REDD net article

Networking for equity in forest climate policy

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# REDD+ and energy: a cross-sectoral approach to REDD+ and implications for the poor

Charcoal production from eucalypt plantations in Brazil

Source: Flickr/treesftf

## INTRODUCTION

As countries develop national level REDD+ (Reducing Emissions from Deforestation and Forest Degradation, with the + referring to forest conservation, sustainable forest management and carbon stock enhancement) strategies, policies, and programmes, the inter-linkages between forests and other sectors become increasingly important. There is growing recognition that strategies and their implementation will need to be cross-sectoral in their approaches in order to address deforestation and forest degradation (DD) effectively.

## KEY POINTS

- The energy sector and forests are closely linked at local and global levels. At the local and regional level, wood fuel is a major source of energy in many parts of Africa and Asia, particularly in rural areas. At the global level, feedstock production for renewable transport energy (biofuels) is occurring in direct and indirect competition with forests in many areas.
- To be effective, and to ensure broad support in REDD+ countries, REDD+ policies will need to both address the energy sector as a driver of deforestation and forest degradation and contribute to energy access priorities.
- REDD+ provides an incentive to improve the sustainability and efficiency of wood fuel energy use and production, requiring the implementation of a number of complementary demand and supply side measures.
- The dependence of the poor on wood fuels as an energy and income source mean that these policies have the potential to have large socio-economic impacts. These impacts need to be explored and mitigated through policy design and targeted REDD+ revenue distribution mechanisms to ensure that REDD+ is equitable.
- Because international markets drive biofuel feedstock production in most REDD+ countries, international biofuel sustainability standards provide an incentive for countries to undertake land-use planning to minimise competition between agricultural production and forests, and to strategically identify priority areas for both uses. This will assist in national level harmonisation of international REDD+ and energy objectives.

## DISCLAIMER

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The energy sector is closely linked to forests in most developing countries: through the widespread dependence on traditional biomass fuel for energy in Africa and Asia, and the increasing competition for land between biofuel feedstock production and forests, mainly in Asia and Latin America. The harmonisation and cross-sectoral coordination of REDD+ and energy policies will therefore be essential in order for REDD+ to be effective.

This paper outlines the relationships between the energy sector and forests at the local/regional and global levels, and what these linkages mean for the implementation of REDD+. It then highlights a number of possible policy approaches to address the energy sector as a cause of DD, that may be appropriate as part of a REDD+ strategy. The paper also seeks to raise some potential socio-economic impacts of these proposed policies so that these are able to be considered and mitigated in the development of REDD+ strategies, essential to ensuring that REDD+ policies and programmes are equitable and are able to achieve desired co-benefits. The paper draws principally on published literature, as well as from specific case study research undertaken through the REDD-net project. It is complemented by another REDD-net paper on REDD+ and agriculture which follows the same framework.

## Forests as an energy source

Wood fuel[1] provides an important source of energy for many people, particularly in developing countries (Black and Richter 2010). More than 40% of the global population, (2.7 billion people) rely on traditional use of biomass (including fuel wood and charcoal) for energy, with the demand for fuel wood and other biomass fuels expected to increase. The IEA estimates that the number of users in Africa will rise by more than 40% to about 922 million by 2030, and that despite consumption in Asia and Latin America declining, by 2030 there may still be 1.75 billion users in Asia and 79 million in Latin America (IEA 2010). This is higher than previous estimates due to population growth, rising liquid fuel costs and the global economic recession driving a number of people back to using biomass fuels.

1 Throughout this paper 'fuel wood' will be used to refer to the traditional use of unprocessed wood e.g. sticks, logs, other wood products collected from forests. The term wood fuel will be used to refer to both charcoal and fuel wood.

Much of this use is concentrated in rural areas of developing countries, and it is a preferred energy source in these areas because of its decentralised method of production, its low and relatively stable cost and because production can be maintained in addition to the production of other goods and services from the same area (FAO 1983; Black and Richter 2010). Choice of fuel, and transitions away from wood fuels has been shown to be influenced by primarily by convenience, price and reliability of supplies (Gupta and Kohlin 2006).

Although stopping degradation as a result of biomass extraction for fuel may only achieve 5-8% of the emissions reductions that preventing complete deforestation would provide (Annex 4.3 Angelsen et al. 2009), the scale of wood fuel harvesting makes this is a major cause of degradation in some regions and countries. Given the increasing demand for wood fuels this area is likely to increase.

Given the contribution of the fuel wood and charcoal sector to the incomes of the poor (Macqueen and Koraliller 2011; Mugo and Gathui 201; Openshaw 2010), as well as the reliance of the poor on fuel wood and charcoal for energy (Kartha and Larson 2000), it will be particularly important that policies and measures to address degradation from this sector closely identify and mitigate impacts on the poor.

## Policy options to meet energy sector and REDD+ objectives

A number of policy options exist that have the potential to meet energy sector and REDD+ objectives (e.g. reducing deforestation and forest degradation as well as improving access to affordable and reliable energy in developing countries), many of which have previously been implemented with varying success. Many past failures of these policies have been a result of the powerful vested interests in maintaining the status quo in the energy sector and the high costs (both political and financial) of reform (Macqueen and Korhaliller 2011). The political and financial support and incentives offered by REDD+ provide an opportunity for greater success in reforming the wood fuel sector, however because of the dependence of the poor on traditional biomass fuel and (often) open access forest resources, REDD+ will also need to mitigate the potential socio-economic impacts of these policies

### The role of wood fuel in meeting energy needs

Wood fuel provides the majority of rural energy needs in many parts of Africa and Asia. For example in Kenya 90% of rural energy needs are provided by wood fuel (48% from fuel wood and 52% from charcoal), and wood fuel meets 68% of national energy needs. This requires the annual harvest of 240 000 ha of forest for fuel wood and a further 298 000 ha for charcoal production (Mugo and Gathui 2010).

In Malawi, biomass accounts for 97% of total primary energy supply (59% fuel wood and 41% charcoal) with 98% of households depending on wood for energy (Black and Richter 2010).

In India 77.6% of the 159 million rural households use fuel wood to meet their energy needs. This traditional use of biomass energy is characterised by low efficiency and environmental degradation (TERI 2010). Biomass delivers nearly 90% of energy used in rural households and 40% of energy used in urban households (TERI 2010).

In 2009, 77% of total forest products in Africa were used for fuel wood or charcoal, with 94% of wood production in East Africa used for wood fuel (FAOSTAT 2011).

Table 1: Potential REDD+ strategy options to address DD from the energy sector

| Policy | Description | Effectiveness in achieving REDD+ | Cost of implementation | Potential socio-economic impacts | Other policies necessary for improved effectiveness | Further information |
|---|---|---|---|---|---|---|
| Changes to supply of wood fuels | | | | | | |
| Sustainable management of natural wood fuel resources | Sustainable forest management requires ensuring harvesting is within natural regeneration rates. This may include harvesting quotas or stumpage fees and sustainable management (however structured) may form a precondition for devolving to local communities the control, management and the right to economic benefits of forest resources. | High in the medium – long term | Moderate. The costs of enforcing regulations partially offset by improved revenue, particularly if communities control and are able to benefit from sustainable management. | Any restrictions on open access resources will have greatest impact on poorest households who rely on them for subsistence use. Stumpage fees may have impacts on vulnerable participants in fuel wood industry. Impacts on other fuel wood users if the price of fuel wood rises to reflect costs of sustainable management. | Increased supply of wood fuels from plantation sources, provision of efficient cook-stoves to offset higher costs of wood fuel. Community level control and enforcement of harvesting. | Arnold et al 2003; Arnold et al 2006; Hofstad 1997. |
| Commercialisation of the wood fuel sector | Legalising and formalising the sector to incentivise more sustainable management of resources. Tax and other revenues generated from the sector used to fund sustainable management of wood fuel resources. | High, but given lack of enforcement has previously been difficult to implement. | Initially moderate but would then generate tax revenue to offset this cost. | Increased costs to producers may marginalise returns and affect the comparative advantage of poor participants as well as their ability to participate in the wood fuel industry. Many poor participants in the industry have no alternative livelihood options, and would suffer severe hardship if this were not mitigated. May impact women by diverting wood fuel from subsistence use to sale, and increasing involvement of men as scale of industry increases. | Sustainable management of natural wood fuel sources, more effective enforcement of licences and taxes, increased supply of wood fuels from plantation sources. | Arnold et al 2003; Hofstad et al 2009; Macqueen and Korhaliller 2011; Mugo and Gathui 2010; Seidal 2008; World Bank 2009. |

| Policy | Description | Effectiveness in achieving REDD+ | Cost of implementation | Potential socio-economic impacts | Other policies necessary for improved effectiveness | Further information |
|---|---|---|---|---|---|---|
| Improving charcoal production efficiency | Increasing the use of mud, brick or steel kilns through subsidies or tax incentives for their use, or including their use as a provision of sustainable forest management undertaken by communities. | Moderate | Moderate | May affect the ability of the poor to participate in the industry (as for commercialisation). Poor producers may require subsidised access to efficient kilns and training in maintenance and use to remain competitive. | Effective implementation and enforcement of sustainable forest management (without this, efficient kilns are unlikely to be economically viable). Commercialisation of the sector. | Hofstad et al 2009. |
| Establishing plantations | Establishment of plantations to increase the supply of sustainably managed wood fuel. | Moderate, however to date has proven difficult to compete with unsustainably managed natural sources. | High, although would decrease over time if sustainable management of natural forest resources made plantation produced wood fuels price competitive. | Provide benefits to landholders if wood fuel can be grown or harvested as a bi-product. To be economically competitive with natural fuel wood resources, access to natural fuel wood resources will need to be restricted or a tax imposed, which would affect poor urban fuel wood users, as well as rural subsistence users reliant on open access resources. | Sustainable management of natural wood fuel resources. Landholders need to be able to benefit commercially from plantations on their land. | Arnold et al. 2003; Arnold et al. 2006; Jama et al. 2008. |
| Changes to demand for wood fuels | | | | | | |
| Fuel switching or rural electrification | Encouraging the use of biofuels for cooking, or rural electrification with renewable energy (e.g. large scale, sustainably managed biomass energy, biogas) to support climate change mitigation goals of REDD+. | Uncertain as people are likely to require continued access to biomass energy for some uses. | High, but depends on technology chosen. | People are likely to require continued access to biomass energy because of its stable cost and ease of access, although electricity could be substituted for some uses. Subsidised pricing for electricity for basic needs may be required for access by the poor. | Sustainable management of natural wood fuel resources, improved cook stoves. | Arnold et al. 2003; Hofsted et al. 2009; IEA 2010. |
| Improved cook stoves | Promotion and distribution of improved efficiency cook stoves | Moderate | Low | Largely positive social impacts for women and children who spend less time collecting wood. Upfront and maintenance costs for stoves may be too expensive for poor households. | Sustainable management of natural wood fuel resources. | Kammen 2000; TERI 2010; Macqueen and Korhaliller 2011. |

### Biofuels under the EU Renewable Energy Directive.

The EU Renewable Energy Directive (2009) requires that by 2020, 10% of transport fuels in EU member states come from renewable energy sources, which includes biofuels. The directive also includes sustainability standards for biofuels which aim to ensure that biofuels counted towards the target generate clear net GHG savings and do not have negative impacts on biodiversity and land use. Biofuel producers and importers are responsible for demonstrating that the sustainability criteria have been met and verification is left to member states. All biofuels and bioliquids must comply with these criteria to be eligible to be counted towards the mandated targets. The sustainability criteria require that biofuel production and use results in a reduction in greenhouse gas emissions, with direct land use change and change in carbon stock from land use accounted for in these calculations (Annex V Renewable Energy Directive 2009), although indirect land use emissions are not included.

The criteria also require that biofuels do not originate in a primary forest and will not be taken from land that had high carbon stock in January 2008. Areas of high carbon stock are defined to be areas of continuous forest over 1ha with canopy cover of greater than 30%. If canopy cover is between 10% and 30% GHG emissions reductions must be demonstrated in accordance with the life cycle analysis methodology to comply with the criteria (17(4)).

As the Directive only came into effect in December 2010, and given that member states are still scaling up biofuel use to meet 2020 targets, it is too early to tell if these criteria have been effective in mitigating undesirable effects on land use change.

through the equitable distribution of REDD+ revenues, and in the design of REDD+ policies and programmes. Table 1 outlines the potential policy options as well as potential socio-economic impacts that should be considered in doing this.

## Energy as a driver of deforestation – Biofuels

The production of biofuel[2] feedstock requires agricultural land, competing with food and other agricultural production, and is thought to drive deforestation directly and indirectly, particularly in Latin America and Asia (Schoneveld 2010). Global studies have indicated that soy and palm oil production are more likely than other biofuel feedstocks to be in direct competition with forests, thereby driving deforestation (Gao et al. 2011; Schoneveld 2010). Indirect land use change is where the establishment of biofuel feedstock crops displaces agricultural production for food, or pasture lands for livestock, which then move to other regions and drive deforestation there (Kim et al. 2009).

The relationship between biofuel feedstock production and deforestation is a complex one, and very difficult to quantify given the lack of data on areas used for biofuel feedstock production, as opposed to use of the same crops for food products. It is also made more complex by the direct and indirect links that biofuel feedstock production may have to deforestation at the national and international scale (Gao et al. 2011), and the fact that most estimates of indirect land use change attributable to biofuels are based on modelling (Arima et al. 2011; Gao et al. 2011; Kim et al. 2009; Laopla et al. 2010).

Despite the difficulties in demonstrating the impact of biofuel production on forests disaggregated from general agricultural production, biofuel feedstock production is still important to consider in the context of REDD+ because demand for biofuels, and therefore demand for land to grow biofuel feedstock is likely to increase. Biofuel feedstock production currently covers 1% of the worlds arable land, but it expected to cover 3.8% by 2030 (WBCSD 2007), equating to an additional 0.5-1.1 million ha needed for feedstock production per year. Other estimates suggest that to achieve globally a 10% substitution of all liquid transport fuel for biofuel, 118 – 508 million ha of additional land will be needed for feedstock production (Howarth et al. 2009). Both of these estimates demonstrate the likely increasing competition between forests and biofuel production, with large-scale biofuel development likely to pose a high risk for forests, particularly the expansion of palm oil and sugar cane as feed

Biofuel feedstock production in the Amazon

Source: http://squashed.tumblr.com

2 Biofuels are solid, liquid or gaseous fuels produced from biomass, however in the context of this paper, biofuels will be used to refer only to bioethanol and biodiesel as they account for 90% of current biofuel production. Biofuel feedstocks are those crops grown and refined to produce biofuels and include high sugar crops and cereal crops for bioethanol e.g. sugarcane, maize sugarbeet, cassava, wheat, sorghum, and oil crops for biodiesel e.g. rapeseed, sunflower, soy, castor, oil palm, coconut or jatropha.

Table 2: Summary of potential REDD+ strategy options to reduce DD from biofuels

| Policy | Description | Effectiveness in achieving REDD+ | Cost of implementation | Potential socio-economic impacts | Other policies necessary for improved effectiveness |
|---|---|---|---|---|---|
| International environmental standards* | Sustainability criteria for biofuel feedstocks imposed by international markets e.g. US and EU. Market entry is contingent on meeting the criteria. REDD+ countries could unilaterally adopt these standards for all biofuel production to reduce competition between forests and feedstock production regardless of final market. | Uncertain, but potentially high. | Moderate. Will require developing country to establish certification systems to access markets. | Small producers may not be able to afford certification process under the criteria if these costs are passed on from exporters or processors. Expansion of biofuel feedstock production into forested areas is often justified by the economic contribution of the industry to rural livelihoods. However, this contribution is often overstated and depends heavily on the model of production and feedstock grown. Realising rural development benefits usually requires targeted government policies and support. | National level land-use planning so that the criteria are underpinned by national ownership and definition of important forest areas. |
| Voluntary certification^ | Certification under stakeholder roundtable criteria that include sustainability criteria for the production of biofuel feedstocks | Low as they are voluntary | Low | Small producers may not be able to afford certification processes, and therefore may be unable to sell to some biofuel producers. Potential socio-economic impacts greater if voluntary certification becomes more widespread, but could present problems for smallholders locally. | National level land-use planning so that the criteria are underpinned by national ownership and definition of important forest areas. |

* Further information: Clancy 2008; Dufey 2007; Shoneveld 2010; Peskett et al. 2007.

^ Further information: Nepstad 2011;

stocks (Shoneveld 2010). This competition will have implications for the political palatability, opportunity costs and therefore effectiveness of REDD+ implementation.

Demand for biofuel feedstock produced in tropical countries (with the exception of Brazil) is largely driven by international policies, with the EU and USA the largest importing markets for developing countries (Shoneveld 2010). Tropical countries are expected to play a central role in biofuel production given their low land and labour costs and land availability, although land availability is unlikely to be as high as estimated (Cotula et al. 2008; Shoneveld 2010). This means that some policy responses to reduce the competition between forests and biofuel feedstock production may need to come from changes in international policy (e.g. EU and US feedstock sustainability standards).

## The way forward for energy and REDD+

This paper demonstrates the need for integrated policy approaches to achieve energy and REDD+ objectives both locally and globally. REDD+ provides the political and financial incentive to improve the sustainability of biomass energy production, which will continue to be the main energy source in many parts of Africa and Asia. Prior experience has demonstrated that this will require a range of complementary reforms including commercialisation of the sector, harmonisation of incentives and tax policies to encourage investment in sustainable production systems (both efficient kilns and plantations), sustainable management and improved enforcement and control of harvesting in natural forest areas, as well as demand side measures.

The reliance of the poor on wood fuel for energy and as an important income source means that many of the policy measures discussed have a potentially large impact on the poor. The way in

which they are implemented will also determine their impacts on the poor, for example achieving sustainable management of natural forest resources by making it a precondition for allowing local control of forest resources, compared with central government using a 'command and control' approach to sustainable forest management. To ensure that REDD+ is equitable these potential impacts need to be explored and mitigated through the design of REDD+ policies as well as in the design of REDD+ revenue distribution mechanisms.

On a global level, the achievement of renewable transport fuel targets alongside REDD+ will require integrated planning and harmonisation of agricultural and REDD+ policies in REDD+ countries and at the international level. Large scale land-use planning (as discussed in Graham and Vignola 2011), stimulated by the need to comply with international sustainability criteria, provides a promising mechanism to do this.

The discussion in this paper demonstrates the need for greater cross-sectoral coordination of REDD+ at the national and international levels. The complexity of addressing the drivers of deforestation and forest degradation mean that this will be essential to ensure that energy and REDD+ objectives are able to be achieved in ways that are equitable.

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## ABOUT REDD-NET

REDD-net is an international knowledge forum for southern civil society organizations through which they can access information about efforts to Reduce Emissions from Deforestation and forest Degradation, share their own experiences and help to build pro-poor REDD projects and policies. REDD-net is a partnership between Centro Agrononómico Tropical de Investigación y Enseñanza (CATIE), the Overseas Development Institute, RECOFTC – The Center for People and Forests and Uganda Coalition for Sustainable Development. REDD-net is funded by Norad.

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