GEORG-AUGUST-UNIVERSITÄT GÖTTINGEN

UNITED NATIONS UNIVERSITY
UNU-EHS
Institute for Environment and Human Security

GlobeDrought

1st Stakeholder/Expert Workshop

Workshop Report

May 3-4, 2018

UN Campus, Platz der Vereinten Nationen 1, 53113 Bonn

Globe Drought

Table of Contents

Agenda

Time	Topic	Format
	Thursday, 03 May 2018	
09:00 – 09:05	Welcome address UNU	Z. Sebesvari (UNU)
09:05 – 09:15	Workshop structure & organization	S. Siebert / M. Hagenlocher
09:15 – 09:45	Short introduction round	Participants
09:45 – 10:15	Project goals, partners and roadmap until 2020	Talk, S. Siebert (Göttingen)
10:15 – 10:30	Coffee break	
10:30 – 12:15	Progress reports from GlobeDrought partners	Talks, GlobeDrought PIs
12:15 – 13:00	Lunch	
13:00 – 15:00	Drought monitoring and drought risk management in GlobeDrought project regions: • *Brazil* • *India* • *India* • *United States*	Talks, Invited GlobeDrought partners *Eduardo Sávio P.R. Martins (FUNCEME)* *J. Adinarayana (CSRE/IITB)* *Dr. Rajendra Prasad Pandey (Nat'l Inst. of Hydrology, Inda)* *Kelly Helm Smith (NDMC)*
15:00 – 15:30	Coffee break	
15:30 – 17:00	Drought monitoring and drought risk management in GlobeDrought project regions *(continued)* • *South Africa* • *Zimbabwe* • *ZEF (Food Monitor)*	Talks, Invited regional GlobeDrought partners *Andries Jordaan (UFS)* *Sara Feresu (IES, University of Zimbabwe)* *Lukas Kornher (ZEF)*
19:00	Joint dinner in Bonn city (Restaurant DelikArt)	
	Friday, 04 May 2018	
09:00 – 09:15	Wrap up first day & outlook on day 2	M. Hagenlocher (UNU)
09:15 – 10:45	Definition of final case study regions within the countries & identification of drought impacts	Moderated discussion (M. Hagenlocher)
10:45 – 11:00	Coffee break	
	Setup of the drought information system to meet the requirements of our stakeholders (techn. capabilities, indicators, how to present information)	Moderated discussion (N. Cornish)
12:00 – 13:00	Lunch	
13:00 – 14:30	Plans and next steps for project regions (Southern Africa, Eastern Brazil, Western India, Western US)	Working groups / world café
14:30 – 15:00	Reporting back to plenary	Rapporteurs
15:00 – 15:15	Coffee break	
15:15 – 15:45	Plenary discussion on cross-cutting topics identified in the working groups	Moderated discussion (S. Siebert)
15:45 – 16:00	Community of Practice (CoP) & further engagement	F. Saltetti (UNU)
16:00 – 16:30	Wrap up and outlook	S. Siebert

Thursday, 03 May 2018

1. Progress reports from GlobeDrought partners

Progress updates from GlobeDrought partners were presented including:

i) Objectives of the respective work packages and project tasks
ii) Methodology and indicators
iii) Preliminary results
iv) Discussion questions for regional experts

*The following **presentations** were given:*

1. "GlobeDrought: A global-scale tool for characterising droughts and quantifying their impact on water resources, crop productivity, trade in food products, and the need for international food aid", Prof. Dr. Stefan Siebert, University of Göttingen, Germany
2. "Hydrological drought indicators", Dr. Claudia Herbert, Goethe University Frankfurt
3. "Meteorological and hydrological drought indicators", Dr. Olga Engels, University of Bonn, IGG
4. "Remote Sensing based Drought Indices", Dr. Valerie Graw, University of Bonn, ZFL
5. "Global Vegetation Indices, Agricultural Monitoring & Online Platforms", Natalie Cornish, RSS GmbH
6. "GlobeDrought: UNU-EHS sub-project: vulnerability & risk; community of practice", Isabel Meza, United Nations University, UNU-EHS
7. "Welthungerhilfe: Objectives and progress", Daniel Rupp, Welthungerhilfe

For detailed content please refer to specific presentations.

A summary of the expertise of the GlobeDrought consortium, however, was compiled by Dr. Michael Hagenlocher (UNU-EHS):

- Quantification of **meteorological and hydrological droughts** using state-of-the-art global climate data sets as well as the Global Hydrological Model WaterGAP
- **GRACE satellite measurements** of total water storage anomalies on the continents for quantifying hydrological drought, also in combination with WaterGAP (by data assimilation)
- Multi-temporal **remote sensing** to assess vegetation conditions (NDVI, VHI, etc.) as a proxy for **agricultural drought**
- **Crop models** to simulate the effects of droughts on different crops
- Concepts and methods for **exposure and vulnerability assessment**
- Expertise in **food insecurity and hunger**; end-user perspective

➢ **Challenge of integration: risk of what to what?**

2. Drought monitoring & drought risk management in GlobeDrought project regions

Presentations were given by invited regional experts highlighting the respective impacts of drought, state of drought risk assessment, monitoring and information/early warning systems, as well as project goals and questions. The key messages of each presentation are summarized below. For detailed content please refer to specific presentations.

2.1 Brazil - Eduardo Sávio P.R. Martins (FUNCEME)

- Impacts on rain-fed agriculture, water supply, water quality, health, etc.
- Drought monitor (met. drought) has been set up based on USDM and is operational (http://monitordesecas.ana.gov.br/); institutional collaboration at different levels and "on the ground" is crucial
- Precipitation data from a large quantity of gauges as well as data on water levels in reservoirs is collected in a timely manner
- Lack of vulnerability assessments and sector-specific indicators, emphasis on infrastructure fixes from government
- Need to collect impact data and integrate data from different drought type networks
- Stakeholder engagement is key to success
- Need to move from reactive measures to proactive planning

2.2 India - J. Adinarayana (CSRE/IITB), Rajendra Prasad Pandey (Nat'l Inst. of Hydrology, India)

- Impacts on agricultural system, water availability/supply ("difficult to quantify"), health,, food security, energy production, tourism, degradation
- Existing work on characterizing meteorological, hydrological and agricultural drought
- Lack of vulnerability studies
- Focus strongly on mitigation and relief, less on prevention
- SMART Technologies and understanding complexity for agriculture, including drought early warning systems
- Need to strengthen observation networks, improve open-source data and real time monitoring

2.3 United States - Kelly Helm Smith (NDMC)

- Impacts on agricultural system, water supply, ecosystems/species, health
- US Drought monitor is highly operational and used as an input for mitigation and response plans – blend of indicators ground-truthed at 400 observation points
- Focus on drought impacts and new tools for collection/visualization of impact data (e.g. use of media reports useful method for determining drought impacts) – Drought Impact Monitor (http://droughtreporter.unl.edu/map/)
- Vulnerability assessments exist in the US (e.g. SOVI), but not considered since not drought specific

2.4 South Africa - Andries Jordaan (UFS)

- Impacts on agricultural system, water supply, food security, energy production, tourism
- Climate change not the main driver of impacts, human factors are more relevant (e.g. population increase, tourism, etc.)
- Shift from vulnerability to resilience in existing risk assessments (where resilience is seen as the 'flipside' of vulnerability)
- Need to be specific in terms of vulnerability of what/to what (e.g. communal vs commercial farms)
- Socio-economic drought also crucial and the role of markets, both domestic and international, for determining impacts from all drought types
- Consideration of political actors and motives also crucial for drought impacts/mitigation

2.5 Zimbabwe - Sarah Feresu (IES, University of Zimbabwe)

- Impacts on food security, agricultural systems, water and hygiene, health, energy production, tourism
- Country is heavily dependent on rain-fed agriculture and livestock, with 70% of the population depending on agriculture for their livelihoods
- Regionally contextual impacts – some areas need food aid and others have bumper crop

- Drought hazard assessments partly exist (→ need to follow up on which models are in place/used)
- Vulnerability assessments lacking
- Stakeholder engagement is key to success (government, civil society, NGOs, etc.)
- Capacity building also crucial for collaboration, e.g. capability of Zimbabwe's Met office

2.6 Linkages to the Food Monitor project

The Food Monitor food security early learning platform was presented by Lukas Kornher from ZEF (Center for Development Research, University of Bonn). The global system uses real time information at country level to provide a traffic light output of potential food insecurity. This is based on four different indicators; price transmission, food security news, global supply, and excessive price volatility. Food Monitor can be accessed at: http://www.foodmonitor.org/.

Friday, 04 May 2018

3. Regional impacts & study area brainstorming

The session was moderated by Dr. Michael Hagenlocher (UNU-EHS). The goal of this session was to determine the primary drought impacts and the extent of study areas to focus on in each region. This was achieved through dialogue with the regional experts and included also questions regarding the state of risk assessments, data availability, but also around current gaps and needs in the regional study areas that could be catered by the GlobeDrought project. The main ideas were collected on a pin board (Fig. 1). These results helped frame the next discussion on technical specifications.

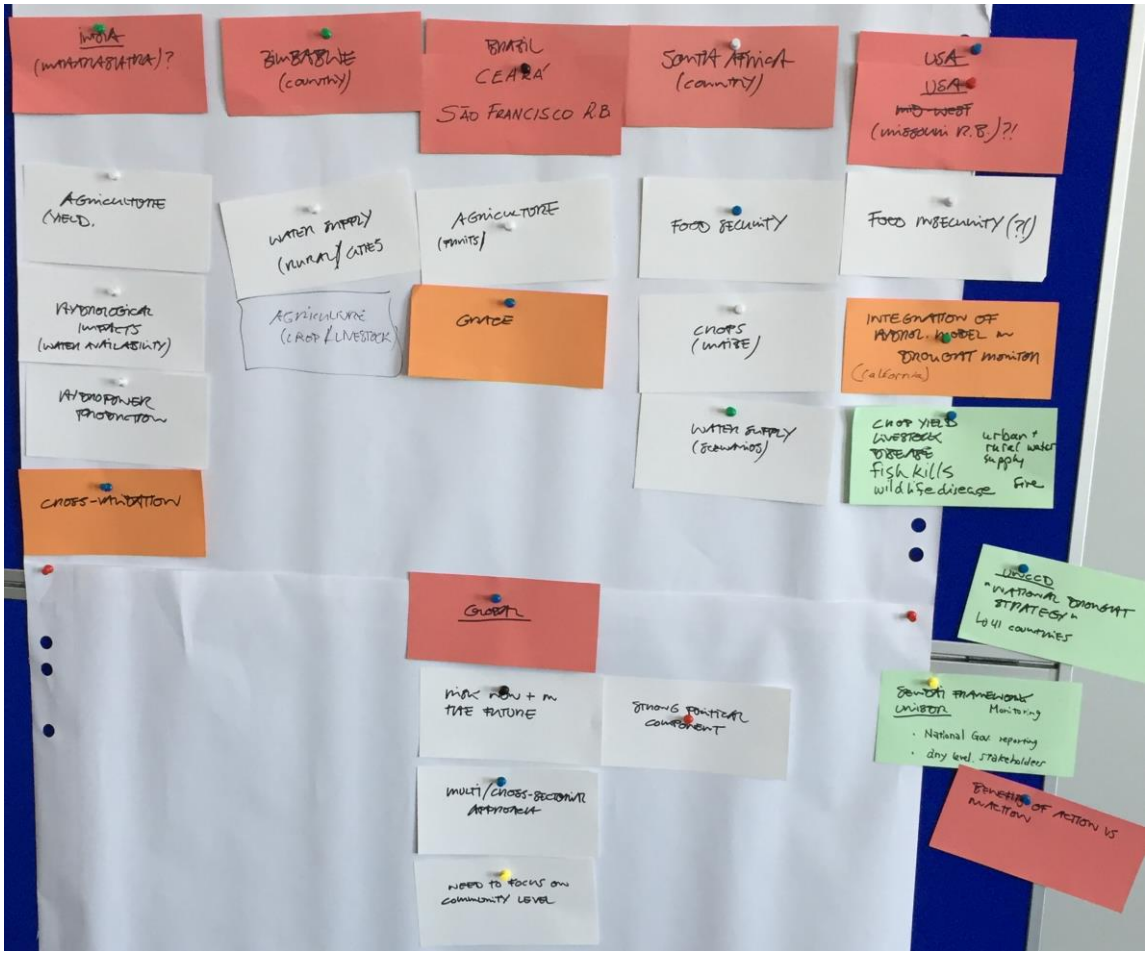

Fig. 1: Study areas and drought impacts in these regions.

In addition, the following links to international agendas/policy processes were highlighted by colleagues from the United Nations Office for Disaster Risk Reduction (UNISDR) and the United Nations Convention to Combat Desertification (UNCCD):

- Understanding risk is one of four key priorities of the **Sendai Framework for Disaster Risk Reduction 2015-2030**. Countries have concrete targets, e.g. to limit economic losses due to drought (and other hazards) (https://www.preventionweb.net/drr-framework/sendai-framework-monitor/indicators). To achieve these targets it is necessary to understand, characterize and assess current and future risks based on cross-sectoral approaches.
- As part of the **Drought Initiative** (https://www.unccd.int/actions/drought-initiative), UNCCD is currently working with 40 countries to set up **National Drought Plans** focusing on drought preparedness to build resilience of people, communities and ecosystems. Drought risk and vulnerability assessments form a central element of those plans. Two of the GlobeDrought regions, South Africa and Zimbabwe, are amongst the 40 countries who are participating in the initiative. Further, UNCCD is currently in the process of developing a **Drought Toolbox** for policy and decision makers. The toolbox shall consist of the following 3 modules: (1) drought monitoring and early warning, (2) drought vulnerability assessment, and (3) drought risk mitigation. UNCCD sees potential synergies with the GlobeDrought project.

4. Collaborative setup of drought information systems (global & regional)

The session was moderated by Natalie Cornish (RSS GmbH) and focused on defining an initial conceptual framework for the proposed drought information system(s). Each regional expert considered questions such as their intended audience and desired content. Questions were also posed by the group regarding data availability, regional utility of potential outputs, and scale issues, among others. Responses are summarized in the table below, along with the primary impacts and study regions identified in the prior session.

Table 1: Specifications for regional drought information systems (impacts, audience, content).

Country	Area	Impact(s)	Audience	Content
Brazil	Ceará	agriculture (fruits: melons, citrus)	Water committee, Agência Nacional de Águas	indices, drought risk interpretation
India	Maharastra	agriculture (yield – sorghum, rice, sugar cane), water availability (domestic, industrial, hydropower)	ICAR, ISRO, state government departments, NGOs, BHABA: (agronomic research, water/ drought crisis)	vulnerability, drought characterization
USA	Missouri River Basin	agriculture (crop yield, biodiversity) water supply, fish kill	farmers and ranchers, state/ federal agriculture department and water resource management, NOAA, NIDIS, NASA	summary of previous inputs (and existing abilities)
South Africa	Entire country	agriculture, food security (maize), future water availability (2023)	policy makers (senior officials in key depts.), national farmer associations, commodity organisations, banks, agricultural coops and companies, grain traders, investors	factors contributing to drought risk, thresholds (indicators), trends, price trends linked to drought, forecasts, sensitivity analyses, price elasticity
Zimbabwe	Entire country	agricultural livelihoods (crop and livestock), food security, safe water supply	Ministry of agriculture (rel. dept.), national water authority, met. Department, NGOs, START network, African risk capacity team, farmer association	vulnerability, drought characterization, trends, forecasting, factors contributing to drought risk

Table 2: Specifications for the global drought information system (content, function, format, management).

Audience	Content	Function	Format	Management
NOAA, USDA, NIDIS, JRC GDO, UN	Timelines; *Highlight political/ national benefits versus disadvantages of drought preparedness*	drought factor weighting (/calibration), flexible output displays, reference per region (decided by local experts), visualization of market-drought interaction, external indicator library, user defined AOI analyses/ information, drought condition-specific messaging, generate country summaries/ fact sheets, no uploads, UN idea: limited well-defined case examples and similarity analysis (what are others doing in the same situation?), regional inter-comparison	maps (tiffs, .shp, .gpx, tables)	record of user weightings with sector in order to provide standardized output, product should be free but not open-source for databases and codes, empirical information: automated processing chains, future: local authorities, consider global drought observatory (or JRC) format in order to facilitate future management on a global level, maintenance system needs to be documented also to provide cost and time (effort, human resources, hours) estimates to future users

5. Region-specific questions & impact ranking (World cafe)

Groups were formed by region and led by the respective regional expert. Questions such as data availability and sources as well as technical questions regarding modelling specifications were discussed. The most relevant factors determining the severity of drought impacts on ***agricultural systems, health, food availability, tourism and recreations, water supply, and biomass/hydropower energy production*** *were identified by regions and weighted based on importance (Fig. 2). Impacts on* ***ecosystems*** *was added as a factor in the USA group, as well as* ***environmental degradation*** *in the India group. Brazil identified* ***wildfires****, but no rank was given. Results of the weighting exercise are summarized in Figure 2.*

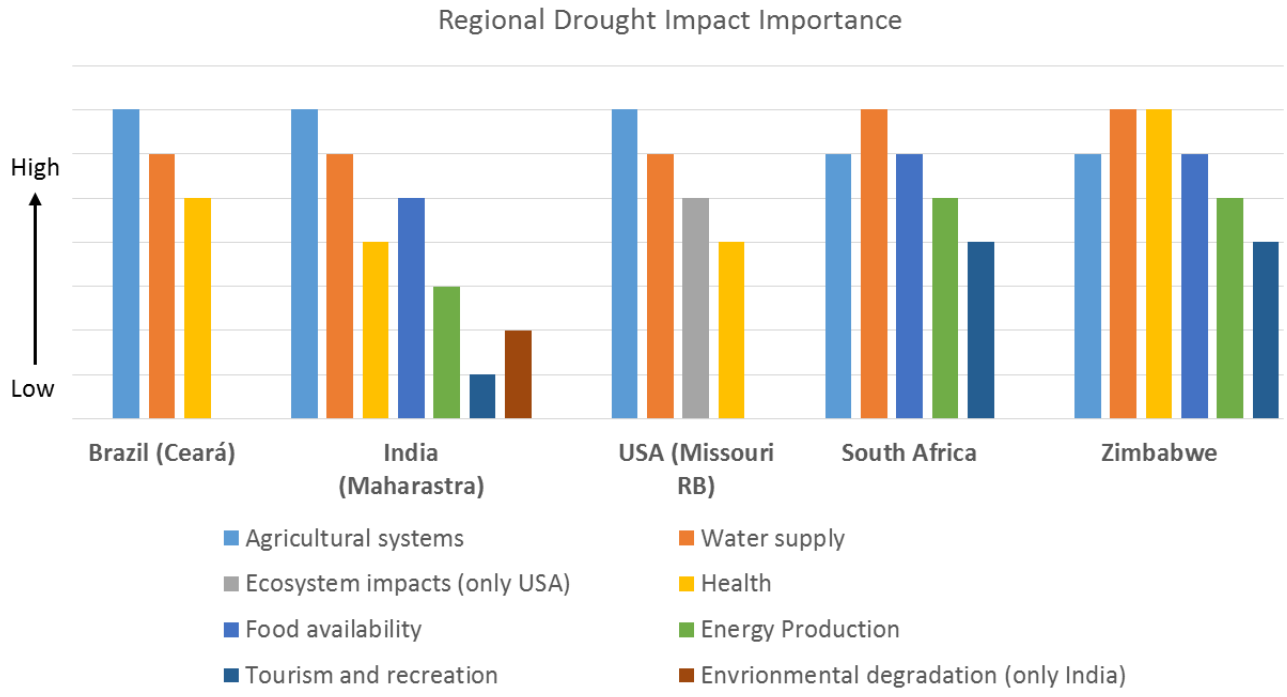

Fig. 2: Drought impacts in the five case study regions (by relevance).

6. Agreements & next steps

What	From who	To who	Until when
Share relevant stakeholder contacts	Regional experts	UNU	Asap
Data requests I	GlobeDrought partners	Uni Göttingen	Asap
Data requests II	Uni Göttingen	Regional Experts	Asap
Internal data sharing platform	GlobeDrought partners	GlobeDrought partners	Asap
Shapefiles of regional extent and geographic units	UNU	GlobeDrought partners	May 2018
Skype meeting of subproject leaders to discuss indicators and data products that need to be developed for the 4 GlobeDrought regions	Uni Göttingen	GlobeDrought partners	Asap
1st draft of short paper on conceptualization of drought risk (lead: UNU)	GlobeDrought partners & regional experts		June 2018
Think about methodology of drought impact assessment – identify gaps and how to fill them	GlobeDrought partners	n/a	
Develop a glossary with definitions/common understanding of key terms related to drought risk	UNU	GlobeDrought partners	June 2018
Identify final date for 2nd GlobeDrought workshop (proposed for September 2019)	GlobeDrought partners		Asap
Contact JRC GDO to evaluate their interest in the project	Uni Frankfurt	n/a	May 2018
Participate in drought risk stakeholder workshops in South Africa (NDMC Pretoria, Eastern Cape, Cape Town)	UNU	n/a	4-8 June 2018

Appendix A: Existing drought information systems repository

Source	Country	Link
Global Drought Observatory	Global	http://edo.jrc.ec.europa.eu/gdo
NOAA Global Drought Map	Global	https://gis.ncdc.noaa.gov/maps/ncei/drought/global
Global Integrated Drought Monitoring and Prediction System (GIDMaPS)	Global	http://drought.eng.uci.edu/
SPEI Global Drought Monitor	Global	http://spei.csic.es/map
Early Warning Explorer (EWX)	Global	https://earlywarning.usgs.gov/fews/ewx/index.html?region=gb
Global Drought Information System (GDIS) (*forthcoming*)	Global	https://www.earthobservations.org/activity.php?id=123
European Drought Observatory	Europe	http://edo.jrc.ec.europa.eu/edov2/php/index.php?id=1000
Climate Engine/ FEWS Engine	USA	http://clim-engine.appspot.com/
US Drought Monitor	USA	http://droughtmonitor.unl.edu/