

# Village Botanic gardens as a tool for preserving plant diversity and indigenous knowledge on a local scale in Benin and Burkina Faso

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## Background

In most West-African regions, phytodiversity is under great threat due to increasing human impact and changing climatic conditions. The widespread savannah ecosystems are subject to an increasingly intensive land use (rising cultivation of cash-crops, especially cotton, general extension of agricultural areas, stronger pasture pressure on the remaining areas). In this changing environment, numerous plant species are becoming noticeably rare, and this shortage of species used in traditional medicine may jeopardise the local traditional health systems.

## Creation of a network of local botanic gardens

During several ethnobotanical surveys on the utilisation of plants, conducted since 1999 in Northern Benin, it appeared that the local populations were aware of this problem, and they expressed a need to take measures. Together with these villagers the concept of several local botanical gardens was developed in order to conserve species richness as well as the traditional knowledge linked to numerous threatened species.

The aims of this garden initiative have been elaborated conjointly by villagers and scientists and are as follows:

- Conservation of phytodiversity (*in situ* and *ex situ*): Botanical inventory and monitoring; protection of threatened species, including the possibility to reintroduce rare or locally extinct species. The creation of seed banks is also part of the conservation measures.
- Conservation of traditional knowledge by documentation of all kinds of traditional plant uses, especially medical use.
- Establishment of training facilities, in order to promote the economic value, and the transmission (in some cases the revival) of traditional plant knowledge to younger generations.
- Using the garden as a tool and a resource for environmental education, i.e. for school children, students, non-governmental organisations (NGO), local, national and international public.
- Protection of natural resources by sustainable production of the plants used in traditional medicine.
- Creation of new income possibilities for the local populations.

- Improvement of the state of knowledge of biodiversity dynamics in utilised and protected areas by long term monitoring, leading to development of management plans.
- Establishment of permanent test sites designated for research on sustainable utilisation methods and the reintroduction of threatened species, at the same time promoting awareness amongst the population.
- (The latter two activities are conducted in cooperation with the universities of Frankfurt (BIOTA-project) and Abomey-Calavi (Cotonou)

These aims correspond to the recommendations of the *Guidelines on the Conservation of Medical Plants* (WHO/IUCN/WWF 1993).



Fig.1: The botanic gardens (BG) in Benin and Burkina Faso composing the network (Koungarou, Gnarou, Nassou and Dakererou, close to Guson, are newly protected areas, where the activities have only just begun)

## Papatia

In 2001, the first garden has been established in the north of Benin, near the village of Papatia (fig.1). A species-rich savannah area which had not been cultivated for many years due to its poor soil has been protected from all further human impact. This area has been donated to the newly created garden committee in perpetuity by the local king.

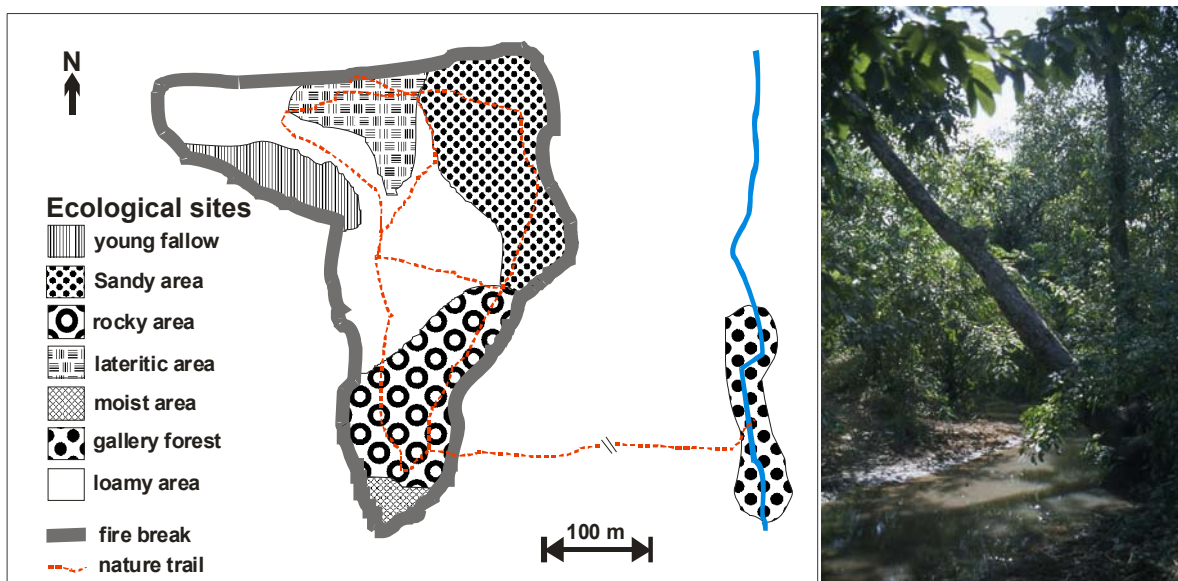


Fig. 2: The core zone and the gallery forest at the Papatia Botanic garden.

The Botanic Garden of Papatia contains more than a hundred woody plants and several hundreds of herbaceous species. It is composed of a totally protected core zone (about 5 ha, Fig. 2, 3), surrounded by a 10 m wide fire break (Fig. 4) and a thorny *Acacia* hedge to prevent the intrusion of cattle. The core zone includes various ecological sites, such as a young fallow, sandy, rocky, lateritic, moist and loamy areas (Fig. 2). In this way, all the different site types of the region are represented. Wood-cutting, pasture, hunting and bush-fires are now forbidden in this core zone, in order to enable natural growth without any human influence. In the surrounding 9 ha buffer zone, moderate pasture is allowed and annual early fires (at the end of the rainy season) are lit as a protection measure. They help to avoid the more destructive accidental bush fires in the late dry season.



Fig. 3 and 4: The dense core zone and the fire break.

The garden features the necessary educational infrastructure (nature trail, information centre, herbarium, trained guides) to facilitate field visits and permit the sensitisation of visitors (pupils, students, tourists, villagers). Already in the year following the foundation, educational workshops about environmental issues and traditional medicine have been held. These facilities have been set up by the members of the garden committee themselves, the (surprisingly low) costs being covered by a project of the University of Frankfurt and a private donor.

In 2002, a nearby gallery-forest could be added to the garden (*Fig.2*): The biodiversity of such water-accompanying formations is particularly high and nowadays particularly threatened.

In the same year, a tree-nursery was created in order to multiply rare species for distribution and to reintroduce them into the garden. Permanent plots in the core zone have been established for a long term monitoring of vegetation dynamics under such protected conditions.

In 2005, with the financial assistance of the IUCN, the project *Ecole Baobab* was initiated, which enabled the foundation of an environmental education centre aiming at the ecological sensitization of the whole region's population. Since the support ended 2006, the garden committee is looking for new funding to ensure that the actual achievements will persist and continue to progress. At present, the garden receipts are far from being sufficiently high to finance the educational activities.

Additional garden activities:

- tree nursery: multiplying threatened local species, but also selling highly demanded exotic fruit trees like cashew nut and mango tree. This is an important source of additional income for the population, just as the
- beekeeping in the garden core zone for honey production, the
- creation of a traditional pharmacy and the
- foundation of a women's group for market orientated vegetable gardening, made possible by a new well.
- Eco-tourism is planned to be integrated in the garden programme in the future.

These additional income possibilities appeared to be a very important, if not essential condition for a long term garden-existence.

For a more detailed description of the Papatia garden, see Krohmer et al. (2006).

## **Gusõn**

The example of Papatia strengthened an association of traditional healers at Gusõn in the region of Pehunco (*Fig. 1*), who were also worried about the ongoing decline of traditional medicinal plant species, in their idea to create their own botanic garden: They put a 40 ha territory under permanent protection, located on two hills and therefore not agriculturally used. Its main aim is to guarantee the continuity of the local traditional medicine, by the protection of the used plant species and the knowledge linked to them. To achieve this aim, an action programme quite similar to that of Papatia is currently put into practice. As an additional and very effective instrument for environmental sensitization, the Gusõn garden committee produces radio transmissions that focus on traditional knowledge, biodiversity, ecology and so on, which are broadcasted twice a week and reach a wide audience in the region.

## **The other network gardens**

Currently, five other protected areas in different implementation states joined the network: the Botanic Garden of Kouandé, the sacred forest of Nassou, the municipal forest of Dakererou and the protected areas of Koungarou and Gnarou (*Fig.1*). An international cooperation with the Medicinal Plant Garden of Dano, situated in the neighbouring country Burkina Faso (*Fig.1*), has also been initiated. This garden is located in the same vegetation zone as those of the Northern Benin network.

## Cooperation between the network member gardens

The network gardens already exchange management know-how and their experiences concerning education and sensitisation methods. All gardens will soon benefit from the possibility of exchanging plant and seed material, to enrich their local collections and to reintroduce species that may have been already extinguished locally, but have important medical properties. A regional traditional healer's network will allow its members to exchange knowledge and remedies to help the traditional medicine compete better with the modern medical system. An increasing esteem for traditional medicine can already be noticed in the places where the first gardens had been implemented.

## Conclusions

Up to now, there have been many positive side-effects of the botanic gardens for the local communities, most notably an increasing ecological awareness in the respective villages and their neighbourhood. These projects demonstrate the efficiency of sustainable, participatory-based management of plant resources and traditional knowledge at a local scale.

Two points are to be specially emphasised here:

*In addition* to the ecological and geographical requirements necessary for the creation of such a botanic garden, the following *social conditions* proved to be necessary to guarantee the long-term existence:

- Integration of all local stakeholder groups in the garden-planning, especially the different ethnic groups present in the region and all those who may eventually be affected by the protection measures, in order to avoid local conflicts.
- Integration of traditional (e.g. council of the elders) *and* modern authorities.
- Sensitisation, by means of workshops, excursions etc., of all villagers affected directly by exploitation restrictions.

Community-elaborated code of conduct, the protection measures being agreed by *all* members of the local community.

*Consider the* necessity to develop income generating activities for the population which are closely linked to the garden; so each and everyone will be eager to contribute to its long term success.

## What can be concluded from the Benin experience?

- Have a close look: In many places, people already preserve their environment: Look for sites like holy groves, sacred forest, fetish places and other traditionally protected sites, as well as for sites that are not or little used for agriculture as starting point for such activities. They may be especially well-suited as starting-points for local botanic gardens.
- Go to the roots: Ask the local populations about their perceptions of environmental changes and discuss with them their ideas of remedies and measures to be taken: you will admire their creativity and energy and realize that you are preaching to the already converted.
- Think not to big: In countries like Benin and Burkina Faso, small projects often reveal to be more efficient than big ones; with little money, a lot can be done.

## References

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