



University of Natural Resources and Life Sciences, Vienna Centre for Development Research

Conference, June 17th 2016

Summary: World Day to Combat Desertification

One third of the earth' surface is affected by desertification. Climate change exacerbates the effects of drought, threatening food production. With 17 "desert days" (temperatures above 35°C) in 2015, the consequences of global changes are evident in Austria, too.

How can we halt the conversion of arable land into desert that is lost for agriculture? Can we reverse desertification processes in spite of climate change? How can we use and manage drylands more sustainably? These are some of the questions we addressed in key note lectures, two sessions and discussions.

THE SUSTAINABLE DEVELOPMENT GOALS - A MANDATE TO US ALL

Franz Breitwieser of the Federal Ministry of Europe, Integration and Foreign Affairs, and **Axel Mentler** of BOKU's Institute of Soil Research, opened the conference. They underlined the importance of the Sustainable Development Goals (SDGs) for all nations. As opposed to the Millennium Development Goals, that fixed targets solely to be reached by developing nations, the SDGs stress that all nations are responsible for the development of our world. Prominent goals include

- SDG #1, ending poverty,
- SDG #2, ending hunger, achieving food security and promoting sustainable agriculture, and
- SDG #6, ensuring the availability and the sustainable management of water and sanitation for all.

Of particular interest is SDG #15 that exhorts us not only to protect, restore and promote the sustainable use of terrestrial ecosystems, but also calls on us to combat desertification and land degradation.

The programme was destined to give an overview of the challenges associated with managing drylands and assuring livelihoods for the inhabitants. Further, the conference aimed at providing insights into traditional and modern methods for coping with and adapting to the harsh climatic conditions. The broad variety of expertise in different disciplines at BOKU can contribute to fighting desertification. At the conference it was matched with outside expertise from development work and research, as well as a farmer's perspective.

DESERTIFICATION CONCERNS EVERYBODY

It is tempting to think that desertification does not concern people living in temperate climates. However, changing climatic conditions



Franz Breitwieser and Axel Mentler both drew attention to the Sustainable Development Goals that urge us all to action.



Mario Winkler reminded the audience of how important soil is for maintaining the microclimate.



The lifestyle of Mongolian nomads is perfectly adapted to the harsh climatic conditions they face, explained Wolfram Schaffar.



Winfried Blum stressed that the competition between nomadic and sedentary lifestyles often leads to conflicts.

also affect Austrians. Farmers face challenges due to drought conditions and increasingly difficult water supply; inhabitants of cities feel the increasingly hot microclimate as more and more free landscape is being built upon. **Mario Winkler**, head of communications of the insurance company Österreichische Hagelversicherung, surprised with the figure of 20ha of land are being developed each day in Austria and, thus, are lost to the maintenance of the microclimate. He also stretched the need to support farmers in finding strategies and adaptation measures for coping with changing climatic conditions, as we depend on farmers for producing the world's food.

COMBINING TRADITION AND CHANGING TIMES

In Mongolia, nomadism resurged in the 1990s as a response to political instability and as an adaptation strategy to climate change, explained **Wolfram Schaffar**. However, the new nomads often lacked traditional knowledge and livestock management techniques, putting ecosystems at risk. Schaffar also drew attention to efforts of protecting ecosystems, and compared approaches in Bolivia and Mongolia, where the protection of "Mother Earth" has been enshrined in the constitution.

Winfried Blum argued in his presentation that many conflicts are in fact land use conflicts that arise between proponents of nomadic and sedentary lifestyles.

LAND USE FEEDBACKS ON THE REGIONAL CLIMATE

Extreme weather events like droughts and floods regularly make it to news headlines, but actually not just the mere accumulation of such phenomena is challenging. Equally disturbing is that weather patterns in general become less and less predictable. Erratic precipitation events threaten agricultural production world-wide.

Land use can profoundly affect the regional climate, stressed meteorologist **Josef Eitzinger**. Hence it is important to consider approaches that also improve the microclimate besides increasing productivity, like for example agro-forestry systems. Science and practice need to team up more and more strongly.

WATER MANAGEMENT: SOIL WATER IS THE KEY

How can we use the resources that we have more wisely? In his talk Willibald Loiskandl, head of BOKU's Institute of Rural Water Management and Hydraulics, reminded the audience that it is hard work to keep water reserves usable all year round. Not only is water a finite resource – often soil degradation and water scarcity combine to a vicious circle from which it is difficult to break free.

Soil water is the most prominent factor deciding how the vegetation cover will develop. And soil water aids different functions like heat regulation, water and nutrient transport, or microbiological activity. Therefore, improved land management and cultivation practices are needed.



"It is not the experts, who will feed and save us," said Josef Eitzinger, "the farmers will."



Willibald Loiskandl reminded the audience that water management is hard, all-year-round work.



Remote sensing can improve water management dramatically, explained Francesco Vuolo.



Clement Atzberger presented a drought early-warning system based on remote sensing.



Climate-adaptive architecture reduces the energy required to condition the indoor environment, said Doris Österreicher.

REMOTE SENSING: USING WATER EFFICIENTLY AND PREPARING FOR DROUGHT IN TIME

Another possible strategy consists of using water resources as efficiently as possible. **Francesco Vuolo** uses satellite images to assist farmers in decision making. The images allow monitoring crop growth, and water requirements are estimated based on the actual canopy development. In the Marchfeld region, this system is already implemented. Advice on irrigation can thus be provided with high spatial resolution, at parcel level, and specific for each crop.

Clement Atzberger argued for a stronger focus on anticipatory, preventive risk management as opposed to crisis management that, by definition, lags behind events. He gave the example of a BOKUdeveloped drought management system in Kenya. Here, satellite images give overviews over large areas, but are sampled very frequently, enabling authorities to respond quickly and early to drought risk.

ENERGY CONSUMPTION MUST BE REDUCED – ARCHITECTURE CAN CONTRIBUTE TO CUTTING ENERGY NEEDS

We use much of our resources to satisfy our energy needs. Around 40% of our energy consumption is currently used for the building and maintenance of buildings - mainly for conditioning the indoor environment. **Doris Österreicher** underlined the requirement to adapt how we construct our buildings to the respective climatic zones. Iconic glass and steel architecture that makes cities look similar to the point of losing their local characters is not an option for the future. Too high is the amount of energy required to maintain human-friendly indoor climate.

Instead, much can be learned by studying climate-adaptive features of traditional architecture from arid and semi-arid regions. Österreicher illustrated how climate-adaptive elements of traditional architecture can be integrated into contemporary buildings and interpreted in a modern way.

AFFORDABLE ENERGY: WHAT CAN PLANTS DO FOR US?

The SDG 7 aims at "ensuring access to affordable, reliable, sustainable and modern energy to all". To use plant extracts as biofuels has often been proposed as a solution to the dilemma of growing energy demands and the planet's dwindling fossil fuel reserves. In her talk, **Fatemeh Maghuly** described the potential of the plant *Jatropha curcas* to counteract soil erosion and serve as a renewable source of energy. The speaker mentioned that *Jatropha* does not compete with edible plants for land because it is toxic and can grow on arid and degraded land. However, the following discussion showed that it remains arguable to what extent we should use our limited land resources to grow plants for biofuels, when we need to feed an ever growing population. Will we be able to do both in the future – grow food, as well as, fuel? And if yes, under which conditions will it be possible?

DESERTIFICATION CALLS FOR A STRATEGY SHIFT IN PLANT BREEDING

With climatic changes, breeding efforts need to select for other traits



The morning session on the biophysical context closed with a panel discussion of all speakers.



Between the two sessions, there was time for informal discussions at the lunch buffet.



We need to select for plant species that produce well under stress conditions like water scarcity, underlined Gernot Bodner.



Fatemeh Maghuly presented the advantages of cultivating the plant *J.curcas* in (semi-)arid regions.



Maria Vogt underlined the importance of smallholder farmers in feeding the world's population.

as yet, stressed **Gernot Bodner**. Maximizing the uptake of nutrients and water is no longer a valid strategy; instead the focus has to shift to minimizing losses and increasing resistance to stresses like water scarcity.

WE NEED TO TAKE CARE OF THE PLANET - WE ONLY BORROW IT FROM OTHER GENERATIONS

Organic farmer **Maria Vogt** pleaded for smaller, more diversified farms. She sees herself as a caretaker, as the custodian of the land she cultivates, not as its owner. Vogt's talk very much resonated with the aim of SDG 12 that reads "ensuring sustainable consumption and production patterns". How much is "enough"? How much do we need to live a good life, was one of the questions she posed.

LIVESTOCK IS A SAFETY NET FOR DRYLANDS

In arid and semiarid regions agricultural production is often not only limited, but virtually impossible, explained **Maria Wurzinger**. Here, keeping – well-adapted – livestock not only constitutes a source of meat, milk and fibre, the animals also serve as pack animals. However, these systems have been fine-tuned over generations, often being the only safety net for securing livelihoods, and drylands are very fragile ecosystems. Therefore, only few intervention strategies to improve production lend themselves to application.

FRAGILE ECOSYSTEMS RENDER THEIR POPULATIONS MORE VULNERABLE

Waltraud Rabitsch and Sandra Wibmer argued that poverty, vulnerability, and increasing competition for limited natural resources are closely intertwined. Living conditions in arid and semiarid regions are already dire; external shocks due to climate phenomena, conflicts over resources, or issues of poor governance further exacerbate the challenges. As many factors need to be dealt with simultaneously, it is difficult to design appropriate intervention strategies that are adapted to the specific circumstances at local level.

LONG-STANDING TRADITIONS: BOKU LIBRARY HOSTS ORIGINAL RECORDS OF EARLY 20th CENTURY EXPEDITIONS INTO IRANIAN DESERTS

Afsaneh Gächter spoke about the expeditions of Alfons and Agnes Gabriel, illustrating the long-standing tradition of Austrian research in arid regions. Scientist couple Gabriel were among the first Europeans to explore the Iranian deserts. Their works were translated into Persian and became classic references, whose originals are kept in the BOKU library.

STUDENT POSTER PRESENTATIONS

Students of the BOKU lecture "Soil problems in arid and semiarid regions" presented their work. They discussed the SDGs, introduced a traditional water supply system in Oman and talked about water-saving rice production.



In drylands, livestock is often the last still available option for securing livelihoods, explained Maria Wurzinger.



Waltraud Rabitsch and Sandra Wibmer related fragile ecosystems to vulnerablity.



Moderator Lorenz Probst and student Magdalena Geinzer assured the translation of German talks.



BOKU keeps records of the Iranian expeditions of scientist couple Gabriel, knew Afsaneh Gächter.





Students and audience discussed the SDGs (above: Pierre Ellßel, below: Asia Peureux).

SURVEY AMONG CONFERENCE PARTICIPANTS

During the conference, a short survey was performed. Only two thirds of participants who handed in the questionnaire thought they were personally affected by desertification. Those who responded affirmatively gave various reasons for their assessment, summarized in the table below (score/total responses).

Climate change, drought, water supply	10/12
Crop losses, yield decrease, increasing food prices	8/12
Deforestation	3/12
Loss of (agricultural) land	3/12
Loss of biodiversity	1/12
Migration	1/12

When asked for ways in which one could contribute to the fight against desertification, most frequent answers included through education, raising awareness and lobbying (13/20), as well as through research (6/20) and changing one's own consumer patterns (buy locally, sustainably produced items; 6/20).

CULTURAL EXCHANGE BETWEEN (SEMI-) ARID AND TEMPERATE CLIMATES

Participants continued their discussions around cheese and drinks. After the lottery with complimentary tickets for Schönbrunn's Wüstenhaus (the desert house), the conference closed on a cultural note. Sakîna and friends presented music from the Middle East and Special Guests included the audience in their dynamic dance performance.

DESERTIFICATION CAN BE FOUGHT

This day was devoted to characterizing the challenges that inhabitants of arid and semiarid regions face. Speakers and audience vividly discussed various measures that can be taken to halt, and ideally revert, desertification. We are all affected by the climatic changes, whether we are aware of it or not. One of the key messages of the day was that we all can and must contribute to more sustainable use of resources. Changing our consumption patterns is one possible strategy.



Students presented a traditional water supply system, the qanat system (above: Javed Khattak, below: Livia Klenkhart).





Students introduced the SRI system of rice cultivation (Pedro Manga, Clothilde Collet, Daniela Jelovic).



The conference closed with discussions around cheese and drinks...



... with a concert by Sakîna and friends.

















Conference participants danced with Special Guests.

We thank our sponsors without whom this conference would not have been possible!

Special thanks to Gabi Leitner, Sebastian Postl, Franz Zehetner and the facility management!



















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