

Focali Brief: 2011:02

Criteria and indicators for sustainable woodfuels

The global energy demand is projected to grow 50 percent by 2030. Developing nations can become major exporters of woodfuels to meet part of this demand. This will provide export earnings and local employment opportunities, but may also have negative environmental, social and economic consequences. Achieving sustainable woodfuel production will require that relevant criteria and indicators are developed and adapted to local conditions. Implementation should seek broad stakeholder input to balance objectives and benefit from local knowledge.

WOODFUELS are biofuel derived from trees and shrubs (woody biomass) grown on both forest and non-forest land. Dependence on woodfuels is greatest in developing countries where they provide about one-third of the total energy. For many households, especially rural, they are the primary fuel for cooking and heating. Woodfuels are also important in food processing industries in developing countries for baking, brewing, smoking, curing and producing electricity. In developed countries, especially in the Nordic countries, woodfuels are increasingly used as a climate friendly alternative to fossil fuels for generating heat and power and woodfuels are also promoted as a means of reducing energy imports. Furthermore, woodfuels can be beneficial for local economic development; due to high transportation costs, woody biomass is preferably processed near its production site, thus generating local jobs and income.



Dependence on woodfuels is greatest in developing countries where they provide about one-third of the total energy. For many households, especially rural, they are the primary fuel for cooking and heating. Photo: Thomas Hackl

Threats from unsustainable production

Developing nations will probably become major exporters of woodfuels to the growing bioenergy markets in indus-

About this brief

Focali provides to Swedish ministries, government agencies and other relevant actors timely and topical analyses, syntheses and conclusions on forest management in relation to climate and poverty targets. This brief discusses environmental and socioeconomic consequences of woodfuel production - and the development of criteria and indicators for sustainable woodfuel production.

trialised countries. This trade will bring export earnings to developing countries but raises concerns about social, economic and environmental sustainability, including:

- **Social:** The livelihoods of the poor may be threatened if woodfuels become more scarce and/or valuable, thus depriving the poor of access to affordable woodfuels. Fuel scarcity reduces the capacity to cook high-quality foods such as beans, and increases the consumption of less nutritious foods that are prepared more quickly. Furthermore, woodfuel harvesting generates many jobs in rural areas that are threatened if the production grows unsustainably.
- **Economic:** Markets tend to emphasize short-term profit with inadequate management leading to overuse of for-

est resources, deforestation and forest degradation.

- **Environmental:** Harvesting forest resources can diminish water quantity and quality and increase soil erosion, leading to overall reductions in site productivity and tree growth. Furthermore, excessive harvesting can adversely affect biodiversity and create air pollution and excessive carbon emissions.

Developing countries may face disproportionately high threats due to their rapid population growth and probable role as woodfuel suppliers to developed countries. International development agencies and other authorities, industries and NGOs can support developing countries by promoting sustainability standards to avoid a situation where the costs of woodfuel production outweigh

the benefits and to ensure a balanced approach for long-term sustainable development. The policy instrument of criteria and indicators can be used to facilitate sustainable development of the woodfuel sector as they go beyond an assessment of sustained yield of woodfuels and incorporate social, economic and environmental values.

Design of criteria and indicators for sustainable woodfuels

A recent publication from FAO (2010a), produced in a joint project with IEA Bioenergy Task 31, presents criteria and indicators that can be used at the national, regional or local level to monitor and report on the implementation of sustainable production of woodfuels. While criteria describe management goals, indicators are quantitative or qualitative variables that can be measured or described to show trends over time. Since they were created to be an adaptable set that can be applied to all production systems worldwide at a range of scales, they do not prescribe any exact levels to be attained for a woodfuel production system to be termed “sustainable”. Instead, they are designed to serve as a reference when

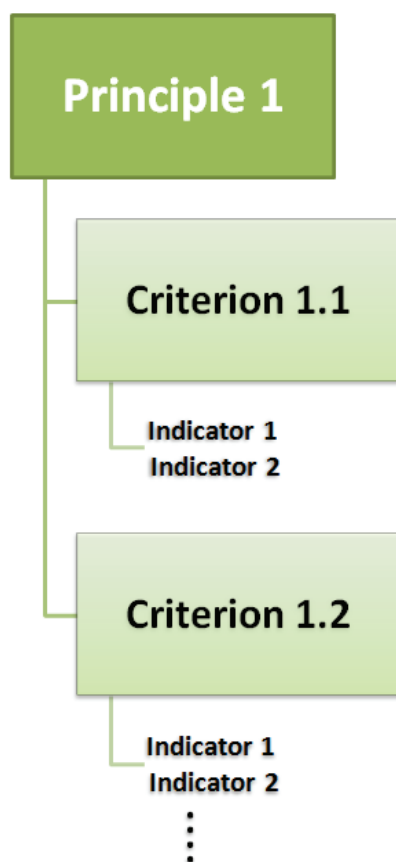


Figure 1: The four principles address key elements for sustainable woodfuel production systems.

criteria and indicators are developed locally and values are assigned to indicators with site-specific knowledge and broad stakeholder input.

The FAO publication has structured the recommended set of criteria and indicators under four overarching principles. As is displayed in Figure 1, the principles, criteria and indicators are hierarchically designed:

- Principles lay out the foundation for criteria and indicators by establishing a fundamental truth or law.
- Criteria enhance the meaning and operability of principles.
- Indicators are measures of one aspect of a criterion and, if observed periodically, can be used to demonstrate trends.

The four principles address key elements for sustainable woodfuel production systems. They are:

- Principle 1: Policies, laws, institutional frameworks and capacity exist and are clear and consistent.
- Principle 2: Human and labour rights are respected and social and cultural values are maintained or enhanced.
- Principle 3: Economic sustainability is ensured.
- Principle 4: Landscape and site productivity and environmental values are sustained.

The principles are then defined by criteria and indicators that provide further guidance towards sustainability. For example, one criterion of Principle 4 states that “Woodfuel production does not degrade ecosystems and landscapes” and an indicator for that criterion provides trend analysis through measuring “The extent to which soil nutrient status, temperature, structure and processes are maintained or improved”.

Balancing all aspects of sustainability

The criteria and indicators for sustainable woodfuels build on the extensive experience and lessons learned from criteria and indicators of Sustainable Forest Management (SFM, see Box 1). While the environmental criteria for SFM were established at an early stage, socio-economic criteria have evolved more slowly (Brand 1997).

The criteria for SFM originally developed at the international level were heavily weighted towards environmental issues

Box 1. Criteria and indicators of SFM

Criteria and indicators have been the primary policy instrument in the progress towards Sustainable Forest Management. While C&I apply to 150 countries accounting for 98% of the world’s forests, only 10% of forests are actually certified. One challenge will be to find ways to increase adoption of C&I through voluntary means. There are several different sets of criteria and indicators, but all have come to embrace the following seven thematic elements of SFM:

- (1) extent of forest resources
- (2) biological diversity
- (3) forest health and vitality
- (4) productive functions of forest resources
- (5) protective functions of forest resources
- (6) socio-economic functions
- (7) legal, policy and institutional framework

Sources: Wijewardana (2008) and FAO (2010b)

of sustainability; of the seven thematic elements, five address biological features of forests (Wijewardana 2008:119) including one addressing greenhouse gases (GHGs) directly. Surveys of SFM stakeholders have identified social and economic issues as key gaps in existing criteria (Gough, Innes et al. 2008; Wijewardana 2008:119).

Compared to the criteria and indicators for SFM, the FAO publication provides a more balanced set of criteria and indicators for sustainable production of woodfuels. Social and economic issues are on par with environmental aspects of sustainability, and addressed in separate principles, each with several criteria and accompanying indicators.

Social issues addressed include human, labour and tenure rights. Furthermore, there are indicators concentrating on the extent to which relevant stakeholders have been included in decision-making processes, to contribute to the social and cultural development of local, rural and indigenous communities.

Reducing emission of GHGs is included as an indicator of the environmental criteria, but climate issues are also covered under other principles. One criterion of

Box 2. Experience from implementation of criteria

Although criteria and indicators provide a more balanced approach to different aspects of sustainability, achieving balanced implementation is also a challenge. Tests have found that social and economic criteria and indicators are more difficult to apply than ecological ones, as the former required national and regional knowledge, time-consuming stakeholder interviews, and decisions about conflicts between land and forest tenure rights.

Adopting a national and sub-national framework can alleviate this challenge, an approach successfully taken in Australia that improved their ability to report social, economic and environmental forest values. The process involved extensive consultation with - among others - managers, policy makers, forest users, researchers and community representatives, leading to a strong ownership and endorsement of the final framework. However, the process required considerable effort by the authorities at different levels, resources many developing countries lack.

Sources: Prabhu, Colfer et al. (1998) and Howell, Wilson et al. (2008)

the economic sustainability principle includes the indicator “The profitability of woodfuels, when the full benefits and costs are taken into account”. Full benefits and costs refer to accounting for externalities such as emissions of GHGs, as is discussed at length in the chapter on economic aspects of sustainable woodfuels.

Implementation of criteria and indicators

The implementation of criteria and indicators for sustainable woodfuels faces several challenges. The producers and sources of woodfuels are diverse; harvesters of woodfuel may operate informally (or illegally) and are difficult to monitor, and woodfuels may stem from

orchards, windbreaks and urban street trees that usually are not inventoried. In contrast to most fossil fuels that are centrally distributed and consumed, the flows of production and trade of woodfuels are complex.

Implementation of social and economic indicators is often difficult and requires in-depth knowledge of national and regional context (see Box 2). The FAO publication points out lack of data and information, high cost and difficulties for small producers to access support networks as barriers to implementation. To overcome these barriers, policy makers and decision-makers are advised to consider:

- Taking advantage of market mechanisms and information, as market-based mechanisms may be more cost-effective than mandatory ones.
- Coordinating with existing forest, energy and GHG policies/regulations, certification systems and ethical standards.
- Avoiding duplication and promoting synergies among environmental, economic and social standards.
- Allowing flexibility since biomass sources, socioeconomic conditions and policy emphases vary.



Women have an important role in collecting fuelwood for domestic use in developing countries.

Photo: Rita Willaert

In conclusion

- Policy-makers and decision-makers should acknowledge the potential and benefits of sustainable woodfuel production and be aware of the environmental, social and economic risks of unsustainable production.
- The benefits and threats should be addressed with the aid of the FAO publication's criteria and indicators for sustainable woodfuels adopted locally with site-specific knowledge and broad stakeholder input.

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Policy-makers and decision-makers should acknowledge the potential and benefits of sustainable woodfuel production and be aware of the environmental, social and economic risks of unsustainable production. Photo: Màrtainn MacDhòmhnaill

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