

Reducing of malnutrition through the food supplements from native tree species in Sub-Saharan Africa

OBJECTIFS

The overall developmental objective of TREEFOOD is to contribute to food security and the fight against malnutrition through improved sustainable management and use of a selected number of edible tree/shrub species. The overall research objectives are : i) Make a literature review and inventory local knowledge and practices on native edible tree/shrub species and products ; ii) Assess/characterize biochemical compounds and nutritional value of native edible tree/shrub products ; iii) Analyze and develop value chains and improve marketing and processing of selected edible tree/shrub products for longer shelf life and improved nutritional quality ; iv) Develop locally adapted domestication of high-potential native edible tree/shrub species ; v) Strengthen institutional and innovation capacity of local communities. This project is based on Sustainable agro-food processing for more sustainable and healthy diets. Its objectives are to achieve the following goals of the initiative which are three-fold: (1) To advance understanding of food systems sustainability; (2) To facilitate the emergence of excellent, new and potentially high-impact research; and (3) To generate leverage effect that encourages new collaboration across disciplines and across diverse stakeholders. The main scientific hypotheses or questions are:

- ▶ Sub-Saharan Africa cannot meet its food needs due to its exponential growth rate;
- ▶ Local forest species used in the fight against malnutrition are not widely available;
- ▶ Diets of higher income groups are more diversified than those of the lower income group;
- ▶ Diets based on non-timber forest products are low in vitamins, minerals and trace elements;
- ▶ Diversification of food resources is needed in sub-Saharan Africa.

ACTIONS

The project was carried out in Southern Sahara four countries (Benin, Burkina Faso, Mali, Niger) in collaboration with two European countries (Belgium, Denmark). Its realization required the synergy of actions that were initiated by research institutes (IER-Mali, INRAN-Niger) and universities (UAC-Benin, UJKZ-Burkina Faso, UA-Denmark, Ugent-Belgium). The researchers involved have more than 20 years of experience and belong to several disciplines (forest management, agroforestry, nutrition, biometry, plant improvement, ethnobotany, agro-economics, rural sociology).

The research approach was focused on a holistic approach with high rural community participation from the four African countries. This holistic approach allowed the sustainable development use and conservation of a number of local

RESULTATS

As results, the project has identified 6 priority species in the fight against malnutrition in the four African countries among which 2 species have been selected per country for the research activities of the project. These are: *Adansonia digitata* et *Irvingia gabonensis* in Benin; *Saba senegalensis* et *Ziziphus mauritiana* in Burkina Faso ; *Balanites aegyptiaca* et *Ziziphus mauritiana* in Niger ; *Saba senegalensis* et *Borassus aethiopicum* in Mali. These six species were documented in the areas of consumption, conservation as well as the constraints of their use in human food. In addition to a synthetic document on the biochemical composition of West African forest species, the work showed that these 6 species are rich in vitamins, minerals and trace elements and can be used as fortifying, energetic and nutritional. To strengthen the capacity of women of reproductive age and to improve the growth of children under 5 years of age, traditional dishes enriched with the edible parts of the six species showed potential for tackling malnutrition. It's the case of Mutchayan (fermented cereal porridge enriched with baobab fruit pulp), the *Cochlospermum tinctorium* root powder, the *A. digitata* fruit pulp and *Moringa oleifera* leaf powder, the *S. senegalensis* juice and millet porridge, the *B. aethiopicum* juice and maize porridge, the *Z. mauritiana* cookie. To valorize these practices, the characterization and mapping of the value chains of the edible parts of the selected species by country showed that: i) women are the main collectors; the activity of harvesting edible organs is economically profitable; iii) semi-industrial processing of the edible parts of the selected species has started. All these results must be sustained by the availability of the resource. The profitability indicators showed that the collect/harvesting of these species is a profitable activity in the four African countries. Therefore, high regeneration potential was found for *I. gabonensis* in Benin, *B. aegyptiaca* and *Z. mauritiana* in Niger, *Z. mauritiana* in Burkina Faso, *S. senegalensis* in Burkina Faso and Mali. Among these 6 species, some are suitable for grafting and aerial layering which are low cost domestication techniques. The platforms set up enjoyed capacity building actions in the areas of regeneration and vegetative propagation, training on the juice value chains, nutrition health and capacity building, promotion of non-timber forest product. Recipes for improved iron-rich child food based on *A. digitata* were developed.

PERSPECTIVES

New research questions arising from the project (in terms of knowledge needs, practices, methodology...)

Should we formalize innovation platforms?

In what form should food supplements fortified with NTFPs be presented?

What strategy should be developed to better sensitize political decision-makers?