São Paulo School of Advanced Science on Scenarios and Modelling on Biodiversity and Ecosystem Services to Support Human Well-Being

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Why the sustainable management of food tree species is a great challenge for human well being?

Climate change and human pressure on forest resources are responsible for ecosystem degradation and the loss of biodiversity, compromising the long term availability of ecosystem services. In West Africa, recurrent drougts and floods due to climate change cause important crop losses. In this context, food tree species (FTS) play a significant role for income generating and food supplying that increased due to high demographic growth. Therefore, FTS are subjected to high human pressure for leaves, flowers, and fruits/seeds harvesting. This pressure is expressed by overharvesting and the use of destructive methods for harvesting such as uncontrolled branch pruning, tree cutting and harvest of immature fruits. These practices contribute to habitat degradation, cause a problem of regeneration and lead many species to be vulnerable or endangered. Therefore, developing sustainable use strategies is strongly needed to ensure both species and habitat conservation. The following projects are proposed to develop decision tools to support sustainable use of FTS.

Recent research projects and topics

P1: Assessment of production and economic potential of FTS

- ❑ allometric models to estimate fruit and foliage production of FTS
- ❑ impact of uncontrolled branch pruning on fruit/seed production of FTS
- ❑ economic value of FTS based on their production and market data

P2: Modelling of food tree species distribution

- ❑ effects of climate change and land use dynamics on their diversity and abundance
- ❑ effects of climate change and land use dynamics on their phenology

P3: People awareness

- ❑ understand local perception on methods used for product harvesting
- ❑ identify local exploitation strategies securing species conservation

Fruiting branches of Vitellaria paradoxa

Harvested immature fruits of V. paradoxa

Branches of T. indica pruned for fruits harvesting

Branches of Baobab pruned for leaves harvesting

Main current and planned research topics

The topics of the project 2 are the main planned research themes. Three main reasons support these topics: (i) local people highly depends on FTS for their socio-economic well being, (ii) FTS provide important ecosystem services (soil fertilization, carbon sequestration, food production etc.) and (iii) populations of many FTS are in decline due to overexploitation and climate change. Their decline compromises the supply of their ecosystem services. The sustainable use of FTS are become great challenges in West Africa. What can be done today to ensure their conservation? It is important to examine how climate change and land use dynamics affect diversity, abundance and phenology of FTS by using scenarios and models to support decision making regarding species management. Modelling on diversity and abundance of species is poorly studied in West Africa.

Selling of the fuits of V. paradoxa

Selling of the fruits of Saba senegalenis

Selling of the fruits of Tamarindus indica

Fruits source of resources for bees

Shea trees are habitats for insects

Expectations and suggestions

I need capacity building about theorical and technical aspects in scenarios and modelling on biodiversity and ecosystem services to improve my research works in terms of data collection and analysis. I wish to integrate the network group of experts working in similar areas for permanent collaboration to build my professional career.

Leaves of V. paradoxa used to fortilize degraded lands

Partners supporting my projects

LUX DEV · AMBASSADE DE SUEDE · IFS · INTERNATIONAL FOUNDATION FOR SCIENCE · The Rufford Foundation

Impact of branch pruning on savanna ecosystems and associated services in Burkina Faso

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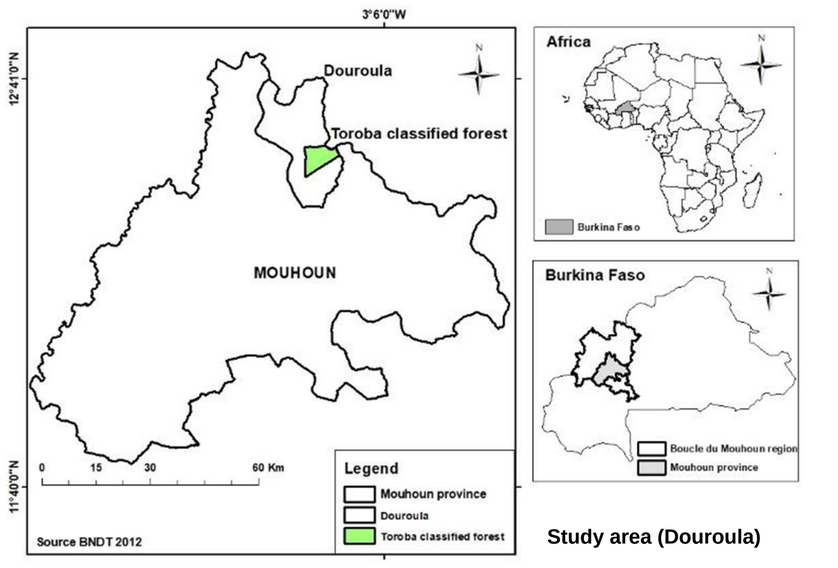
❑ Introduction

Fruits and leaves of many plant species are highly harvested and used as food, medicine, forage and for income generating. Impoverishment and food crisis increased the use of destructive methods (branch pruning) for fast harvesting, which significantly contribute to habitat degradation, reduction of productivity and difficulties in natural regeneration of species.

Tree of Pterocarpus erinaceus heavy pruned

❑ Methods

Measurement of pruned crown area at 900 m² plot level. Assessment of foliage and fruit production in *Pterocarpus erinaceus* and *Lannea microcarpa* respectively, according to pruning degree of trees.



Study area (Douroula)

❑ Impact of branch pruning

❖ *Habitat degradation*

Reduction of land cover at 90,45 m² /ha

Tree of Bombax costatum completely pruned

Repeated pruning of Pterocarpus erinaceus

❖ *Foliage production of Pterocarpus erinaceus*

The potential foliage biomass estimated at 15.54 kg per tree is reduced by 5.76 kg for trees pruned last years

❖ *Fruit production of Lannea microcarpa*

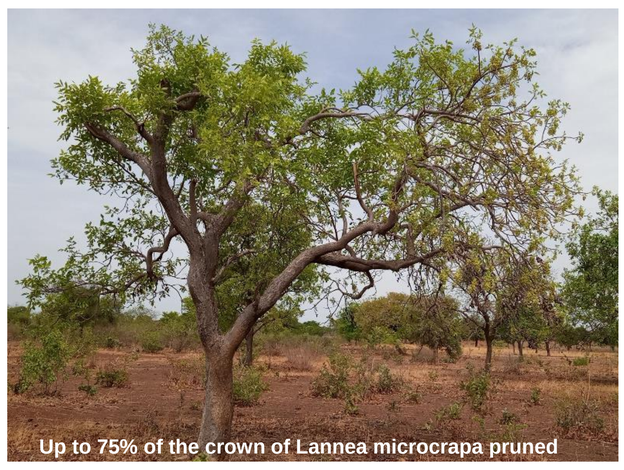
The potential fruit biomass estimated at 82.18 kg per tree is reduced by 19.99 kg for trees pruned last years

❖ *Income from fruit production of Lannea microcarpa*

Income loss related to branch pruning is estimated at 4.19 USD (2532.71 F CFA) per tree on local markets and 8.59 USD (5173.91 F CFA) on urban markets

Fruits of Lannea microcarpa selling on market

Leafy twigs pruned for livestock feeding at home



Up to 75% of the crown of Lannea microcrapa pruned

Up to 25% of the crown of Tamarindus indica pruned

Tree of Adansonia digitata completely pruned

❑ Recommendations

❖ Cutting of leafy and fruiting twigs for harvesting instead of large branch pruning to enable fast renewal of branches

❖ Promoting of the use of pole for fruit harvesting instead of branch pruning

❖ Avoid integral harvesting of fruits on trees to build seed bank for species regeneration

Outreach communication workshop with local community

Douroula, 01 April 2022, Dédougou, Burkina Faso

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