01/2012

Outlook Earth

Research into global change

“It’s Time for Africa”

How is climate change affecting the continent?

Picture: Fotolia

Climate change: the underestimated crisis?

Anyone scanning the news headlines for evidence of an impending climatic disaster can only conclude that there is no catastrophe (for the time being). Very different issues are currently defining the news agenda.

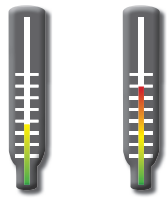
News coverage is understandably shaped by the latest topical events. Therefore, it is easy to overlook the fact that huge climatic changes are already looming on the horizon. In light of the potentially dramatic consequences of climate change for mankind, it is important not to lose sight of the long term effects of these processes.

One thing is certain: climate change has not gone away, even if some sceptics have attracted media attention by disputing its existence. While even the experts may argue about its extent and effects, there is, however, broad consensus on the reality of climate change and its main causes, as well as on the scale and urgency of the threat. Many scientists believe that Africa will be one of the parts of the world hardest hit by climate change – even though the continent contributes the least towards it.

Mankind is confronted with some very complex decisions for the future. The coming years will reveal whether and how prevailing global challenges will be dealt with, including climate change, water shortages, the loss of biodiversity, soil degradation, the scarcity of raw materials and the conflicts and flows of refugees resulting from these. There is often not sufficient knowledge to demonstrate the consequences of individual activities to the decision-makers in the affected regions and equip them with the appropriate tools for dealing with the problems – especially in Africa.

The Federal Ministry of Education and Research (BMBF) is therefore supporting research into global change in Africa with its framework programme "Research for Sustainable Development" (FONA). From the Cape of Good Hope to the Sahel, scientists from Germany are working with partners from Africa to examine the different changes and provide guidance, for example, on how to use land and provide drinking water in a sustainable way.

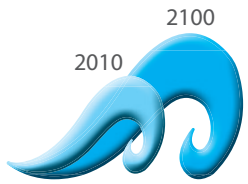
Increase in global average temperature by 2100:



1.8 - 4.0 °C

Source: Intergovernmental Panel on Climate Change IPCC 2007

Increase in sea levels by 2100:



18 - 59 cm

Source: Intergovernmental Panel on Climate Change IPCC 2007

Climate change exacerbates problems in Africa:

- **Desertification**
- **Water shortages**
- **Loss of fertile soil**
- **Loss of biodiversity**

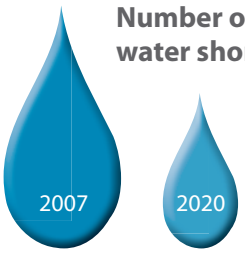
Source: Intergovernmental Panel on Climate Change IPCC 2007

Loss of yields in areas without artificial irrigation:

up to -50 %

Source: Intergovernmental Panel on Climate Change IPCC 2007

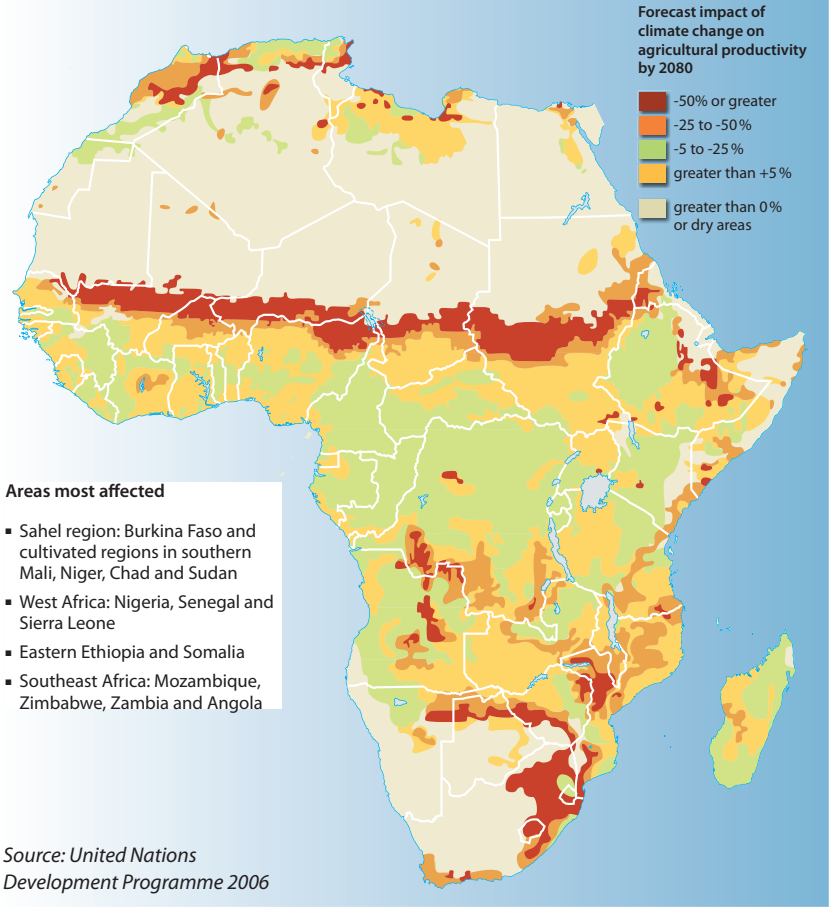
Number of people threatened by water shortages by the year 2020:



75 - 250 million

Source: Intergovernmental Panel on Climate Change IPCC 2007

Development of grain harvests by 2080

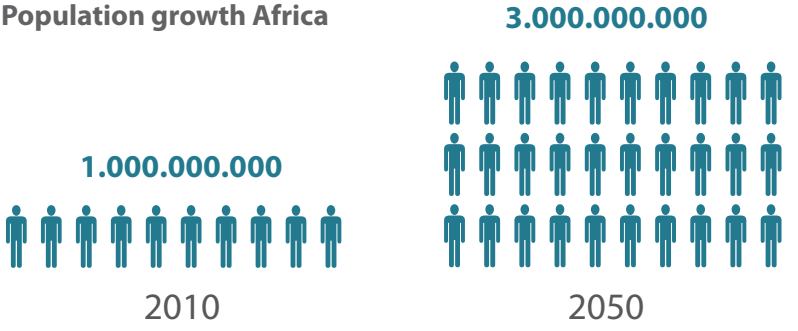


Source: United Nations Development Programme 2006

A **radical new approach** underpins the climate research activities in Africa supported by the BMBF: **"research *with*, instead of in, Africa."** The objective is to strengthen the scientific infrastructure in Africa to ensure that results are not lost when German research programmes end, but are carried on and can be used in the future. This will be achieved by building two science centres in southern and West Africa that will be jointly supported by the African countries.
Pages 4-5

Research in the Okavango region is already underway, in a natural paradise threatened by climate change, population growth and changes in food production methods. "The Future Okavango" project will identify the interaction between human activity and the unique ecosystem and help develop sustainable concepts for the region.
Pages 6-7

Population growth Africa



Source: United Nations Department of Economic and Social Affairs 2012

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➤ www.fona.de/de/perspektive-erde/

You may find useful material here.

Climate refugees globally in 2050:

up to 250 million

Source: Stern Review on the Economics of Climate Change 2006

Further links:

- ➤ www.fona.de
- ➤ www.zukunftsprojekt-erde.de
- ➤ www.pt-dlr-klimaundumwelt.de
- ➤ www.deutsches-klima-konsortium.de
- ➤ www.metoffice.gov.uk/climate-change/resources/hadley
- ➤ www.ncdc.noaa.gov
- ➤ www.ipcc.ch

“Research *with*, instead of in, Africa”

The Federal Ministry of Education and Research (BMBF) is supporting a number of African countries in setting up and running two science centres that will help them tackle the effects of climate change. The aim is to form a network of scientists from the continent and motivate governments to engage in joint research activities. Expertise in the region will be developed and strengthened so that the continent does not lose it when the research projects end.

West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL)

WASCAL locations

WASCAL partner countries

Scientific contact for WASCAL:

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Link:

➤ www.wascal.org

The African negotiating partners were suspicious. The proposal on offer from the Federal Government seemed too good to be true. Were the Germans really promising to help West Africa set up a science centre for research into climate change without dictating the research agenda? Were they actually proposing to invest up to 100 million euros here and in southern Africa over the next few years without wanting to use the results only for themselves? “The scepticism of many of the countries was almost palpable,” remembers Dr. Gisela Helbig. As head of the BMBF’s Global Change section, she is responsible for the construction of the climate competence centres in West and southern Africa.

In fact, the BMBF is taking a radical new approach. It aims to help those regions worst affected by climate change to set up appropriate scientific structures so that the countries in these areas are able to make their own valid decisions – for example, with regard to their land use and water supply. However, the funding is not charitable development aid, but an investment from which the BMBF expects to generate valuable knowledge in the fight against climate change. It is also about building and maintaining trusting partnerships with the countries involved, above and beyond the research collaboration.

The initiative is based on the belief that regional problems can only be solved with the help of regional research. “We need to create sustainable structures in the region and help establish a scientific community so that knowledge isn’t lost when the different aid programmes end, but is carried on,”

Southern African Science Service Centre on Climate Change and Adapted Land Use (SASSCAL)

Scientific contact for SASSCAL:
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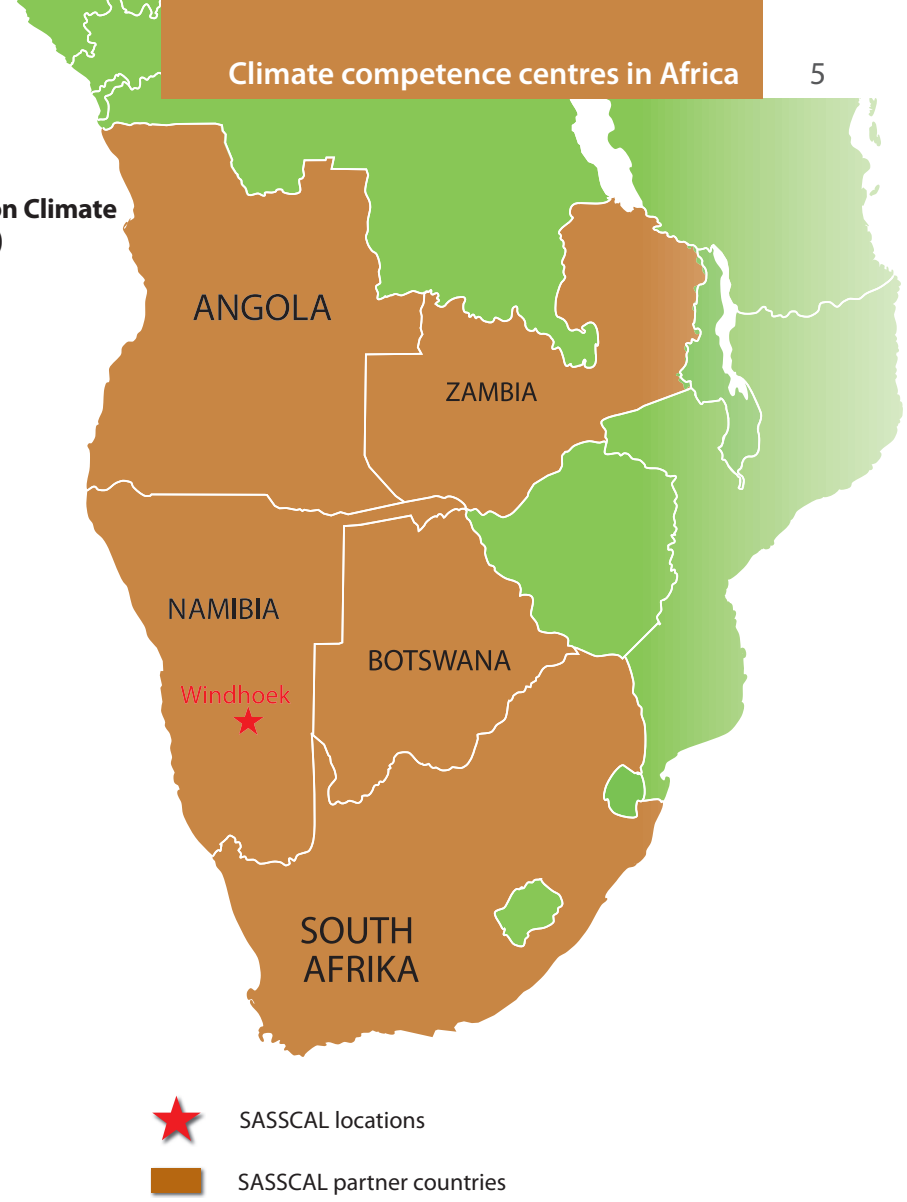
Link:
➤ www.sasscal.org



explains Wilfried Kraus, head of the BMBF's Sustainability, Climate and Energy subdivision. "Research *with*, instead of in, Africa" is the new objective.

After intensive negotiations, a cooperation agreement was signed on February 10, 2012 in Lomé, the capital of Togo, by Dr. Georg Schütte, State Secretary in the Federal Ministry of Education and Research, and ten African countries: Benin, Burkina Faso, Gambia, Ghana, Ivory Coast, Mali, Niger, Nigeria, Senegal and Togo. The agreement confirmed the construction of the West African Science Service Centre on Climate Change and Adapted Land Use (WASCAL) and guaranteed funding for a minimum of five years.

A new campus with laboratories and lecture theatres will be created in Ouagadougou, Burkina Faso, while the headquarters and administrative seat of WASCAL will be located in Accra, Ghana. Research findings from all of the participating countries will be collated in the climate competence centre in Ouagadougou. Every country has a programme for doctoral students that deals with a specific aspect, such as "Climate change and water (use)" in Benin and "Biodiversity" in Ivory Coast. The African governments have committed themselves to bearing shares of the running costs from August 2012. This proportion will increase from around five percent per year initially to twenty percent in 2016. The Federal Ministry of Education and Research is only shouldering the cost of the start-up funding in its entirety. The decisions about which research projects WASCAL will tackle in practical terms are in the hands of the Africans themselves. Scientists from the region together with their German counterparts have started a research programme examining the direct impact of climate change, like rainfall distribution and desertification, they will also look at the indirect effects, such as food supply, migration and security policy aspects.

"There is an awareness of the problems caused by the serious impact of climate change," says Professor Paul Vlek, WASCAL Executive Director, "but the expertise and the empirical data are lacking. Many relationships have not yet been researched, such as what consequences the type of land use in a country has for the climate in the region, or for the ecosystem and social system in neighbouring countries. Our goal is to bring the understanding of different relationships to a new level."

A similar centre to WASCAL is about to be established in southern Africa – the SASSCAL competence centre, which will have its headquarters in Windhoek, Namibia, and offices in Angola, Botswana, Zambia and South Africa. Regional research, educational and service structures will be jointly created.

Contact for both centres:
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A paradise under threat

The Okavango River and its delta feed one of the most important ecosystems in Africa. But the rich biodiversity of this wetland is undergoing radical change: climate change, population growth and exploitation of resources are all endangering the ecosystem, resulting in serious conflicts over land and water. "The Future Okavango" research project aims to help countries in the Okavango region implement concepts for sustainable land use and safeguard the future of this vital lifeline.

Sustainable Land Management (LAMA):

Subjects: solutions for sustainable land use; examining the relationships between ecosystems, climate change, biodiversity and land use

Projects: The Future Okavango and Sustainable Land Management in Madagascar (SuLaMa)

Funding from BMBF:
up to €115 million, 2010-2016

Link: http://nachhaltiges-landmanagement.de

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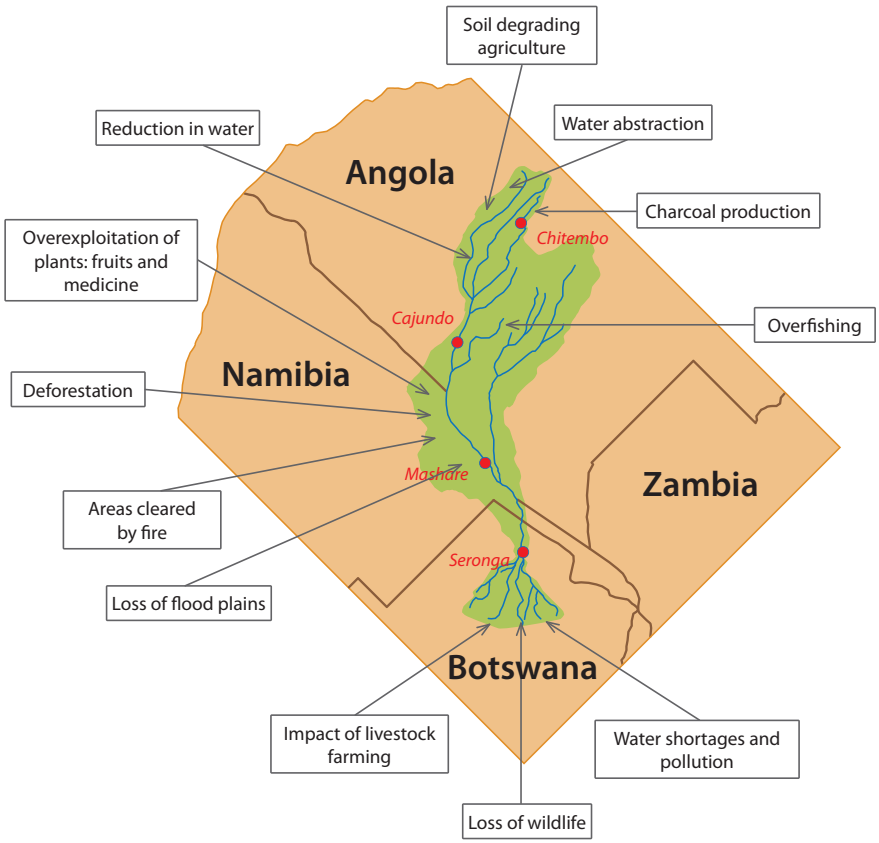
The Okavango Basin: a natural paradise threatened by human activity

Regional research into regional problems: this is the approach adopted by an international research team led by Professor Norbert Jürgens from the University of Hamburg in research work in the Okavango Delta. Some 1,700 kilometres in length and surrounded by a wilderness half the size of Germany, the Okavango River is home to a vast diversity of species and is the basis of life for around one million people. It brings water to places where there would otherwise be none: huge masses of water collect in the uplands of Angola during the rainy season and slowly make their way down to reach the Kalahari Desert in the dry season months later – a total of around ten billion cubic metres every year.

These "Floods of Life" evaporate in Botswana's hot climate, forming the largest inland delta in the world and Africa's most important wetland area south of the Sahara. The mosaic of savanna woodlands, floodplains and extensive wetlands is of great economical value to the neighbouring countries and is exceptionally important in terms of biodiversity. Rapid transformation caused by climate change, population growth and exploitation of resources is endangering the ecosystem and resulting in serious conflicts over land and water. "The Future Okavango" (TFO) project aims to provide scientific knowledge to support the development of water and land management in Angola, Botswana and Namibia.

Professor Jürgens and his colleagues have already set up field stations and taken the first soil samples. At the same time, ethnologists are consulting local populations on how they traditionally use the river and surrounding land.

Problems in the Okavango Delta



Source: illustration from www.future-okavango.org

Intensive research is necessary to preserve the natural functions and resources of the Okavango. Which scenarios are realistic for the future development of the Okavango region? How can sustainable land use management be put into practice to preserve this unique environment? The project has set itself the task of helping to shape the future of the Okavango lifeline.

TFO brings together the natural sciences, the humanities and socioeconomics. Twelve universities and seven research institutions in Germany and in the African partner countries are taking part in research activities. The Federal Ministry of Education and Research is providing funding of around 8.4 million euros to support research in the Okavango region between 2010 and 2015.

The river system is the ideal model region in which to learn how to better understand the relationships between land use, the functions of the ecosystem and climatic conditions. The "Global Biodiversity Outlook" produced by the "Convention on Biological Diversity" (CBD) cites the savanna woodlands of the Okavango as one of the earth's ten most important control points. They are an important indicator of the global climate and the state of the planet.

Scientific contact for The Future Okavango project:

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Link:

➤ www.future-okavango.org

Other global change programmes funded by the BMBF

Future Megacities

Subject: sustainable use of resources in large cities

Example projects: waste recovery in Addis Ababa (IGNIS); sustainable city development in Casablanca; energy efficiency in the Johannesburg region

Funding: €50 million, 2005-2013

Link: www.future-megacities.org

Biodiversity BIOTA Africa

Subject: research into biodiversity

Projects: biodiversity loss in West Africa, East Africa, southern Africa and Morocco

Funding: €53 million, 2001-2011

Link: www.biota-africa.org

Global Change and the Hydrological Cycle (GLOWA)

Subject: supporting decision-making for sustainable water management

Example projects: hydrological cycle of the Ouéme River, Benin, and Wadi Drâa, Morocco, (IMPETUS); analysis of the hydrological cycle in the Volta Basin, Ghana.

Funding: €36 million, 2000-2011

Link: www.glowa.org

Climate Service Center

Subject: refining the knowledge derived from climate research and conveying the findings to decision-makers (politics, administration, economy) and the public

Funding: approx. €20 million, 2009-2014

Link: www.climate-service-center.de

Latest information about research into global change

➤ Climate engineering

Are direct, large-scale interventions into the radiation budget or the carbon cycle of the earth potential means against global warming? Or should this "climate engineering" be rejected owing to potential side effects that are hard to calculate? An interdisciplinary team of experts working on behalf of the Federal Ministry of Education and Research (BMBF) has scientifically and comprehensively compiled current knowledge for the first time.

More information is available at:
http://www.fona.de/mediathek/pdf/Climate_Engineering_engl.pdf

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➤ KLIMZUG

KLIMZUG (Managing Climate Change in the Regions for the Future) develops innovative climate change adaptation strategies. Its aim is to integrate the anticipated changes in climate into regional planning and development processes. Despite all efforts in terms of climate protection, certain changes in climate can no longer be avoided in the short term.

More information is available at:
http://www.klimzug.de/en/index.php

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