

Projet Hombori: Activity Report 2003 - 2004

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I. INTRODUCTION

1. Brief presentation of the project

Mount Hombori consists in an inaccessible tableland of about 2 km square located south of Timbuktu (Mali), at the border between the Sahara desert and the Sahel area. Due to the high cliffs surrounding its summit plateau, both flora and fauna of its summit plateau has been preserved from pasture and agriculture. This ecological heaven - one of the few remaining unspoiled zones of primary vegetation of Sahel - is nowadays being threatened by the increasing pressure of tourism. Taking Mount Hombori as a unique model of study, a multidisciplinary survey has been started to understand the respective impact of human and climatic factors on the desertification process of the African sub-Saharan region. A preliminary evaluation of the site was launched in 2000 and followed by a 2-month field-work involving 22 scientists in August and September 2003.

2. Objectives of the project (2003-2004)

The objectives of the project 2003-2004 were

- ♦ the survey of the biodiversity of Mount Hombori and of its surroundings.
- ♦ the transversal evaluation of the impact of human pressure in the Mount Hombori region.
- ♦ the implementation of a system allowing the biodiversity monitoring of the Hombori region in order to understand the impact of climatic changes.

3. Design and methodology

To fulfil these objectives, a transdisciplinary approach was undertaken according to the following interdependent modules:

3.1. Biodiversity module

- ♦ Botanical survey and mapping of the summit vegetation.
- ♦ Setup of permanent plots at the top of Mount Hombori enabling a following-up monitoring of biodiversity to study the climatic impact.
- ♦ Comparison of the flora of the summit plateau with the one of the neighboring plains.

3.2. Ethnobiology module

- ♦ the selection of plants that commonly grow on the summit plateau and are absent/rare in the surrounding plains
- ♦ an ethnobotanical survey focusing on the different plant uses (medicinal, veterinary, technological, food and others) with the aim to understand human impact on those plants
- ♦ an evaluation of the frequency of use of the selected plants both in the past and nowadays.

4. Social context

4.1. Social frame

Mount Hombori is surrounded by 3 distinct villages Kelmi (400 inhabitants), Tunduru (900 inhabitants) and Hombori (4000 inhabitants) with a common history as their inhabitants come originally from the neighbour village of Ouari. Villagers mainly belong to the Muslim Songhaï ethnic group except Hombori that is also inhabited by Peuls and Tamacheks. Songhaï are sedentary cultivators (essentially Pennisetum) with very few ovine and caprine cattle while semi-nomadic Peuls and Tamacheks owe large bovine cattle. Hombori village is located along the tar road and drains every Tuesday villagers from Douenza (200 km South) to Gossi (200 km North) to the local market that is the main economical feature of the region.

4.2. Development of tourism in the Hombori area

The Mount Hombori outstanding setting and the weekly Hombori market attract an increasing cultural touring tourism mainly constituted of 30-40 old sportive travellers. Most of them come to climb Mount Hombori. During the last 3 years, the local hotel capacity has been tripled; a new camping site as well as a tourist shop has been built. Several tour operators are now offering trips to the Hombori region and a via-ferrata equipment has been installed to facilitate access to the summit.

This increasing development of tourism is now threatening the fragile ecosystem of the Hombori summit plateau. According to local culture, access to Mount Hombori should be obtained after consultation of the authorities of at least one of the three surrounding villages. At the moment the benefit of the tourism only profit to Hombori village because of its "along the road" situation.

Due to the emerging tourist threat, there is an urgent need to protect Mount Hombori for both long-term benefits of local population as well as for scientific and ecological considerations.

II. ACTIVITIES COMPLETED

I. Results of the biodiversity module

- ◆ A total of 119 plant species were collected from the top of Mount Hombori and 115 were identified. Around 150 to 180 species are estimated to be found on the mountain [1].
- ◆ The remaining 4 undetermined species have been dispatched to specialists for accurate botanical determination as they could potentially be new species.
- ◆ A total of 20 permanent plots were set up for further climatic investigation.
- ◆ A database including the phytosociological information on the collected species as well as details on their distribution and abundance on the top of Mount Hombori has been built.

- ◆ The summit plateau was shown to be an important refuge for rare species in Sahel (e.g. *Amorphophallus aphyllus*, *Enteropogon rupestris*, *Tacca* sp., *Gloriosa superba*, *Lanena humilis*, *Boscia salicifolia*). An exhaustive list of these species is presented in annex 1.

- ◆ The lack of thorny species illustrates the absence of grazing pressure on the top of the mountain.
- ◆ An insect collection has been achieved. Identification of species is underway.
- ◆ Entomological survey of selected groups has been initiated.

2. Results of the ethnobiology module

- ◆ A total of 13 plants present on the plateau were selected for their scarcity/ absence from the neighboring plains and shown to 15 local holders of the traditional knowledge.
- ◆ 12 of these plants have/had at least one medicinal, veterinary, technological, pastoral and food uses, most of them having been reported for several purposes [2, 3].
- ◆ These 13 selected plants were associated with a higher abundance in the past by the local interviewees (30 out of 35 citations) [2, 3].
- ◆ The main given explanation for species rarefaction was the lack of rainfalls (24 out of 27 citations). Anthropological pressure was only mentioned twice as an explanation for plant disappearance [2, 3].

3. Discussion of the obtained results

The scientific data gathered in the frame of this first mission indicate that the summit plateau of Mount Hombori has a much higher biodiversity than its surrounding plains that are subject to both human and animal pressure. The rarefaction of plant species have been addressed through both botanical observation and ethnobotanical survey conducted with the help of the local population living in the neighborhood of Mount Hombori. According to the results of this study, the disappearance of species in the Hombori region seems to be mainly due to human pressure. It was indeed found that out of 13 species commonly found on Mount Hombori summit plateau but rarely or not observed in its neighbourhood, 12 of them have/had been intensively used in the past. When asked about the reasons of this disappearance, the different answers given by the interviewees were external factors such as lack of rain falls or fire bush. Interestingly, these observations show that, even if human activities seem to play an important role in the reduction of biodiversity, these activities are not considered as a major threat for their direct environment. The role of climate changes remains under investigation and we have established on this purpose a long-term monitoring strategy of Mount Hombori biodiversity.

III. SUMMARY OF THE FINDINGS AND FOLLOW-UP

Our results suggest that Mount Hombori is a hotspot of biodiversity and an excellent model for studies focusing on environmental impact in the Sub-Saharan area. However this exceptional site is in the same time threatened by an emerging tourism. Ways should be found to preserve this environment with the participation as well as for the benefit of its inhabitants. This participative approach shall also be taken as an opportunity to address environmental issues together with the local population. This will be part of a win-win strategy proposed in the follow-up project for the years 2006-2009.

IV. THE PROJECT IN FIGURES

I. Budget and financial balance

A part of the scientific and technical material as well as the team working time (both preparation and field work) were not taken into account into this budget.

Financial contributors to the project

The sponsors of the project are:

Leenaards Foundation: 20000 CHF

WWF International: 10000 CHF

Dr Lukas Hoffmann: 10000 CHF

Anonymous private donors: 2000 CHF

Total amount: 42000 CHF

Kodak and Mammut have also supported the Hombori project though significant discount on technical equipment (already taken in account in the list of expenses below).

Balance: a positive balance of 19'466.

Due to:

- ◆ Extra -money granted to the project (4800 CHF)
- ◆ A significant reduction of the accommodation budget was achieved thanks to the off-charge housing of the whole team in Bamako
- ◆ The budget allocated to publication and conference issues has only partially been used until now.

Extra money will be used for:

- ◆ Transport for the feedback mission (March 2005, see link on website)
- ◆ Publications (under redaction) will be submitted in Spring 2005. Exposition, whenever possible and information to local habitants as well as tourists will be organized in Mali.
- ◆ Organization and planning of the follow-up project.

Globally, when compared with the forecasted budget and expenses, this very good result can be explained by an excellent management and monitoring of our funds all along the project.

	Budget	Expenses	Difference
Transport (both air and overland)	11 300	7 758	3 542
Accomodation and Food	6 100	2 318	3 782
Financial compensation of the Malian team	3 300	3 042	258
Scientific and technical material	7 000	6 621	379
Audiovisual support	2 000	1 420	580
Publication and conference fees	7 500	808	6 692
Administration	-	591	- 591
Total, CHF	37 200	22 534	14 662
Extra grants	4 800		
TOTAL	42 000	22 534	19 462

2. Team list

The multidisciplinary team has gathered 22 scientists from Mali and Switzerland. A Swiss based, non-for-profit association named Diam Tam and regrouping the team members has been created to coordinate the whole project. Swiss and Malian students were integrated to the project. Main contributors were:

Dr Drissa Diallo

Local Coordinator; Head of
Département de Médecine
Traditionnelle, Bamako, Mali

Dr Jean Robert Ioset

Project co-Director;
Phytochemist, London School of
Hygiene and Tropical Medicine,
London, UK

Jonathan Kissling

Project co-Director; Biologist,
University of Neuchâtel

Thierry Renaud

Project co-Director; Biologist,
Helvetas, Burkina Faso

Prof. Amadou Diallo

Zoologist, University of
Bamako, Mali

Sébastien Nusslé

Zoologist, University of
Lausanne

Seydou Dembelé

Forest engineer, Bamako, Mali

Amadou Diallo dit "Fine"

Mountain guide, President of the Malian Association of
Mountain Guides, Hombori, Mali

Akouni Dougnon

Ethnobotanist, Institut National de Recherche en Santé
Publique, Bandiagara, Mali

Prof Hon. Pierre Hainard

Scientific adviser, Geobotanist, University of Lausanne

Prof. Peter Vogel

Scientific adviser, Zoologist, University of Lausanne

Other contributors

Scientific contributors:

Prof. A. Cissé

University of Bamako, Mali

Prof. Diarra N'Gollo

Institut de l'Équipement Rural, Bamako, Mali

Dr E. Mougin

Centre d'Étude de la Biosphère, Toulouse, France

Administrative contributors:

Traditional chiefs of Hombori region

Prefect of the Hombori Department

Mayor of the Hombori village.

Director of the Institut National de Recherche en Santé Publique, Bamako, Mali

V. FOLLOW-UP PROJECT

1. Objectives 2005-2006

A second mission, partly financed by the positive balance of the budget, is now being organized and will mainly focus on the following issues:

- ◆ Completion of the botanical survey (Association des botanistes de l'Afrique de l'Ouest (ABAO), Institut supérieur de recherche appliquée (ISFRA), Bamako and Laboratoire de Botanique évolutive, Université de Neuchâtel
- ◆ Survey of the Fauna of Mount Hombori (Institut de Médecine (Zoology), Université de Bamako and Département d'Écologie et d'Évolution, Université de Lausanne)
- ◆ Continuation of the long-term evaluation (Laboratoire de Botanique Évolutive Université de Neuchâtel)
- ◆ Socio-geographical frame of Mount Hombori region (Institut de Géographie, Université de Lausanne)
- ◆ Perception of Mount Hombori biodiversity by local inhabitants (Département de médecine traditionnelle (DMT) du Mali, Institut d'Ethnologie and Laboratoire de Botanique évolutive, Université de Neuchâtel)

2. Design, methodology and planning

The mission is subdivided in 5 modules with a responsible person in charge of each module.

Module 1: Fauna

Module 2: Long-term evaluation and Flora

Module 3: Socio-geography of the region

Module 4: Ethnobiology

Module 5: Logistic

The scientific design of the proposed modules is not presented here.

Both Malian and Swiss students will be part of the next mission, mainly in the frame of their university Diploma/Master work. This will permit a cultural and technological transfer between Mali and Switzerland and contribute to the formation of local scientists who will be in charge for the future biodiversity monitoring of Mount Hombori.

3. Team list

The team is being constituted. So far, the known contributors are:

- Prof. Drissa Diallo
Local Coordinator; Head of Malian department of Traditional Medicine, Bamako, Mali
- Dr. Jean Robert Ioset
Project co-Director; Phytochemist, London School of Hygiene and Tropical Medicine, London
- Jonathan Kissling
Project co-Director, Biologist, University of Neuchâtel, Switzerland
- Thierry Renaud
Project co-Director; Geobotanist, Helvetas, Ouagadougou, Burkina Faso
- Seydou Dembelé
Forest engineer, Bamako, Mali
- Akouni Dougnon
Ethnobotanist, INRSP, Bandiagara (Mali)
- Dr. Julia Krohmer
Geobotanist, ethnobiologist, Goethe University, Frankfurt
- Dr. Sory Diallo
Pharmacist/Ethnobotanist, University of Mali
- Prof. A. Cissé
Botanist, University of Mali, Bamako
- Prof. Diarra N'Gollo
Institut de l'Équipement Rural, Bamako
- Dr. Karen Hahn-Hadjali
Geobotanist, Goethe University, Frankfurt
- Chantal Peverelli
Ethnobotanist, Lausanne
- Olivier Walther
Geograph, University of Lausanne
- Prof. Amadou Diallo
Zoologist, University of Mali, Bamako
- Gregoire Castella
Zoologist, University of Lausanne
- Ewa Gawronski
Zoologist, Bobo-Dioulasso, Burkina Faso
- Sébastien Nusslé
Zoologist, University of Lausanne
- Raul Vega
Botanist, Teacher, Lausanne
- Jacques Thiébaud
Faunal technician, Geneva
- Prof. Peter Vogel
Scientific adviser, Zoologist, University of Lausanne
- Prof Hon. Pierre Hainard
Scientific adviser, Geobotanist, University of Lausanne
- Florian Kissling
Historian, University of Lausanne

Other contributors

- Amadou Diallo dit "Fine"
Mountain guide, President of the Malian association of mountain guides, Hombori
- Sophie Arnaud
Technical adviser (climbing, material), CHUV, Lausanne
- Alice Panchaud
Technical adviser (climbing, health), CHUV, Lausanne
- Dr E. Mougin
Centre d'Etude de la Biosphère, Toulouse (France)

VI. ACKNOWLEDGEMENTS

The authors would like to thank the Foundation Leenaards, WWF International, and Dr. Lukas Hoffmann for financial support of this work, as well as Kodak and Mammüt for material support of the expedition. We are extremely grateful to the people of Hombori, Kelmi, Tundurou and Ouari for their “sens de l’hospitalité”, input and assistance during the field mission.

VII. PUBLICATIONS

Scientific paper/presentations

- [1] Renaud and Kissling, Mount Hombori, an ex-unexplored part of West Africa, Biology 04 congress, Fribourg, poster: 2nd best poster award.
www.hombori.org/docs/HomboriBIOL04.pdf
- [2] Kissling et al. An ethnobotanical survey of rare plants of the Mount Hombori region (Mali), Journal of Ethnopharmacology, submitted. *Annex 2*
- [3] Ioset et al., 2004, Mount Hombori (Mali): first botanical investigation of its inaccessible summital plateau and an ethnobotanical survey of its surroundings. 9th International Congress in Ethnobiology of the International Society of Ethnobiology, University of Kent, Canterbury, June 2004, poster.
www.hombori.org/docs/HomboriICE04.pdf
- [4] Ioset et al., 2004, Biodiversity monitoring, protection and integrated development of mount Hombori region (a hot spot of Biodiversity). ISE Newsletter, Vol. 4(2), 7-8.
www.hombori.org/docs/HomboriISE04.pdf

Scientific vulgarisation

Already published

Kissling F., Le projet Hombori a ausculté une flore et une faune méconnue, Le Messager, 2003

Kissling J., Le projet Hombori, une recherche au cœur du Mali, L'ermite Herbu, 2004

Under preparation

Kissling, J., Renaud, T., and Ioset J.-R. ANIMAN, September 2005, (in French, about 200'000 readers)

TERRE SAUVAGE, under discussion (in French, about 700'000 readers)

Exhibitions and conference entitled “Biodiversity of Mount Hombori and its region”.

16 mars 2005 : Cercle vaudois de botanique, Lausanne

Mars 2005: Courses in Ethnology based on Hombori Project, University of Neuchâtel

VIII. APPENDICES

Annex 1

First Checklist of the Angiosperm species of Mount Hombori

Annex 2

An ethnobotanical survey of rare plants of the Mount Hombori region

