity, and improved access to alternative energies, the number of fuelwood reliant households will dwindle, although there will still be millions of people using fuelwood for several decades to come. But as the number of users decline, fuelwood will still be produced and available, and to not use it will be a lost opportunity. Therefore, investigation and planning for the longer-term use

of this valuable and renewable resource needs to start within the next decade. For example, use of fuelwood in small-scale industrial applications in rural villages and towns, charcoal, and energy chips for export. There is also an opportunity to think of wood as a modern fuel that can be packaged and sold to modern markets as pellets or bricks to be used in modern, ‘trendy’ appliances. A national, sustainable and long-term fuelwood strategy has multiple benefits for communities, land owners and South Africa, including:

- Contribution to poverty reduction through the provision of a cheap and sustainable energy supply and job creation
- Economic development and promotion of valuation addition from local resources
- Additional value to land
- Biodiversity benefits
- Empowerment of communities in managing such a critical resource
- Access to international funding available for environmental, participatory forestry and carbon credit programmes.

## **7. CONCLUSION**

There are a number of strategic options that the DWAF, along with other national, provincial and local government agencies can do to help alleviate energy poverty. It is important that the approach taken recognizes that (i) there will be households dependent on fuelwood to a greater or lesser degree for decades to come, and (ii) the identified options are not seen in isolation from one another, but rather more as a suite of interventions and policy changes that complement one another and help address the issue in a holistic fashion. Some interventions can be implemented relatively quickly given political will and financial resources. Others need longer-term planning, and will only yield results over a much longer time scale. All need to be pursued within a spirit of partnerships with other government departments, stakeholders and affected communities. All need to be cemented within an integrated approach considering not just supply, nor just demand, but supply and demand within a defined and functional institutional framework and real life management strategies on the ground, whilst recognizing and building on the flexibility and adaptability of local livelihoods. DWAF needs to focus on providing an enabling environment so that energy poor households can select from a range of options to meet their fuelwood and broader energy needs. Key amongst these is the need for (i) strengthening local institutions to manage existing tree resources and enforce the rights of local users, (ii) advocacy around

fuelwood issues at all levels of government, and (iii) developing an integrated approach in collaboration with other government departments. The lead approach for these would be the establishment of a prescribed sub-directorate in DWAF, and development and deployment of a woodlands extension service around fuelwood and other woodlands resources.

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## Appendix 1: Workshop participants

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## Appendix 2: Workshop programme

### Fuelwood Strategy Workshop

26 October 2004; National Botanical Gardens, Pretoria

#### Aim of the workshop

The aim of the workshop is to synthesize expert opinion on the status of fuelwood energy in South Africa, and identify realistic strategies that could be pursued by the Dept of Water Affairs & Forestry DWAF to optimize the role of fuelwood in poverty alleviation and enhancing local livelihoods, within the context of existing policy frameworks.

This will be achieved by undertaking the following:

1. Briefly profile the use of fuelwood energy in South Africa.
2. Briefly profile the status of fuelwood energy supply in South Africa.
3. Identify the key governance opportunities and constraints to increase the contribution of fuelwood energy to free basic energy and renewable energy in terms of Government policies and international commitments.
4. Identifying workable approaches and tactics for overcoming the constraints and seizing the opportunities.

#### Approach

The workshop will be divided into a number of sessions (see programme), facilitated by Mr Erik Buiten. In order to optimize efficient use of the short time available, and start off from a common base, participants are requested to read the following two chapters in advance of the workshop.

Shackleton, C.M., Grundy, I.M. & Williams, A. 2004. Use of South Africa's woodlands for energy and construction. In: Lawes, M.J., Eeley, H.A., Shackleton, C.M. & Geach, B.G., (eds). *Indigenous forests and woodlands in South Africa: policy, people and practice*. University of KwaZulu Natal Press, Pietermaritzburg. pp. 337-366.

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A workshop report will be produced within a week or two of the workshop. A draft copy will be circulated to each participant for comment before finalization. Participant names will be listed on the front page of the report, unless they request otherwise.

## Workshop Programme

09h15 – 09h45	Arrival of participants
09h45 – 10h00	Welcome and introductions
10h00 – 10h20	Review of workshop aims and outputs
10h20 – 10h50	Background presentations:
	Prof. Charlie Shackleton      Evolution of fuelwood paradigms and a conceptual framework for the workshop
	Dr Doug Banks                      Future fuelwood scenarios
10h50 – 11h15	<b>TEA</b>
11h15 – 12h00	Background presentations (cont.):
	Dr Wendy Annecke              The profile of energy poverty
	Mr Wayne Twine                Local and non-local demand for fuelwood and institutional implications
	Dr Marlis Kees                 The PROBEC programme and fuelwood models in southern Africa
12h00 – 12h30	Consideration of Workshop Tasks 1 and 2 (see Aim) relative to the pre-reading and background presentations
12h30 – 13h00	General Discussion (If Discussion is limited then set the process of identifying opportunities and constraints)
13h00 – 13h45	<b>LUNCH</b>
13h45 – 14h30	Identification of opportunities and constraints
14h30 – 16h30 (tea taken whilst working)	Consideration of workable approaches (probably break into to work groups depending upon the number of opportunities and constraints that are identified)
16h30 – 17h00	Closure

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## Appendix 3: Workshop presentations (minus pictures)

### 3.1. Evolution of fuelwood paradigms over the last three decades & links to poverty: Charlie Shackleton

**EVOLUTION OF FUELWOOD  
PARADIGMS OVER LAST  
THREE DECADES  
AND LINKS TO POVERTY**

**Charlie Shackleton**

**Dept of Environmental Science  
Rhodes University, Grahamstown**

**THE MID 1970s : The Start of it All**

- Fuelwood crises postulated for millions of people in the developing world with predicted severe –ve implications for:
  - rural poverty (esp. material poverty & energy security)
  - deforestation
- International and national programmes of research and funding of interventions to:
  - increase the abundance of fuelwood resources via plantations, woodlots and agroforestry
  - enhance management efficacy of indigenous forests and savannas
  - decrease demand through use of fuel efficient stoves
  - promote substitution by other fuels
- Most efforts were directed at the first
- Number of models predicting a growing gap between demand and supply, known as the fuelwood gap

**THE MID 1980s : Re-appraisal**

- Realization that:
  - rates of tree planting were way below required targets, and
  - adoption and use of alternative fuels and stoves was lower than hoped
  - and yet widespread crises failed to materialize
- Thorough research identified a number of reasons for this, key ones being:
  - much fuelwood was actually the by-product of lands being cleared for agriculture and housing, which were the primary drivers of deforestation
  - people change energy use patterns and amounts when faced with changing supplies – models were too static
  - participatory research found that rural communities rarely identified with a fuelwood crisis
  - models were based on forestry yield models
  - local situations rarely conformed to national or regional models
  - plus others ...
- The first led to fuelwood being downgraded on the environmental and poverty agendas

**THE MID 1990s : Fuelwood in Rural Livelihoods**

- Appreciation that a sectoral focus on fuelwood alone did not yield practical results either for fuelwood alone, nor rural poverty alleviation
- Rural poverty is multi-dimensional and therefore fuelwood issues need to be part of a broader package – not simply the realm of forestry departments, but rather collaboration amongst many depts
- Focus on:
  - understanding rural livelihoods and importance of energy security as a component of sustainable livelihoods
  - providing people with a package of options rather than prescribing outcomes
- Growth of fuelwood and charcoal markets in tandem with urbanization.
- Rate of human population growth slowing

**THE MID 2000s : Current Operational Context**

- Global fuelwood consumption peaked in late 1990s, except in Africa – therefore a fading research and policy issue within much of the energy sector
- Consumption of charcoal is growing in Africa and globally
- Urban demand is a key factor in consumption of fuelwood and charcoal, resulting in growing fuelwood markets and networks
- Household fuelwood is rarely viewed as a sustainable resource, but rather a lesser energy source that needs to be limited due to poverty and health reasons
- Introduction of trees is still desirable but more for environmental benefits and to support rural livelihoods by offering a variety of products to provide options for lessening rural poverty. A by-product of trees might be fuelwood
- Establishment and maintenance of tree stocks is an important mitigation for global warming.
- Energy plantations in developed world

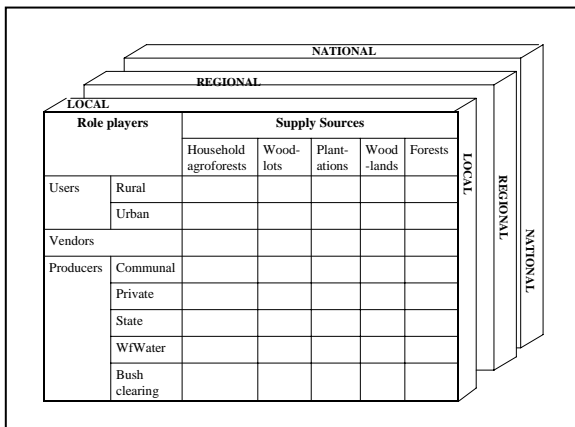
**A FRAMEWORK FOR THINKING  
ABOUT FUELWOOD  
IN SOUTH AFRICA**

**WHAT ARE THE GIVENS?**

- Human population in South Africa will be stable for the next 15 years in the face of HIV/AIDS
- Rapid urbanisation
- Massive electrification programmes and free basic electricity allocation to poorer sectors
- Poverty levels unchanged, or even increasing
- Per capita fuelwood consumption of urban populations significantly less than rural ones
- Fuelwood supplied largely from communal lands which have multiple stakeholders and requirements from those lands
- Multiple role players
- Very wide local variation in supply, demand, and context, which is masked by national or regional level analysis.

**CONTEXTUAL ISSUES UNDERPINNING OUR DEBATE:**

- What nature or definition of poverty?
- What scale of analysis and action?
- How to match intervention strategies with local level variation? (i.e. one-size definitely does not fit all and therefore what criteria to use to identify priority areas for intervention?)
- Influence of resource and land tenure and responsible institutions?



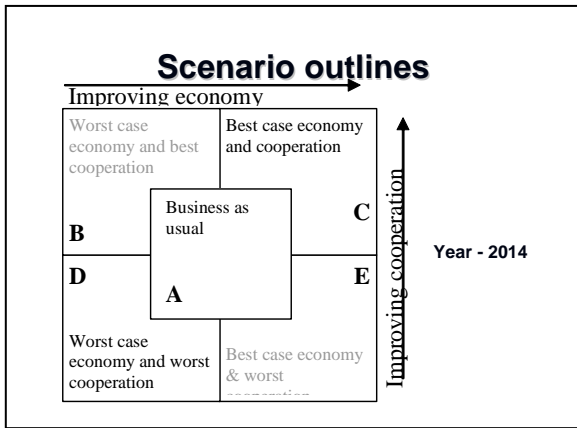
### 3.2. Woodfuel scenarios: Doug Banks

# Woodfuel Scenarios

Douglas Banks  
RAPS Consulting Pty Ltd  
[www.raps.co.za](http://www.raps.co.za)

## SPARKNET Scenarios

- Knowledge network on sustainable household energy in Southern and Eastern Africa (6 African countries, with international partners) – EU funded
- [www.sparknet.info](http://www.sparknet.info), [www.hedon.info](http://www.hedon.info)
- Email conference held on scenarios end September 2004.
- Will be further work on policies in next few months (including further email conference)



## General Issues

<p><b>WORST CASE</b></p> <ul style="list-style-type: none"> <li>■ Regional instability, significant displaced persons influx (15 million)</li> <li>■ HIV/AIDS major rural impact- reduction in SA citizen population, shortage of rural labour</li> <li>■ AID/investment limited (resources allocated to conflict)</li> </ul>	<p><b>BEST CASE</b></p> <ul style="list-style-type: none"> <li>■ Slight increase in population (HIV/AIDS better managed)</li> <li>■ Low impact of displaced persons/refugees</li> <li>■ Rural population stable</li> <li>■ Investment ongoing</li> </ul>
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## Energy consumption

<p><b>WORST CASE</b></p> <ul style="list-style-type: none"> <li>■ Wood most important</li> <li>■ Grid Electrification 50% - retracting</li> <li>■ Off-grid 5%</li> <li>■ FBE no longer applicable</li> <li>■ Kerosene/LPG used- but not widely for thermal (&lt;40% hh)</li> <li>■ Solar stoves, hay boxes etc. disseminated</li> </ul>	<p><b>BEST CASE</b></p> <ul style="list-style-type: none"> <li>■ Wood very important</li> <li>■ Grid Electrification 80%</li> <li>■ Off-grid 14%</li> <li>■ FBE applicable, and can be used for thermal fuels</li> <li>■ Electricity, LPG, Ethanol Gel widely used for thermal (&gt; 60% hh)</li> <li>■ Solar stoves, hay boxes etc. disseminated</li> </ul>
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## Fuelwood status

<p><b>WORST CASE</b></p> <ul style="list-style-type: none"> <li>■ 40% communities experience significant scarcity</li> <li>■ Refugee communities in severely deforested regions</li> <li>■ Alien vegetation clearing – leads to surplus followed by deficit</li> <li>■ Efficient/safer appliances not widely distributed</li> <li>■ Resource management poor</li> <li>■ Wood prices increase – more commercialisation in some parts</li> <li>■ Not enough energy to cook food/keep warm in some areas</li> </ul>	<p><b>BEST CASE</b></p> <ul style="list-style-type: none"> <li>■ Scarcity not major problem – as other fuels contribute about 50% of energy requirement</li> <li>■ Alien vegetation clearing managed as resource, with appropriate replacement</li> <li>■ Active resource management support programmes in place happens, but better bargaining ability as alternatives exist</li> </ul>
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## Health impacts

### WORST CASE

- Indoor pollution effects: acute lower respiratory infection (ALRI), chronic obstructive lung disease (COLD) and lung cancer and eye infections.
- Walk long distances to collect wood- which is tiring
- Strains back and necks which lead to spinal injuries and other head related injuries.
- Risk of violence/rape while collecting

### BEST CASE

- Knowledge on IAP more widely available – less IAP (combustion methods, cleaner fuels)
- Collection related issues still important, but not as long hours, large numbers of people
- Fuel efficient, lower emission stoves with chimneys widely used – significant health benefits
- Unsafe paraffin stoves illegal

## Gender Issues

### WORST CASE

- Responsibility of women to collect wood has remained unchanged.
- In areas where significant degradation of resource has occurred, this has led to significant hardship (long time spent collecting wood).
- Labour issues (HIV/AIDS..)
- Where woodfuel purchasing has become the norm, a shift in the status and relationships occurs, with an increase in the percentage of men participating in this new 'cash based' woodfuel economy

### BEST CASE

- Women have more time for other tasks
- Lower IAP – particular benefits for women and children
- More time/resources for gender needs to be incorporated in energy projects

## Closure

- All scenarios – woodfuel remains very important
- Potential for significant hardship, health and gender impacts if poor options develop
- Potential for significant deforestation
- Major effort on sustainable forestry, other thermal fuels/appliances, improved stoves (emissions and efficiency), required if want to achieve significant change

## Brief introduction to rural energy utilities

- Emerging rural energy delivery model
- Off-grid electricity
- Possibly grid electricity
- LPG and appliance
- Kerosene
- Hayboxes, solar stoves, other energy efficiency products
- ?wood, wood stoves, engaging in woodfuel delivery?

## Examples

- Nuon RAPS Utility
- KwaZulu Energy Services Company (EDF/Total)
- Solar Vision
- Shell-Eskom JV
- New – to be selected next year, KfW/DME concession

## Energy and Development needs in rural communities

- Households
  - Thermal needs (cooking, space heating, refrigeration)
  - Lighting
  - Entertainment/media access/telecommunications
  - Domestic appliances (more limited in poor rural areas)
  - Productive use appliances
- Institutions (Health, education, government, community)
- Enterprise
- Agriculture
- Water and sanitation

## PPP as a method to achieve socio-economic government objectives

**Government**  
National  
Provincial  
Local  
Public Sector  
Institutions



### Key principle

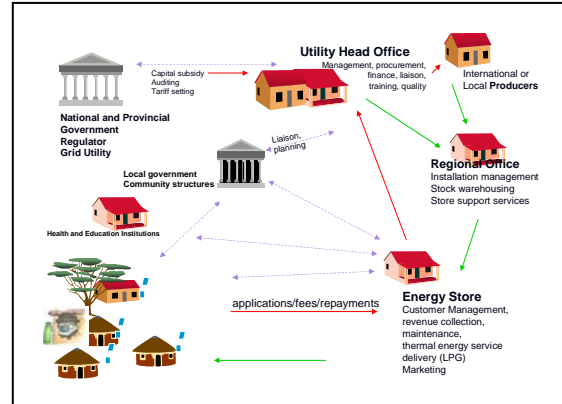
Total cost of programme can only be covered by Government, customers and donors. Other parties (investors) may put funds in to start with, but need to recover their funds later- otherwise will not invest.

**Efficient Energy Service Delivery**  
Targeted at customers  
– achieves government objectives

Investment by NuRa motivates NuRa to run the business very well (else will not recover investment)

Investor contribution adds to government contribution

Investor brings skills, ensures that the job is done



### 3.3. The profile of energy poverty: Dr Wendy Annecke

My thanks to DWAF for the opportunity to be here today with so many people who have been working on fuelwood for many years more than I have. I have been documenting fuelwood use in-between other energy sector research since 1990. I come from a social development perspective and will be highlighting social development issues.

Before I begin I would like to note a couple of things. The first one is that although I have been given the objectives of the workshop, (i.e. to contribute to ‘workable approaches and tactics for overcoming opportunities and seizing opportunities’ for DWAF to be able to ‘increase the contribution of biomass energy to free basic energy’), it is difficult to contribute without knowing what DWAF brings to the table, or is prepared to contribute in the way of money, resources (such as expertise, raw materials, vehicles, and/or labour). DWAF’s contribution/ budget will determine what DWAF considers workable (and if put on the table may limit the discussion both positively and negatively).

The second note is that the participation of other the other part of DWAF – Water – is imperative, given that Water, Food Security and Energy are inherently linked and together constitute the basis of poverty alleviation. Global forces, such as climate change, which impact on the availability of water, food and energy, have to be taken into account by all planners. As DWAF knows, the wise management of water resources will be crucial to our survival. Climate change is resulting in changing patterns of precipitation and since we do not have the ability to move water from areas of flooding to areas of drought, water harvesting and the frugal use of water, including changing methods of planting and irrigation, are becoming matters of urgency. For *food security* to replace *food scarcity*, the urban and rural poor should be offered incentives to grow and maintain food gardens and fruit trees. The planting of indigenous trees will be an important element in demonstrating South Africa’s willingness to mitigate the greenhouse gases it produces so prolifically, and especially so if fuelwood trees are planted (with the consequence of wood fires emitting more ghg).

Third note: behaviour change among the middle classes is essential and must be tackled, albeit not in this short presentation.

With those caveats in mind, I will move to talk about poverty and energy. First of all a reminder about the extent and the depth of poverty in South Africa, and the exacerbation thereof.

Almost half of South Africa’s population are poor. The intensity of poverty varies from province to province, from rural to urban, and mostly markedly, between people in what the President has called the two economies in South Africa. The gap between the rich and the poor has been widening since 1994 and it would appear that there are at least 41/2 million ‘new poor’ (Meth C and Dias R 2004, [www.sarpn.za/documents](http://www.sarpn.za/documents)). The prevalence of HIV/AIDS and rising unemployment accounts for the poverty in many households. Unemployment levels vary significantly across the country, reaching 53% in several urban areas, including the Cape Flats, from where several of my examples are drawn.

The prevalence of HIV/AIDS varies too, with estimates of more than 5.3 million people infected ([aidsinsite@healthinsite.net](mailto:aidsinsite@healthinsite.net)), with the incidence varying from 13.1% in the Western Cape to close to 30% in 6 provinces, and peaking at 37.5% in KZN (Deane N ‘Missing the Mark in *Mail & Guardian* 15-21 October 2004). This is having a major impact on households, by, for example reducing the average life expectancy of women in KZN to under 40 years. While it is possible to lead a relatively productive life in the early stages of HIV infection, later stages of AIDS make it difficult to hold down a job, or work for more than one or two days a week. In the later stages, which can last for two to three years, continuous bouts of pneumonia, TB, genital sores, nausea, dementia, and blindness, mean that AIDS patients need attention themselves and are unable to earn a living, or care for people who previously depended on them. The average prevalence of 25%

HIV/AIDS infections in South Africa means that one person in every household of four people is likely to be infected. That is, almost every household has, or will be affected in some way.

With this as the background, energy poverty is a specific form of poverty. Energy poverty means not having enough fuel (or energy carrier) to meet one's day to day needs for lighting, heating and cooking. This may be not enough candles to last the evening, or cook the evening meal by, it may mean running out of electricity half way through cooking and not being able to buy more, or it may mean going hungry because there is not enough fuel to heat water and make black tea. As we know, in the face of such energy poverty, households use a variety of strategies: they may 'choose' to cook on wood or with paraffin rather than electricity, they may cook refined foods which take a shorter time to cook, they may eat bread which doesn't require cooking, they may dip mielie cobs in fat or wax and use them for lights, or many other energy saving strategies. But the fact remains that they have too little wood, electricity, gas, coal, paraffin or candles to be minimally comfortable.

The role of policy in the face of such poverty, is significant. The policy and intention to provide free basic water and electricity is laudable. But of course only those who have reticulated water get the 600kl and only those who have a Solar Home System or a grid electricity connection and live in a capable municipality get the 50kWh per month. The really poor and un-connected do not get these. And recent research has shown that the potential benefits of eliminating VAT on paraffin have not reached the poor. Other policies implemented through grants are important too. We have seen children fed and clothed and mother educate themselves on the child support grant, and entire households living on a disability grant or a single pension. On the other hand many people abuse conditional grants by fulfilling the conditions cynically: having babies to get R170 a month for themselves; prostituting themselves to get a HIV assistance or claiming the child support although both parents are working. There is not much we can do about this, other than advocate for an *unconditional* Basic Income Grant that would enhance households access to food, education and health care.

Back to those who are not getting a free basic electricity grants, to those who, even though they have electricity cannot afford the credits or the appliances to cook with electricity, and those with Solar Home Systems none of which supply sufficient power for cooking, – what are they using for the most energy intensive domestic activity - cooking? A few are using LPG, most are using paraffin and wood. This is in urban and rural areas, urban poverty is not new but it is a growing phenomenon. In urban areas wood is used in new, informal dwellings and for micro-enterprises (food and beer). In Cape Town there is still a backlog in electrification of legal, tenured dwellings in Kayelitsha, and the estimates are that this is growing by about 4,000 new households a month. Some of these informal households use Working for Water wood, many more cut their own. The health problems of paraffin use and wood smoke are well documented by the World Health Organization, as well as many South African researchers: Ross (1993), Terblanche et al (1993) and in particular van Horen (1996).

Apart from the devastating consequences of fires in informal settlements, the pollution caused by paraffin and wood smoke means that in poor households the indoor air quality, measured in noxious particulates, is unsafe and the levels of emissions are way above those deemed safe by the WHO. Among the consequences of indoor air pollution are eye infections and the exacerbation of respiratory disorders such as asthma, bronchitis and coughing, which lead to millions of deaths every year, especially among women and small children (Glajchen & Richter 2001). Of course in South Africa the poor are likely to be worst affected by HIV/AIDS, so people with reduced immune systems, vulnerable to pneumonia and TB are in households where fuelwood use is prevalent

My question is obviously an ethical one – who is it that should be using wood, or who should benefit from DWAF's proposed 'increase the contribution of biomass energy to free basic energy'? This is not to say that I do not value the contribution of fuelwood to meeting household energy needs, but I have serious reservations about the health hazards and some recommendations to make.

Before I speak to these, I want to highlight the impact of HIV/AIDS on the future of the management of the energy sector by telling you four stories

1. The oscillating population has continued – but the composition is changing with young women with AIDS taking urban-born children ‘home’ to rural areas to be cared for by grandparent(s) –too young for a pension, too old to carry wood and water, young cannot – necks not ‘trained’; do not want to – want urban lifestyle and brand names consumer goods – inter-generational resentment a problem;
2. The 1998 energy plan for Swaziland – to provide 1 million people with electricity is in limbo – there are only 650-750,000 people left;
3. Anecdotally there are too few trained electricians /technicians in the Eastern Cape, Further Education and Training is in disarray – electrification is being affected – but who be trained, one of the targeted villages has the highest proportion of males infected – 50% of 15 year olds tested HIV positive.
4. Teachers who should be identifying future resource managers and technicians are coming under strain at all levels – especially primary schools where the prevalence of HIV and AIDS orphans affects morale. And it is not only children who dying in class. “In KwaZulu-Natal about 68,000 of the 75,000 teachers will be lost from the system by 2010 because of AIDS and staff taking jobs outside of the area....” (HIV/AIDS barometer Mail & Guardian 15-21 October 2004). Potential, leadership and corporate memory are being lost.

In conclusion I would like to recommend that:

- constraints to planting trees be removed and indigenous trees planted as a long term strategy in mitigation of climate change;
- woodfuel be moved from areas of abundance to areas of scarcity, and supplied once a month as ‘free units’ with a so-called improved stove, or an efficient three-stone fire, or whatever PROBEC recommends;
- serious attention be given to the production of biodiesel as a labour intensive activity, as a black empowerment possibility and as a SMME opportunity;
- in areas of sufficient water that biogas production be piloted;
- the pricing and packaging of LPG receive proper attention to make it more accessible and affordable perhaps with a subsidy for the poor;
- efficient electric cooking appliances especially for the low-income market be researched and produced – and exported to other developing countries.
- the strategy should be designed in collaboration with the DME.  
And recent research has shown that the potential benefits of eliminating VAT on paraffin have not reached the poor.

## References

Glajchen, S., and Richter, E. 2001 Higher prevalence of asthma and chronic bronchitis among women than men in KwaZulu-Natal, South Africa, in Gender differences in the impact of biomass fuel on health, in *ENERGIA News* Volume 4, Issue 4, December, p11

Ross, F. 1993. Assessment of the impact of fuel-use on residents of an informal settlement. Report for the National Energy Council, Pretoria

Terblanche, A., Danford, I., and Nel, C. 1993. Household energy use in South Africa: Air pollution and human health, in *Journal of Energy in South Africa*, Volume 4, Number 2, p 54-57

Van Horen, C. 1996. *Counting the social costs: electricity and externalities in South Africa*. Elan Press, University of Cape Town.

### 3.4. Local and non-local demand for fuelwood: institutional implications: Wayne Twine

## Local and non-local demand for fuelwood: institutional implications

**Wayne Twine**  
SUNRAE programme  
 School of Animal, Plant & Environmental Sciences  
 University of the Witwatersrand

### Background

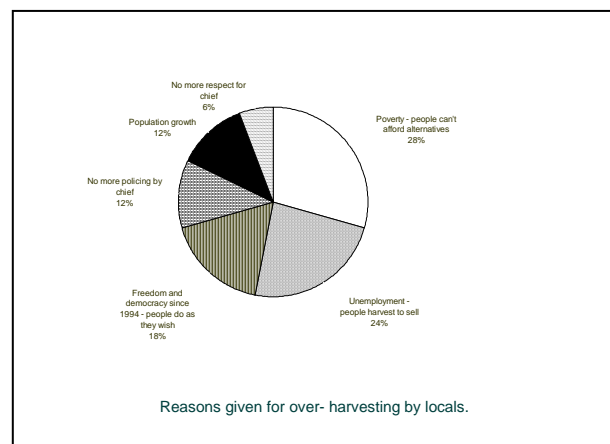
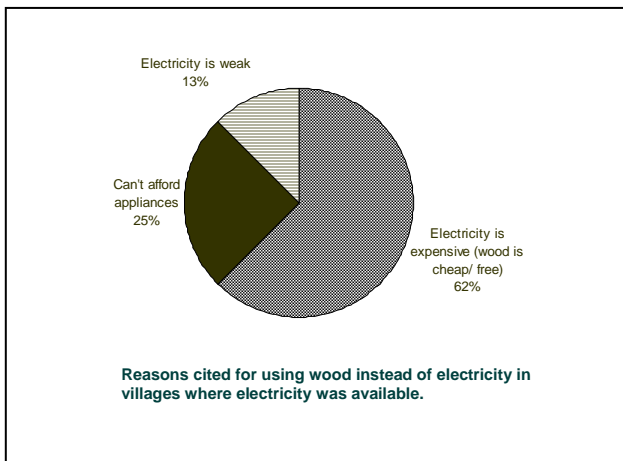
- ◆ Emphasis on local demand for fuelwood – little attention to non-local demand.
- ◆ Emphasis on domestic consumption – little attention to commercial use.
- ◆ Inadequate attention paid to key socio-economic drivers of fuelwood usage.
- ◆ Insights gained from collaborative NTFP research project funded by DWAF.

### Resource decline

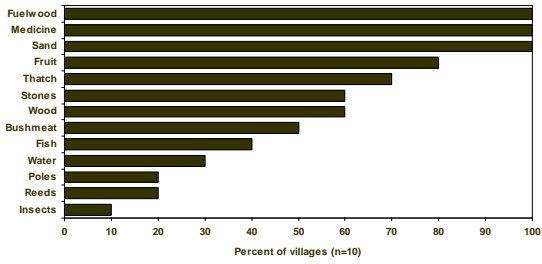
- ◆ Perceived resource decline over last 5-10 years: 96% of respondents (Twine et al 2003).
- ◆ Increased harvest travel time.
- ◆ Over-harvesting by locals cited as main reason for decline.
- ◆ Also over-population (shortage of land) and harvesting by non-locals (“outsiders”).

### Local demand

- ◆ Mametja (DWAF NTFP project):
  - 644kg/person/year (Twine et al. 2003).
  - 97% of households (Twine et al. 2003).
  - 520 hours/year per household (Twine et al. 2003).
  - 14% of households buy fuelwood (Twine et al. 2001).
- ◆ Bushbuckridge (Wits Rural Facility research):
  - 485kg/person/year (Griffin et al. 1992).
  - 94% of households (Griffin et al. 1992).
  - 10% of households buy fuelwood (Giannecchini 2001).
  - 5-53% of households sell fuelwood (Shackleton & Shackleton 1997; Hansen 1998; Giannecchini 2001).
  - R180/bakkie-load (2003)



## Non-Local demand



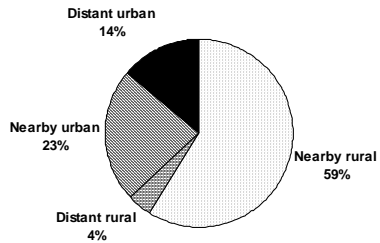
Extent of harvesting by non-local harvesters ("outsiders")

## Case study of external fuelwood demand: Welverdiend Village

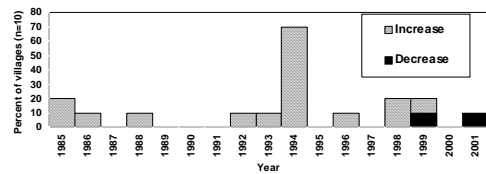
Approximate mass of fuelwood transported from Welverdiend in a week (external demand).

Vehicle	Number	Assumed capacity (tonnes)	Calculated wood mass (tonnes)
Pick-up	32	0.5	16
Trucks	5	2.0	10
<b>TOTAL</b>	<b>37</b>		<b>26</b>

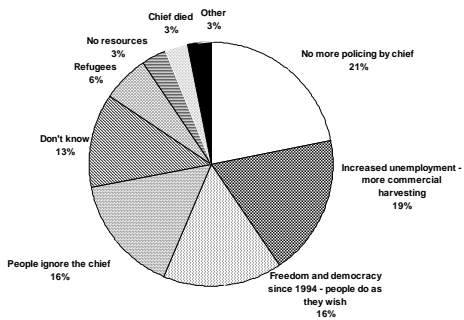
15-20% of weekly local demand



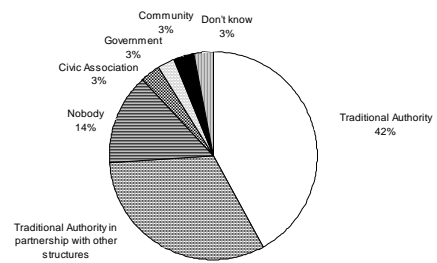
Origin of external harvesters across ten villages and thirteen resources.



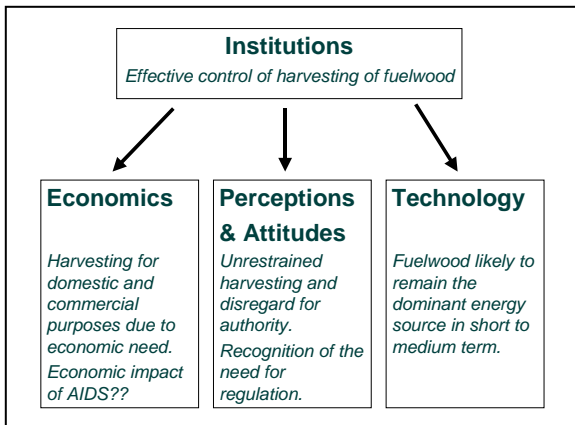
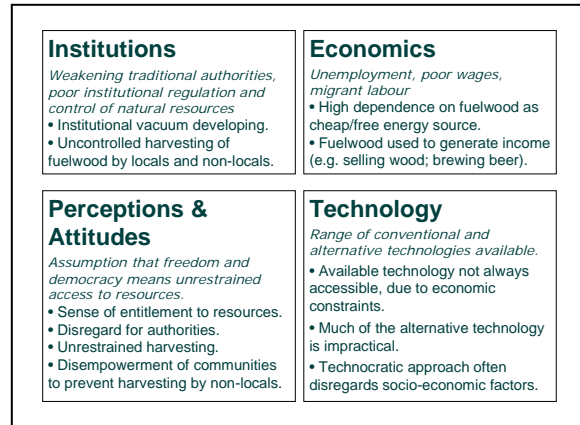
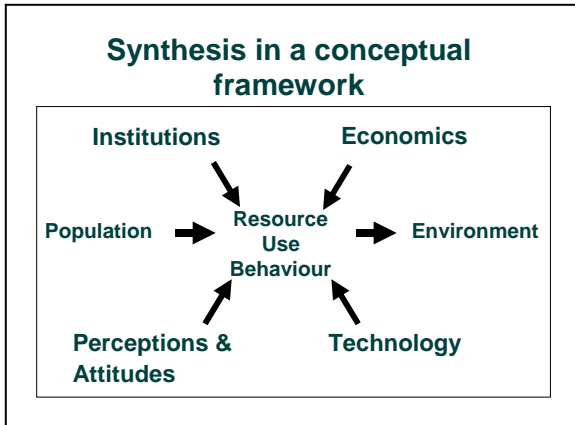
Year in which an increase or decrease in harvesting by outsiders started, as observed by locals (more than one year for some villages).



Reasons cited for increased harvesting by outsiders



Preference for institution responsible for controlling natural resources.



### Conclusions

- ◆ Need to consider *local AND non-local demand* for fuelwood.
- ◆ Need to consider *domestic AND commercial uses* of fuelwood .
- ◆ Need to consider *socio-economic drivers* of fuelwood usage.
- ◆ Institutions (especially local) are crucial for sustainable management of the resource base.

### 3.5. The PROBEC programme: Marlis Kees

Please refer to PROBEC website