



Sustainable woodfuel for food security

A smart choice: green, renewable and affordable

Food insecurity and a high dependence on woodfuel as a primary cooking fuel are characteristics common to vulnerable groups of people in developing regions. Woodfuel is often erroneously viewed as the chief contributor to deforestation. Furthermore, the continuing perception of woodfuel as an old-fashioned energy source obscures its potential role as a modern fuel in a renewable, affordable energy mix. But with adequate policy and legal frameworks in place, woodfuel can be sustainable and a main source of green energy for both rural and urban areas in developing countries. The widespread availability of woodfuel, and the enormous market for it, present opportunities for employment and for sustainable value chains, providing further rationale for promoting this source of energy.

Forests cover one-third of the Earth's land surface. Forests and trees outside forests, including tree-based agricultural systems, are sources of food, cash income, woodfuel for cooking, and ecosystem services that support agriculture and provision of water. In this way they make vital contributions to the four dimensions of food security – availability, access, utilization and stability.

One of most important contributions of forests to food security is the provision of woodfuel for cooking and boiling water. Cooking enhances the uptake of nutrients and makes food more digestible. Cooking or reheating food also increases food safety by eliminating dangerous micro-organisms and toxic elements. In many forest-dependent communities, woodfuel is the only means for sterilizing water to ensure its safety for drinking and food processing. It is also used in food preservation (e.g. smoking, drying), prolonging shelf-life beyond the growing season. Commercial woodfuel production can contribute to household income diversification and act as a safety net for households during periods of food shortage, by providing cash to purchase food. Income from woodfuel sales also provides capital that can be invested in agricultural activities.

Woodfuel is still the predominant fuel for rural households in much of the developing world, especially in Africa and South Asia. It is of particular importance to the poorest people, for whom it is often the cheapest, most available and most easily accessible fuel. Woodfuel dependence varies largely between urban and rural areas, reflecting different levels of development and the availability of

alternative energy sources. In most regions woodfuel dependence has declined or remained steady over time, but in sub-Saharan Africa consumption continues to increase.

Depletion or degradation of forest resources and trees outside forests puts at risk the multiple benefits that forests and trees provide for people's food security and nutrition. Where such degradation limits the availability of, and access to, woodfuel for household use, hunger and poverty are likely to be exacerbated.

Woodfuel represents over 50 percent of the world's total wood production. One-third of woodfuel is harvested unsustainably, generally as a result of unregulated forest access, and contributes to forest degradation. However, contrary to popular belief, woodfuel is not a main cause of deforestation. The main driver of deforestation is conversion to agriculture, accounting for 80 percent of the world's forest loss.

Through improved management, woodfuel production and harvesting systems can be made sustainable. In addition, with appropriate and efficient stove systems in place, sustainable woodfuel use can contribute significantly to food security for the more than 2 billion people who depend on it as their primary source of energy for cooking.

Woodfuel has a major role in the food security and nutrition of one-third of the world's population. With improved forest and tree management, it can help to ensure sufficient, safe and nutritious food for those who are food insecure.

DEFINITIONS AND KEY TERMS

Food security is a state where all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. Nutrition security is integral to the concept of food security.

Woodfuel is defined as all types of fuels originating directly or indirectly from woody biomass. The main types of woodfuel in less-developed regions of the world are **fuelwood** (wood in its natural state, including residues from wood-processing industries) and **charcoal** (the solid residue derived from the carbonization, distillation, pyrolysis and torrefaction of wood).

Forest is defined as land spanning more than 0.5 ha with trees higher than 5 m and a canopy cover of more than 10 percent, or trees able to reach these thresholds *in situ*.

Deforestation is the conversion of forest to other land use or the permanent reduction of the tree canopy cover below the minimum 10 percent threshold.

Forest degradation is the reduction of the capacity of a forest to provide goods and services.

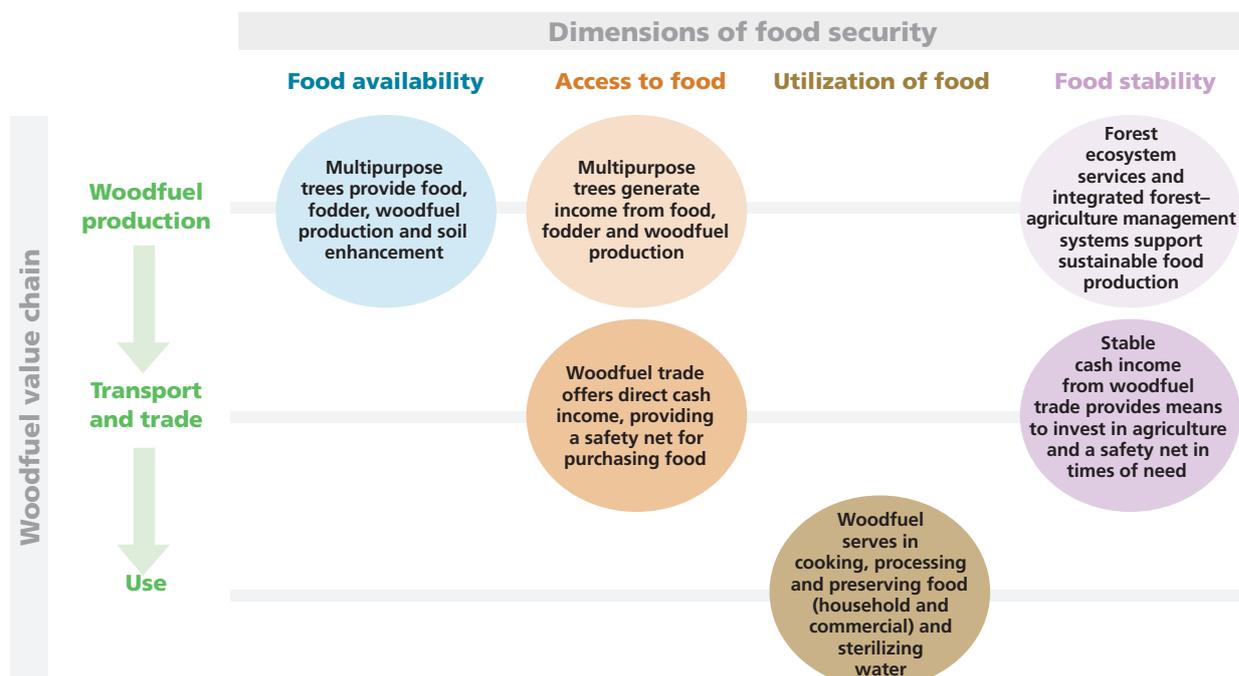
Tree-based agricultural systems (also known as agroforestry systems) are defined by tree cover on agricultural land of more than 10 percent. They can include trees on farms, home gardens, intercropping, fallows, woodlots and plantations.

KEY FACTS AND FIGURES

WOODFUEL AND FOOD SECURITY

- About 795 million people are undernourished globally; of this total, 98 percent live in Africa, Asia and the Pacific, and Latin America and the Caribbean.
- An estimated 663 million people globally in 2015 had no access to clean, safe drinking-water.
- Woodfuel represents over 50 percent of the world's total wood production and generated US\$33 billion of income in 2011.
- Globally 2.4 billion people – one-third of the world's population – use woodfuel for cooking; for more than 2 billion people it is the primary source of cooking energy.
- In low- and medium-income countries, over 75 percent of rural households and around 20 percent of urban households depend primarily on woodfuel for cooking.
- Reliance on woodfuel is highest in Africa (63 percent) and Asia and Oceania (38 percent), followed by Latin America and the Caribbean (15 percent) – the regions where most of the world's undernourished people live.
- About 765 million people (10.9 percent of the global population) use woodfuel to boil and sterilize their drinking-water.
- Per capita demand is highest in sub-Saharan Africa (0.57 m³ per person per year), two to three times higher than in any other region, and total consumption continues to increase.
- Commercial fuelwood and charcoal activities to supply urban centres involve over 40 million people, representing 1.2 percent of the global workforce.

Links between the sustainable woodfuel value chain and food security



ISSUES OF CONCERN

Forest resource degradation and woodfuel

- Between 2010 and 2015, the net annual loss of forest cover amounted to 3.3 million hectares worldwide.
- Agricultural conversion, not woodfuel use, is the main cause of global deforestation, accounting for 80 percent of total forest loss.
- It is estimated that 27 to 34 percent of woodfuel harvesting in tropical regions is unsustainable.
- Around 275 million people live in “woodfuel depletion hotspots” where more than 50 percent of woodfuel harvesting is unsustainable.
- In Africa, unsustainable fuelwood collection and charcoal production – favoured by open access with a lack of clear and secure forest and tree tenure – currently constitutes the main cause of forest degradation, accounting for as much as half of it.
- Where urban demand for woodfuel is high, it creates pressure on peri-urban forest and tree resources, contributing to land degradation which can have a negative impact on food availability, as these lands are also needed for agricultural production to feed the urban populations.

Potential woodfuel shortage

- Lack of sustainable management of wood resources, informal woodfuel trade dynamics and poorly defined tenure rights can result in woodfuel shortage on a local scale.
- Woodfuel shortage can have direct implications for food and nutritional security, potentially resulting in reduced intake of nutritious cooked foods that require long cooking times. In extreme circumstances, people may reduce the number of cooked meals.
- Shortage of woodfuel often arises during crises and conflicts, endangering the food security of already vulnerable groups such as refugees and internally displaced people.
- The need to spend more time collecting fuelwood because of shortage is especially burdensome for women and children, and reduces the time that can be spent on other activities such as agriculture or education.

Health risks

- Smoke is the greatest health risk of woodfuel, especially when it is used indoors. Women and children in particular face high risks from exposure.
- Household air pollution is the single most important environmental health risk worldwide; cooking with solid fuels, including woodfuel, is implicated in 4.3 million deaths each year.
- Malnourished people and those with nutrient deficiencies are more prone to suffering from diseases induced by poor air quality.

Climate impacts

- Climate change has negative impacts on agricultural production and affects all aspects of food security.
- Climate impacts from woodfuel use include CO₂ emissions from unsustainable wood harvesting,



and methane and black carbon (the most light-absorbing component of particulate matter) emitted during incomplete combustion.

- Traditional bioenergy (which includes agricultural residues and dung in addition to fuelwood and charcoal) contributes 18 to 30 percent of global black carbon emissions.
- However, woodfuel is generally considered almost carbon neutral, because it is assumed that regrowth of wood captures about the same amount of CO₂ that is emitted into the atmosphere when woodfuel is burned.
- Estimates of woodfuel’s contribution to global anthropogenic emissions range from 2 to 7 percent.
- Fossil-fuel alternatives (coal, gas or oil products) have higher CO₂ emissions as well as higher economic costs, and may also be difficult to introduce given deep-rooted cultural preferences and habits associated with woodfuel.

OPPORTUNITIES

Sustainable woodfuel and food production systems

- Sustainable woodfuel production depends on sustainable forest and tree management practices that ensure regrowth or regeneration that is at least equal to the level of extraction.
- Sustainable woodfuel options can include dead wood, wood from dead or dying trees, and harvesting or processing waste.
- Agroforestry systems provide food and fuelwood while also indirectly contributing to food security by providing fodder and ecosystem services.
- Woodfuel can also be produced sustainably through plantations, assisted natural regeneration (enrichment planting) and management of fallows and degraded forests.

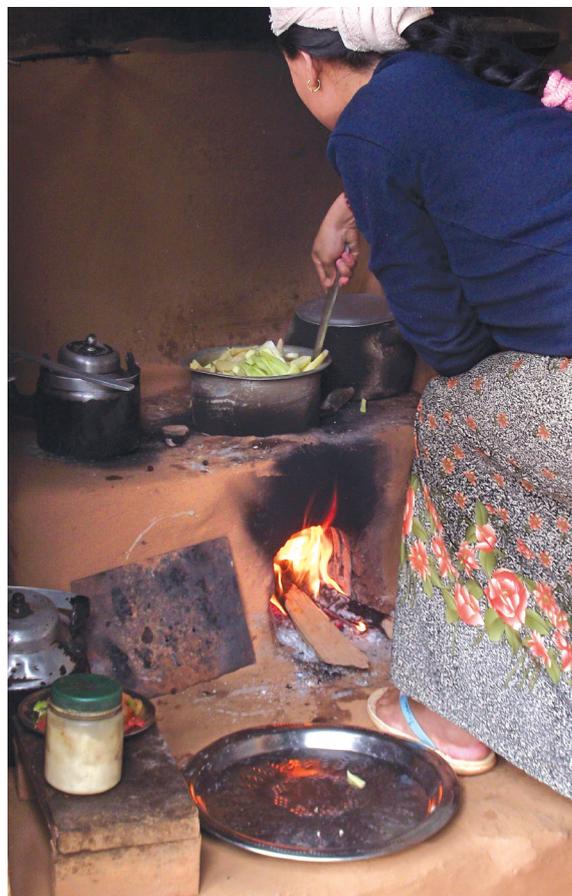
Improving fuel efficiency for resource conservation, climate impacts and air quality

- Improved cooking stoves offer more complete combustion, more efficient energy use and improved household air quality. They can be easily built with local and readily available materials at low cost.
- Introducing improved stoves may be more feasible in urban areas or in countries with better economic conditions.
- Other fuel-saving practices include using an appropriately sized pot with a fitting lid; protecting the stove from the wind; burning small, dry wood; and preparing food ingredients (soaking, tenderizing) to reduce cooking time.

POLICY RECOMMENDATIONS

- The contribution of forests and trees to all dimensions of food security should be appreciated by policy-makers and reflected in national and international development and food security policies, strategies, programmes and legal frameworks.
- The prospect of dependence on woodfuel in the immediate to mid-term future should be acknowledged in national energy plans.
- Woodfuel-related policies should combine supply-side and demand-side interventions and should distinguish between rural and urban contexts. Spatial mapping tools can help countries plan strategically to meet woodfuel demand sustainably.
- Strategic planning should be combined with fiscal and regulatory incentives for sustainable woodfuel and food production, based on a value-chain approach.
- Cross-sectoral governance of multifunctional landscapes offers the potential for the equitable supply of both food and energy – requiring integration of forest, energy, environmental, agricultural, food security, and nutrition and health policies. Conflicting interests concerning the use of trees and land for fuel, agriculture and other purposes may need to be addressed.
- Policies should ensure clear and secure forest and tree tenure rights for community-based or private entities and should promote community-based forest management, agroforestry, assisted natural regeneration, village woodlots and plantations under simple management plans.

- The use of wood-industry residues should be promoted in the production of charcoal and other woodfuels.
- Policies for introduction of improved cooking stoves need to be tailored to the local context and must be accompanied by financial and tax incentives and guidelines.



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Links to the 2030 Agenda for Sustainable Development:

How sustainable woodfuel production and use contribute to the Sustainable Development Goals

Relevant SDG	Contribution of sustainable woodfuel
SDG 2 (Zero Hunger)	Improved food utilization and nutrition, integrated food production systems, enhanced agricultural productivity
SDG 3 (Good Health and Well-Being)	Improved nutrition and food safety, safe water, minimization of health risks associated with smoke, better environment
SDG 5 (Gender Equality)	Reduced fuelwood collection time and labour for women and children, and income opportunities for women
SDG 6 (Clean Water and Sanitation)	Sterilization of water, improved forest ecosystem services
SDG 7 (Affordable and Clean Energy)	Renewable and affordable energy source when sustainably managed
SDG 13 (Climate Action)	Near carbon neutral compared with fossil fuels; mitigation through increased forest cover
SDG 15 (Life on Land)	Healthy ecosystems maintained by addressing woodfuel in wider institutional, legal and policy frameworks for agriculture, energy and development (ensuring woodfuel rights and access to sustainable woodfuel sources, using integrated land-use plans, including woodfuel in energy master plans)

This fact sheet is adapted from the working paper *Sustainable woodfuel for food security – A smart choice: green, renewable and affordable* (FAO, 2017). Sources for all facts and figures can be found there.