

THE CHALLENGE OF TARGETING DIFFERENT USER GROUPS WITH THE BIOTA EAST AFRICA ATLAS

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1. BACKGROUND

Towards the end of the BIOTA East Africa research project (<http://www.biota-africa.de>) the demand by the counterparts from Kenya and Uganda arose for a product to unite and visualise the vast amount of geospatial data collected or derived over in total nine years of interdisciplinary biodiversity research (see http://www.biota-africa.de/East_GISWeb1_ba.php?Page_ID=L800_04_03). Within BIOTA-East three forest remnants of East Africa have been intensively studied (cf. e.g. Lung and Schaab, 2010) which resulted in valuable information on the environmental transformations that have occurred within the last century (e.g. Mitchell, in print). The geodata processed mainly relates to land/forest cover change timeseries, forest use histories, farmland use and structures (incl. scenarios of rural livelihood), and spatial extrapolations of biological field findings (Schaab et al., 2009b). Cooperations with Kenyan counterparts in a participatory forest management process (Mitchell et al., in prep.), capacity building efforts (Schaab, 2007), as well as the testing of geospatial visualisations by people in Kenya (Schaab, 2009) have contributed to a better understanding of the various needs regarding an adequate presentation of geospatial data.

On this thorough basis an atlas with the overarching theme ‘Rainforest Change over Time’ was planned as a final product. When asked what user groups the atlas should address, the counterparts’ answer was all: i.e. decision makers, scientists as well as the local people (Schaab et al., 2010). The product is to give an overview of the rainforest areas under investigation, to provide insight into the spatially explicit landscape-scale research results and their mutual linkages, and to constitute a basis for future management decisions towards the sustainable use of the forest resources. The atlas concept was guided by the idea to unite all spatially presentable BIOTA-East research outcomes in one representative volume and to allow for comparing the three investigated East African rainforest areas wherever possible. Here, particular emphasis has been put into providing a balanced and well-rounded picture of the area without being repetitive although having three distinct user groups in mind.

While in a previous paper (Schaab et al., 2009a) the atlas concept was described, with The BIOTA East Africa Atlas (Schaab et al., 2010; see figure 1) now being finalised and available we like to point out the various challenges encountered during the realization of the atlas as well as of its dissemination and use. The challenges are closely linked to the aim of creating one atlas for three user groups.

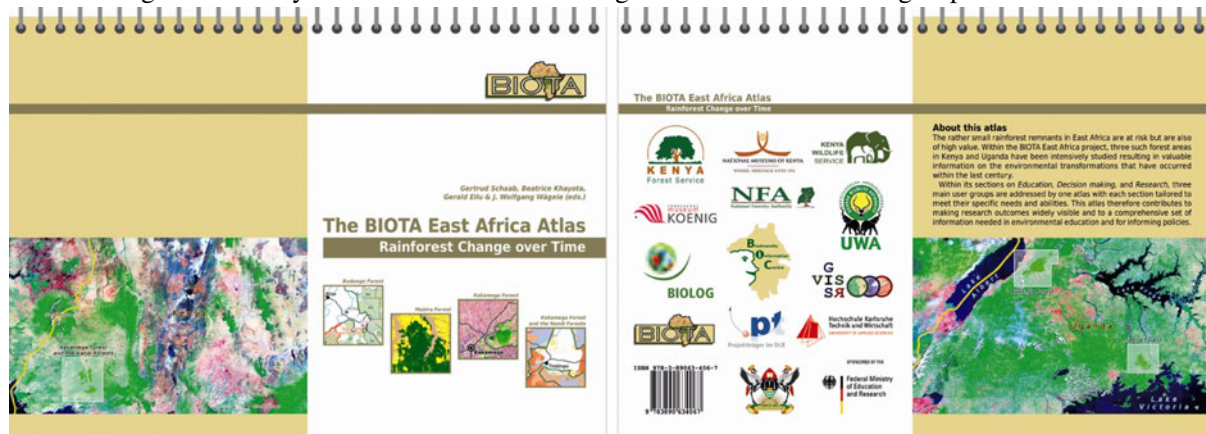


Fig. 1: Front and back cover of *The Biota East Africa Atlas. Rainforest Change over Time*.

2. THE ATLAS MAKING

A printed publication has been preferred to a digital one as it is a time-honoured format and due to the continuing difficulty in deploying digital media in Africa (cf. Schaab, 2009). In order to facilitate the communication of the content and to make the reading of the atlas as interesting as possible, not only the display of maps was considered but also of accompanying text, graphs, tables and photographs. Both decisions are linked to producing an atlas which should be useful in Kenya and Uganda too but not yet

specifically to the different user groups targeted. As the atlas should be easy-to-handle the A4 landscape format has been chosen with a wire-O-binding along its longer side, also for keeping shape longer. A3-sized copies were printed in addition for educational purposes.

The approach chosen for the technical realization, as already described in Schaab et al. (2009a), is as follows. The atlas was created i) starting with editing of the geodata and the composing of maps in a geographic information system (GIS), ii) the maps were refined as well as the graphs created in a vector graphics programme, iii) all five content elements were combined in a desktop-publishing software, and finally iv) proof-reading and printing followed. In total 1000 atlas copies were printed, 150 of them in double size (i.e. in A3).

Several groups of people were involved in the atlas project. It had to be decided on the board of editors, including here the Kenyan and Ugandan BIOTA-East coordinators as well as the German project head. Thus all countries involved are represented. The list of contributing authors is long: besides those of the subproject E02, which dealt with the processing of geospatial data, other subprojects as well as a scientist from outside BIOTA were asked to publish their spatially-explicit scientific results. People living in the areas investigated checked map content or provided valuable hints. The many photographers are acknowledged by labelling the photos with their names. Atlas cartography and production took place at Karlsruhe University of Applied Sciences and covered all, the selection of content elements, overall layout and creation of graphics, map design, and text writing. Only the printing and binding was given to an external contractor.

The time frame was rather tight. Initially the idea for an atlas had already been included in the proposal of the third project phase. The request for a substantial cost reduction led to the decision to do without. However, the counterparts from Kenya and Uganda surprised with a sincere request for an atlas at the International BIOTA Africa Conference in Spier in autumn 2008. The chance of handing in a proposal for increasing the budget was offered. For that conceptualising of the atlas followed. With the okay from the funding German Federal Ministry of Education and Research (BMBF) finally, the start of actually working on the production of the atlas started in August/September 2009. The only chance of introducing and discussing an atlas pre-version with Kenyan and Ugandan counterparts was during a visit to Kenya in March 2010. The very latest the printed copies had to be available, i.e. having been sent over to East Africa, for the official atlas launch at Kenya Wildlife Service towards the end of August 2010.

3. CHALLENGES ENCOUNTERED DURING ATLAS PRODUCTION

3.1 Meeting the demands of distinct user groups

Fulfilling the wish of the counterparts (see chap. 1), the atlas was conceptualised addressing three groups of users. Providing adequately prepared information to people of diverse educational background within one single atlas is, however, a real challenge and to our knowledge only one other printed atlas has tried to achieve such a goal (Murgia et al., 2002). a) The local people living in close vicinity to the forests generally have a shorter formal education and require easy-to-comprehend atlas content, while b) decision makers should be supported in their capacity to draw conclusions from the atlas maps, whereas c) scientists expect a high level of detail and thematic depth (Schaab et al., 2009a).

Consequently, the atlas has been subdivided into the three sections Education, Decision making, and Research, each being tailored to the specific needs and abilities of the respective user group. In the Education section the users are offered maps to learn about their home areas and, in particular, to create map reading literacy. In the Decision making section differences within and between areas are emphasised and other maps referenced to enhance map understanding. In the Research section the methods for gaining the visualised results are explained and the final map presentations are discussed. However, this does neither mean that the atlas is split in three independent parts nor that the users are restricted to their specific section. It is advised to read the atlas in the given sequence, because the three sections following each other create an increasing level of complexity. It is 'accumulative' in the way that local people might stop at the end of the Education section and planners at the end of the Decision making section.

Working with five content elements (see chap. 2) strongly facilitates the tailoring of the information presentation for each user group. A colour coding per section provides a visual guidance to the reader. Depending on its complexity, a certain topic can be found predominantly in one of the three sections, or as e.g. in case of forest cover change is displayed in all three sections but applying varying visualisation methods: three visual layers in Education, use of a matrix legend in Decision making, a synthetic map presentation in Research. Here, single topics were tailored to the three distinct user groups by drawing the reader's attention in different ways.

This is strongly supported by the different styles of the accompanying texts. The text for each section has been written by a different person emphasising suitable and distinct text characteristics. In the Education section easy-to-grasp sentences are made use of. It is simply explained what can be seen on the maps while, wherever applicable, offering other reference values for comparison. The textual explanations of each chapter are headed by a question as the title, and within the text bodies the readers are directly addressed (by using 'you'). In the Decision making section the text titles are statements pointing to the relevance. The texts focus on the usefulness of the map contents and depictions, either by offering an interpretation or, in the case of indices, by describing the methods and the results. Here, technical terms are allowed. Each chapter ends with conclusions. The texts of the Research section follow the scientific style, including literature references, although space is only for methods and results. Here the titles highlight the 'what' and the 'how'. Thus we hope to have met the various requirements of the user groups addressed without being disturbing as the atlas nevertheless presents the complete picture only when considered as a whole.

3.2 Satisfying participation

An interdisciplinary, inter-cultural scientific network like BIOTA-East asks for participation, in particular when aiming at capacity building and at implementations. How was this achieved within this atlas project? First of all we agreed on an editor team with people from all three countries involved. Being from and working in Kenya or Uganda, certain tasks could be resolved much easier locally. Via forewords the remaining main counterpart institutions were acknowledged. Here, the goal was a balanced selection of people/institutions between Kenya and Uganda as well as between East Africa and Germany. An official launching of the atlas in Nairobi and Kampala in August 2010 was of great importance for the East African counterpart institutions, thus sealing their ownership of The BIOTA East Africa Atlas.

During two workshops in Kenya a preliminary atlas version could be introduced, feedback on the atlas was collected, and organisational matters treated (regarding editing, printing permissions, forewords, etc). Comments on atlas content by the local people was asked for resulting in feedback on spellings of local names or how to refer to certain areas. Furthermore, agreements on sensitive content (e.g. definition of poverty) and phrasing (e.g. in the context of governmental sanctioned actions) could be reached. On the BIOTA East Africa Concluding Conference in Kakamega (March 2010) the atlas in progress could be made known to a much wider audience. Requests by East African project partners to contribute text were not feasible, as they were made at a far too late stage. In addition, their general lack in map reading experience as well as a situation where many people claim a text contribution would result in a rather heterogeneous overall text. Maybe a more participatory approach could be chosen if there will be the chance for another atlas or a second volume. But this would require further development of capacities and for sure a much longer time span for production. However, a certain quality standard has to be met despite the claim for participation.

3.3 Harmonisation and quality assurance

Achieving a high quality in a joint project of many contributors and within a rather tight time frame is another challenge. Quality was assured by involving various people: Having been part of the core planning team responsible to come up with a new participatory forest management planning document for Kakamega Forest ecosystem (Mitchell et al., in prep.) subproject E02 has been sensitised for the critical and confusing issue of forest names (cf. Mitchell et al., 2006). Here for all forest areas major efforts went into checking of the true official forest names, this with the help of counterparts. This harmonisation effort is of value for any future planning or scientific work. People from the area were helpful with their local knowledge on correct spellings of local names and for a proper selection of base-map elements. As three different people not speaking English as their mother tongue prepared the texts (see chap. 3.1), first a harmonisation of the entire text by one of them assured consistency, the avoiding of repetitions and an overall-balanced content. Next, the final text editing was performed by a native speaker with a thorough background on all three forest areas, thus still checking content representation. In addition, every map author was asked for a careful checking of her/his map plus accompanying text, while a single cartographer was responsible for the layouting of all maps and the overall look, thus ensuring the same style throughout. Nevertheless, one editor overlooking all content elements together in the most careful manner was needed to ensure an atlas forming a consistent unit.

4. THE ATLAS CONTENTS

The atlas consists of 100 pages, includes 84 maps contributing to 37 map themes within 6 main topics, 47 photographs, 18 graphs, and 12 tables. The map themes draw a line from (1) overview maps on e.g. orography, land cover, and forest infrastructure, via thematic maps on (2) population, (3) forest cover change, and (4) forest fragmentation and disturbance, to those maps with topics related to (5) fauna and flora, and (6) livelihood. Maps can be found for all the three investigated forest areas, Kakamega Forest in

western Kenya and Mabira as well as Budongo Forest in Uganda. In the case of Kakamega Forest the maps are often extending to the Nandi Forests which up to now have been widely neglected, however, once formed a single forest block together with Kakamega Forest (cf. Mitchell et al., 2006). For demonstrating their spatial context a few maps cover an according region of East Africa, or Kenya or Uganda. Not every topic could be displayed for all three forest areas due to the differing degrees of BIOTA-East research performed at the sites so that Kakamega Forest and the Kakamega-Nandi forest complex are depicted more often. Opportunities for comparison are nevertheless provided in many instances, both between forests and regarding varying visualisation methods (chap. 3.1). Being subtitled 'Rainforest change over time', the atlas is obviously also strong in enabling comparisons over time. For a detailed atlas content overview and the possibilities for comparison see table 1.

Maps	KF	KN	MF	BF	K	U	EA	sec. 1	sec. 2	sec. 3	GTP	
Overview maps												
Geographic overview	•						X	X				
Orographic overview	•						X	X			G	
Land cover and protected areas	•				X	X		X			T	
Topographic overview	•	X	X	X				X			P	
Kakamega Forest Tourist Map	X							X				
Forest infrastructure	•	X	X	X					X		P	
BIOTA biodiversity observatories	•	X	X	X						X	TP	
Thematic maps												
Population												
Population density	•	X	X	X				X			TP	
Projected population density and growth *		X							X		G	
Poverty and cattle		X							X			
Population density (gridded)		X								X	G	
Forest cover change												
Forest cover change *	•	X	X	X				X			TP	
Maps over time *	X'							X				
Land cover derived from satellite imagery	X'							X				
Land cover derived from aerial photography	X'							X				
Land cover derived from old topographic maps	X'							X				
Land cover time series (KN/MF: 6, BF: 4 time steps) *	•	X	X	X					X		G	
Forest cover change (matrix legend) *	•	X	X	X					X		P	
Place name evidence *		X								X	T	
Land cover development types *	•	X	X	X						X		
Forest fragmentation and disturbance												
Forest fragmentation index	•	X	X	X					X		G	
Forest fragmentation index (7 time steps) *	X'								X		P	
Local disturbance index	•	X	X	X					X		GP	
Commercial disturbance index	•	X	X	X					X		GP	
Forest cover change index *	•	X	X	X					X		GP	
Fauna and flora												
Army ants and ant-following birds (5 time steps) *		X								X	GP	
Forest types (5 time steps + 1 scenario) *	X									X		
Bird habitat guilds (3 time steps + 1 scenario) *	X									X	GP	
Vegetation	X									X	P	
Leaf area index	(•) X			X						X	G	
Livelihood												
Land use/cover derived from satellite imagery	X'							X				
Buyangu village	X'							X			GP	
Agro-ecological zones and natural vegetation		X							X			
Soils		X							X			
Farmland typology	X								X		GP	
Participatory forest management	X								X		P	
Review												
Biogeographic setting	•						X			X	P	
		16	17	12	13	1	1	3	20	28	15	

KF: Kakamega Forest; KN: Kakamega-Nandi forests; MF: Mabira Forest; BF: Budongo Forest; K: Kenya; U: Uganda; EA: East Africa; sec. 1: Education; sec. 2: Decision making; sec. 3: Research; G: graphic; T: table; P: photo; X': subset; •: comparison between forest areas; [comparison regarding varying visualisations; * comparison over time

Tab. 1: Map themes of The Biota East Africa Atlas grouped by their content and classified regarding geographical coverage, targeted user groups as well as accompanying illustration types. Possibilities for comparison also are marked (Schaab et al., 2009a, Tab. 1 updated and extended).

5. CHALLENGES FOLLOWING ATLAS PRODUCTION

5.1 Dissemination of the atlas

A challenge was also to transport two thirds of the printed atlases to East Africa in time. Instead of leaving dissemination to a publisher, it was decided to organise it in cooperation with our counterparts. Although it added significantly to the costs, this way it is hoped that the atlas will gain a wider local distribution. The company responsible for the transport to the airports in Nairobi and Kampala all of a sudden asked the client for a special type of packing. The next major hurdle was customs at the German as well as the Kenyan and Ugandan side with contradicting instructions. Luckily, the East African partners accepted our donations and organised their clearance from the port. At last, the atlas copies arrived and were just in time available for the launching events (see chap. 3.2; figure 2 left). Although in Kenya the official atlas launch was not the point of starting the handing-out of copies, both events contributed to making the atlas known within institutions and via the media even beyond.

Already when deciding on the number of prints, each editor added to the long lists of whom to consider with atlas copies: all the many people having been actively involved in BIOTA-East, whether scholars, scientists, reviewers or field assistants, the counterpart institutions, all libraries of higher education in Kenya and Uganda, the state and national libraries in Germany as well as supporters (e.g. BMBF, experts). In Kenya and Uganda sets of several atlases were meant for universities and training institutions close to the forests or run by counterpart institutions as well as to schools in the vicinity to the forests. In particular in East Africa, these lists serve as a means to make sure that every person/institution listed will have the atlas copies in hands eventually. This lies in the responsibility of the editors plus the officer of the Biodiversity Information Centre at Kakamega Forest, which was established via BIOTA funding. However, dissemination is taking time, in particular for Kenya with 500 copies to be delivered (as compared to 170 in Uganda). In the meanwhile letters from libraries in Kenya are arriving acknowledging the donation, some of them kindly requesting for more copies.



Fig. 2: Photographic impressions from the launch of The Biota East Africa Atlas in Nairobi (left) and the first 'geodata use' workshop in Kakamega employing the atlas (right), both August 2010.

5.2 Actual atlas use

The still remaining challenge is the actual use of the atlas locally for the benefit of the forests and the people. Observations when showing around the atlas clearly point to the power of photographs which receive first interest almost throughout. Those not familiar with maps (e.g. field assistants) only read the texts without caring much for the maps, although texts and maps belong closely together. Generally it only needs little, i.e. someone starting to point out things which the maps are revealing, to raise real interest in this means of depiction. Here, workshops incorporating the reading of atlas maps will increase the awareness of the availability of thorough, visually displayed knowledge and will foster map reading literacy in a society where map reading is not necessarily part of education (Schaab, 2009). A first such workshop with a mixed group of Kakamega Forest stakeholders took place in August 2010 (see figure 2 right). Atlas copies in A3 size proved to be highly useful for grouping several people around. By telling stories depicted by the maps of their home area as well as when giving them tasks to solve, engaged discussions related to nature conservation and the potential of geodata usage were easily steered. To conclude, with all the many information at hand now it only needs very little preparations for such effective training units.

6. CONCLUDING REMARKS

The BIOTA East Africa Atlas has been finalised in time and to full satisfaction. Some of the challenges encountered have their background in the cooperation with a less developed country. However, most of them added to the motivation of the core team involved, while only some were experienced as struggles. Most challenging was a) the exact fitting of text in the remaining, strongly varying space after having placed maps and graphics on each page, b) the organising of (joint) forewords (the printing process had even to be stopped), and c) the harmonising of atlas content prepared within a team of highly motivated individuals. All challenges related to the atlas production could be met within the tight time frame, for those left related to atlas dissemination and use we stay optimistic. This joint Kenyan-Ugandan-German effort would not have been possible without the fruitful and trusting cooperation which has evolved over the past nine years.

Three forest areas – two countries – one atlas: landscape-level BIOTA East Africa outcomes (geodata and interpretations) were made available in an appealing, easy-to-handle, and long-lasting format. Being unique in addressing target groups of considerably differing backgrounds, the atlas is hoped to contribute to an increasing awareness of the vulnerable East African rainforest ecosystems among the local communities. The atlas should also be of use in decision making for a sustainable forest management and conservation and will help to gain a better scientific understanding of the ongoing change processes and resulting patterns (Schaab et al., 2009a). It is to be judged in the years to come as to whether the challenge of addressing three distinct user groups within one atlas has worked out. In countries like Kenya and Uganda, however, in order to make full potential of maps and the use of geospatial data further broad capacity building is needed. With workshops based on our atlas we like to in particular target pupils and students and their teachers/lecturers as well as decision makers from the forest management and governmental authorities including the higher policy level.

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