

Agroforestry tree species for dryland Sahel

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Introduction

The Sahel is a transitional zone between the arid Sahara and the tropical green forest bordering the maritime coast. Climate and rainfall variability, land degradation and desertification are among the most important obstacles to the achievement of food security and poverty reduction. Sustainable agriculture innovations, up and out-scaling of research results, and efficient policies are key elements towards the re-greening of the Sahel and ensuring impacts on livelihoods of rural poor communities. Therefore information on the domestication of tree crops (Fig 1), fruit (Fig 2), vegetable (Fig 3), fodder and medicinal trees for agroforests is important for poverty alleviation in the Sahel.



Fig. 1 Farmer assisted regeneration of *Faidherbia albida* parkland system, Niger



Fig. 2 Agroforestry fruit tree products



Fig. 3 Baobab *Adansonia digitata* vegetable garden

Objective

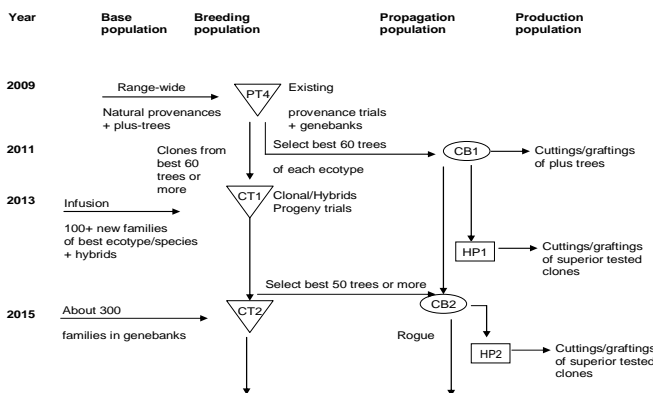
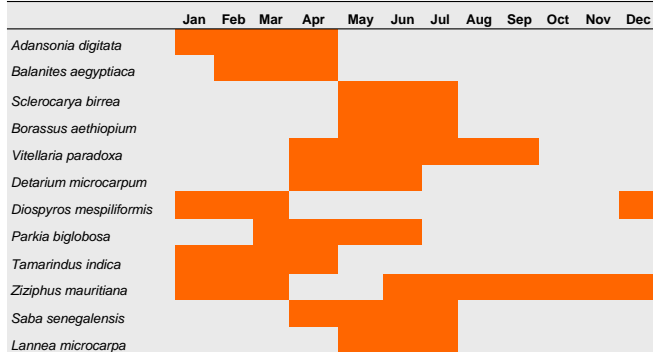
This study gives an overview of existing information and some of the progress made on the domestication and management on-farm of key tree species for the Sahel.

Materials and Methods

- Participatory tree domestication for species evaluation, productivity and adaptability to prevailing conditions.
- Field evaluation of introduced species, selection and breeding of key indigenous tree species under the harsh growing conditions of the Sahel.
- Tree farming for fruit and vegetable: baobab *Adansonia digitata*, tamarind *Tamarindus indica*, shea tree *Vitellaria paradoxa* and ber *Ziziphus mauritiana*; for fodder: *Faidherbia albida*, *Guiera senegalensis*, *Piliostigma reticulatum*, *Prosopis africana* and *Pterocarpus* species.

Collection, *in-situ* and *ex-situ* conservation of genetic resources for further improvement.

Fig. 4 Fruit maturation phenology for 10 priority local fruit tree species in the West Africa Sahel



CB: Clone bank; CT: clonal trial; HP: Hedge plants
Fig. 5 Breeding strategy for *Ziziphus mauritiana*

Results and Discussion

In the Sahel, indigenous woody plants function as reserves that ensure the continued existence of people and livestock throughout the long dry season, when stored crops and grazing grasses are lacking. Agroforestry tree domestication is enhancing cultivation of indigenous species by smallholder farmers. Through new introductions, selection and breeding, enormous gains (Tab. 1) in productivity are being achieved.

Tab. 1 Fruit production of key accessions of ber cultivated in the Sahel

Accessions	Fruit production kg tree ⁻¹	No. fruits kg ⁻¹
Senegal	7	2100
Umrn, India	21	25
Gola, India	26	22
Sotubata, India	28	25
Thailand 7	25	28
Thailand 4	30	32
Thailand 9	36	15
Thailand 8	38	16
Thailand 6	40	21

In the Sahel, fruit consumption is currently limited by seasonal availability. However, if the right combination of species was promoted for cultivation, fruits could be produced throughout most of the year (Fig 4). This would be beneficial for consumers, producers and processors.

Most indigenous trees are able to regenerate naturally on-farm but need farmers' efforts in protecting young trees against depletion by animals (Fig 1) and human mismanagement. Thus tree cultivation techniques and management are being developed through participatory domestication involving fruit tree breeding (e.g. ber and tamarind – Fig 5) the evaluation of performance, adaptability and productivity.

Tree domestication, mainly fruit and vegetable trees, agroforests and fodder trees are important in combating desertification, contributing to food security and alleviating rural poverty. However, the availability of a reliable source of high genetic quality and productive material for propagation remains a key problem for promoting local fruit trees in the West African Sahel.

Conclusions

Indigenous tree species, once domesticated, are useful not only in enhancing livelihoods of the rural poor population but also for combating desertification.

References

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