"Adaptation of African Agriculture to Climate Change" – BMZ research priority started

Africa is particularly affected by climate change. Extreme weather events such as droughts and flooding are already today occurring more frequently and with greater severity than in the past. As a consequence water shortages, heat and diseases are becoming even more serious resulting in a decline or even total loss of crop yields and livestock production. Enhancing the capacity of the most vulnerable poor to adapt to climate change is one of the main challenges of development cooperation in the near future.

However, the impacts of climate changes differ locally and depend on natural conditions such as species and variety of crop and cropping system, but also on political and socio-cultural factors. A precise understanding of these factors as well as their local and regional impact is essential to adapt to climate change.

To develop concepts of adaptation to climate change, the Federal Ministry for Economic Cooperation and Development (BMZ) assigned the Advisory Service on Agricultural Research for Development (BEAF) of the Deutsche Gesellschaft für Technische Zusammenarbeit (GTZ) with the design of the priority research area "Adaptation of African Agriculture to Climate Change". In summer 2007 the call for proposals had started and led to the submission of 18 project suggestions of which eight were selected.

Five international agricultural research institutes (CIP, ICRISAT, IFPRI, ILRI, IWMI)[1], two German universities (Göttingen, Hohenheim) and one of the German Leibniz centers (ZALF)[2] have received research funding totalling EUR nine million for the programme, which is scheduled to run for three years.

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The research priority is designed interdisciplinary and multi-institutional. There is a manifold network between the participating institutes and universities. Professional tasks range from climatology, classical agricultural disciplines – cropping systems, plant breeding, grazing management and agroforestry – to water management and policy research. Regional focuses are the Sahel countries in West Africa with Senegal, Mali, Burkina Faso, Niger and Ghana as well as Eastern Africa, in particular Ethiopia, Kenya, Tanzania, Uganda, Mozambique and Zambia (see Box).

One of the main issues of the research priority is to involve local stakeholders to enhance their capacity as well as to feed their knowledge into the research approach. At least three non-governmental organisations, farmer associations or national agricultural research centres are participating in each project to assure an appropriate connection to the persons concerned.

Granted projects of the research priority "Adaptation of African Agriculture to Climate Change"

Institution	Project title	Locations	Collaborating institutions
CIP[1]	Participatory development of strategies to reduce climate vulnerability of poor farm households through innovation in potato and sweet potato technologies	Kenya, Uganda	Max Planck Institute of Meteorology, Germany
ICRISAT[1]	Community management of crop diversity to enhance resilience, yield stability and income generation in changing West African climates	Burkina Faso, Ghana, Mali, Niger	University of Hohenheim, Germany
IFPRI[1]	Strategies for adapting to climate change in rural sub-Saharan Africa: Targeting the most Vulnerable	Ethiopia, Uganda, Zambia	PIK[3] and ZALF[2]
ILRI[1]	Increasing the adaptive capacity of agro-pastoralists to climatic change in West and Southern Africa	Kenya, Mali, Mozambique	PIK[3] and DITSL[4]
IWMI[1]	Re-thinking water storage for climate change adaptation	Ethiopia, Ghana	PIK[3] and ZEF[5]
CETSAF-Uni Göttingen, Germany	Adaptation of land use to climate change	Burkina Faso, Ethiopia, Niger	ICRAF[6] and ZIAF[7]
Uni Hohenheim, Germany	Developing rice and sorghum crop adaptation strategies for climate change in vulnerable environments	Benin, Madagascar, Mali, Senegal	WARDA[8]
ZALF[2]**, Germany**	Climate change impact assessment and adaptation options in vulnerable agro-landscapes	Tanzania	ICRAF[6] and PIK[3]

1 CIP: International Potato Center, ICRISAT: International Crops Research Institute for the Semi-Arid Tropics, IFPRI: International Food Policy Research Institute, ILRI: International Livestock Research Institute, IWMI: International Water Management Institute
2 ZALF: Leibniz-Center for Agricultural Landscape Research, Germany
3 PIK: Potsdam Institute for Climate Impact Research, Germany
4 DITSL: German Institute for tropical and subtropical agriculture of University of Kassel, Germany
5 ZEF: Center for development research of University of Bonn, Germany
6 ICRAF: World Agroforestry Center
7 ZIAF: Center for Interdisciplinary Research on Africa of University of Frankfurt, Germany
8 WARDA: Africa Rice Center

Fungi to counter witchweed

Researchers have found a new way of controlling witchweed (*Striga hermonthica*). In order to prevent witchweed from occurring, specific strains of the fungus *Fusarium oxysporum* is utilised. This technology was developed by the team lead by IITA (International Institute of Tropical Agriculture) plant pathologist Dr. Fen Beed with partners from the University of McGill (Canada) and the University of Hohenheim (Germany). Two procedures are possible: coating the seed before sowing with a mixture of spores of the fungi and liquefied Arabic gum and then drying them, or applying the fungus directly in the soil before sowing.

Witchweed is a formidable weed in the African savannah. It occurs in maize, rice and millet, amongst other crops. The parasitic weed is found particularly on dry, nutrient-poor soils and it drains organic substance and water from host plants. Some 50 million hectares of cereal cropping areas are afflicted with witchweed in sub-Saharan Africa. This means an annual loss of some seven billion US dollars for the farmers. More than 300 million people in the region are affected by the impact of witchweed infestation. Once an area is infested with witchweed, the pressure on the host plants increases from year to year. This is because of the large number of seeds which are enriched in the soil and have a germination capacity of up to twenty years.

To date, various more or less successful approaches exist to control witchweed. The most promising was intercropping with desmodium in the cereal fields. Some years ago desmodium was used during the development of the push-pull technology to control the stemborer maize pest. By chance it was discovered that desmodium inhibited the growth of witchweed. Other less successful measures to contain witchweed infestations were mechanical tilling of the fields and the use of soil disinfection agents.

More information:
www.iita.org
www.push-pull.net

(ib)

High-yielding wheat harvest despite drought

The foundation has been laid for breeding salt-tolerant wheat varieties. Researchers at the Center of Life and Food Sciences Weihenstephan (WZW) of Munich Technical University (TUM) / Germany have discovered how wheat deals with excessive salt levels in the soil and how to recognise its salt tolerance.

Dry periods and droughts are on the rise, many cropping areas in the world have to be irrigated. Irrigation causes the groundwater level to rise, evaporation increases and salt is left in the soil. A high salt content in the soil is damaging for most plants, water uptake is inhibited, and plants become stunted or, in the worst case wither away. However, some plants develop despite the high soil salinity. This occurs thanks to a special mechanism to inhibit the expulsion of water and promote the discharge or storage of salt. In detail, this concerns wax-containing protective layers on the leaves, an efficient regulation of fissure opening and glands to discharge water or cell compartments to store salt.

The best known example of salt-tolerant plants are the mangroves, which grow in saline coastal soils. During crop trials in Egypt, scientists of the WZW discovered that wheat varieties can also cope with these hostile conditions. The salt-tolerant and non-salt-tolerant types of wheat have different leave surfaces, different sodium and potassium concentrations in the two top leaves and a varying number of barren spikelets.

Now that the mechanism with which wheat adapts to these adverse circumstances is known, salt-tolerant varieties can be selected and bred. Cropping salt-tolerant wheat in desert and arid areas could make a contribution to food security in many regions.

More information:
www.mytum.de *(ib)*

Best master's degree courses

The top ten international master's degree courses 2008 at German universities have been selected by the Stifterverband für die Deutsche Wissenschaft and the German Academic Exchange Service (DAAD). The award winners include the courses:

- „Tropical Forestry and Management", Technical University Dresden
- „Agricultural Sciences in the Tropics and Subtropics", University of Hohenheim
- „Agricultural Management", University of Applied Sciences Weihenstephan (Triesdorf)

Each award is doted with 20 000 Euro prize money and with the quality label "TOP 10 International Master's Degree Courses made in Germany".

The jury members considered a total of 76 candidates from 63 universities in 13 Federal German states.

Further information and a list of all prize-winners can be obtained at:
http://www.daad-magazin.de/08236/

German-Chinese research cooperation continuing

Financing is to continue for the German-Chinese research project in the northern Chinese lowlands, the granary of China. This was announced by the German Research Society (Deutsche Forschungsgemeinschaft, DFG) at the beginning of May 2008. DFG will provide 2.8 million Euro support to the project in the coming four and a half years; additional funds will continue to be provided by the Chinese Ministry of Education. The scientists working on the project are from University of Hohenheim / Germany and the China Agricultural University.

Eleven science tandems of one German and one Chinese agricultural expert will work for four years on the topic of "How to reduce the drastic environmental burdens of Chinese agriculture but nevertheless achieve high yields". Research results include new adapted maize varieties, improved management strategies and measurements of pollutants and noxious substances.

A new focus for the 2008 research agenda will be projects for more efficient irrigation techniques and on the needs-appropriate use of pesticides. The project has been operating since 2004.

More information:
www.uni-hohenheim.de

Scientists from the University of Hohenheim and the China Agricultural University are working closely together in various projects in northern China.

Photo: University of Hohenheim

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