

**CONSERVATION OF MUSHROOMS AS NON-TIMBER FOREST PRODUCTS OF
ECONOMIC IMPORTANCE AND THEIR BENEFITS TO COMMUNITIES AROUND
THE BUI NATIONAL PARK OF GHANA**



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AUGUST, 2010

Title: Conservation of mushrooms as Non-Timber Forest Products of economic importance and their benefits to communities around the Bui National Park of Ghana.

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Start Date: August, 2010

Abstract of Report

The Bui National Park covers an area of about 1,821km² and is situated in the centre-west of the country. The communities around the Park consist of native Banda and Nafara as well as settler Ewe and Wassa among others; they are mainly farmers and fishermen. There are many edible mushrooms in the area which are eaten as meat or fish substitutes. The mushrooms are collected at the onset of the rainy season on various substrates; excess mushrooms that are not eaten or sold are preserved in many ways including drying for future use. Many species are however being lost because of bushfires and irregular rainfall patterns. The local people are eager to receive training in mushroom farming so that they can have access to the mushrooms throughout the year. The 30 plant species identified in the off reserve include trees, shrubs and herbs (grasses), some of which are ectomycorrhizal.

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1. Background

The Bui National Park covers an area of about 1,821km² and is situated in the centre-west of the country, against the international frontier with Côte d'Ivoire, and is bisected by the Black Volta River. The vegetation is predominantly savanna woodland, with gallery forests along the river course. These riverine forests are the best-preserved forests remaining along the Black Volta and, probably, the only left in the entire Volta system (IRN, 2001).

Scientific data on diversity and status of species of birds, primates and other mammals, and insects within the Park were collected with little or no data on fungi. The Park is famous for its two groups of hippopotamus population and of a variety of many globally endangered primates, leopards, ungulates, amphibians, monitor lizards, butterflies, birds, fish, fruit bats, rodents, dragonflies, lions and various other primates and other fauna (WRM 2006). The common tree species include *Vitellaria paradoxa*, *Parkia clappertoniana*, *Daniellia oliveri* and *Isobertina doka* (WRM 2001; BirdLife International, 2009).

According to the Bui Power Authority the development of the Bui dam will involve the permanent inundation of about 444km², of land, including nearly a quarter of the Bui National Park, at its full supply level. The area of permanent inundation includes three communities: Bui Village, Battor (Akanyakrom) and Dokokyina with a total population of about 2,600 people who would be resettled (Ghanaian Chronicle, 2009; Daily Graphic, 2011). These rural poor derive their livelihoods directly from small-scale agriculture and the natural resources provided by the country's forests and fishing from the river. The inundation might affect the diversity of plants, animals and fungi of economic importance and thus the livelihood and food security of the fringe forest communities. Knowledge on fungal genetic resource would raise awareness to biodiversity conservation in the Park. It would also improve community adaptation to climate change by initiating alternative livelihood strategies as to the sustainable utilization of the resources.

1.1. Objectives

The specific objectives of the study were to:

- a. determine diversity and distribution of fungi (edible, medicinal and mycorrhizal) in the Bui National Park
- b. facilitate germplasm conservation of threatened economic fungi
- c. create awareness on biodiversity conservation by initiating alternative livelihood strategies.

1.2. Expected Outputs/Results

- a. Diversity and distribution of fungi (edible, medicinal and mycorrhizal) in the Bui National Park determined.
- b. Germplasm conservation of threatened economic fungi facilitated.
- c. Awareness on biodiversity conservation by initiating alternative livelihood strategies created.

2. Methodology

An interview schedule with structured questionnaires was used to obtain information from the local people around the Bui National Park. A reconnaissance survey was conducted in people's homes in three local communities: Battor, Bui and Bongase in the Tain District of the Brong Ahafo Region. Purposive sampling was used and covered different ethnic groups of various ages, educational background and gender. A total of 60 community members were interviewed.

Temporary Sample Plots (TSP) of 2 hectares (two 100m x 100m plots) were established randomly in the area and each plot was divided into four 50m x 50m sub-plots for easy assessment. Forest trees and other vascular plant species associated with the fungi were identified.

The opportunistic sampling method (carefully walking through the study site and collecting conspicuous sporocarps) was employed in collection of the macrofungi. The macrofungi

encountered were photographed in-situ prior to picking, described (smell, colour, shape, size, nature of substrate/foothold) and labeled. Specimens were picked up from the substratum by excavating around the base, bulb or attachment to a sclerotium or buried substrata with the aid of scapel. The collected macrofungi were identified based on macroscopic and microscopic features using field monographs of coloured mushrooms. Specimens which could not be identified immediately were air dried for identification later.

3.0 Results and Discussion

3.1 Social status of local communities

Most of the respondents were Middle School leavers with women forming the majority. The highest number (25%) of respondents was in the 41-50 age bracket followed by those in the 31-40 and over 51 age brackets. Fifty seven per cent of the respondents were settlers (Ewes, Wassas) while 43% were natives (Banda and Nafara). The respondents were mostly farmers and fishermen.

3.2 Indigenous knowledge

Edible mushrooms collected from the wild by the local people are mainly *Volvariella volvacea* (oil palm mushrooms), *Termitomyces macrocarpus* (nkankum) and *T. schimperi* (ahimire/sibre). Others include *T. telestui* (tweaworodo) and *Coprinus* sp. (sasea) as documented in earlier ethnobotanical studies by Apetorgbor *et al.* (2006). The people eat these mushrooms because of their taste and availability. Mushrooms act as meat or fish substitute as well as for nutritional benefits. The respondents complained that certain mushroom species are getting scarce because of bushfires and irregular rainfall patterns. Parren and Sam (2003) noted that forest fringe communities depend on NTFPs for most of their domestic needs whether for food or for other household needs. They also observed that with dwindling forests such products are becoming difficult to come by.

Mushrooms are collected from around termite hills, on cassava peel heaps, under decaying logs or tree stumps as well as under living trees in abandoned farms and fields under fallow at the onset of the rainy season. Decaying logs on which mushrooms are known to grow include *Afzelia*

africana (papao), *Ceiba pentandra* (onyina), *Triplochiton scleroxylon* (wawa), *Antiaris toxicaria* (kyenkyen). Others include *Daniellia oliveri*, *Adansonia digitata* (baobab), *Mangifera indica* (mango) and *Vitellaria paradoxa* (shea butter). The latter substrates are additional information typical of the savanna zone which has not been listed as substrates of edible mushrooms in earlier studies by other researchers (Apetorgbor *et al.*, 2006; Sawyerr, 2000).

After collection of the mushrooms, the excess that cannot be sold or eaten immediately are preserved by steaming with salt, sun drying, smoking or spreading in baskets overnight. Dried mushrooms can be stored for several months. A few respondents indicated that mushrooms like Tafukunyi (in Banda language) are used to treat breast problems; *Auricularia auricula* is used to treat heartaches while *Ganoderma lucidum* is used to cure naval cord problems. On the contrary, *G. lucidum* is used in the treatment of cancer and stroke in some communities in southern Ghana (Apetorgbor and Apetorgbor, 2009). A few respondents also indicated that a mushroom called Begukunyi (in Banda) promotes seedling growth.

3.3 Training in mushroom farming

All the respondents are willing to receive training in mushroom farming but most of them look up to the government or NGO's for sponsorship to such training programmes.

3.4 Macrofungi encountered in the off reserve

A total of 41 macrofungal species belonging to 18 families were recorded from the off-reserve. Four edible species including *Termitomyces macrocarpus* and *T. schimperi* were recorded while two species (*Ganoderma lucidum* and *G. turbinatum*) were known to be medicinal. There were fifteen ectomycorrhizal fungal species including *Russula congolena*, *Boletus edulis* and *Cantharellus* species which were in the order Russulales, Boletales and Cantharellales, respectively. Common tropical ectomycorrhizal fungi belong to the Agaricales, Aphyllophorales, Cantharellales, Boletales, Russulales, Amanitales, Sclerodermatales, Hymenogastrales and Gautieriales (Sanon *et al.*, 1997).

3.5 Plant species diversity in the off reserve

Thirty different plant species were identified in the off reserve. The grasses (*Axonopus compressus*, *Elymandra androphila* and *Melinis minutiflora*) dominated the area with trees including *Isobertinia doka*, *Daniellia oliveri*, *Azelia africana*, *Detarium macrocarpus*, *Albizia malacophylla*, *Terminalia mollis*, *Anogoneissus leicarpus* and *Parkia biglobosa* found in decreasing order of density. Ectomycorrhizal plant species in the family Caesalpinaceae were relatively high in density in the area. The most frequently occurring ectomycorrhizal tree species is *Isobertinia doka* followed by *Azelia africana* and the grasses, *Elymandra androphila* and *Ischaemum amethystinum*. Jenick and Mensah (1968) observed presence of ectomycorrhiza in *Azelia africana* in riverine forest in Ghana.

4. Conclusion

The communities consist of native Banda and Nafari as well as settler Ewes and Wassas among others; they are mainly farmers and fishermen. There are many edible mushrooms in the area which are eaten as meat or fish substitutes. They are collected at the onset of the rainy season on various substrates; excess mushrooms that are not eaten or sold are preserved in many ways including drying for future use. Many species are however being lost because of bushfires and irregular rainfall patterns. The local people are eager to receive training in mushroom farming.

The 30 plant species identified in the off reserve include trees, shrubs and herbs (grasses), some of which are ectomycorrhizal.

5. Recommendation

It is recommended that the communities be trained in mushroom farming for improved livelihood since most of the areas where mushrooms are collected will soon be submerged by water on completion of the Bui dam.

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