

## FOREST RESOURCES CONTRIBUTION TO ENERGY SUPPLIES IN BRAZIL

JOSÉ ÓTÁVIO BRITO  
Universidade de São Paulo  
Depto. de Ciências Florestais/ESALQ  
P.O.Box 09, CEP 13400, Piracicaba, SP, Brazil

**ABSTRACT** – The Forest resources have been having an important role in the Brazilian Energy Balance. Nowadays, the wood is the third primary energy source in the country, and the energy appliances have been representing the most important quantitative use of wood in Brazil. There is a big quantitative and economic aspect involved with the use of wood for energy in the industry, and a very important social aspect related to the household use. The following comments are intended to discuss some aspects of these wood energy utilizations.

### INTRODUCTION

Until 1972, the wood was the first national source of energy in Brazil. After this date the wood was uplanted by the petroleum, and only after 1978 it was supplanted by the hydroelectricity. Nowadays the wood is the third primary energy resource in the country, and in despite of the decreasing of its share in the total of the Brazilian energy consumption (Figure 1), in absolute terms there wasn't a big decrease in the volume of wood consumed (Figure 2).

The energy appliances have been representing the most important quantitative use of wood in Brazil. For instance, as the Table 1 is showing 67% of the total volume of wood consumed in the country in the year of 1980 had energy destination, and only 33% were consumed for other purposes. Table 2 shows the distribution of wood consumption for energy in different sectors of the Brazilian society.

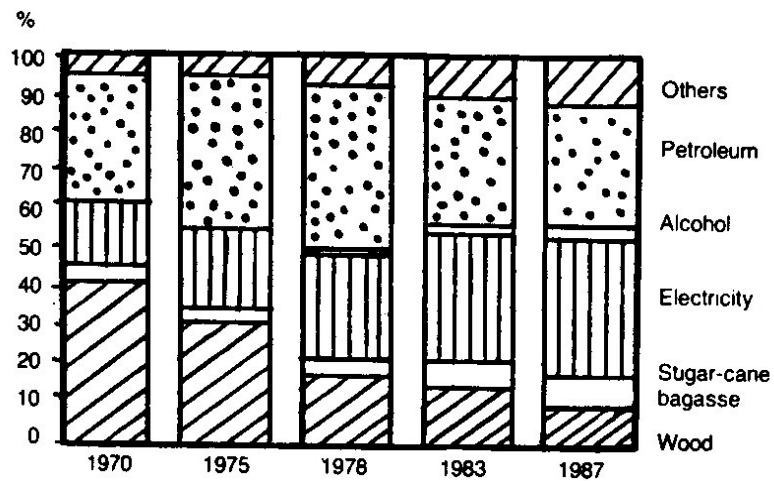


FIGURE 1 – The share of sources of energy in the Brazilian consumption. (BRASIL, MINISTÉRIO DA AGRICULTURA, 1984).



FIGURE 2 – The volume of wood consumed for energy in Brazil in millions of cubic meters. (BRASIL. MINISTÉRIO DA AGRICULTURA, 1984).

TABLE 1 – Quantitative distribution of the wood utilization in Brazil during 1980.

Utilization	Volume (Mm <sup>3</sup> )	Share (%)
All purpose	250.30	100
Energy	168.64	67
Others*	81.66	33

Mm<sup>3</sup> = millions of cubic meters

\* = includes wood as raw-material (BRASIL. MINISTÉRIO DA AGRICULTURA, 1984 e BRASIL. MINISTÉRIO DAS MINAS E ENERGIA, 1988).

TABLE 2 – The wood consumption for energy in Brazil in sector during 1987.

Sector	Wood volume consumed (Mm <sup>3</sup> )			%
	As fuelwood	As charcoal	Total	
Industry	32.53	29.03	61.56	36.4
Household	49.40	4.20	53.60	31.7
Agriculture	15.00	0.07	15.07	8.9
Charc. Manuf.	35.49	-	35.49	21.0
Others*	1.73	1.76	3.49	2.0
Total	134.15	35.06	169.21	100.0

Mm<sup>3</sup> = millions of cubic meters

\* = electricity generation, transport, losses, etc. (BRASIL. MINISTÉRIO DA AGRICULTURA, 1984).

In relation to the consumption of the wood in its natural form (fuelwood), the household shows the most important consumption, followed by the charcoal manufacture. In relation to the consumption of wood as charcoal, the industry occupies the first place.

It is important to observe that the sum of the two volumes of wood consumption related to the charcoal (charcoal manufacturing and charcoal consumption), results in 70.55

millions of cubic meters, or 41.7% of the total consumption of wood for energy in Brazil during the year.

The industry has been showing a significant increase in the wood energy consumption during the last years. This is the result of the programs on fuel oil substitution started in Brazil after the petroleum crisis. From 1979 to 1987 it happened an increase from 32.8 to 61.5 millions of cubic meters (87.5%) in this consumption.

### **SOURCES OF WOOD FOR ENERGY IN BRAZIL**

About 90% of the volume of wood consumed for energy in Brazil comes from the natural forest. The wood from the forest plantations represents 10%.

In the Southern and Southeastern regions are concentrated the most intensive agricultural development of the country. Since long time, the forests in areas of land occupation of these regions have been used to supply the wood energy requirements. But the forest area has been decreasing, due to the increase of land occupation destined to agricultural activity. This has been generating a serious problem in the offering of wood for energy.

Figure 3 shows the situation of offering wood for energy in Brazil. It is possible to observe that in the Southern, Southeastern and the major part of the Northeastern Regions the situation of offering wood is of penury. The population that uses the wood for energy does not have conditions to obtain it for its minimum necessities. In the Central Region and part of the Northeastern Region, the situation is considered critical and in the year 2000 the offering of wood for energy will be also lower than the necessities. The Northern Region exhibits a satisfactory situation of offering of wood for energy, but that Region is the less developed of the country, and consequently requires the lower quantity of energy.

Partially, the problems of offering wood for energy have been solved during the last 20 years through local reforestation, principally in the Southeastern. Chiefly in the Minas Gerais State it was planted near 1.2 million hectares of forests. There, it is concentrated an important reserve of iron, and consequently the most important Brazilian focus of charcoal consumption destined for siderurgy and metallurgy. Worried with the continuity of the wood offering, the industries of the sector have made efforts in the reforestation with **Eucalyptus** species, but the charcoal from this kind of forest represents only 22% of the total consumed. It is important to observe that the participation of the charcoal from **Eucalyptus** has increased along the time. In 1977 the participation represented only 10.5%.

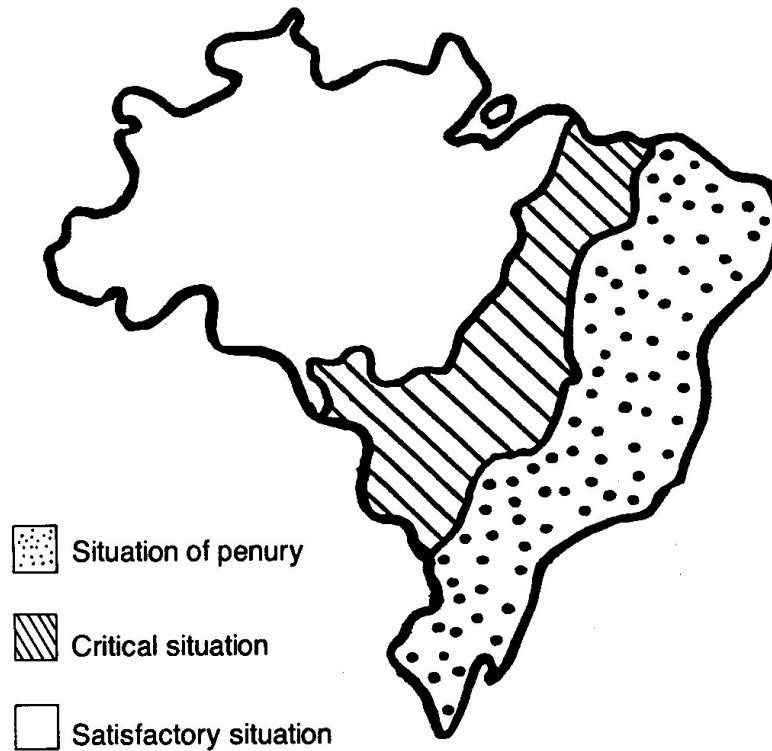


FIGURE 3 – Situation of offering wood for energy in Brazil in 1980. (FAO, 1981).

## CONCLUSIONS

The wood has been representing a very important energetical resource in Brazil, and after the petroleum crisis it arised new increases in the wood consumption. With the hydroelectricity crisis that maybe will be happening in Brazil in the next future years, certainly there will be additional increases in this consumption.

There is a big quantitative and economic aspect involved with the use of the wood for energy in the industry, and a very important social aspect related to the household utilization.

By the way, there is presently in Brazil a big discussion and a new conscience related to the ecological aspects of the forest resources utilization. In relation to the use of wood for energy, this discussion appears in the best moment. Only with the conscience that the forest resources need a new way of management it will be guaranteed the continuity of the offering wood. In this context it is crucial to establish an emergencial national forest planning and to render concret forest programs of wood supplies for energy. It is necessary to change the ways of land explotation where the natural forests exist, and only to permit this activity throught a well established program of management that includes the conservation of the forests stands; it is necessary to create new resources by plantations of fast growing trees, chiefly in small and middlesize rural properties, and finally, it is

necessary to improve the techniques and equipments of wood conversion to energy, and to give incentive to the development of new concepts of wood energy utilization.

### **REFERENCES**

**BRASIL. MINISTÉRIO DA AGRICULTURA. Proposta para utilização de florestas e resíduos agrícolas.** Piracicaba, 1984. 164p.

**BRASIL. MINISTÉRIO DAS MINAS E ENERGIA. Balanço energético nacional.** Brasília, 1988. 136p.

**FAO. Map of the fuelwood situation in developing countries.** Rome, 1981. 1v.