AGROFORESTRY AND WOODFUEL PRODUCTION: SOME DATA FROM AGROFORESTRY SYSTEMS IN AFRICA

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Introduction

In the past, fuelwood production played an important economic role in European agroforestry systems (AFS), as was the case in the Cevennes in southern France. Wood pruned or pollarded from chestnut, ash and fruit trees was used for heating and cooking. Very little data have been published on the quantities of wood that were produced, but p.c. indicate values of about 2.4 t/ha/year. In many African countries, farmers harvest most of their fuelwood in their own fields and pastures. Yet although numerous studies have been conducted, few figures have been published about the actual productivity of African AFS.

With the support of WB, AFD and FFEM, projects are developing wood energy master plans to supply African cities. Researchers are being asked to provide figures to estimate fuelwood production in the anthropized areas which cover most of these cities’ supply basins. CIRAD and its partners have conducted a number of studies that provide an initial assessment of the productivity of AFS in Africa.

Material and methods

In many African countries, CIRAD has helped introduce an innovation which involves planting fallow land with leguminous trees to improve slash-and-burn systems, restoring the fertility of degraded land and limiting forest clearing by farmers while increasing the production of wood energy.

In northern Cameroon, traditional agroforestry systems have been renovated through Assisted Natural Regeneration (ANR). To enable diverse productions (tree fodder, fuelwood, shea fruit, and Faidherbia pods) while limiting shade over crops, livestock owners and tree owners came to an agreement that pollarding would take place on a rotating basis every eight years.

This research may also inspire scientists working in other systems for the supply of wood energy to African populations. For a density of 30 mature trees/ha, the fuelwood productivity has been estimated at 1.07 t/ha/year.

In the past, fuelwood production was calculated as 0.043 €/m³. In 2005, the price of pollarded wood is 0.043 €/m³.

Logged plantations of Acacia senegal to produce fuelwood before planting corn, North Cameroon

Results

In Ngong (northern Cameroon), fallow was improved by planting Acacia senegal on ferruginous alluvial soils with 900 mm/year of rainfall. At the end of 15 years, the production of wood energy was 2.74 t/ha/year (€73/ha/year). In Mampi, Bateke plateau (DR Congo), fallow was improved by planting Acacia auriculiformis on thick sandy soils, with 1,400 mm/year of rainfall. The average production of wood energy was 10 t/ha/year.

Logging planted tree fallows

In N'gang (northern Cameroon), Acacia senegal was pollarded with a high density of trees. Near N’gang (see above), shea tree (Vitellaria paradoxa) parkland pruning is done late in the dry season to provide additional feed for livestock. For a density of 30 mature trees/ha, the fuelwood productivity has been estimated at 1.07 t/ha/year.

A large Faidherbia albida parkland is located to the east of the city of Maroua. The soils are alluvial and ferruginous, rainfall is 600 mm/year. Trees which retain their foliage throughout the dry season are pollarded to provide a nutritional supplement for livestock. For a density of 30 mature trees/ha, fuelwood production was estimated at 3 t/ha/year.

In the fuelwood supply basin of Zinder, the surface of agroforestry areas was estimated to be 5,108,237 ha. The calculated production of pollarded wood is 0.043 t/ha/year, i.e., at the basin scale, 217,444 t/year (sold at a retail price of €100/t), representing 54% of the wood energy produced in the region.

Logging a plantation of Faidherbia albida due to lack of fuelwood, North Cameroon

Discussion

In addition to traditional studies of AFS, which often focus on their agricultural and pastoral productivity or their environmental services, it would be desirable to launch more research on their wood energy productivity.

This would help to better understand the interests of farmers, devise more productive and profitable systems, and orientate the energy policies of the South. This research may also inspire scientists working in the North, where the use of wood energy is becoming increasingly topical and where data on the wood energy production of agroforestry systems are very rare.

This set of data on the productivity of AFS is a first step forward. The data clearly show the socio-economic importance of these systems for the supply of wood energy to African populations.

Conclusion

However, precise production figures remain elusive as studies have been carried out either on small plots or over large surface areas on the basis of limited inventories.

Harvesting cassava grown after fallow planted with Acacia auriculiformis, D.R. Congo

References


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