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**To Plant or Not to Plant? – Considering the Cultural Context of Adoptive Transplantation of Baobab (*Adansonia digitata* L.) and Tamarind (*Tamarindus indica* L.) in West Africa**

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**Abstract**

The availability of wild plants that have traditionally been collected in West Africa is decreasing. To secure future access to multipurpose indigenous fruit trees, local farmers need to decide which wild plant species they may want to start cultivating in their fields and agroforestry systems. This process is called ‘adoptive transplantation’ (Hildebrand, 2003). A regional ethnobotanical study on the traditional use and management of baobab (*Adansonia digitata* L.) and tamarind (*Tamarindus indica* L.) trees was undertaken to highlight the cultural context of adoptive transplantation. This research aims to identify the farmers’ perspectives and motives that lead to or prevent the adoptive transplantation of these two species. 220 individual interviews were conducted with 11 ethnic groups in Benin, Mali and Senegal covering 4 agroecological zones. Methods include structured questionnaires, group discussions and participatory mappings. This regional study highlights that it is not a lack of knowledge on planting techniques, but rather underlying cultural reasons that prevent the farmers from planting indigenous fruit trees. Local cultural belief systems are key elements in the farmers’ decision- making processes and need to be considered by development agencies and forestry institutions intending to establish sustainable reforestation and in-situ conservation programs.

**Introduction**

In West Africa indigenous fruit trees, such as baobab (B) and tamarind (T), play an important role in local diets and are used intensively by rural communities. B&T grow on communal lands, in the ‘bush’ or on privately owned fields. In the past many wild seedlings could grow undisturbed and mature into fruit bearing trees. But irregular and sparse rainy seasons, desertification and population growth increasingly strain Sahelian parklands and local agroforestry systems as access to arable land and water diminishes (Kandji et al., 2006). Continuous clearing of tree seedlings as well as unsustainable harvest techniques of mature trees reduce the number of fruit bearing trees and increase pressure on the remaining tree populations. Local farmers are aware of the decrease in availability of such highly valued and locally used trees, but B&T are not actively propagated and/or transplanted. Traditional planting techniques of B&T are rarely mentioned in the literature. Whereas literature suggests that local farmers in West Africa do not have a tradition to plant trees (Kristensen and Lykke, 2003) and that indigenous planting techniques have not been developed in the Sahel (ICRAF, 2003), it is not uncommon that exotic trees are planted (Gijsbers et al., 1994).

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## Methods

This research forms part of ongoing research within the ‘Domestication and Development of Baobab and Tamarind’ (DADOBAT<sup>1</sup>) project. 220 individual interviews were conducted with 11 ethnic groups in Benin (Idatcha, Dendi, Gourmantché, Nagot, Fulani<sup>2</sup>), Mali (Dogon, Sénoufo, Fulani) and Senegal (Serer, Wolof, Fulani) covering 4 agroecological zones (Soudano-Guinean, Soudanean, Soudano-Sahelian, Sahelian). A stratified purposeful sample (Bernard 2006) was used with the strata ethnic group and sex. In each ethnic group 10 women and 10 men were interviewed on cultivation, management and uses of B&T using a structured questionnaire. Group discussions, agricultural calendars and participatory community mapping informed the research about village structures, daily life, local planting seasons, main food crops, as well as access to local resources. Local informants participated and provided information on a voluntary basis and only after educated prior informed consent. An intensive literature review was undertaken comprising 284 articles on the ethnobotany of B&T accessed through online catalogues of relevant institutions and via e-journal consortia.

## Results and Discussion

Baobab and tamarind leaves and fruits are used daily in the subsistence of rural West Africans. We recorded 300 different uses (consumption, medicine, ethnoveterinary, construction, spiritual and other uses) for all B plant parts and 250 different uses for T. Of all informants (n=220) 75% and 65 % stated that the food use of B&T respectively is the main reason for the trees’ local importance. In addition, all parts of the trees are used medicinally, and we documented 179 different medicinal applications for B and 184 for T. Being such useful indigenous trees we expected to find local farmers actively planting trees in order to secure future access a vital food source for the farmers’ families. But in the field as well as in the literature, the planting of B&T are rarely mentioned. In the T literature, the prevalent notion on the status of the tamarind in Africa is that of a tree growing wild (e.g. Jama et al., 2008; Mukadasi and Nabalegwa, 2007; Nordeide et al., 1996; Robinson, 2006; Tabuti et al., 2003) and receiving little or no tenure (El-Siddig et al., 1999). There are a few records mentioning that planting of tamarinds occurs in Tanzania (Hines and Eckman, 1993), in Cameroon (Tchiegang-Megueni et al., 2001), in the Sahelian zone (Le Houérou, 1979) and in the Soudano-Sahelian zone (Dupriez and Leener, 1993). In most reviews about baobab (Sidibé and Williams, 2002; Wickens and Lowe, 2008) technical instructions for modern vegetative and generative propagation techniques are documented, but only few publications, all concerning Mali, report of traditional management techniques of baobab (Dhillion and Gustad, 2004; Savard, 2003; Savard et al., 2006; Sidibé et al., 1996; Sidibé and Williams, 2002). Out of 285 articles on the general ethnobotany of B&T, only 83 include information on traditional tree management. Of these 83, only 10 articles report traditional propagation techniques (6 for B and 4 for T). Our field research confirmed the impression that these trees are rarely propagated or transplanted, but not for a lack of technical knowledge. Within our sample of 220 informants in Benin, Mali and Senegal, 88% know how to plant a tree and have planted trees in the past. However, only 12% and 10% of informants stated having planted B and/or T respectively. No vegetative propagation was stated in the interviews and B&T were preferably multiplied by seed (16% of informants) than by transplanting wild seedlings (10%). How can the neglect of the cultivation of such useful indigenous trees be

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<sup>2</sup> The Fulani took part in the research in all three countries. Since migration and subsequent adaptation to different local ecosystems is expected to result in different knowledge systems, these three Fulani groups are therefore regarded as three different ethnic groups in this ethnobotanical research and are thus counted three times.

explained? The underlying reasons can be found in local belief systems, such as mythical beliefs about the reproduction of the species (Lamien et al., 1996). When asked about reasons that prevent the farmers from cultivating B&T, most answered that they simply have 'no tradition' to do so (B:35%, T:32%, n=220). In addition, B&T are considered wild trees that belong to the bush and have always grown there without human help (B:34%, T:33%). Existing tree populations are being perceived as sufficient with no need for further multiplying by 14% (B) and 16% (T) of informants. Some female respondents stated that only the men are allowed to plant trees. Another argument against planting B&T is that the same planting space may be dedicated to commercially used trees. However, this reason has only been stated by 5% of informants. Some farmers explain that they have inherited the trees from their ancestors or God, thus consider this heritage to be lasting so that their children will also inherit the trees without the need for planting (5%). In addition to these rather 'technical' answers, more 'hidden' emic reasons on why informants haven't planted B&T were revealed through informal discussion during the ethnobotanical fieldwork. These were reasons shaped by local belief systems, referring to tree spirits and taboos, and their influence on use and management of B&T. Many farmers seem to be deterred from planting B&T because the trees are associated with spirits, ceremonies and taboos. Ceremonies (B:25%, T:14%), spirits (B:42%, T:37%) and taboos (B:22%, T:19%) that are directly related to the use, access and harvest techniques need to be taken into consideration. These emic and traditional perspectives mostly concern indigenous trees and only partly relate to non-indigenous trees, which could be one explanation on why exotic trees are planted whereas indigenous trees are not. More 'bad' (malevolent) than 'good' (benevolent) spirits are associated with both B (55 and 40 mentions respectively) and T (50 and 26 respectively). The presence of bad spirits is often identified by elderly people and healers, but also by farmers, and then reported to the whole community along with spirit-related harvest restrictions. These specific harvest restrictions limit access to certain plant parts, at a certain time, for a defined group of people. For example no one may harvest except elderly men at 5am in the morning. The presence of bad spirits may also limit general access to the tree. The fear of having to live next to bad spirits may also prevent people from planting B&T close to their house. Considering these emic perceptions, planting would be a waste of time, effort and valuable space, when the planted trees may not be used due to the occupation of a spirit. Communities are guided and informed about a particular tree's management, through visible signs, such as piles of stones and/or sticks, a certain coloured (e.g. white) cloth or animal parts (e.g. goat horns), which are placed next to, or in the tree. It is generally acknowledged that spirits tend to inhabit old and large trees. This preference of the spirits to primarily move into old trees, provides a loop hole to develop a domestication strategy, that is not contradicting local belief systems. One elderly Sénoufo woman in Mali, for example, has created her own baobab orchard right beside her house to secure easy access to baobab leaves for daily subsistence. She needs to prepare baobab leaf sauce for 14 household members, but is too old to climb baobab trees in order to harvest the leaves. Therefore her orchard includes young trees only, and the largest ones are removed when the crown height surpasses approximately 2,50m. She continually cares for younger seedlings to secure future access to young baobab trees. A similar strategy of a baobab bonsai garden has also been tested by the World Agroforestry Centre in Mali (ICRAF, 2003). It presents a solution that would reduce leaf harvest of mature baobab trees and increase fruit production currently disturbed by rough leaf harvesting techniques. Furthermore local farmers may be more inclined to plant a baobab if it is kept in 'Bonsai' size, as spirits 'tend to live in very large trees', as stated by informants in all three research countries. There may be less taboos and harvest restrictions on those trees that are cultivated as garden plants.

## **Conclusion**

This regional study confirms that, albeit their local importance, B&T are rarely planted. It is highlighted that it is not the lack of knowledge on planting techniques, but rather underlying

cultural reasons that prevent the farmers from planting indigenous fruit trees. The traditional use and management of B&T and associated local belief systems need to be considered by development agencies and forestry institutions intending to establish sustainable reforestation and in-situ conservation programs. Innovative concepts need to be elaborated together with the local population.

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