



SUSTAINABLE LAND MANAGEMENT

THE FUTURE OKAVANGO





The Okavango, Namibia.

- **The Okavango ranks among the longest rivers in southern Africa and its volumes of water are imperative for the existence of many people. Over-exploitation and privatisation are however threatening this fragile ecosystem. German researchers are in the process of trying to prevent this from happening. They are implementing their expertise locally by providing models for alternative uses.**

The Okavango is in no hurry: In several tributaries it slowly crosses the mountains running through the middle of Angola, marking the border to Namibia for over 400 kilometres, before its volumes of water seep and evaporate after 1,600 kilometres into the swamps of the Okavango Delta in the northwest of Botswana – an area known to be the world’s largest inland delta. For approximately one million people the water catchment area of the Okavango is the most

»Nature is threatened by over-exploitation and privatisation.«

important life support system. For centuries they have been living off what nature has had to offer: they catch fish, grow crops, collect fibrous materials, firewood and building materials and use medicinal plants – all in harmony with nature. 500 bird species, 128 species of mammals as well as 150 species of reptiles and amphibians have so far been recorded



Charcoal for sale at the side of the road, Angola.

by researchers for the river delta alone in Botswana. For a long time nature here was in a stable equilibrium, but recently it has been disturbed. »Nature is being irreversibly threatened by overexploitation and privatisation«, says Norbert Jürgens. The Professor of Biodiversity from the University of Hamburg is the spokesman of the research group »The Future Okavango« (TFO).

This network of six universities and two research establishments from Germany as well as three African partner countries (Angola, Botswana and Namibia) are investigating the use and exploitation of natural resources in the Okavango region in ten sub-projects. The German Federal Ministry of Education and Research is funding the project until 2015 with 7.5 million Euros as part of the grant programme »Sustainable Land Management«.

Global problems are feared

To get an idea of just how fragile the Okavango ecosystem is, you only have to take a look at the upper reaches of the river in Angola where 37 years of civil war brought chaos and devastation, causing inhabitants to flee from the region. These refugees are now returning to their old homeland and as a result the total population in this region could increase to two million over the next 40 years, estimates Jürgens. This would have alarming impacts: Savannahs and grasslands would be used much more intensively and forests of ecological significance would be cleared and converted for agriculture. Moreover, there would also be negative global impacts: habitats



Local market close to Chitembo, Angola.

such as savannah forests for example are known to sequester a substantial amount of the world's carbon reserves.

Jürgens wants to create ecological awareness about these issues and interactions through this research project based on scientific expertise. »The goal is to provide instruments and scenarios for how people in the region representing different interests could sustainably use and preserve a multitude of natural resources«, he says.

Basic information is still lacking

Realising this goal for an area that covers some 430,000 square kilometres is no easy venture. Scientific data for the catchment area of the Okavango is still missing, particularly for Angola and therefore researchers still need to collect basic information – on agriculture for example. Soil scientists such as Dr. Alexander Gröngröft from the University of Hamburg are sometimes faced with unusual problems: »The amount of phosphorus is so small on most of the agricultural investigation sites that it cannot be detected using our conventional methods of analysis«, he comments. Such data is imperative however, since phosphorus interactions are essential as nutrients for agricultural crops. How can this vegetation grow with such a limited amount of nutrients? How does the nutrient cycle work when there are hardly any nutrients available? How can we intervene with the cycle to make the soil more fertile? These are just some of the questions that Gröngröft would like to find the answers to



Local women in Cussequ, Angola.

by implementing specific measurements and models together with his co-operation partners.

Most of the local inhabitants living along the Okavango depend on agricultural yields. »Subsistence farming« is the term that is normally used to refer to those families growing crops on their fields (usually millet,

»This cannot be compared to European conditions.«

corn or beans) predominantly for their own use.

It is not exactly huge quantities that the farmers are able to reap from these poor-quality soils. Gröngröft is aware of the fact that on average families in Namibia would harvest approx. 95 to 100 kilograms of millet per hectare annually, without the application of fertilizers or pesticides.

»This cannot be compared to European conditions, where on the same area of land an average of 7,000 kilograms of wheat would be harvested«, he says. Many farmers are so unhappy with the situation that if the land is so unproductive or the harvest insufficient, they simply clear the next area of forest to increase the area of land available for growing crops so that they are able to feed their families. This high rate of land consumption is simply not sustainable. In order to improve harvests, the TFO scientists have started running some model tests with a local NGO and farmers in the region of Kavango in Namibia on the border to Angola.



Illegally logged wood for building materials in Botswana.

Conservation Agriculture is the approach being adopted, with which they are hoping to harvest more corn or millet than previously on sandy and nutrient-poor soils. With this approach tests are being car-

»Whether or not this method of cultivation is successful, depends on just how committed the farmers are.«

ried out whereby the seeds that would have otherwise been distributed over the entire surface, are sown individually in small pre-drilled holes, which are then fertilized with cow dung and covered with compost. »Whether or not this method of cultivation is successful, depends on just how committed the farmers are.« Preliminary results have shown clearly higher yields. However what has been successful in this region does not necessarily mean that it will be equally successful elsewhere i.e. in Botswana or Angola: »Whether this method of cultivation will be successful also depends very much on the commitment of the farmers themselves«, says Dr. Michael Pröpper. The anthropologist from the University of Hamburg is using case studies to investigate how the inhabitants of three selected municipalities use the natural resources along the Okavango. Technological changes in agriculture cannot easily be applied because the dissemination of information down to the level of the farmers is very slow: »Knowledge transfer from the authorities to subsistence farmers



Large-scale irrigation systems in Namibia.

hardly ever takes place, as training initiatives for farmers only dispose of resources and personnel that are limited«, says Pröpper. One of the first insights from the project is the fact that new consumer desires from farmers are born as new markets develop. These new desires among local inhabitants who have lived off subsistence farming for most of their lives require an increased amount of capital that is mainly covered by exploiting more natural resources from the region. What is more: an increase in consumption results in an increase in the generation of waste.

Targeted by the agro-multinationals

Agro-multinationals are much better informed than the local inhabitants and have already targeted the fertile river valleys of the Okavango. »These companies grow *Jatropha* plants as biofuels so that they can cultivate them over extensive areas at favourable global fuel prices«, explains Jürgens. This could drastically change the agricultural land uses in the region, when in the future land is mainly used to grow fuel crops for the global market instead of for growing food crops for the domestic market. In spite of the potential change of land use to grow fuel crops, an intensification of agricultural systems can admittedly have its advantages for local inhabitants in rural areas: »It can lead to higher productivity and therefore increase the availability of food«, says economist Dr. Thomas Falk from the University of Marburg. It is important that the interests of local inhabitants are taken into account and that both their land and water rights are properly recognized.



Typical catch using traditional fishing equipment, Namibia.

Furthermore, companies should be required to pay for the costs of using the services of nature. This would induce incentives for a more sustainable use of natural resources. In order to be able to compare different land-use forms, the scientists are developing bio-economic computer models.

»In this way we are able to see which conflicting goals arise among land users for food production and environmental protection like for example soil quality«, states Dr. Stephanie Domptail, agro-economist from the University of Gießen. The monetary value for ecosystem services like for example the consumption of water by food producers can by all means be worked out.

Water dependency

The inhabitants living along the banks of the Okavango River are dependent on its water. Scientists still know very little however about the hydrological conditions of the river: What is the water quality like? Where is it stored? How does water dissipate? What is the influence of land use on water? The geographer Dr. Jörg Helmschrot from the University of Jena wants to find the answers to these questions together with his German and African colleagues as part of a TFO sub-project. »We want to model those processes that look at how water dissipation changes, if land uses change in the neighbouring countries and climate change takes place«, he says. For example: Researchers want to develop scenarios as to what would happen if there was an increase in water consumption in Namibia and if extensive irrigation



The Okavango delta, Botswana.

systems or dams were built over extensive areas for the production of energy in Angola or Botswana. In order for the controversy over water not to become a full-scale conflict as in some other areas around the world, the three neighbouring countries have already taken some precautions. In 1994 they established the Permanent Okavango River Basin Water Commission (OKACOM) with the aim of preventing conflicts over water use in the region. Ebenizário Chonguica, the president of this Commission is hoping for important insights from the TFO project in terms of sustainable land management: »Our information about the Okavango catchment area is still limited. We therefore still need more scientific information in order to be able to develop a management plan for the area and to advise policy-makers.«

»The ecological significance and the economic value of the Okavango are immense.«

TFO spokesman Jürgens, who has been conducting research in Africa for many years, is aware of the expectations that the African project partners have about the project. »The ecological significance and the economic value of the Okavango are immense for the three countries«, he says. The ecologist hopes to be able to draw some conclusions from the research project that can be applied to the whole continent with respect to a sustainable land management concept: »The project is of a case-study nature because



View of a valley close to Chitembo, Angola.

it illustrates the typical problems of Africa: population explosion, limited education, artificially-drawn borders from the colonial period, unfavourable predictions for climate change.«

»We provide important information to ministries, authorities, NGOs, and land users.«

The results from the TFO project are to be implemented at the local level over the next few years. »We will provide important information to ministries, authorities, NGO's, and land users«, says Jürgens. The scientific data act as helpful guidelines for decision-makers. In this way for example model-based scenarios can help to make decisions about those areas along the Okavango that should be used or protected in such a way so as to avoid the clearance of forests or the exploitation of water resources to the point of irreversible damage to the ecosystem. Jürgens: »If we can succeed in this way then both nature and people will benefit.«



Production systems that are being investigated in the region are: [intensive and extensive] agricultural systems, forestry systems

■ **The Future Okavango**
www.future-okavango.org



Grassland with termite hills, Angola.

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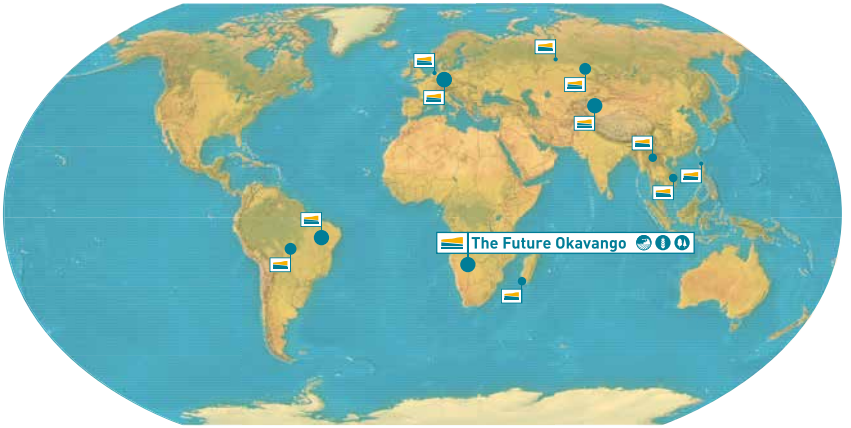
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