VolkswagenStiftung

Translation *) of the Grant Letter of 25 July 2008

Dear Dr. Waltert,

On behalf of the VolkswagenStiftung I am pleased to inform you of the following grant:

Recipient of grant:	University of Göttingen, Centre for Nature Conservation
Basis of grant:	Application of 15 February 2008, letters of the Volkswagen Foundation dated 11 and 15 July 2008, your letter of 17 July 2008
Amount of grant:	up to 549,900 EUR (i.w. fivehundredfourtyninethousandninehundred Euro)
Anticipated duration:	three years
Purpose:	Research project "Managing forest wildlife for human livelihoods in the Korup-Oban Hills region, West-Central Africa. A multi-agent systems model to assess socio-economic and ecological sustainability" in accordance with basis of grant.
Project partners:	• Dr. Matthias Waltert, University of Göttingen/Germany • Dr. Kadiri Serge Bobo, University of Dschang, Yaoundé/Cameroon • Prof. Dr. Roger Ngoufo, University of Yaoundé I, Cameroon • Dr. Emeka Obioha, Nigerian Institute of Social and Economic Research (NISER), Ibadan/Nigeria • Dr. Saka Oladunni Jimoh, University of Ibadan, Nigeria

*) Only the German text is authentic. The translation into English of this letter and of the enclosures attached to it, especially the Funding Principles, are only offered for your convenience.

The funds are subdivided as follows:

in support of the working group Waltert, Göttingen

Personnel expenditure
Project coordination   110,000 EUR

Recurring non-personnel costs
Travel expenses   35,700 EUR
Expert consultancies   23,400 EUR

Non-recurring expenses
Equipment   6,700 EUR   **175,800 EUR**

in support of the working group Bobo, Yaoundé

Personnel expenditure
1 Top-Up Dr. Bobo   27,000 EUR
1 PhD Stipend   36,500 EUR

Recurring non-personnel costs
Travel expenses   48,100 EUR
Research permits   900 EUR

Non-recurring expenses
Equipment   7,500 EUR   **120,000 EUR**

in support of the working group Obioha, Ibadan

Personnel expenditure
2 PhD stipends   38,000 EUR

Recurring non-personnel costs
Travel expenses   38,100 EUR

Non-recurring expenses
Equipment   7,500 EUR   **83,600 EUR**

Your project partners will receive a copy of this letter and an English translation for information.

Whenever you have any inquiries, please do not hesitate to contact Dr. Detlef Hanne (e-mail: hanne@volkswagenstiftung.de, ext.: +49 511 8381 389).

The VolkswagenStiftung wishes you the best of success for your project.

Sincerely yours,
p.p.

(signed) Henning Otto

Enclosures

Copy of the grant letter addressed to Dr. Waltert

Funding Principles 02/2008

Guidelines for the Interim and Final Report

Certificate of Donation with acknowledgement of receipt

Homepage-Information

Jinch 34

Knowledge for Tomorrow - Cooperative Research Projects in Sub-Saharan Africa

VolkswagenStiftung, Hannover, Aktenzeichen: I/83 729

Managing forest wildlife for human livelihoods in the Korup-Oban Hills region, West-Central Africa: A multi-agent systems model to assess socio-economic and ecological sustainability

Final Report to Volkswagen Foundation
(project period 08/2008-05/2011)

Göttingen, May 2011

Project Leaders:

Matthias Waltert, Georg-August-Universität Göttingen
Serge Kadiri Bobo, Dschang University, Cameroon
Emeka Obioha, Nigerian Institute of Social and Economic Research, Nigeria
    and
Jimoh Saka, University of Ibadan, Nigeria
Roger Ngoufo, University of Yaoundé I, Cameroon

Co-operating Partners:

Cameroon Environmental Watch (CEW), Yaoundé, Cameroon
Centre for International Forestry Research (CIFOR) Yaoundé, Cameroon
Agricultural Research for Development (CIRAD) Montpellier/Yaoundé, France/Cameroon
Council for the Development of Social Sciences Research in Africa (CODESRA), Dakar, Senegal

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2. TABLES

1. SCIENTIFIC RESULTS AND PROJECT PROGRESS

1.1 General Information

Bushmeat consumption, the consumption of meat from wild forest animals, is an important part of livelihoods in rural West- and Central Africa. In the Congo Basin, bushmeat protein supply was estimated at 30 g person^{-1} day^{-1} (Democratic Republique of Congo) to 180 g person^{-1} day^{-1} (Gabon) (2002-2003). Based on extraction-production models it has been suggested that supply would drop by 81% by 2050 in a 'no-change' scenario of current extraction levels (Fa et al. 2003). In order to secure this resource for the future, sustainable harvesting in community-based wildlife management (CWM) approaches is a potential option, aiming at maintaining the recommended daily protein allowance (RDA of 52 g per person per day, FAO). However, the social, economic and ecological sustainability of forest wildlife management has rarely been investigated in a holistic approach. In Cameroon, CWM exists since 1994 as *Zone d'Intérêt Cynégétique à Gestion Communautaire (ZICGC)* or *Territoire de Chasse Communautaire (TCC)*.

This project aims to assess conditions under which CWM can be made socio-economically and ecologically sustainable. In a multi-agent system (MAS) approach, we study principal actors (or 'agents': e.g. hunters, traders, wildlife), their characteristics and their relationships and simulate effects of different approaches to manage wildlife, in particular populations of two species of small- and medium-sized antelopes ('duikers' *Cephalophus spp.*) on household economy. Data are being gathered for an 'artificial' model landscape of the Korup / Oban Hills region (CMR and NGR) on site, and aims at simulating a realistic picture of the current system in this and other, similar regions.

Multi-agent systems modelling combines spatial and individual based modelling and is done in four steps:

(1) Description of the agents
(2) Description of their dynamics and interactions
(3) Translation into Smalltalk language using the CORMAS (Common-Pool Resources and Multi-agent Systems (Bousquet *et al.* 1998) modeling platform
(4) Simulations based on management aspirations of local communities.

We use the CORMAS platform, which serves as main tool both for scientific analysis and for companion modelling in negotiations with stakeholders. Multi-agent modelling allows us to include multiple parameters which affect livelihoods and is suited to integrate spatially explicit information. It therefore allows to compute different scenarios at different time and spatial scales.

The project is composed of five subprojects (see next section) and has a strong research capacity building component: during 2008-2011 it supported four PhD, nine Master level (including two Diploma, six M.Sc., one M.A.), nine Forest Engineer (Diplome d'Ingenieur des Eaux et Forêts) and an uncounted number of B. Sc. level students. Nineteen of these 23 students are African nationals.

The project's outcomes include MAS tested hunting models for adoption by communities,

improved monitoring approaches and recommendations for alternatives to bushmeat exploitation and wildlife policy. It ensures capacity building of future managers, especially through Dschang university's Forest Engineer degree, the main degree of protected area managers of CMR. It also enhances South-South/North-South knowledge transfer. Co-Funding of the project is available through CODESRIA (Council for the Development of Social Science Research in Africa) - Comparative Research Network funding (International Cooperation, Publications), CEW (Cameroon Environmental Watch): Legal Framework of Wildlife Management, CIRAD/CIFOR: Economic analyses of conservation strategies (CORUS project), and GTZ/KfW: Wildlife Monitoring at landscape level.

Literature:

Fa, J.E., Currie, D., Meeuwig, J. 2003. Bushmeat and food security in the Congo Basin: linkages between wildlife and people's future. Environmental Conservation 30: 71-78.

Bousquet, F., Bakam, I., Proton, H. et Le Page, C. 1998. Cormas: common-pool resources and multi-agent Systems. Lecture Notes in Artificial Intelligence 1416: 826-838

1.2 Results

1.2.1 Subproject SP 1 (Bobo): (part A) Development of a Multi-Agent Systems model (MAS) on sustainable wildlife management and (part B) duiker populations and the spatio-temporal patterns of hunting

Duiker populations and spatio-temporal patterns of hunting

The main objective of this subproject was to determine and characterise key wildlife and human agents for a MAS. Specifically, it aimed at assessing behavioural and population ecological characteristics of two species of duiker (*Cephalophus spp.*) in the study area, and the spatio-temporal patterns of hunting in seven villages in the northeastern part of the Korup Support zone, and adjacent areas within KNP. We combined diurnal and nocturnal mammal surveys, and net hunts and monitored and mapped activities of hunters over a period of twelve months (dry and wet season). A total of 65, out of the 187 hunters and trappers found in the study area, were monitored, in the forest and in villages, in order to map village hunting territories, to evaluate the hunting effort and to estimate the harvested biomass. We also obtained biometric and population structural data from killed duikers. Semi-structured interviews were conducted with all hunters and complemented by structured interviews with external stakeholders serving as potential agents for our MAS. Results show that village hunting territories overlap and extend into the National Park (Figures 1, 2). Hunting is highly non-specific and takes place during both day and night. All recorded hunting activities were illegal. During the rainy season, an average hunting expedition lasted for 1.9 ± 0.7 days. Mean fresh biomass off-take was estimated at 21.6 ± 13.6 kg/hunter and hunting expedition, resulting in a mean of 11.7 ± 19.2 kg per hunter and day. Sex-ratio of duikers was 3:2 and age structure was 66.7% adults, 26.7% sub-adults and 6.6% young. Duikers represented about 51% of the bushmeat harvested. Even the most resilient species, the blue duiker appears to be threatened by hunting. When applying Feer's (1996) logistic model, off-takes were between 5.95 and 21.15 times higher than the sustainable production of the study area. However, sex and age class structures suggest that blue duiker populations could recover from current levels. 83.7% of hunter catches were sold in villages and local markets, only 16.4% is designated for own consumption (including family members). A potential community hunting zone (CHZ) of 6,236 ha, adjacent to six of the seven villages studied and to the KNP, has been proposed, but details are subject to negotiations between stakeholders because of potential conflicts about other land uses (farming), and depleted wildlife populations. One M.Sc. student from Dschang, Mr. T.O.W. Kamgaing, has been selected for a talk at the student conference on Conservation Science in New York (SCCS-NY) 12 to 14 October 2011. Another student of Dr. Bobo, M.L.S. Ndengué, has been selected to present a talk on hunting and conservation of endangered primates at the 7th International Wildlife Ranching Symposium, in Kimberley, South Africa 10 – 14 October 2011.
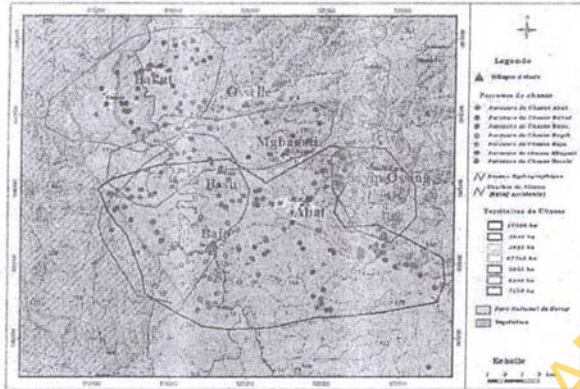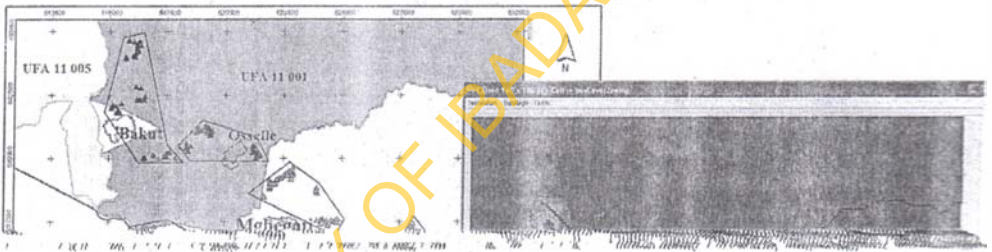
Figure1 : Boundaries of hunting territories of gunmen of seven villages at the border of – and extending into - Korup National Park.

Socio-economy of hunting

Students from Yaounde and Dschang universities cooperate in the conduct of socio-economic surveys and of the spatio-temporal distribution of hunting (frequency, duration of hunts, and type and effectiveness of different hunting strategies). In a first sample of 194 households, about 55% of the total off-takes were sold. The average daily income per hunter was 488.63 CFA francs. Main income sources were farming involving 96.4% of households, followed by NTFPs (92.3%), trading (34.0%) and hunting (33.0%). The dependency on different activities for livelihoods varied according to wealth category. Very poor households were not involved in hunting as a source of income while poor, average and rich households had respectively 14.82%, 18.30% and 13.76% of their total mean annual incomes coming from hunting. Farming was the first contributor to total mean household incomes (i.e. 1,154,000 CFA) (61.28%), followed by hunting (12.55%) and NTFP (9.78%). Both primary (local communities) and secondary stakeholders (organizations and NGOs working in and around the study area) have a vital role to play in the implementation of a Community-Based Wildlife Management system (the potential CHZ). A cordial relationship exists between most (83%) of the secondary stakeholders and the local communities. There is a great potential

(Figures 3 and 4). This has yet to be done for the other important target species, the Ogilby's duiker.
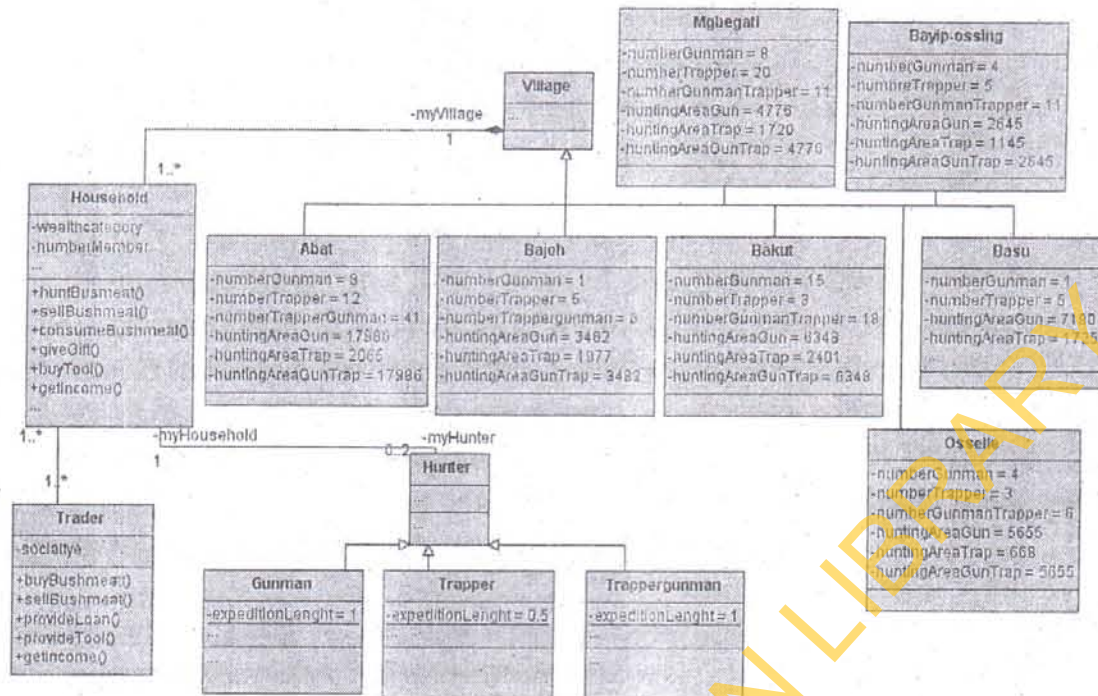

Figure 3: Class Diagram for the hunter system, for the study area consisting of seven villages in the Korup Support Zone
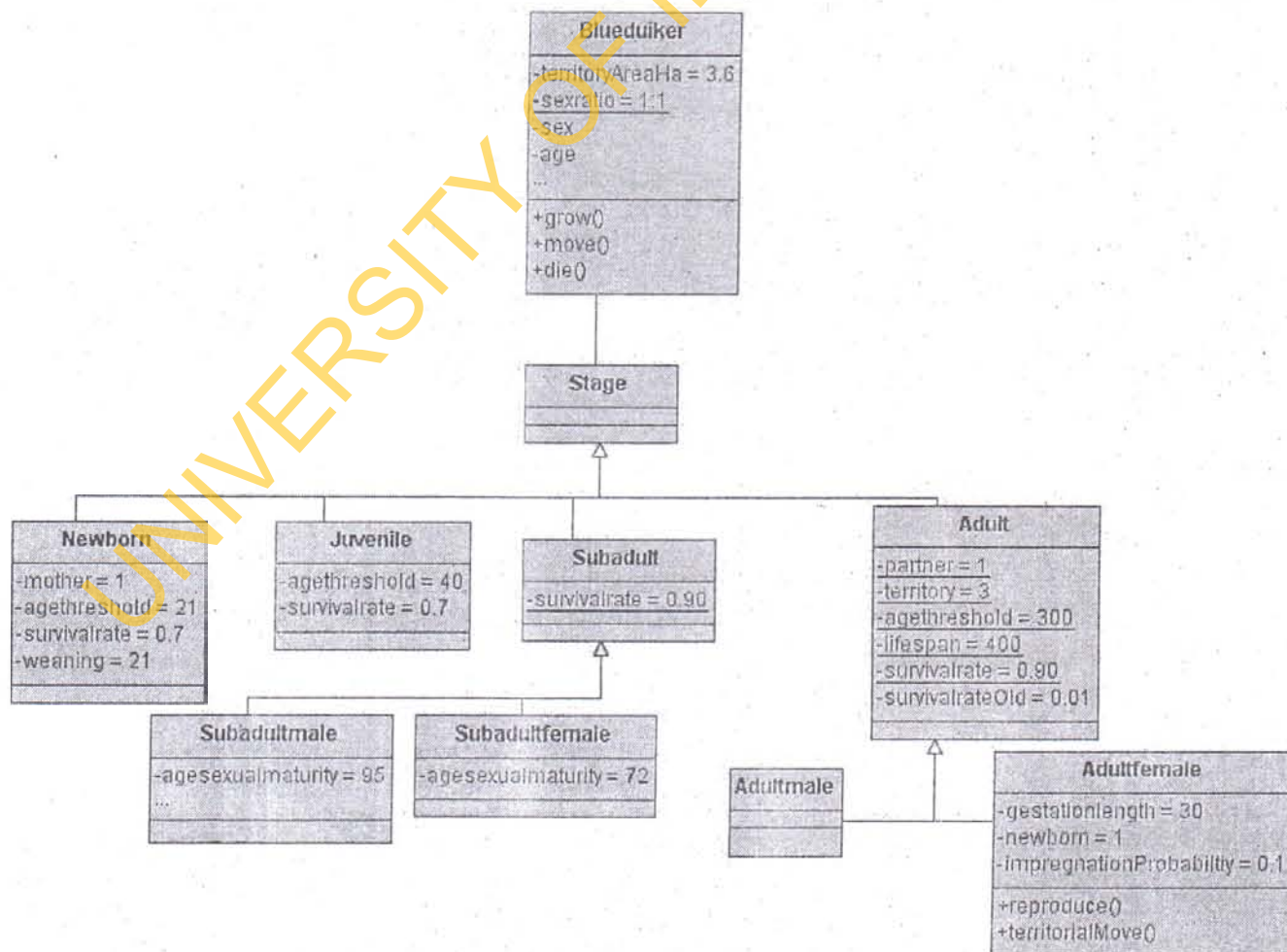

Figure 4: Class Diagram for the blue duiker population in the study area

Scenarios which are mainly based on the management aspirations of the local stakeholders have been developed based on the results gathered by other subprojects (interim project workshop at Ikeja, NGR in November 2010). Simulations started in April 2011.

Upon the completion of a sensitivity analysis for the blue duiker population by the end of May 2011, the basic biological model, as well as the trapping component of the hunter's activities are established. First no-change scenarios on the sustainability of a single hunting activitiy (snare trapping, only blue duiker), have been run. Results suggest that the current practice of setting traps is unsustainable, and that - without any management intervention, bush meat (of blue duiker) consumption to decline from a potential of about 16.1 kg to 4.5 kg per week and a decrease in average revenue from bushmeat marketing from ca. 54,000 CFA to 19,000 CFA (37.5% vs. 13% of total household revenues) within a period of 100 years (Figure 5). These results will be presented at the 2011 International Tropentag in Bonn (Oct. 5th to 7th) (see section 2.6). The final MAS as a management tool and joint manuscripts on the MAS will be made available by the end of 2011.

Figure 5: Daily (left) and cumulative (right) off-take, as produced by the CORMAS platform, forming the basis for the assessment of the socio-economic sustainability of hunting

Literature:

Lepage, C., Bousquet, F. & Takforyan, A. (2010): Simulations on virtual worlds: understanding the interactions between ecological and social dynamics. Download (01 August 2010) from: http://cormas.cirad.fr/pdf/jardinplanetaire.pdf

Feer, F. (1996) Les potentialite's de l'exploitation durable et de l'e'levage du gibier en zone forestie're tropicale. In L'alimentation en fore't tropicale: interactions bioculturelles et perspectives de de'veloppement (eds C.M. Hladik, A. Hladik, H. Ragezy, O.F. Linares, G.J.A. Koppert & A. Froment), pp. 1039–1061. Editions UNESCO, Paris, France.

1.2.2 SP 2 (Jimoh): Status of duiker populations in the Oban-Hills region in and around Cross River National Park, NGR

Effects of Hunting and Land use on Wildlife Resources

Wildlife surveying in Nigeria includes four land use types (closed canopy forest close to the Park headquarters and far from them, secondary forest, oil palm plantations and farm fallows (PhD thesis of Mr. Emmanuel Ikyaagba). First results indicate the considerable impact of law enforcement units deployed by the Cross River National Park staff, but overall low duiker populations with only two species, the blue and the Ogilby's duiker being still found frequently. This is very similar to the situation across the border in CMR. The collection of field data was concluded in May 2011 with a survey effort of 648 km from a total of 16 transects. One Master student from the University of Ibadan spent a month at the University of Goettingen attending a course on wildlife assessment techniques taught by Dr. Waltert over the course of a month and is now heading towards a teaching position in the Department of Forest Resources Management at University of Ibadan. First results from this study will be presented at Tropentag 2011, Bonn, Germany (5-7 October 2011).

The Role of Traditional Laws and Taboos in Wildlife Management

Wildlife has traditionally been regarded as a valuable community asset at least protected by customs and taboos. Nowadays, many Africans have begun to question their cultural values, resulting in the net decline of those taboos that were formerly vectors for management and conservation of natural resources. The breakdown of sometimes very specific traditions and taboos may have exposed several species to serious threats. Additionally, wildlife habitats are heavily degraded due to agricultural practices and the ubiquitous deforestation. Recently, the use of traditional laws and taboos has received attention by scientist; many are calling for their inclusion in the sustainable management of natural resources as they are oriented towards the people. A manuscript submitted by the working group of Dr. Jimoh analyses the ways in which cultural practices and values systems of the people of Cross Rivers Oban Sector have fostered conservation in the past and how such a systems may be encouraged, strengthened and transferred upon areas with a comparable backdrop for a sustainable natural resources management. The paper analyses the taboos among the *Chans* (*Ejagham* tribe) protecting the wildlife in their area. Some of the species are taboo due to religious, some due to health beliefs (Table 1). These laws and taboos are respected by all members of the *Chans* The social organisations in the area sees to it that these taboos are respected. However, the cultural influence of other tribes and the availability of modern hunting equipment and the increased human population density pose a great threat to these ancestral taboos. The adaptation of some aspects of these taboos may be valuable for wildlife conservation.

Table 1: Wildlife species with off-take restrictions in different villages

Species	Old netim	Aking	Oban	Osomba
Leopard	T (60%)	T (80%)	T (75%)	T (65%)
Yellow backed duiker	T (45%)	T (40%)	T (60)	
Crocodile	P (55%)	P (20)	P (30%)	P (25%)
Bush pig	P (10%)	R (15%)	R (5%)	
Giant hog		P (5%)		
Elephant	P/T(45%)	P/T 60%)	P (55%)	T (35%)
Monkey	P (5%)	P (15%)	P (10%)	P (15%)
Snail			H (5%)	
Python	T (80%)	T (90%)	T (85%)	T (75%)
Tortoise			P (5%)	
Golden cat	T (40%)	T (75%)	T (55%)	T (35%)
Red duikers	T (55%)	T (40%)	T (45%)	
Bush baby		T (45%)	T (55%)	

T= Cultural taboo, R= Religious taboo, P= Personal dislike and H= Health reasons

1.2.3 SP 3 (Obioha): Socio-cultural factors affecting Wildlife Exploitation in Oban Hills, NGR

This study investigates the socio-cultural and economic factors that affect the exploitation of wildlife in the Oban Hills, NGR. The specific factors investigated include:

1. household diets, nutrition and protein preferences

2. belief system, taboos and totems attached to the exploitation of the wildlife species

3. human utilization strategies of the bushmeat, hunting methods and the typologies including the major types of animals hunted and the perceived sustainability of the duiker populations

4. the enforcement of laws and their legislative status

5. the pattern of conflict manifestation and mechanisms of resolution in relation to wildlife exploitation

Five villages were purposively selected from a cluster of about fifty villages around Cross River National Park (CRNP) in the Oban Hills area, which is populated by about 40,000 inhabitants of different ethnic and cultural affiliations, mainly of the *Ejegham* and *Ibibio* groups. Stratified samples of households, groups and individuals were chosen as the respondents for the survey and interviewees for the qualitative data, respectively. Various techniques of data collection are being triangulated. In-depth interview and key informant interview guides and questionnaire were designed and are being used to conduct interviews among selected stakeholders, role players and community leaders in the chosen communities. Data generated from the survey are being analysed by the use the Statistical package for the Social Sciences (SPSS).

Based on the preliminary findings, most households in the study area are poor according to United Nations Development Programme international standard and measurement of poverty. The apparent lack of an adequate infrastructure in the area drastically reduces the quality of life. In addition, there are but few income sources available to the people, forcing many local community members to engage in either part time or full time hunting and trading of bushmeat. Apart from the direct economic gains derived from marketing and trading in bush meat, the by-products are useful sources of traditional medicines, arts and crafts.

The study reveals that in addition to guns, wires and traps, certain chemicals (that are harmful to humans as well) have recently gained importance in killing animals. Even though hunting usually does not target single species, the study reveals that duikers are the most common supplier of bushmeat. Remarkably, hunting activities are controlled by enforcement of legislations, laws and even informally observed totems, beliefs and taboos. The study further reveals that the hunters are usually people from remote communities, sometimes even from villages beyond the border to CMR, a fact that has helped to establish a well developed and extensive bushmeat trade network over the last decades.

1.2.4 SP 4 (Ngoufo): Social and economic conditions affecting wildlife exploitation in the Korup region, CMR

This research is based on four field studies in the Korup region, CMR, which address the relationship between social and economic conditions and the sustainability of communal wildlife management (CWM), in order to identify and characterise main agents and their relationships in a Multi-Agents Systems Model (MAS). Seven villages are part of the study area in the northern periphery of KNP. All studies were at household level, a total of 652 households were surveyed.

Research consisted of

(1) a baseline socio-economic study regarding the feasibility of community hunting zones

(2) a study on the advantages and constraints of agricultural land transformations in regard to the establishment of CHZ

(3) a study on beliefs potentially affecting a sustainable wildlife exploitation

(4) a study on existing community-based organizations, identifying their types, potentials and constraints

Almost all (96.8 %) respondents acknowledged the decrease in wildlife populations compared to 10 and 20 years ago. Agriculture is now the main source of income in most households, amounting to an average of 279,000 CFA franc (even 596,000 CFA in one village) per household from agricultural products, while admitted income from hunting was only 110,000 CFA francs. Over 80% of household heads are members of community-based organizations ranging from farmer groups, common initiative groups (associations registered by ministerial law n° 92/006 from 14.08.1992) and non-governmental organisations. The activities of these groups include environmental sensitisation and development. We analysed in some detail conflict mitigation in these groups, which is essential also for the characterisation of interaction between agents in the MAS model. Weaknesses of community-based organisations range from no training in respect to wildlife management, conflicts of interest especially to sensitive positions (e.g. financial secretary), disrespect of wildlife regulations, and other administrative problems (e.g. lack of record keeping, planning and basic democratic attitudes).

The social life is still marked by beliefs and taboos: 70 % of the households surveyed acknowledge the use of wildlife for traditional rites and some practices are against sustainability (e.g. animal products given to the *Ekpe* society). On the other hand, animal totems still exist in several households (e.g. from chimpanzee, *Pan troglodytes*). Even though the people were aware of the official hunting regulations of 1994, none of the interviewees possessed a gun licence or hunting permit. The major reported reasons were expensive transport fares to the administrative offices and the lacklustre effort of law enforcement. While monetary fines and the seize of possessions are still used traditionally to punish violations of communal rules, new regulations are also proposed by households' heads such as to include the ban of hunting by strangers and rendering farming obligatory for hunters. 90.1% of the household respondents and all external stakeholder workers accepted the idea of creating a community hunting zone in the study area. TRC, the timber exploiting

company in the study area, would need to collaborate with the project in the formation of a CHZ. However, CWM may only succeed under current socio-economic conditions if wildlife meat production is able to challenge gains from agriculture and the influence of community based organizations can be strengthened. The latter, however, will be extremely difficult to achieve and it is more than questionable, if such approaches can be implemented before wildlife populations have reached a state of post-depletion sustainability.

1.2.5 SP 5 (Waltert): Wildlife monitoring techniques and analyses of wildlife population change at the regional scale

Current status of target species for hunting and protected animals

In the MAS, the blue duiker *Cephalophus monticola* serves as the principal agent for the simulation of wildlife management scenarios. But there are three other resident duiker species (*Cephalophus ogilby, Cephalophus dorsalis, Cephalophus sylvicultor*) in the study region. Apart from modelling, existing information also allows empirical investigation of the effects of existing management approaches. Our research suggest that even in areas where CWM had been implemented in 2002, hunting pressure has resulted into severe declines of all these duiker species and suggests local extinctions of the two largest duiker species (Repp 2010), rendering changes in management approaches an urgent necessity.

Analysis on the status of wildlife at the landscape scale (SW Cameroon) was facilitated and supported by our cooperating partners who contribute long-term data from all over the region (cooperation with GTZ, WWF-CARPO, WCS, KfW), suggests declining wildlife resources (duiker poulations) and protected species (e.g. diurnal primates) in at least five out of seven sites within the last decade (years 2000 – 2010).

We summarized the status of diurnal non-human primate- and duiker species within the Cross-Sanaga-River Region (CSRR) and assessed population changes at different forest sites throughout the region. The study was built on relative abundance data (encounter rates) from a total of 37 sites, distributed over the three provinces of Cross River State, NGR, South West Province and Litoral Province, CMR. Available primate data suggest negative developments at all 7 sites. For example, in 5 out of 7 sites the encounter rates of at least 50 % of the observed primate species, declined by at least 65 %. At community level, the overall primate encounter rates declined in six sites, and in five sites the observed decline was 50 % or higher. For duikers, no common pattern emerged, neither at species nor at community level, however at all sites (3) where duiker abundances were available, duiker abundance declined. At the regional scale (South West Province, CMR) the encounter rates of all 8 primate species declined. In general the results indicate that diurnal non-human primate- and duiker populations have declined over time during the last decade, although it seems that primates suffered more from population declines than duikers.

These results were presented to the Cameroonian Ministry as well as to the regional representatives of the government's German-funded (KfW, GIZ) natural resource management programme in May 2011. In a publication which is in preparation, we give a detailed feedback on current monitoring approaches (e.g. data quality, inter study comparability), and point out how to improve monitoring and wildlife management in the future.
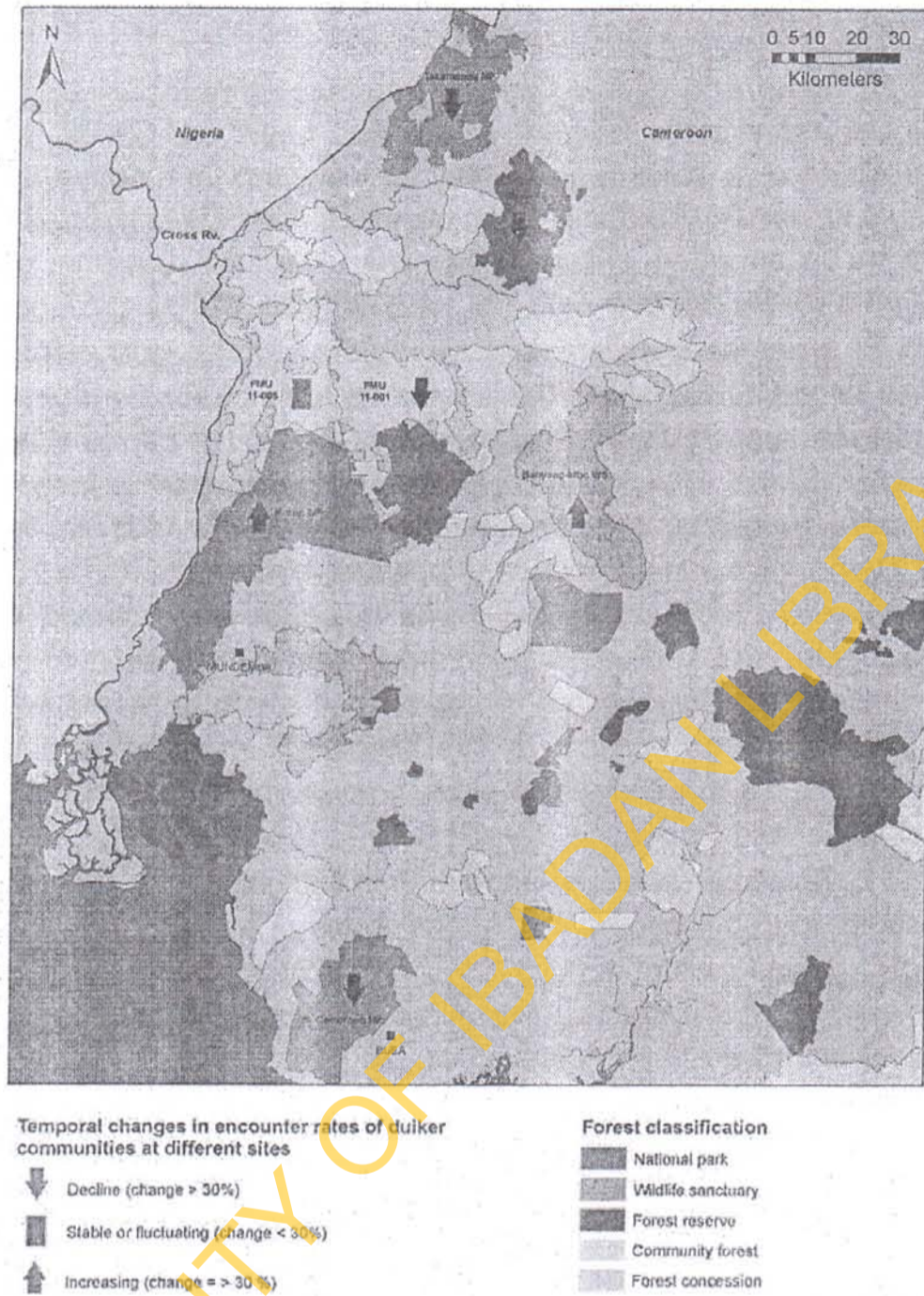
Figure 6: Trends in duiker populations in areas with repeat surveys between 2000 and 2010

Wildlife monitoring techniques

Based on the fieldwork of three german Diploma / Master of Science students (Repp 2010, Vicuerat, Müller 2010), we found diurnal line transect surveys to yield most precise and accurate population data for the two principal duiker species. In contrast, nocturnal surveys, dung counts, playback calls or net hunts did not match the efficiency of diurnal line transects. Using a power analysis approach, we assessed the performance of these established methods in producing density estimates for the Blue and the Ogilby's duiker (*Cephalophus monticola, Cephalophus ogilbyi ogilbyi*) in a systematically sampled 16 km² primary forest site. Direct survey methods (diurnal and nocturnal) yielded estimates of density between 5.1 and 6.8 (Blue duiker) and 6.0 and 4.3 animals / km² (Ogilby's). The associated % coefficients of variation of density estimates imply a resolution of 42% density change detectable in diurnal surveys but only of 160% in nocturnal surveys (statistical power of 80%, z-test). Modelling the CV to effort ratio showed that diurnal surveying resulted into a higher resolution than nocturnal surveying at any given survey effort. Density estimates derived from the dung survey were much lower (1.5 animals / km² and 1.4 animals / km², respectively), which we attribute to changes in the defecation behaviour of both species during the course of the study. The coefficients of variation were intermediate between those of the diurnal and nocturnal survey and imply a resolution of a 100 % change detectable. However, the general susceptibility of dung pile density to variation in key parameters (decay and production rates) and difficulties in data acquisition lead us to reject the dung survey as an efficient method to observe forest duikers. We thus conclude that diurnal surveying from carefully established line transects should be the method of choice. The resolution of a population change detectable with high significance is crucial for long-term wildlife monitoring and adaptive conservation management, since actions and plans can only be judged upon by the change they brought about in wildlife populations, but this change has to be detectable by scientific methods. Two manuscripts on these important results are currently under review.

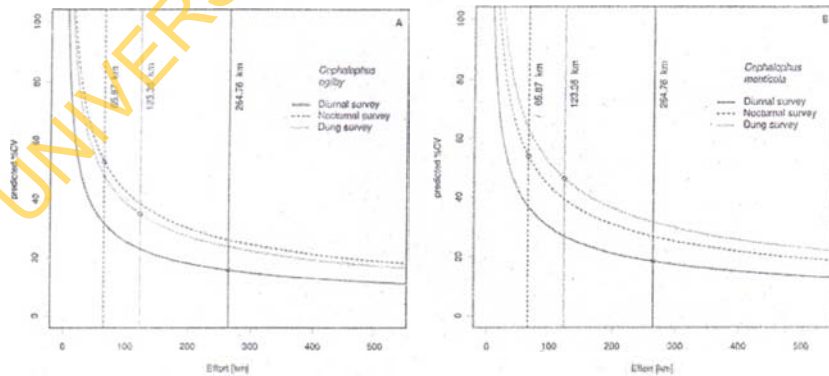Figure 7: Predicted % coefficient of variation (CV) of density versus projected survey effort, for different survey methods, for *C. ogilbyi ogilbyi* (A) and *C. monticola* (B). CV prediction based on survey outcome for dung, diurnal and nocturnal transects. Study CV's are marked circles on the projected %CV to effort curve and intersect with vertical lines to mark the associated realised effort.

Effects of land use

A publication based on data from earlier studies of Dr. Bobo revealed that diversity of wildlife along land use gradients in the region is highly dependent on the geographic ranges of the species group in question (Waltert et al. 2011, see section 2.4. This further strengthens the complexity of the problem to manage local endemic wildlife in land use systems other than forest.

1.3 Critical Self-evaluation

Overall, the experience of this complex international and interdisciplinary project proved to be challenging in many ways. The need for exchange between partners in joint projects such as this one may have been underestimated by some. A truly interdisciplinary project is only possible if the joint questions are tackled simultaneously; data has to be processed with similar methodologies and published together. There is still room for improvement in that regard but partners seemingly already took the experience and learned about these issues. The project proved to be also attractive to other donors, allowing to increase synergy by collaborating with further partners (see section 2.2) – while this is certainly a positive development, it also has its drawbacks and risks, e.g. a lack of focus on the main topics. All these issues however, had been expected to some extent and are part of the true experience of capacity building.

Most project partners started with fieldwork about six months late and subsequently, time schedules had to be adjusted, taking into account that field work could only be conducted in the dry season. In addition, the process of including Cameroonian students into a PhD programme has emerged to be a relatively complicated administrative process, in which faculty committees are involved over a considerable time. This is why much of the field work during the first year had to be conducted by MSc level students who had to be supervised directly and mainly by the project leaders. In the case of those subprojects supervised by Dr. Bobo, this led to some delays in the process of the modelling. The biological project in Nigeria also had to adjust its field work plan in Cross River National Park, thus just finishing the necessary fieldwork in May 2011.

1.4 Knowledge Gains from the International and Interdisciplinary Approach

Through this project, senior and junior scholars have gained substantial levels of exposure and knowledge in their research field through sponsorship of academic workshops (Feb/March 2009 in Mbalmayo, CMR and September 2009 in Calabar, NGR, September 2010 in Witzenhausen, Germany, and November 2010 in Lagos NGR) and the planned Tropentag 2011 participation (Bonn, 5-7 October 2011). The scholars are able to identify and align with the sub regional and international network of researchers, academics and professionals in their various fields.

The project has also created and facilitated opportunities for the junior scholars to gain mentorship from both local and internationally based senior researchers. Particularly the African academic capacity benefited of multiple research stays by African seniors and junior

scholars at the German host University, Georg August University Göttingen. Research capacity also benefitted from access to international literature; especially the web based journals under subscription of the university library.

The cooperation that has been established through this funding initiative is sustainable because the cooperating African-German senior researchers will continue to work together as a research consortium even after the present project has ended.

Importantly, through the project the main collaborating partners and senior researchers have gained substantial knowledge in project fund management, involving multidisciplinary approach and of international nature.

Most importantly, the present project involving biological scientists and social scientists from about seven different disciplines has created a forum for these scientists to work together. In this regard each researcher/scientist has gained tremendous knowledge of methodological issues applicable to other disciplines. Besides, the knowledge gained on common grounds and the relations between various disciplines and their approaches is invaluable.

1.5 Public Relations and Media Coverage

Three participative stakeholder workshops were held in Cameroon and Nigeria, as an integral part of the data collection (exploration of management aspirations of local communities). These workshops also serve as part of the public outreach of the project.

The working group at Yaoundé I (Prof. Ngoufo) prepared calendars for 2010 and 2011 which featured the Volkswagen Foundation and the University of Göttingen, of which 500 pieces each were produced and distributed. In addition, an advocacy workshop was held in Yaoundé to explain the project's position on necessary changes in the country's wildlife legislation. A book on the same topic is being in press at Göttingen University Press and will soon be available in book stores in Cameroon (Ngoufo et al. 2011, see section 2.4).

Dschang university is currently producing a Cameroonian public television film advertising the capacity building aspect of the project, under supervision of Dr. Bobo, showing students from Dschang and Yaoundé I universities at field training sites.

The project has been featured in various newspaper and journal articles in Germany , based on a press release after its inception. The project has also been featured by Volkswagen Foundation in its 'Impulse 2011' brochure, as well as in its calendar 2011 (month March). A request by the German public television on a feature in the television show *nano* had been made in 2009.

1.6 Further Aspects

The opportunity provided by Volkswagen Foundation through funding of this project has enabled the researchers in the socio-economic team to discover new and important research frontiers that are being further investigated. These frontiers will doubtlessly contribute to the understanding of the causes and consequently proffer solutions to the ongoing resource control conflicts in the region. Our research is going to provide a leverage for a shift in conflict pattern analysis in the Niger-Delta because currently most research efforts focus on oil resources based conflicts to the utter neglect of those that emanate from the scramble for the forest and wildlife resources.

There were quite positive collaborations of administrative authorities, e.g. the Divisional Officer at Eyumojock and his collaborators.

The bad state of the roads in the Cameroonian study area was a big menace to the field work, affecting traveling both into the study area as well as between villages. In addition, the illiteracy of villagers is considerable, and many respondents were tentative to participate since they expected researchers to exploit their knowledge for personal interests only. In future studies, these problems should not be underestimated.

2. TABLES

2.1 Participating scientists and students, directly involved in the project

	Institution	Financed through	Remarks
Dr. Matthias Waltert	Georg-August-Universität Göttingen	Georg-August-Universität, Volkswagen Foundation	Senior Scientist
Dr. Christos Astaras	Georg-August-Universität Göttingen, now Univ Oxford, Wildlife Conservation Research Unit	Volkswagen Foundation	Senior Scientist
Sacha Marc Anton Viquerat	Georg-August-Universität Göttingen	Volkswagen Foundation	Diploma student
Mareike Müller	Georg-August-Universität Göttingen	Volkswagen Foundation	Diploma student
Tillmann Repp	Georg-August-Universität Göttingen	Volkswagen Foundation, CIRAD	M.S. student
Corinne Staley	Georg-August-Universität Göttingen	-	M.S. student
Catriona Blum	Georg-August-Universität Göttingen	-	M.S. student
Janine Kunz	Georg-August-Universität Göttingen	-	M.S. student
Sebastian Flinkerbusch	Georg-August-Universität Göttingen	-	M.S. student
Dr. Serge Kadiri Bobo	University of Dschang, Department of Forestry	University of Dschang, Volkswagen Foundation	Senior Scientist
Mirabel Azah Manju	University of Dschang	University of Yaoundé I, Volkswagen Foundation	Master/Forest Engineer student, co-supervised by Yaoundé I
Constance Alah Etubo	University of Dschang	Volkswagen Foundation	Master/Forest Engineer student
OlivierWilliam Towa Kamgaing	University of Dschang	Volkswagen Foundation	Master/Forest Engineer student
Olive Yiika Ngalim	University of Dschang	Volkswagen Foundation	Master/Forest Engineer student
Franklin Ngansop Nganmegne	University of Dschang	Volkswagen Foundation	Master/Forest Engineer student
Steve Djetkeu Tchanou	University of Dschang	Volkswagen Foundation	Master/Forest Engineer student
Laurent Serge Mekongo Ndengué	University of Dschang	Volkswagen Foundation	Master/Forest Engineer student
Lionel Constantin Fosso	University of Dschang	Volkswagen Foundation	B.Sc. Forest Engineer Students
Bonito Chia Ntumwel	University of Dschang	Volkswagen Foundation	B.Sc. Forest Engineer student
Claudele Mekontchou Ghotsa	University of Dschang	Volkswagen Foundation	B.Sc. Forest Engineer student
Lawrence Jean Tayo Téné	University of Dschang	Volkswagen Foundation	B.Sc. Forest Engineer student

Table 2.1 (continued)

Roger Ngoufo Pr	University of Yaounde I- Department of Geography	Volkswagen foundation University of Yaounde	Senior scientist
Mbonji Edjengele	University of Yaoundé I, Department of Geography	University of Yaoundé I	Head of Department of Anthropology
Moupou Moïse	University of Yaoundé I, Department of Geography	University of Yaoundé I	Expert reviewer/Exercises prior to the defences
Sylvie Dorette Ngameni	University of Yaounde I, Department of Plant Biology and Physiology	Cameroon Environmental Watch	Postgraduate research on bushmeat and protein consumption
Njoumemi Nouhou	University of Yaounde I, Department of Plant Biology and Physiology	Cameroon Environmental Watch	Postgraduate research on wildlife legislation
Hubert Tsague	University of Yaounde II, SOA, and National School of Administration and Magistracy	Cameroon Environmental Watch	Postgraduate research on wildlife legislation
Jacques Romain Ndongmo	Cameroon Environmental Watch	Cameroon Environmental Watch	Postgraduate research on wildlife legislation
Albert Kaltsam	Ministry of Economy, Planning and Territorial Development	Cameroon Environmental Watch	Provides training in statistics
Emmanuel Dongfack Tiomo	University of Yaoundé I, Department of Geography	University of Yaoundé I, Volkswagen Foundation	M.Sc./PhD student
Kingsley Yongyeh Nsai	University of Yaoundé I, Department of Geography	University of Yaoundé I, Volkswagen Foundation	M.Sc./PhD student
Elvis Takor Ojong Mbiayamba	University of Yaoundé I, Department of Geography	University of Yaoundé I, Volkswagen Foundation	M.Sc. student
Prof. Dr. Emeka Obioha	Nigerian Institute of Social and Economic Research (NISER), Tshwane University of Technology	Nigerian Institute of Social and Economic Research (NISER), Volkswagen Foundation	Senior Scientist
Isiugo, Paul Nkem	Nigerian Institute of Social and Economic Research (NISER), University of Port Harcourt	Volkswagen Foundation	PhD Student
Cajetan Akujobi,	Nigerian Institute of Social and Economic Research (NISER),	NISER, Volkswagen Foundation	Senior Scientist
James Modi,	University of Ibadan	Volkswagen Foundation	M.A. student

Table 2.1 (continued)

Dr. Saka Oladunni Jimoh	University of Ibadan	University of Ibadan	Senior Scientist
Dr. Abideen Abiodun Alarape	University of Ibadan	University of Ibadan	Senior Scientist
Olabode, E.	University of Ibadan	Volkswagen Foundation	B.Sc. Student
Adeyemi, Adesoji Akinwumi	University of Ibadan	Volkswagen Foundation	M.Sc. Student
Ikyaagba, Tertsea Emmanuel	University of Ibadan	Volkswagen Foundation	PhD Student
Dr. Nathalie van Vliet (until 2010)	Center for International Forestry Research, CIFOR, Yaoundé	CIFOR, Volkswagen Foundation	Provided training in MAS modelling of wildlife resources
Dr. Christoph Lepage (from 2010)	Agricultural Research for Development, CIRAD, Montpellier	CIRAD, Volkswagen Foundation	CORMAS platform, SMALLTALK programming
Dr. Guillaume Lescuyer	Agricultural Research for Development, CIRAD, Cameroon	CIRAD	Cooperation with the project within the CORUS* project/co-financing of fieldwork

* CORUS project: Economic analysis of conservation schemes for forest biodiversity in Cameroon (CIRAD/CIFOR/Yaoundé I&II/Göttingen))

2.2 Additional Partners and Important Contacts

Name	Institution	Remark
Cameroon Environmental Watch (CEW)	National NGO Cameroon	Contributed on wildlife legislation and statistical training
International Union for Nature Conservation IUCN (Programme and National Committee Cameroon)	International NGO	Financial and technical support to wildlife legislation research/ new project concept on wildlife management
Council for the Development of Social Research in Africa CODESRIA	International NGO	Co-financing meetings and publications, ongoing collaboration
Prof. Mark Anikpo	University of Port Harcourt	Co-Supervison of Thesis
Dr. Nathaniel Danjibo	University of Ibadan	Co-Supervison of Thesis
Frank Stenmans	Kreditanstalt für Wiederaufbau, Buea, Cameroon	
Pascal Deschères	Kreditanstalt für Wiederaufbau, Buea, Cameroon	
Dr. Atanga Ekobo	World-Wide Fund for Nature WWF, Limbe, Cameroon	
David Tiku Okon	WWF, Limbe, Cameroon	
Thomas Maschler	GIZ Yaoundé, Cameroon	
Aaron Nicholas	Wildlife Conservation Society WCS, Limbe Office	until 2010
Dr. Imke Warren †	Wildlife Conservation Society WCS, Limbe Office	until 2010
Dr. Joshua Linder	James Madison University, Virginia, USA	
Andrew Dunn	Wildlife Conservation Society WCS, Calabar Office	
Dr. Otu Ibor	Cross River State Forestry Commission	2009-2010
Felix Agada Aya	Department of Forestry and Wildlife Resources Management, University of Calabar, NGR	2009-2010

2.3 Theses (M.Sc./PhD, and selected B.Sc.)

Author/Year	Title	Type of Thesis/Place
Azah, Mirabel/2009	Feasibility of community hunting zones at the northern boundary of Korup National Park, Cameroon	Forest Engineer/Dschang/ co-supervision by Yaounde I
Mouté, Adama/2010	Current conditions of and perspectives for sustainable village hunting in the northeastern periphery of Korup National Park, southwest Cameroon [in French]	Forest Engineer/Dschang
Müller, Mareike/2010	Investigations into the population density and ecology of blue and Ogilby's duiker in Korup National Park, southwest Cameroon: application of a new call-method in connection with classic line transects [in German.]	Diplom Biologie/Göttingen
Repp, Tillmann/2010	Declining duiker populations in two village forests at the border of Korup National Park, Cameroon: a case study on the effectiveness of community-based wildlife management	M.Sc International Nature Conservation/Göttingen
Viquerat, Sacha Marc Anton/2010	Surveys of Cephalophus spp. in Korup National Park: comparing diurnal, nocturnal and dung count surveys	Diplom Biologie/Göttingen
Tiomo, Emmanuel Dongfack/2010	The influences of agricultural activities on animal habitat: advantages or constraints for community hunting in the northern periphery of Korup National Park.	Master 2 Diploma (with thesis)/ Yaoundé I
Tene Tayo, Jean Lawrence/2010	Evaluation de la biomasse animale prelevée dans la peripherie nord-est du Parc National de Korup (Sud-Ouest Cameroun): cas de mammifères et des primates	B.Sc. Forest Engineer/Dschang
Ntumwel, Bonito Chia/2010	Contribution of dung decay rates to the estimation of densities of duikers and the ethnobiology of mammals and birds in the Korup National Park	B.Sc. Forest Engineer/Dschang
Etubo, A.C./2011	Stakeholder analysis for the feasibility of a community-based wildlife management concept in the North-Eastern periphery of Korup National Park	Forest Engineer/Dschang
Kamgaing Towa, O.W./2011	Village hunting and contribution to the elaboration of a sustainable off-take model for Cephalophus montiocola in the Northeastern periphery of Korup National Park, South-west Cameroon	Forest Engineer/Dschang
Ngalim, O.Y./2011	Revenue Components and Conflicts in the Use of Natural Resources in the Peripheral Zone Northeast of Korup National Park	Forest Engineer/Dschang
Tchanou Djetkeu, S./2011	Evaluation of duiker populations in the north-eastern periphery of Korup National Park, South-west Cameroon	Forest Engineer/Dschang
Ndengué Mekongo,	Status of diurnal primates in the north-eastern periphery of Korup National Park, South-west	Forest Engineer/Dschang

L.S./2010	Cameroon	
Nsai, K./2010	Belief systems in the sustainable management of wildlife in the northern part of Korup National Park	Master 2 diploma (with thesis)/ Yaounde I
Mbiayamba, E./2010	Community-based organizations: types, potentials and constraints in the northern part of Korup National Park	Master 2 diploma (with thesis)/ Yaounde I
Flinkerbusch, S./2011	Current status and development of wildlife resources in protected areas of SW Cameroon	M.Sc. International Nature Conservation/Göttingen
Isiugo, P.K. /2012	Socio-cultural and Economic Factors Affecting Wildlife Exploitation in Oban Hills, NGR	PhD Sociology/Port Harcourt (NISER)
Modi, J./2011	Wildlife Hunting Activities and Patterns of Conflicts In Selected Communities In the Oban Hills of NGR.	M.A Peace and Conflict Studies/Ibadan
Olabode, E./2009	Population Density and Distribution of Hunted Species in Land-Use Moaics of Oban West Division of Cross River National Park	B.Sc. Wildlife Management/Ibadan
Adeyemi, A.A./2011	Forest Structure Analysis and Crown Ratio Models for a Tropical Rainforest of Cross River National Park, NGR.	M.Sc. Forest Biometry/Ibadan
Ikyaagba, T. E.	Biodiversity Studies in the Tropical Rainforest of Cross^ River National Park, NGR.	Ph.D./ Ibadan

2.4 Publications (excluding those in preparation or review*) 2009 - May 2011

Author(s)/Year	Title	Source	Abstract
Kunz, J./2009	Deciding on Wildlife Monitoring Schemes Used in Community Based Wildlife Management Models	Discussion Paper Series No.01/09, available at http://www.uni-goettingen.de/en/115492.html	Community based wildlife management models require the input of up to date information on a series of parameters that either directly or indirectly reflect the status of local wildlife. This paper briefly introduces parameters that affect sustainable hunting in Central and West Africa, and which would therefore need to be incorporated in monitoring schemes, and presents methods that have been in the past used to monitor wildlife densities at hunted and not-hunted sites. Finally, a small list of recommendations is presented for methods suitable for community based wildlife management projects.
Kunz, J. & Blum, C. /2009	Challenges in Estimating Sustainable Wildlife Harvest Rates	Discussion Paper Series No.2/09, available at http://www.uni-goettingen.de/en/115492.html	This paper focuses on the advantages and disadvantages of four commonly used methods for estimating bushmeat extraction rates, and presents as an example the calculations from a real-life application of such an algorithm for estimating maximum sustainable harvest rates of four common bushmeat species (*Cephalophus monticola*, *Atherurus africanus*, *Cercopithecus mona* and *Cercopithecus nictitans*) near Korup National Park in Cameroon.
Repp, T. & Waltert, M. /2009	Information on the status of duikers in the Korup Support Zone, Cameroon, during 1999-2002	Discussion Paper Series No.3/09, available at http://www.uni-goettingen.de/en/115492.html	This discussion paper summarizes the findings of earlier duiker surveys in the periphery of the Korup National Park, Cameroon, during the period of 1999-2002 and introduces the research plan for 2009. It is anticipated that the findings of the planned 2009 surveys will permit, through comparisons with 1999-2002 findings, to estimate the change in the population density of the four sympatric duiker species.
Blum, C. /2009	Community-based wildlife management models: A joint vision for future protection of wildlife and rural livelihoods	Discussion Paper Series No.4/09, available at http://www.uni-goettingen.de/en/115492.html	The Community-based wildlife management (CWM) approach to conservation of wildlife in the tropics has long been proposed as an effective and ethical way of integrating conservation goals with the aspirations of the rural poor. This paper reviews first the theoretical background of CWM, and continues with a discussion of specific cases studies and strategies employed primarily in West and Central Africa.
Staley, C. /2009	Bushmeat and Livelihoods in Central and West Africa	Discussion Paper Series No.5/09, available at http://www.uni-goettingen.de/en/115492.html	The extent of hunting on the wildlife populations in Central Africa has reached dramatic proportions over the past decades, resulting in it being often referred to as the "bushmeat crisis". This paper briefly reviews a series of socioeconomic aspects of the bushmeat trade that affect the livelihoods of local rural communities; aspects that will have to be carefully addressed in any income generating alternatives or hunting management schemes planned by natural resource and rural development managers.

Table 2.4 (continued)

Ngoufo, R./2010	Les aires protégées transfrontalières comme instruments de cooperation sous régionale en Afrique centrale: constraintes et opportunités [Transboundary protected areas as tools to promote subregional co-operation in Central Africa]	*In* John O.Igué, Kengne Fodouop et Jérôme Aloko-N'Guessan, Maîtrise de l'espace et developpement en Afrique. Etat des lieux, Volume 1, Editions Karthala, pp. 251-266	–Book Chapter – L'Afrique centrale au plan environmental se structure autour du bassin forestier du Congo, considéré comme le second poumon de la planète aprè l'Amazonie. Pour mettre en ouvre des actions visant la gestion durable des forêts, les approches actuellement privilégiées par les organismes de coopération et de conservation de la nature portent sur des échelles de plus en plus vastes. Les sites de grand intérêt écologique sont délimités dans différents pays et forment une mosaïque de paysages (landscapes). C'est dans de cadre de cette vision que notre étude est envisagée et concerne essentiellement les pays comme le Cameroun, le Congo, le Gabon, la Guinée équatoriale et la République centrafricaine.
Bobo, K.S., Ntumwel, C.B./2010	Mammals and birds for cultural purposes and related conservation practices in the Korup area, Cameroon	Life Sciences Leaflets 9: 226-233 [ISSN 0976 – 1098]	We examined the contribution of mammals and birds to the culture and related conservation issues in the Korup area, Cameroon. Structured interviews were realised in 94 households in seven villages. We found more than 15 mammals and eight birds to be used in various ways for cultural and traditional healing purposes. The conservation of wildlife by the culture is generally unconscious through taboos and totems
Obioha E./2009	Climate Variability, Environmental Change and Food Security Nexus in Nigeria	Journal of Human Ecology 26: 107-121	This paper investigates the chain of interactions between climatic change, drought condition and food production in Nigeria. The paper relied mainly on secondary data that were generated through the analysis of relevant data from government and non-governmental agencies. From these sources, both quantitative and qualitative information were collected depending on the immediate importance. Among other things, this paper addresses the estimate of drought condition in the savannah region of Nigeria, the nature of food production activities in the area and the extent to which continuous climatic change has affected the state of food production. The paper also examines the indigenous and formal institutional frameworks in addressing the situation for assured food security in Nigeria. The paper concludes from the findings that desertification has impacted negatively on the food production activities in the region, which has necessitated the intervention of the government through the assistance from the international development agencies to combat the problem.
Obioha, E./2010	Climate Variability and Food Production Nexus in Lesotho, 2001 - 2007	Journal of Human Ecology 32: 149-160	In the recent times, due to the increasing rate of global warming, the Southern African region, especially, Lesotho has been experiencing continuous climatic change characterized by drastic reduction in rainfall, increase in the rate of dryness and heat, with depletion of the amount of water, flora and fauna resources. The situation has been so for years without many questions and answers with regard to how it affects food production and security in the country. Against this background, this paper investigates the chain of interactions between climatic change, expressed in the rate of rainfall and drought condition, the indigenous adaptation mechanisms

			and food production in Lesotho. The paper addresses the estimate of drought condition in Lesotho, Southern Africa, the nature of food production activities in the area and the extent to which continuous climatic change has affected the state of food production.
Ngoufo, R, Tsague, D.H., Waltert, M. /2011	Improving the legal framework of wildlife resources management in Cameroon: Developments and constraints, challenges and perspectives	Göttingen University Press, Göttingen, Germany, appr. 140 pp. (in press)	-Book Publication -

Table 2.4 (continued)

Waltert, M., Bobo, K.S., Kaupa, S., Montoya, M.L., Nsanyi, M.S. & Fermon, H./2011	Assessing Conservation Values: Biodiversity and Endemicity in Tropical Land Use Systems	PLoS ONE 6(1): e16238. doi:10.1371/journal .pone.0016238	Despite an increasing amount of data on the effects of tropical land use on continental forest fauna and flora, it is debatable whether the choice of the indicator variables allows for a proper evaluation of the role of modified habitats in mitigating the global biodiversity crisis. While many single-taxon studies have highlighted that species with narrow geographic ranges especially suffer from habitat modification, there is no multi-taxa study available which consistently focuses on geographic range composition of the studied indicator groups. We compiled geographic range data for 180 bird, 119 butterfly, 204 tree and 219 understorey plant species sampled along a gradient of habitat modification ranging from near-primary forest through young secondary forest and agroforestry systems to annual crops in the southwestern lowlands of Cameroon. We found very similar patterns of declining species richness with increasing habitat modification between taxon-specific groups of similar geographic range categories. At the 8 km2 spatial level, estimated richness of endemic species declined in all groups by 21% (birds) to 91% (trees) from forests to annual crops, while estimated richness of widespread species increased by +101% (trees) to +275% (understorey plants), or remained stable (- 2%, butterflies). Even traditional agroforestry systems lost estimated endemic species richness by - 18% (birds) to - 90% (understorey plants). Endemic species richness of one taxon explained between 37% and 57% of others (positive correlations) and taxon-specific richness in widespread species explained up to 76% of variation in richness of endemic species (negative correlations). The key implication of this study is that the range size aspect is fundamental in assessments of conservation value via species inventory data from modified habitats. The study also suggests that even ecologically friendly agricultural matrices may be of much lower value for tropical conservation than indicated by mere biodiversity value.
Bobo, K.S & Waltert, M./2011	The importance of agricultural areas for bird conservation in the Korup region, South-western Cameroon	International Journal of Biological and Chemical Sciences 5: 419-418	Recent studies have shown that a relatively high number of individuals and species from the natural forest fauna can still be found in land use systems. To detect key parameters for population development and preconditions for long-term suitability of different land use systems for forest bird populations, we investigated patterns of species richness and abundance of understorey birds using mist-net data, in 24 study sites equally distributed over two types of natural and two types of agricultural habitats. We also assessed arthropod availability, nesting sites, parasite loads, and fault bars for trapped birds. We recorded about equally high numbers of birds in all habitats but with a tendency for smaller species with increasing habitat modification. Our data support the idea that arthropod richness and density attract many understorey forest birds in agricultural areas but that environmental stress in these habitats might be high since numbers of bird species and individuals presenting fault bars were significantly higher in the agricultural matrix. In the Afrotropical context, the management of agricultural areas should consider preserving some aspects of natural habitats, and a fallow period of five to eight years, to avoid biodiversity loss.

* as of May 2011, there are at least six manuscripts for international peer-reviewed journals in preparation. For reasons of good scientific practice, these are not listed here.

2.5 List of major project meetings and conferences since 2009*

Type	Place, date	Remark
Methodological workshop	Mbalmayo, Cameroon/March 2009	
Village level stakeholder meeting	Study area, Cameroon, July 2009	with Cameroonian project participants
Project inception meeting (Village & Divisional level)	Calabar, NGR, September 2009	with community stakeholders and all Nigerian students
Sudvisional stakeholder meeting	Ejumojock, Cameroon, July 2010	with all Cameroonian students
VokswagenFoundation Grantees Scientific Workshop	Witzenhausen, Germany, 20-24 September 2010	Participation of all project leaders and PhD students
Mid term workshop	Ikeja, NGR, November 2010	Participation of all project leaders and PhD students
Final Project Workshop	Göttingen, September 2011	Planned
Tropentag 2011	Bonn, 5-7 October 2011	Planned
Dissemination Workshop (NGR)	June/July 2011 (date not confirmed)	Planned

* individual participation in international conferences and research stays abroad are not listed

2.6 Contributions to the Tropentag conference, October 5 - 7, 2011 in Bonn 'Development on the margin'

Authors	Title	Abstract
Serge Bobo Kadiri[1], Matthias Waltert[2], Christophe Le Page[3]	A Multi-agent Systems Model of Snare-trapping of Blue Duikers in the North-east Periphery of Korup National Park, South-west Cameroon	Bushmeat hunting is a survival mean for rural populations living in and around Korup National Park, South-west Cameroon. Empirical studies suggest strong wildlife declines in the region between 1999 and 2010 and currently unsustainable hunting practices even for species that are expected to have a great resilience capacity. The blue duiker Cephalophus monticola is the second most hunted species (17.6%) after the porcupine Atherurus africanus (19.4%) in this study area. Biological data on blue duikers, and socio-economic data related to bushmeat hunting and to the contribution of bushmeat to household livelihoods, were collected from May to November 2009 and 2010, and taken from available literature. A multi-agent-systems (MAS) model was constructed using the platform CORMAS for blue duikers of one of the studied villages, serving as an 'artificial landscape'. A simulation of its population status (abundance and age structure) was run for 100 years under 'current' conditions of wire snare-trapping and of its implication for household wild meat consumption and revenue. We found that from an initial density of 90 individuals/km2 (unharvested conditions) the population dropped by three quarters. The modeled number of captures by each hunter dropped on average from three to less than one in one week. Age structure changed from a normal to an erratic distribution with a predominance of young individuals, showing an opposite trend to the field observations (captured animals were predominantly older). Overall, snare trapping - in absence of any management intervention - showed no sign of sustainability. Modeled household wild meat consumption decreased from about 16.1 to 4.5 kg per week. The contribution of bushmeat to the monthly revenue of an average household decreased from about 83 Euros (37.5%) to 29 Euros (13%). The constructed model is to be used as a companion modelling tool in finding, in a participatory manner, the best management option that could enhance sustainable wildlife exploitation in the study area.
Olive Yiika Ngalim[1], Serge Bobo Kadiri[1], Matthias Waltert[2]	Household Revenue Components and Livelihoods in the North-east Periphery of Korup National Park, South-west Cameroon	People in forest areas largely depend on forest products for their livelihoods (food, medicine, and income). The aim of the present study, carried out in the North-eastern periphery of Korup National Park in South-west Cameroon from May to November 2010, was to weigh the contribution of bushmeat in household incomes and livelihoods in order to find ways to reduce the pressure on wildlife. Semi-structured and structured questionnaires were used in collecting data from a random sample of 194 of the 285 households found in seven villages. Sampled households were sorted in five wealth categories (very poor, poor, average, rich and very rich) following criteria set by the villagers. Household mean annual incomes (HMAI) per wealth category were compared. Household revenue components were compared within and between wealth categories. We found that farming is the first contributor to household income representing 61.3% of HMAI of 1,154,000 Francs CFA (i.e. 1762 Euros), followed by hunting (12.6% of HMAI), gathering of NTFPS (9.8% of HMAI) and other activities like trading, transportation, fishing, craft work (15.6% of HMAI). Very poor households are completely independent of hunting as a source of cash while poor, average and rich households have respectively 14.8%, 18.3% and 13.8% of their HMAI coming from the sale of bushmeat. Very rich households largely depend on farming that represents 86.3% of their HMAI while bushmeat contributes just for 2.9%. The sale of Non-Timber Forest Products contributes up to 30.4% and 17.3% of the HMAI respectively for very poor and poor households. HMAI showed a significant difference between wealth categories, but very poor and poor categories seemed not to be significantly different. Bushmeat was consumed daily by 15.5% of households, and at least 2-3 times a week by 38.1% of households. To boost livelihoods while conserving wildlife species in the study area, micro-projects to provide alternative sources of protein and income such as poultry, animal rearing, mushroom and snail production, and incentives like price reduction for farming chemicals, are advised.
Laurent Serge Ndengue Mekongo[1],	Diurnal Primates Decline in the North-east	A study on diurnal primates was conducted between May and September 2010 in the North-east periphery of Korup National Park (KNP) in South-west Cameroon. The objective was to help enhancing better management of wildlife in the study area by assessing

Serge Bobo Kadiri[1], Matthias Waltert[2]	Periphery of Korup National Park, South-west Cameroon	diurnal primates abundance, mapping their spatial distribution and looking at factors influencing their distribution. An inventory of diurnal primates, fruiting trees and human activities was carried out on sixteen transects and sixteen recces distributed over three zones with increasing distance from KNP, for a total effort of 225.2 km. Encounter rates and densities were compared between zones using the one way ANOVA test. Spearman Rank Correlations were used to find the relationship between different variables and to explain the observed trends. We found that encounter rates of diurnal primates are decreasing significantly with increasing distance from the park. Densities of diurnal primates are decreasing, but not significantly, with increasing distance from the park. Most diurnal primates are experiencing significant decrease since the past two decades and some (Chimpanzee, Preuss's Red Colobus, Red-capped mangabey) are threatened to local extinction. This last group is highly vulnerable to hunting and has taken refuge in remote areas. Human activities are increasing, but not significantly, with increasing distance from the park. Fruit availability, hunting and other human activities are main factors influencing the spatial distribution of diurnal primates. The control of trade in weapons, the fight against poaching and a community-based wildlife management mechanism are strongly recommended to inverse the current trend on primate threats in the study area.
Serge Bobo Kadiri[1], Towa Olivier William Kamgaing[1], Matthias Waltert[2]	Bushmeat Hunting and Sustainability of Blue Duiker Off-takes in the North-east Periphery of Korup National Park, South-west of Cameroon	In Afrotropical rainforests, bushmeat off-takes exceed the sustainable harvest rates even if hunting is practised with rudimentary methods. The aim of the present study, carried out from May to September 2010 (during the rainy season) in the North-eastern border of Korup National Park (KNP) in South-west Cameroon, was to analyse patterns of bushmeat hunting and to evaluate the sustainability of blue duiker off-takes. A total of 65, out of the 187 hunters and trappers found in the study area, were monitored, in the forest and in villages, in order to map village hunting territories, to evaluate the hunting effort and to estimate the harvested biomass. Age structure of the blue duiker population was determined by analysing the tooth eruption and wear in the lower jaw particularly for the molars. A questionnaire was administered to 47 out of the 65 hunters and trappers monitored. We found that trapping was performed by 80% of hunters. The average number of traps per trapper was 108. Snare-traps density was 156 traps/km[2]. Traps, that functioned continually days and nights, were checked on average every 3.1 days. The duration of a gun-hunting expedition, including resting time, was 5.5 days. The average harvested biomasses were 0.92 kg/gun-hunter/day and 0.7 kg/trapper/day. About 55% of the total off-takes were sold, given a daily average income per hunter of 488.63 CFA francs (i.e. 0.75 Euros). Blue duikers, the 3rd most hunted species in number, constitute up to 23% of the total harvested biomass. When applying the Feer's (1996) logistic model, off-takes of blue duikers were 6 to 21.2 times higher than the maximum and minimum sustainable productions for the study area. However, sex and age class structures suggested that the blue duiker population could be recovering from the current level of off-takes. Therefore, to draw a definitive conclusion, it is necessary to collect similar data in the dry season.
Nsai Kingsley Yongyeh[4] and Roger Ngoufo[4]	Beliefs systems and wildlife exploitation at the northern periphery of the Korup National Park, Cameroon	Culture as a tool in conservation biology must take into account the role of social taboos in traditional societies. Previous studies showed that certain animals are regarded as symbols of power and respect and are therefore considered as sacred and may not be hunted. Similarly, there are some tabooed species that are only used for sacrifice or ceremonial purposes and connect the people with their ancestors. Such species tend to be highly protected thus promoting sustainability. We studied beliefs and taboos of the people of the northern periphery of the Korup National Park based on four forest villages' field studies, with the aim of identifying and characterising main agents and their relationships in a potential community wildlife management system. Studies were based on questionnaire surveys at household level. A total of 164 households were surveyed over a total population estimated at 950 inhabitants. Fifty-seven percent of the respondents still perceive wildlife as a resource that can never get extinct, 36.5% as a resource that if not well managed can become extinct and 6.1% have no idea as far as sustainability is concerned. Seventy percent of the households acknowledge the use of wildlife for traditional rites. Some beliefs favour sustainability while other are against it. Such practices include animals' products given in huge quantities to the Ekpe secret society for initiation. On the other hand, animal totems do still exist in several households (e.g. for the chimpanzees). In practice, taboos are based on beliefs so there's no clear boundary

		between the two. Even though the people were aware of the official hunting regulations of 1994, none of the respondents hold an up to date arm licence or a hunting permit at all. The major reported reasons were expensive transport fares to the administrative offices and the lack of enforcement by the government. While traditionally, monetary fines and goods are still used to punish violations of rules; new regulations are also proposed by household heads to include the ban of hunting by strangers and rendering obligatory for hunters to also own farms.
Kadiri Serge Bobo[1], Emeka Obioha[5], Roger Ngoufo[4], Saka Oladunni Jimoh[6], Matthias Waltert[2]	Managing forest wildlife for human livelihoods: A multi-agent systems model to assess socio-economic and ecological sustainability	Bushmeat consumption, the consumption of meat from wild forest animals, is an important part of livelihoods in rural West- and Central Africa. Based on extraction-production models it has been suggested that in the Congo Basin bushmeat protein supply would drop by 81% by 2050 in a 'no-change' scenario of current extraction levels (Fa et al. 2003). In order to secure this resource for the future, sustainable harvesting in community-based wildlife management (CWM) approaches is a potential option, aiming at maintaining the recommended daily protein allowance (RDA of 52 g per person per day, FAO). However, the social, economic and ecological sustainability of forest wildlife management has rarely been investigated in a holistic approach. The poster presents the approach of an international and interdisciplinary African-German research team to assess conditions under which CWM can be made socio-economically and ecologically sustainable. In a multi-agent system (MAS) approach, we study principal actors (or 'agents': e.g. hunters, traders, wildlife), their characteristics and their relationships and simulate effects of different approaches to manage wildlife, in particular populations of two species of small- and medium-sized antelopes ('duikers' Cephalophus spp.) on household economy. Data are being gathered for an 'artificial' model landscape of the Korup / Oban Hills region (CMR and NGR) on site, and aims at simulating a realistic picture of the current system in this and other, similar regions. We use the CORMAS platform, which serves as main tool both for scientific analysis and for companion modelling in negotiations with stakeholders. The project is composed of five subprojects and has a strong research capacity building component: during 2008-2011 it supported four PhD, nine Master level (including two Diploma, six M.Sc., one M.A.), nine Forest Engineer (Diplome d'Ingenieur des Eaux et Forêts) and an uncounted number of B. Sc. level students. Nineteen of these 23 students are African nationals. The project is funded through the VolkswagenFoundation's 'Africa-Initiative' (Knowledge for Tomorrow). Co-Funding of the project is available through CODESRIA (Council for the Development of Social Science Research in Africa), CEW (Cameroon Environmental Watch), CIRAD/CIFOR: Economic analyses of conservation strategies (CORUS project), and GIZ/KfW: Wildlife Monitoring.
Matthias Waltert[2], Kadiri Serge Bobo[1], Olive Ngalim[1], Lars Gorschlüter[7], Christian Kiffner[8]	Is it really 'All for Africa'? - the fraudulent social and ecological argumentations of oil palm developing institutions	The increasing world-wide demand for palm oil is leading to increased investments also in Africa, especially after the deforestation ban in Indonesia. In order to 'sell' their strategies to socially and ecologically responsible shareholders and international organisations, local government officials and agro-investors argue for palm oil development using keywords such as 'economic development', 'poverty alleviation' and even 'nature conservation'. Based on a case study from the Korup region, West-Central Africa, we show that such argumentations may be flawed and even fraudulent, by comparing the probable future livelihoods of people of 38 villages after creation of a 60,000 ha oil palm plantation with their current economic situation. We also discuss the potential effects of oil palm development for the protected areas in the region. Based on a sample of 194 households from seven villages in the region, the current yearly income of the 38 villages located within the designated plantation area can be estimated at € 2,745,196 (€ 1,762 per household, mainly from farming). Based on estimates of household size, this equals a daily income of 1.4 € person-1*day-1 and is well above the poverty line of 1 US$ (0.70 € person-1*day-1). After creation of the plantation, resources currently free but very important to people (water, firewood, food and other forest products and ecosystem services) would likely disappear, leading to migration and increased pressure on protected areas. A concerted international effort is needed to increase pressure on African government officials to halt such developments and to guide investments in Africa into more sustainable and socially and ecologically acceptable endeavours.
Emeka Obioha[5], Paul	Local Community	Community-based Wildlife Management (CWM) approach has been identified as an effective ethical way of integrating the goals of

Isiugo[9]	Participation in Wildlife Resource Conservation in Oban Hills of Nigeria	wildlife conservation with the needs of the rural poor in the tropics. The fact that The Cross Rivers National Park (CRNP) located at Oban Hills, Nigeria, was created by Acts Nos. 36 and 46 of 1991 and 46 of 1999 respectively locates its control under the purview of the Federal Government of Nigeria. This raises the question on the extent to which the local population participate in the conservation of wildlife species and what plans they have for the future, against which background this study was motivated. Based on in-depth interviews and key informant interviews conducted on a sample of purposively chosen members of the local communities, including the traditional leaders and civil society groups, the study shows arrays and tracjectories of local peoples participation in wildlife conservation. Eventhough the local people do not formally participate in the implementation of conservation policy, which is an exclusive duty of the designated government agency in charge of conservation, they form part of the informal but active sector in this mandate. Among the identified functions of the community leaders, liaison with government agencies (39.9%), creating public awareness (23.1%), arresting violators (17.5%) and enforcement of local taboos (13.3%) are significant. Their entry point has usually been the implementation of traditional taboos and preservation of the customary values and laws surrounding conservation. Apart from this the local people are also physically involved in policing of the forests against encroachment for hunting purposes. The study also revealed how the community members, especially the leaders are involved in public education and enlightenment campaigns organised by non governmental organisations (NGOs). Inspite of the evidence of local people's participation in the conservation of wildlife resources in their vicinity, there is no evidence yet to suggest that their participation is sustainable or that they are satisfied with the whole process of conservation. It is thus evident from this study that there are apparent local structures in favour of wildlife conservation which need to be integrated or harnessed by the government structures
Saka Oladunni Jimoh[6], Emmanuel T. Ikyaagba[6], Adesoji A. Adeyemi[6], Abideen Alarape[10], Matthias Waltert[2]	Preliminary Information on the Density and Distribution of Duikers in the Oban Sector of Cross River National Park, Nigeria	Duikers (Cephalophinae) represent a very high percentage of animal species killed for meat across forested West and Central Africa, and their populations are likely becoming depleted even in protected areas. There is therefore a strong need to provide baseline data for wildlife conservation, monitoring and management. So far, however, there is but very few reliable biological and ecological data on duikers, especially in Nigeria. We assessed the current status of duiker populations in the Oban Sector of Cross River National Park, using the line-transect method. Diurnal and nocturnal surveys were conducted along 32 transects of 2km length each in four land use types viz: core of the park (closed canopy forest), buffer zone (secondary forest), farm fallow and plantation. Eight transects were located in each of the land-use types in four locations evenly distributed over the Oban Division of the Park. After 508 km survey effort on these transects, only two out of four species of duikers of the region were recorded, namely: Ogilby's (Cephalophus ogilby) and blue duiker (Cephalophus monticola). The two larger duiker species known from the region (yellow-backed C. sylvicultor and bay C. dorsalis duiker) were not observed at all. Using habitat as a covariate in modelling detection probability in DISTANCE 6.0, we calculated densities of each species and for each habitat. In the blue duiker, estimated densities ranged from 15.5 (95% Confidence Interval C.I.: 7.8 − 30.9) in the core, over 5.8 (C.I.: 2.6-12.9) in buffer and 0.9 (C.I.: 0.09-10.1) individuals per km2 in fallow to no duikers in the plantation. In the Ogilby's duiker, estimated densities ranged from 1.6 (95% C.I.: 0.7-3.7) individuals per km2 in core, over 1.6 (0.8 − 5.1) in buffer to no duikers in farm fallow and plantation. Based on these estimates, population sizes were estimated at a minimum of 16,000 individuals (lower bound of the 95% Confidence Interval) for the blue duiker and 1,600 individuals (lower bound of the 95% Confidence Interval) for the Ogilby's duiker in the 2,866 km2 study area, with most occuring in the 2,064 km2 core area of the Park (lower bound of C.I: 16,100 blue and 1,400 Ogilby's duikers). These data may serve as a basis to call for increased conservation efforts in order to restore depleted duiker populations and as a baseline for a model on hunting management. The apparent absence of yellow-backed and bay duikers may be an indication that these two species have already become locally extinct as a result of hunting and land use. There is therefore an urgent need to improve on the management of the Park.

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3. KURZE ZUSAMMENFASSUNG IN DEUTSCH

Der vorliegende Bericht enthält die Ergebnisse des im Rahmen der Afrika-Initiative geförderten Projektes der Volkswagen Stiftung "Managing Forest Wildlife For Human Livelihoods in the Korup-Oban Hills Region, West Central-Africa". Er enthält Informationen über den Stand der Arbeiten von fünf Arbeitsgruppen der Unversitäten Göttingen, Dschang, Yaoundé I und Ibadan, sowie des Nigerian Institute of Social and Economic Research. Das Projekt zielt auf die Frage ab, ob und wie kommunale Bewirtschaftung von Wildtierressourcen sozial und ökologisch nachhaltg gestaltet werden kann. Anhand einer Fallstudie am Rande der Nationalparke Korup und Cross River in Kamerun und Nigeria, werden intensiv die Muster der Jagdstrategien lokaler Jäger, deren Beute, sowie sozio-ökonomische Zusammenhänge untersucht, um diese im Rahmen eines Multi-Agenten-Ansatzes im Computer abzubilden und damit eine Möglichkeit zu haben, neben einer Analyse der derzeitigen Situation über Simulationen künftige Management-Ansprüche der Lokalbevölkerung zu überprüfen. Das Projekt ist stark anwendungsorientiert, partizipativ, interdisziplinär und international ausgerichtet. Es besitzt außerdem eine starke Ausbildungsförderungskomponente, erhalten doch 23 Studierende (MSc/PhD level), darunter 19 Afrikaner, die Möglichkeit im Projekt eine Abschlußarbeit zu verfassen. Dies ist besonders wichtig, da sich die Möglichkeiten der Ausbildung im Bereich Wildtier-Management vor allem in Kamerun auf wenige (eine!?) Universität(en) beschränkt und zudem die Ausbildung zumeist ,theoretisch' stattfindet, da viele Universitäten von Wild-Schutzgebieten weit entfernt sind. Die fünf Arbeitsgruppen haben die folgenden thematischen Schwerpunkte: (1) Analyse von raum-zeitlichen Jagdmustern und Wildtierressourcen als Basis für ein Multi-Agenten-basiertes Modell sowie Erstellung der räumlichen Basis für die Modellierung (,model landscape'), (2) Einflüsse von Jagd und Landnutzung auf Wildtier-Ressourcen in Nigeria, (3) Sozio-kulturelle Faktoren der Wildfleischnutzung in Nigeria, (4) Soziale und ökonomische Bedingungen für die Wildtiernutzung in Kamerun und (5) Wildtier-Monitoringmethoden und empirische Befunde über den Status von Wildtieren auf regionaler Ebene. Die übergreifende Datenanalyse und Modellierung wird hauptsächlich durch Herrn Dr. Kadiri Serge Bobo, Universität Dschang, übernommen. Er kooperiert intensiv mit CIRAD in Montpellier, wo mit Hilfe von Herrn Dr. Christoph Lepage Daten aus Kamerun parametrisiert, in die Computersprache Smalltalk übersetzt und Sensitivitätsanalysen durchgeführt werden. Erste Modellierungsergebnisse (Simulationen) zur sozial-ökologischen Nachhaltigkeit des Fallenstellens sind vorhanden und werden gemeinsam mit anderen Ergebnissen gegen Ende des Jahres auf dem Tropentag, Bonn, vorgestellt. Das Projekt kooperiert außerdem mit weiteren Wissenschaftlern, zum Beispiel bezüglich der Analyse der Juristischen Grundlagen für Wildtiermanagement in Kamerun mit der Nichtregierungsorganisation ,Cameroon Envirnonmental Watch CEW', bezüglich einer ökonomischen Analyse von Schutzmaßnahmen mit CIRAD/CIFOR (CORUS Projekt, Dr. Guillaume Lescuyer), bezüglich der Metadaten-Auswertung von Wildtier-Daten aus Südwestkamerun mit der Gesellschaft für Internationale Zusammenarbeit GIZ/Kreditanstalt für Wiederaufbau KfW sowie den Regionalbüros von World-Wide Fund for Nature WWF/Wildlife Conservation Society WCS. Es erfährt ebenfalls Co-Finanzierung (Netzwerk-und Publikations-Förderung) aus Mitteln von CODESRIA (Council for the Development of Social Science Research in Africa, Dakar, Senegal).Der vorliegende Bericht enthält außerdem einen Abschnitt mit kritischer Selbstevaluierung, sowie Informationen über den Wissenszuwachs aufgrund der internationalen und interdisziplinären Ausrichtung des Projektes, über dessen Medienarbeit, Listen der studentischen Abschlußarbeiten, sowie der bisherigen Veröffentlichungen.

4. LIST OF ABBREVIATIONS

Abbreviation	
BSc	Bachelor of Sciences
CEW	Cameroon Environmental Watch, Yaoundé, Cameroon
CFA	Local currency (655 CFA ~ 1 Euro)
CHZ	Community Hunting Zone
CIFOR	Centre for International Forestry Research Yaoundé, Cameroon
CIRAD	Agricultural Research for Development Montpellier/Yaoundé, France/Cameroon
CMR	Cameroon
CODESRA	Council for the Development of Social Sciences Research in Africa, Dakar, Senegal
CORMAS	Common-Pool Resources and Multi-agent Systems
CORUS	Economic Analysis of Conservation Strategies (project by CIFOR/CIRAD)
CRNP	Cross River National Park
CSRR	Cross Sanaga River Region
CV	Coefficient of Variation
CWM	Community-based Wildlife Management
DRC	Democratic Republic of the Congo
FAO	Food and Agriculture Organisation
GIS	Geographical Information System
GTZ	Gesellschaft für technische Zusammenarbeit
IUCN	International Union for Nature Conservation
KfW	Kreditanstalt für Wiederaufbau
KNP	Korup National Park, Cameroon
MA	Master of Arts
MAS	Multi Agent System
MSc	Master of Sciences, or equivalent
NGO	Non-Governmental Organization
NGR	Nigeria
NISER	Nigerian Institute of Social and Economic Research, Tshwane University of Technology, Nigeria
NP	National Park
NTFP	Non-Timber Forest Products
PhD	Doctor of Philosophy, or equivalent
RDA	Recommended Daily Allowance
SPSS	Statistical Package for the Social Sciences
TCC	Territoire de Chasse Communautaire
TRC	Transformation Reef Cameroon
WCS	Wildlife Conservation Society
WWF-CARPO	World Wildlife Fund Central African…
ZICGC	Zone d'Intérêt Cynégétique à Gestion Communautaire