



# SUSTAINABLE WOOD ENERGY

## 1. Key-facts and or key figures:

- Wood and charcoal are the main energy sources for more than two billion people, particularly in developing countries. Two in five people worldwide rely on them for heating and cooking.
- Asia accounts for about 44 percent of all wood fuel use, Africa about 21 percent and South America and the Caribbean about 12 percent.
- In developing countries woodfuel makes up about 80 percent of total wood use and in a few countries it is almost the sole use of wood. Africa is the region where wood fuel plays its most critical role. Compared to other regions, Africa has by far the highest per capita consumption of wood fuel.
- There are 34 countries where woodfuel provide more than 70 percent of their energy needs.
- Of today's 2000 million users, some 1000 million face fuel shortages as supplies of woodfuels dwindle, among them 100 million who already experience virtual 'fuelwood famine'.
- By the end of the century users are expected to raise up to 3000 million.
- Fuelwood is the main fuel for rural users but charcoal is one of the major sources of energy for most of urban dwellers and for small and medium scale commercial activities and industries of developing countries.
- Charcoal consumption has shown a constant increase in the last twenty years, much stronger than fuelwood.
- Charcoal consumption has been particularly consistent in South America and Africa, as result of marked processes of urbanization
- Charcoal is an important forest product and is a relevant source of income for many people living in and around forests. More than fuelwood, which often come from agricultural lands, charcoal is produced almost exclusively from natural forests and woodlands.
- Today charcoal making is a cause of deforestation in many countries with high charcoal consumption due to lack of adequate forest management practices. In fact, sustainable charcoal making may well become the main challenge and battleground of sustainable forest management in the years to come.

## 2. Introduction:

Woodfuel is a broad term covering both the direct use of wood in cooking and heating, the use of charcoal (both for households and for industrial uses) and also recovered wastes in wood-using industries.

Contrary to common belief, not all woodfuel comes from natural forests. Its production takes place within several types of land use, such as tree fallow and shrub fallow, woodlots, tree plantation sites, reforestation sites, agroforestry systems (fruit trees or scattered trees) and brushland and shrubland areas. For example, most of the woodfuel in Cebu in the Philippines originates from a handful of species.

Alternatives to woodfuels are often scarce in rural areas remote from national power grids or centres of distribution of fossil-based fuels such as kerosene or coal. Yet even where such conventional or 'convenience' fuels are available, many cannot afford them or simply prefer to use woodfuels for specific purposes.

Intensive household use of fuelwood as a 'common property resource' goes largely unregulated and poses a high risk both to trees and to the people who depend on them for their livelihood, accelerating a cycle of forest depletion, stagnating local economies and worsening poverty. Forest loss through overcutting of wood for fuel threatens to damage soils, deplete water resources and force needy rural people to migrate from the land as their livelihoods collapsed.

International efforts have been set in motion to find ways to boost production, to cut back household consumption of wood and wood-based fuels and to find other renewable power sources to guard against future household energy shortfalls. The alternatives should aim to promote a more rational, efficient, effective and safe utilization of biofuels as a locally available source of energy that could enhance rural development and increase the amount of energy available through modern biofuel applications. In turn, this would contribute to climate change mitigation through partial displacement of fossil fuels through increased use of biofuels.

corresponding countries. Evidently, the success of these discussions can only be measured by the degree to which countries implement commitments they have made in these various international fora.

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## 3. Current situation:

The demand for energy is rapidly increasing, but wood resources are finite. What was once regarded as a family business, i.e. the free gathering of fuelwood for daily needs - has rapidly become a major policy issue with far-reaching ramifications on vital social, economic and environmental sectors. Satisfying current and future wood-energy demand requires sound planning of the wood-energy sector and careful management of the resources in a perspective of economic and environmental sustainability. This quest for good management relies on the availability of high-quality, relevant and recent data.

The collection of wood energy data at national and local level in order to fill the current gaps and update and upgrade existing data bases constitutes one of the major challenges in the near future. Infrastructures, with properly trained personnel, are required in both the forestry and energy agencies of the countries for the collection, interpretation, collation, storage and presentation of wood energy data. In line with these requirements, FAO has initiated the implementation of a number of activities for the development of improved wood energy data bases, and for the provision of technical assistance to member countries in building capacities for the systematic collection, collation and analysis of information on wood energy aspects and issues.

#### 4. Technical contents:

##### 4.1 Are wood energy systems environmentally sustainable?

There are many different sources of woodfuels. They can be collected from dead trees, prunings and other woody wastes collected from forests, woodlands and tree farming lands. In many areas, a substantial amount of woodfuels originates from the biomass produced by land clearing operations when forests and woodlots are transformed into agricultural farms. In places with intensive use of woodfuels, for example around large urban centres, pressure on fuelwood supply sources can be heavy, with consequent deforestation and or devegetation. Fuelwood utilization for household cooking in general terms does not seem to face supply constraints, especially in rural areas. Nevertheless, there are cases such as Haiti, Andean highlands and the Sahelian countries where there is clear pressure on forest resources. Therefore, generalizations about the sustainability of woodfuel use at the local level cannot be made without careful analysis in the field.

##### 4.2 Gender implications of wood energy use

Energy is a basic human need and in many developing countries it is usually the women and children who spend long hours collecting fuelwood, often foregoing other valuable activities such as farming, education, recreation and rest. Recent information reveals that woodfuel-related tasks exclusively done by men—tree climbing, tree felling, cross-cutting large trunks of trees and long-distance transport tend to be considered heavy. Fuelwood gathering for home consumption and subsistence is considered a light task, even if women walk long distances with heavy head loads for hours; head loading is exclusively done by women. Most activities related to trade or distribution of biofuel for cash in some kind of market, including collection and transport, do not usually involve women. On the other hand, the domestic use of fuelwood, from production and collection up to consumption, is almost entirely dominated by women and children.

##### 4.3 A systems approach to wood energy production

A systems approach to wood energy production and use means linking forests, trees and people in a mutually supportive and interactive chain of benefits.

Besides directly supporting the livelihoods of subsistence users, fuelwood and charcoal also create income and jobs when traded as market commodities, but the majority of users harvest it as a 'common property resource' from forests and from scattered pockets or belts of trees at field margins or roadsides and on waste or common ground. Charcoal is often more sought-after in trade as it burns more efficiently than fuelwood and is easier to transport and store.

In developing countries, trade in fuelwood and charcoal occurs mainly in or around urban areas or beside highways and other transportation routes. Urban fuelwood or charcoal use is not confined to domestic cooking or heating but is often essential to small and medium scale trades or industries such as baking, brewing, textile manufacture and brickmaking. Charcoal also has specific uses in heavy industry, notably in steel and alloy production. In rural 'cottage' industries and major agricultural industries, too, fuelwood or charcoal can have viable and valuable economic uses, for instance in drying or curing tobacco, coffee and tea.

## NATURAL FOREST MANAGEMENT AND WOODFUELS IN BURKINA FASO

Burkina Faso's unplanned use of forest resources has led to the deterioration of all forest areas around Ouagadougou, prompting a Government decision to develop effective management techniques. The project, financed by the United Nations Development Programme (UNDP) and executed by FAO, aims to develop **a national programme for the sustainable and integrated production of wood and non-wood forests products, particularly fuelwood and charcoal.**

In an area 150km around Ouagadougou, 80000ha are being managed with the active participation of local people using simple techniques to implement silvicultural operations. Supported by FAO, the Government of Burkina Faso has introduced a planned and more rational approach to forest resources. This has resulted in **resource conservation and protection, as well as a 50 per cent income increase for local people**, who are now able to fulfil urban demand for fuelwood and charcoal.

Plans are underway for the management of a further 570000ha in Burkina Faso.

##### 4.4 New applications

In addition to fuelwood, charcoal and solid fuel mixtures that include wood in one form or another, new wood energy technologies of outstanding potential for sustainable development are now emerging in developed and developing countries alike.

They include wood-fired combined heat and power (CHP) systems and decentralised power plants that provide competitive and reliable electricity for household and other uses on a village scale, at a cost broadly comparable with that of unsubsidised grid power. The essence of sustainable development thinking is that the maintenance of livelihoods for individuals and families, as well as on economic growth and environmental care are not separate but mutually inclusive.

Where such businesses exist they create a consistent fuelwood demand that promises regular revenues and employment. **These 'commercial' applications of wood energy can thus support new centres of rural settlement** and bring beneficial aspects of market forces into play. Unless systematically geared to woodfuel production by appropriate supply-side management, however, they can also exert a heavy strain on nearby forests, woodlands and plantations - and harm their own economic prospects.

Reducing fuelwood and charcoal consumption through efficient conversion devices that put available wood energy to more frugal use not only takes pressure off the natural resource. It also means industry and commerce can afford to pay more for less wood and thus organised woodfuel production becomes more profitable.

## 6. Projects, programs, institutions and partners:

### 6.1 FAO is undertaking the following main activities :

- **Wood Energy Information System (WEIS)**

WEIS (wood energy information system) is currently being developed, which is an interactive database based on FAO's Wood Energy Today for Tomorrow (WETT) studies. WETT constitutes the major mechanism for the collection and analysis of existing information and data on wood fuels and related energy aspects from various sources at national and regional levels, including production, consumption and trade. The main aim of these activities is to identify shortcomings and fill gaps in the main wood energy databases and information systems. Regional WETT studies have been carried out covering Asia Pacific, Latin America and Eastern Europe and OECD countries, Africa and the Middle East. WEIS, when developed, is expected to become a main source of information and data for many public and private R&D centres, as well as forest services and energy units involved in planning national, regional and international energy, forestry and environmental programmes.

- **Unified Wood Energy Terminology (UWET)**

FAO is also working to develop, review and disseminate a Unified Wood Energy Terminology (UWET), a set of terms, definitions, units and conversion factors commonly used for the organization, collation, interpretation, presentation and exchange of wood energy data. In preparation of UWET, FAO is working in close collaboration with other relevant international, regional and national organizations and agencies involved in wood energy.

- **Forest Energy Forum (FEF)** In order to stimulate discussion and provide information to a wide audience, FAO has launched a new Forest Energy Forum (FEF) bulletin, which covers a full range of multidisciplinary aspects regarding the production, supply, trade, market and conversion of wood fuels into energy. The name Forest Energy Forum has been deliberately chosen to cover both traditional and new/modern sources of energy derived from forest biomass, such as bio-additives for gasoline and diesel oils. The first bi-annual issue of Forest Energy Forum was published in December 1997. These activities are complemented with the development and strengthen information and cooperation networks on different bioenergy issues.

## 5. Further information:

- [www.fao.org](http://www.fao.org)
- <http://www.fao.org/forestry/index.jsp>
- <http://www.fao.org/forestry/FOP/FOPH/ENERGY/cont-e.stm>
- "Forests, fuel and the future-Wood energy for sustainable development-Forestry topics". Report no. 5. FAO Forestry Department, Reprinted 1996.
- "Proceedings of the FAO/UNEP Regional Workshop on Wood Energy Information in Africa". Nairobi, Kenya 23 – 27, 2000. Partnership Programme EC-FAO (2000-2002).
- "Wood Energy", Unasylva, No. 211. An international journal of forestry and forest industries - Vol. 53 2002/4 FAO - Food and Agriculture Organization of the United Nations.
- "Gender and energy planning", by Margaret Skutsch FAO Consultant. Posted July 1996.  
<http://www.fao.org/sd/EGdirect/EGan0004.htm>

## 6.2 Other FAO projects:

### LATIN AMERICA

#### Ec-Fao Partnership Programme (2000-2002)

Information And Analysis For Sustainable Forest Management: Linking National And International Efforts In 13 Tropical Countries In Latin America

#### CUBA

La Dendroenergía, Una Alternativa Para El Desarrollo Energético Sostenible En Cuba

#### HONDURAS

Apoyo Al Desarrollo Del Subsector Dendroenergético De Honduras

#### MEXICO

Dendroenergía para el Desarrollo Rural

**ASIA** - The Regional Wood Energy Development Programme In Asia (Rwedp)

### AFRICA

Deuxième Atelier Régional Sur l'Information En Bois-Energie En Afrique. - Pays Francophones

Ec-Fao Partnership Programme (2000-2002)

Sustainable Forest Management In African Acp Countries

#### BURKINA FASO

Natural Forest Management And Woodfuels In Burkina Faso

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