GEO Global Water Sustainability (GEOGLOWS) and its potential contribution to the Water-Energy-Food Nexus

World Water Week
Stockholm, Sweden

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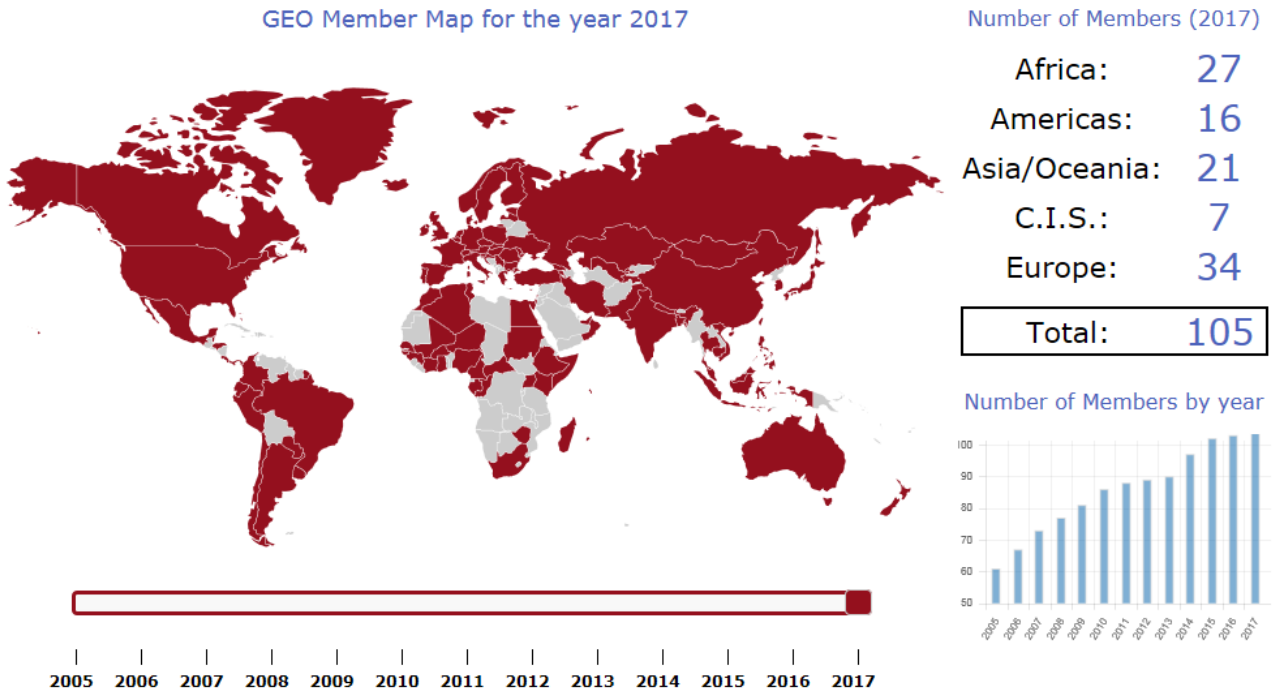
(with inputs from the GEOGLOWS and
FE WEF communities)

August 29 2017

GEOGLOWS: a GEO Initiative (since 2016) that shares to GEO Vision

The GEO Vision:

"To realize a future wherein decisions and actions, for the benefit of humankind, are informed by coordinated, comprehensive and sustained Earth observations and information."



The GEOGLOWS Mission:

"To connect the **demand for sound and timely environmental information** to **the supply of data and information about the Earth's water system** and to **explore the science needed** to achieve the goals outlined in the GEOGLOWS initiative.

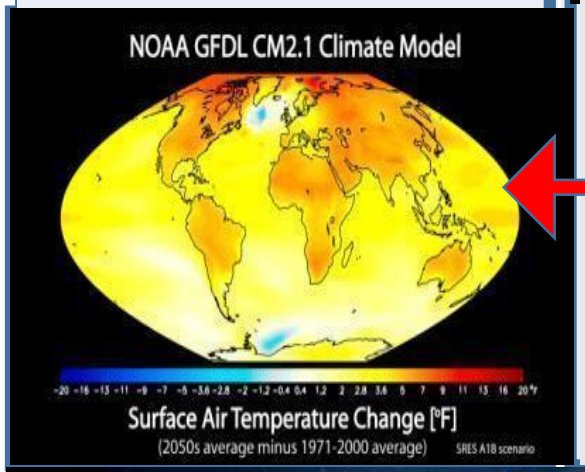
Advocacy for broad, open data policies and for the realization of the right to access information helps ensure that the data collected through national, regional and global observing systems is made available in the public domain and applied to decision-making. GEOGLOWS policy drivers include the Sustainable Development Goals, the Addis Ababa Action Agenda, the Paris Agreement on climate change, the Sendai Framework for Disaster Risk Reduction and Aichi Targets of The Convention on Biodiversity"

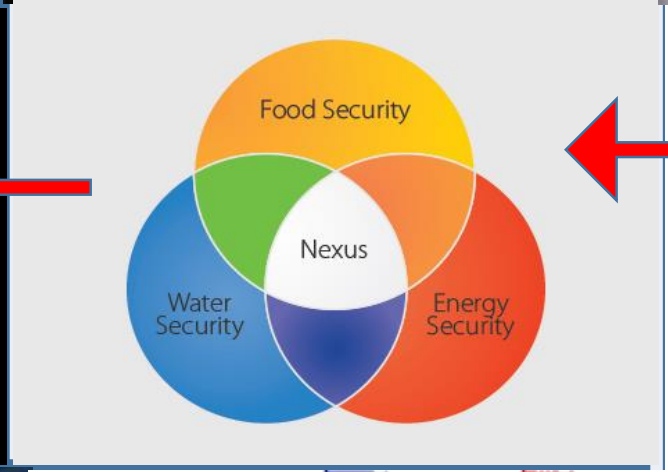
GEO Global Water Sustainability (GEOGLOWS)

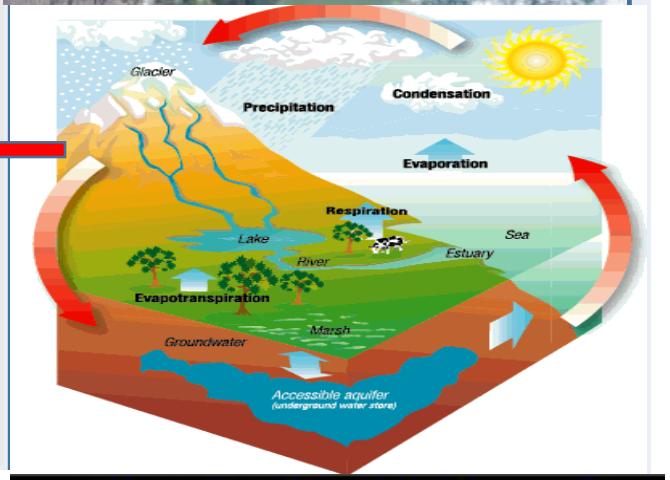
OBJECTIVES

1) **Strengthen capacity to understand water data needs and develop user-driven applications products from EO data and applications**
2) **Engage end users and boundary organizations to understand needs and decision-making process by region, and to prioritize activities based on vulnerability analyses**
3) **Coordinate and leverage GEOGLOWS partners to more effectively provide information and expertise to stakeholder and end-user communities**
4) **Promote effective use of science and water EO across spatial and temporal scales**
5) **Contribute to the assessments of population and economic growth impacts on water resources availability and climate change, to inform planning and adaptation activities**

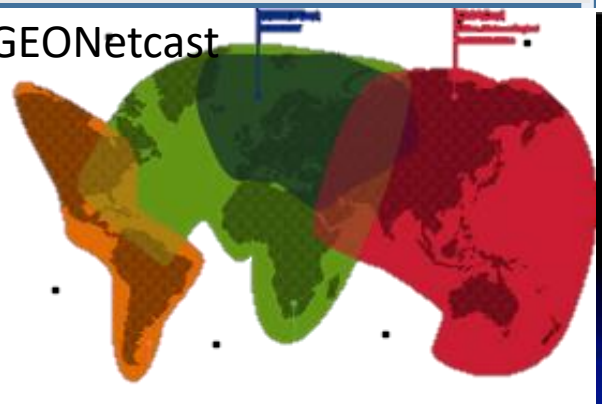
GEO Global Water Sustainability (GEOGLOWS) Themes

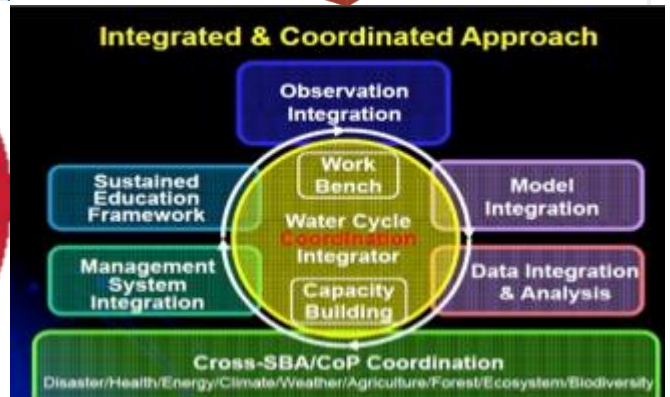




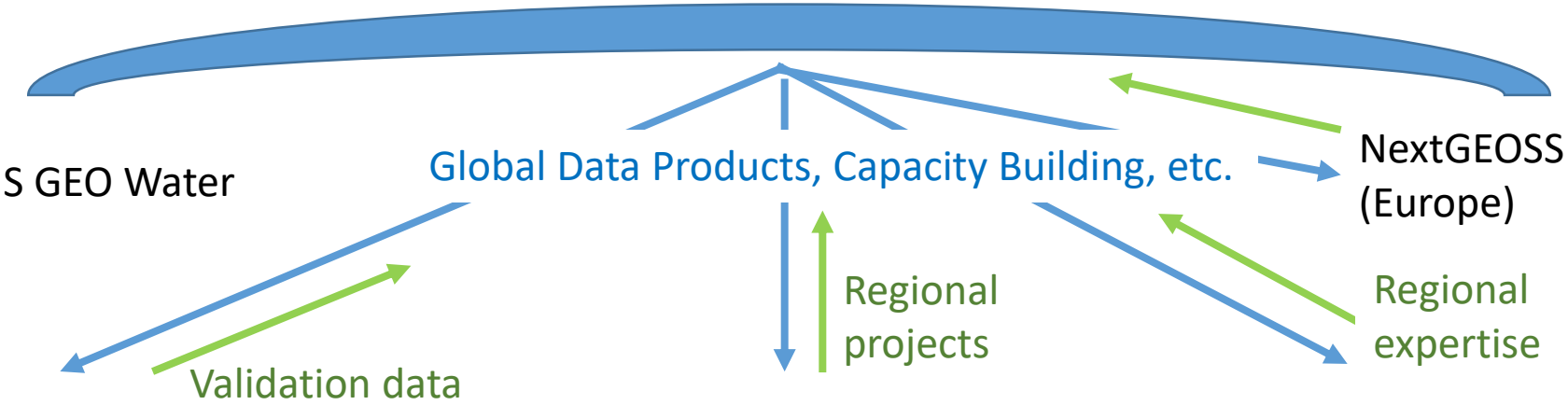


GEONetcast

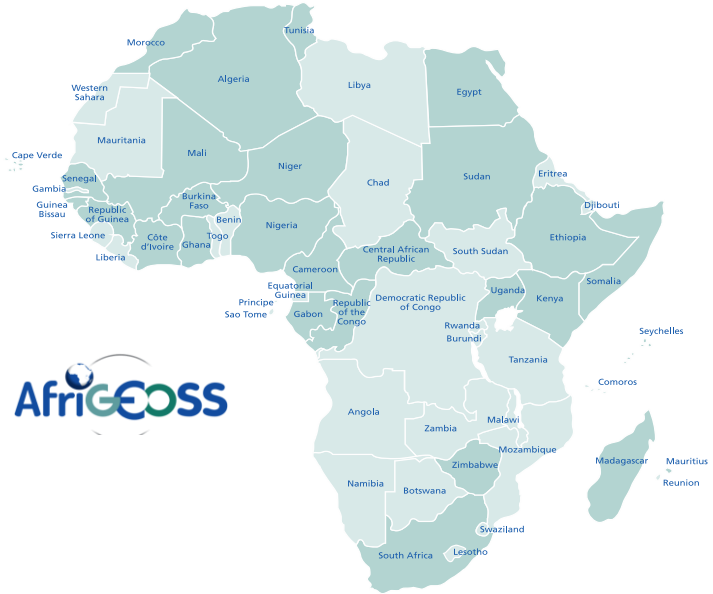




GEOGLOWS brings diverse regional water projects into a global framework for improving water sustainability



AfriGEOSS



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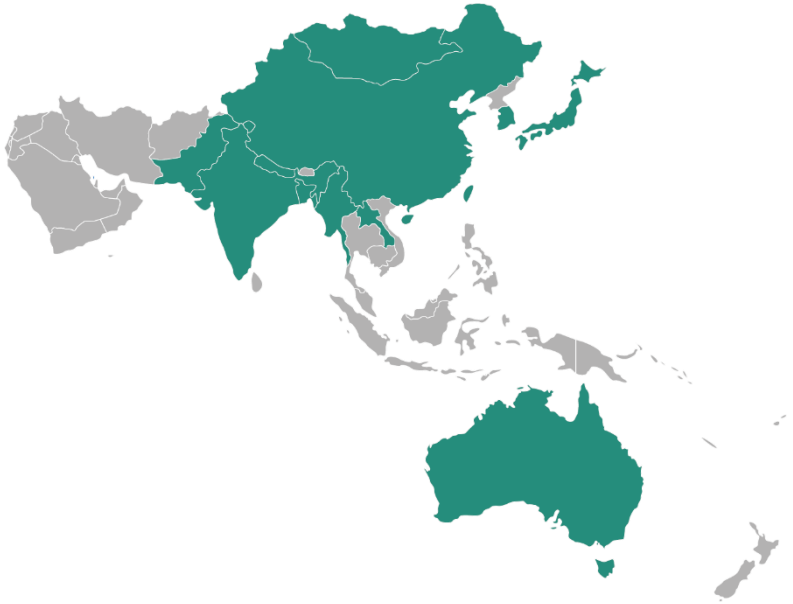
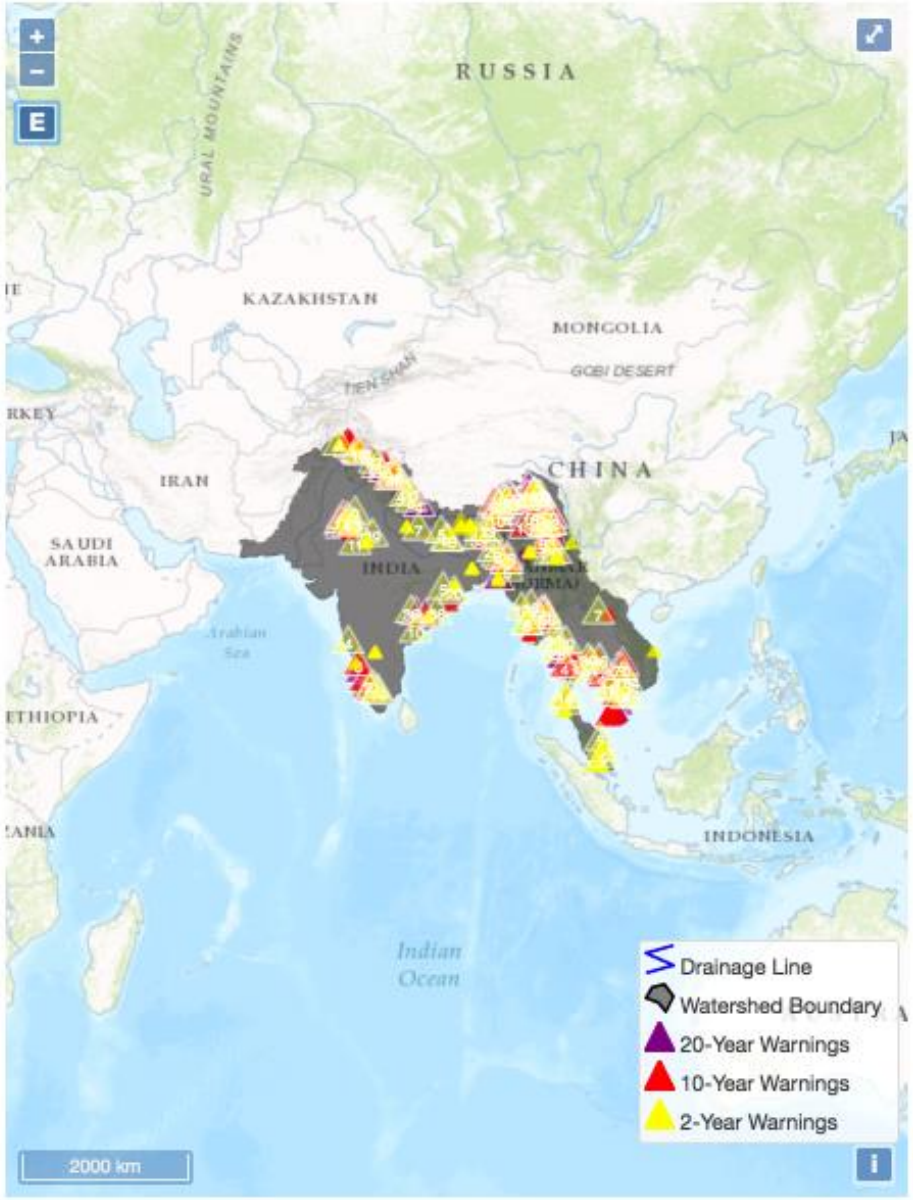


International Stream Flow Forecasts (South Asia Example)



(from J. Nelson)

GEOGLOWS 1st International Business Meeting, NOAA/NWC – USA – May 16-18,2017

Some GEOGLOWS Participants

Working Groups

1. Socio-economic issues of the water crisis and policy linkages (Rose Alabaster)

2. Science, applications, product development, and testing (Ashutoth Limaye, Edward Beighley).

3. Essential Water Variables (EWVs) and observations (George Huffman)

4. Data dissemination, community portals, and capacity building (Jim Nelson)

Current GEOGLOWS Activities:

1. Launch of the international streamflow forecast model as a framework for data services.

2. The Steering Committee and Working Groups are addressing deliverables defined as the first meeting.

3. A proposal is being developed for the World Bank to launch an e-book on Earth observations applications, regional projects in developing countries, and a GEOGLOWS Secretariat.

Linkages of Data, Information and Knowledge in the Water-Energy-Food Nexus

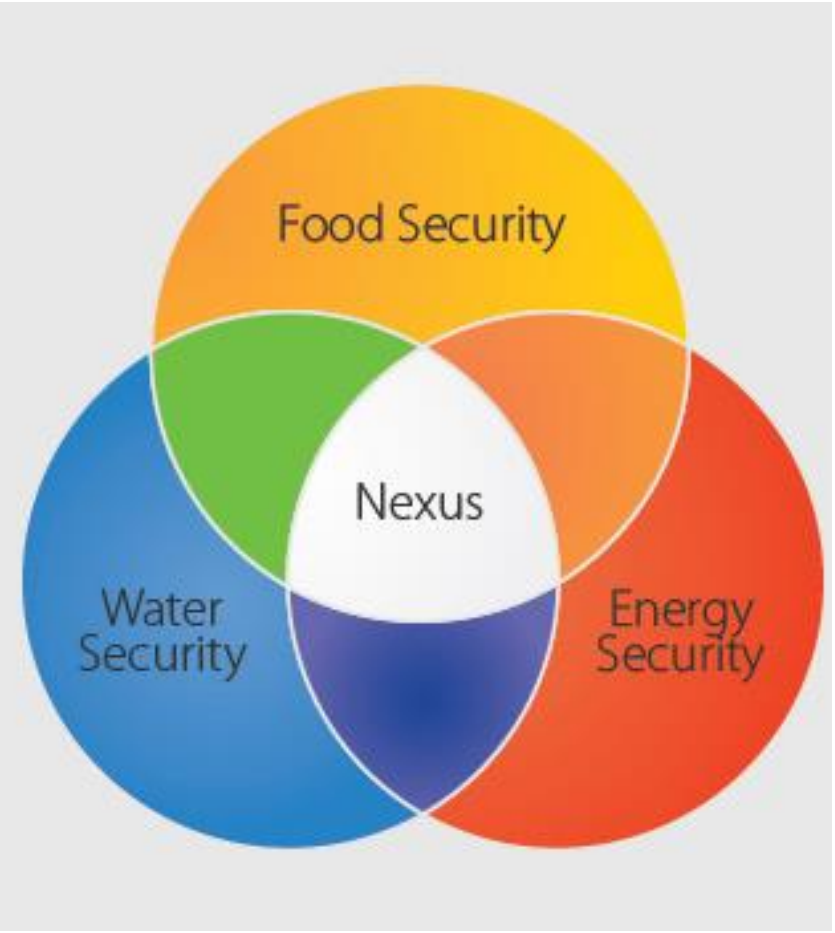
Future Earth and Belmont Forum supported a project during which four regional workshops were held to understand the links between data, information systems and the management of the W-E-F Nexus.

Goal: to explore the use of **integrated information** and **improved governance** for enhancing the **sustainability of the Water-Energy-Food (W-E-F) Nexus**.

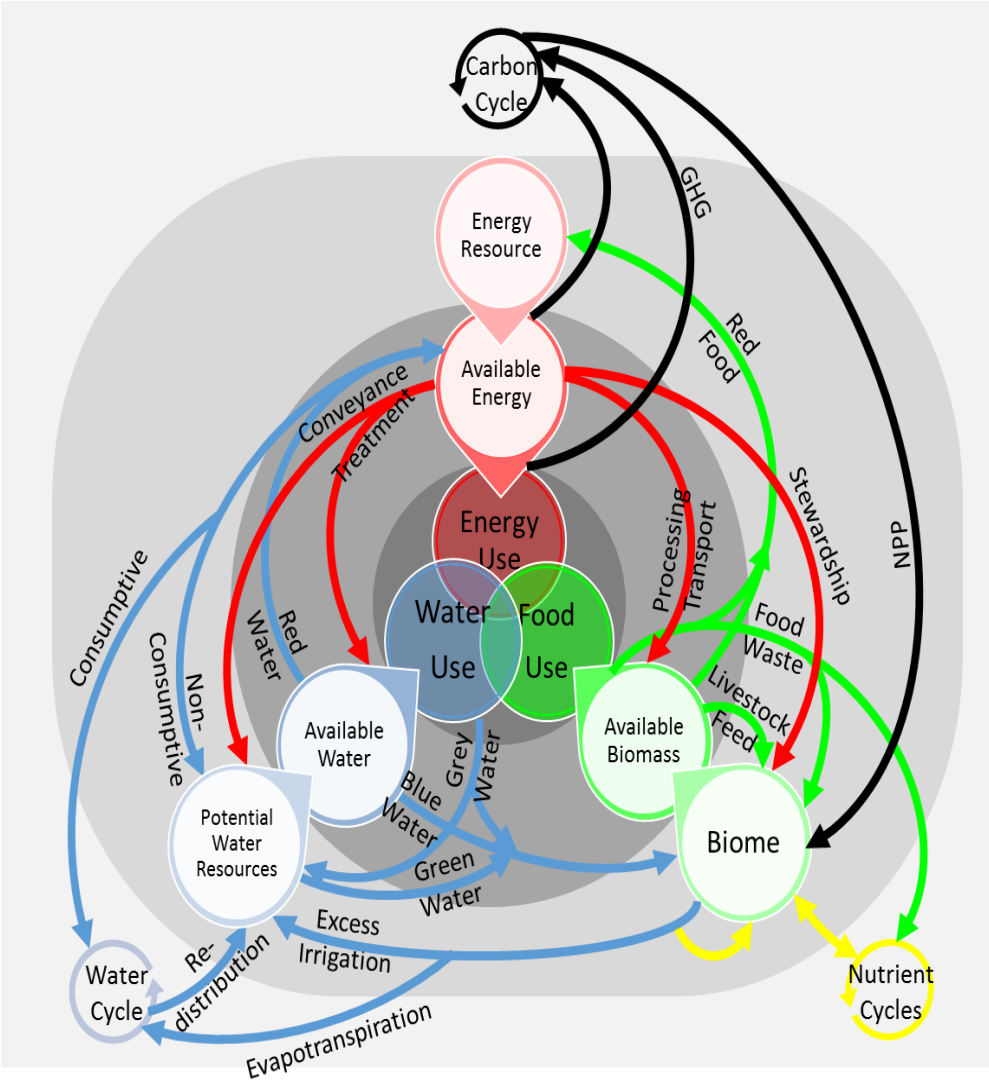
Observation opportunities and issues present in the Future Earth WEF Nexus Study

1. A rigorous **definition of the W-E-F Nexus** is needed as the basis of the design of monitoring programmes.
2. **Simple indicators** need to be developed as a means of monitoring the WEF Nexus at the country level and to track changes over time. These results could help to inform the SDG progress.
3. To address regional W-E-F Nexus issues, **regional information platforms** are needed.
4. Watersheds, basins and areas are needed for **case studies** on how Earth observations can contribute to joint planning of the W-E-F Nexus.
5. W-E-F Nexus implementation could be benefitted from **citizen science** – especially if it is linked to Earth observations.
6. Research to link **Earth observations and analysis systems** for the W-E-F Nexus interactions and issues (e.g. trade).

Defining the Water –Energy-Food Nexus Relationships

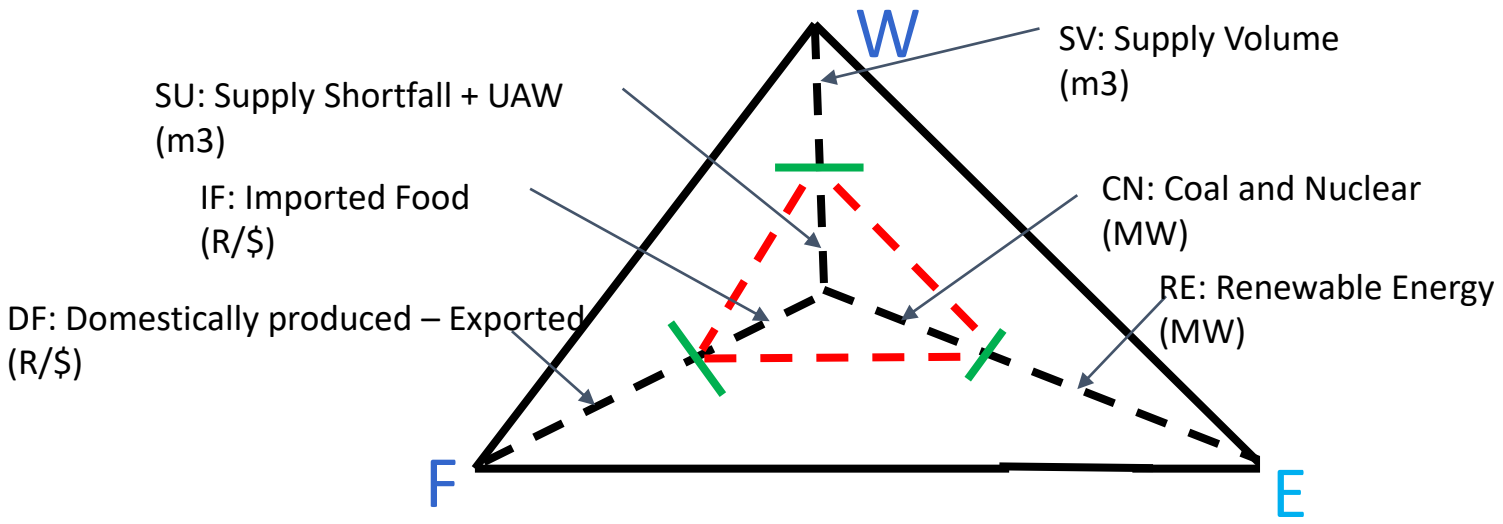


Characterizing the W-E-F Nexus requires a more rigorous definition of the Nexus nomenclature and taxonomy. In addition critical variables need to be defined and measured.



(Higgins)

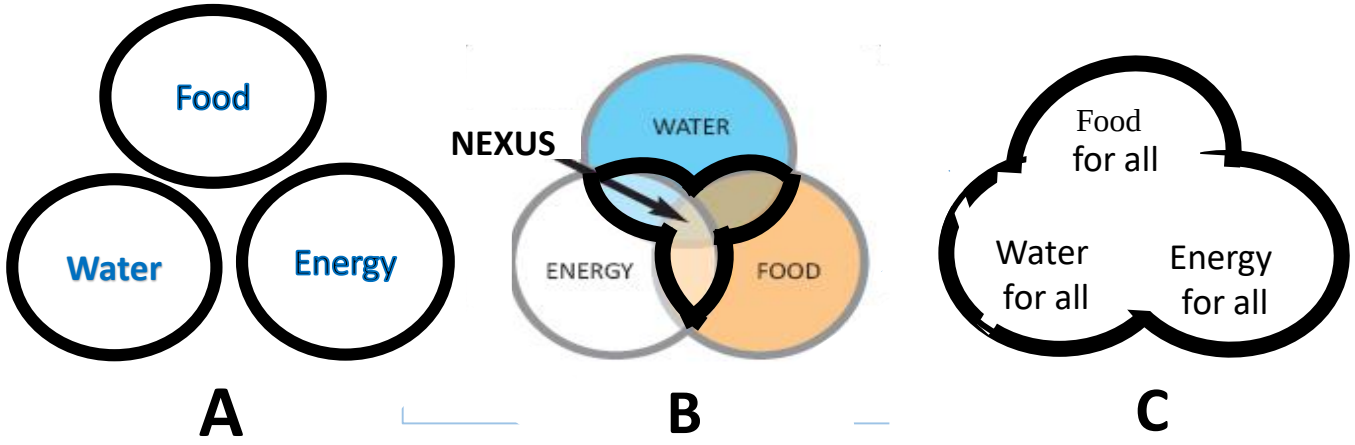
GEOGLOWS Deliverables could form the source of information for defining a W-E-F Nexus indicator which could also contribute to an integrated SDG indicators



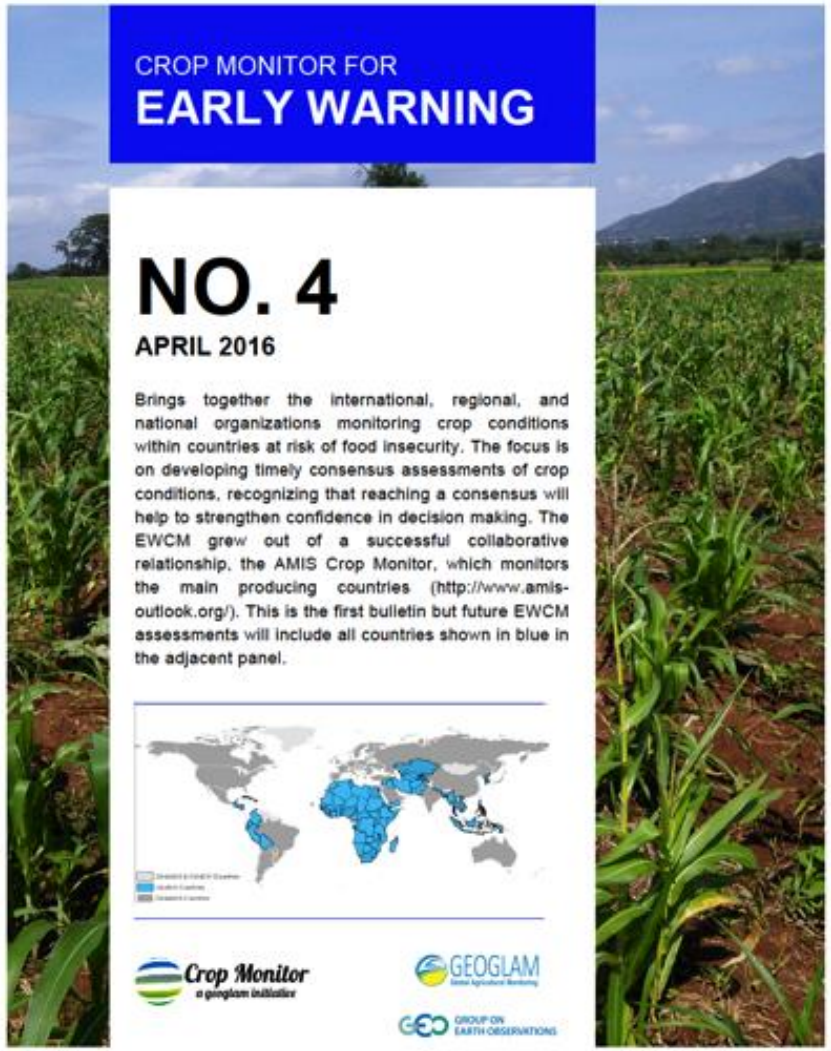
W-E-F Nexus Tri-Indicator

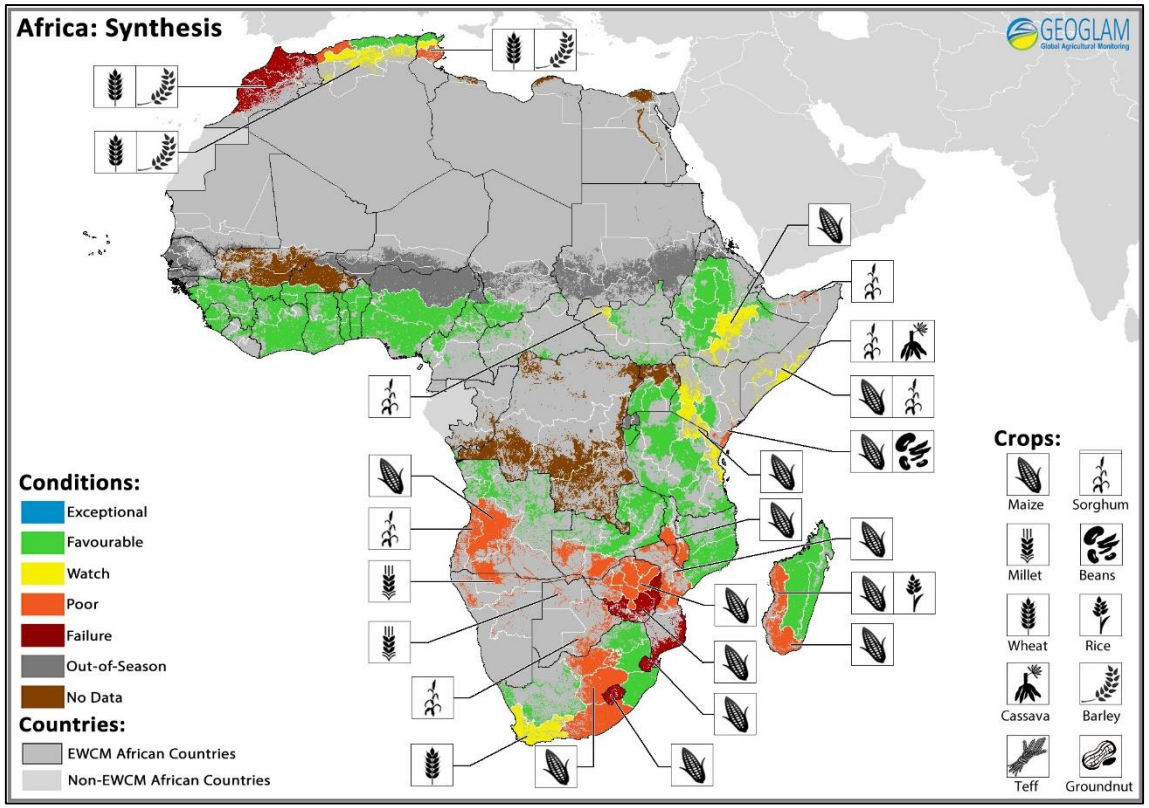
- SDG I(W) = SV / (SV + SU)
- SDG I(E) = RE / (CN + RE)
- SDG I(F) = DF / (DF + IF)

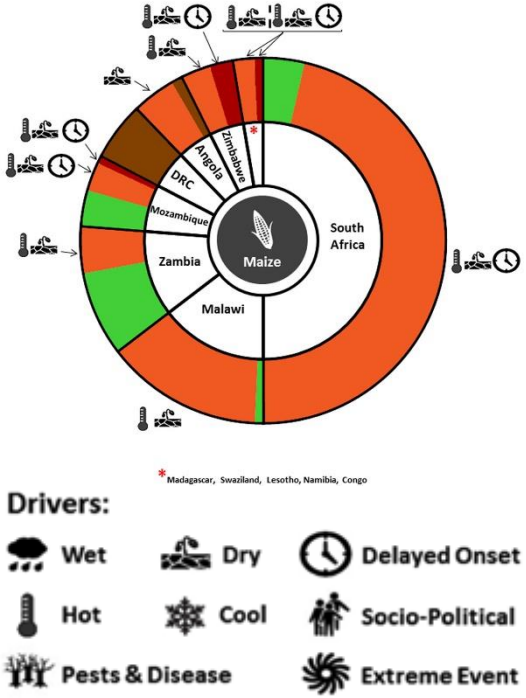
- SDG I (WEF) = Area **Δ** – Area **Δ**



GEOGLAM Products show areas of high productivity and stress



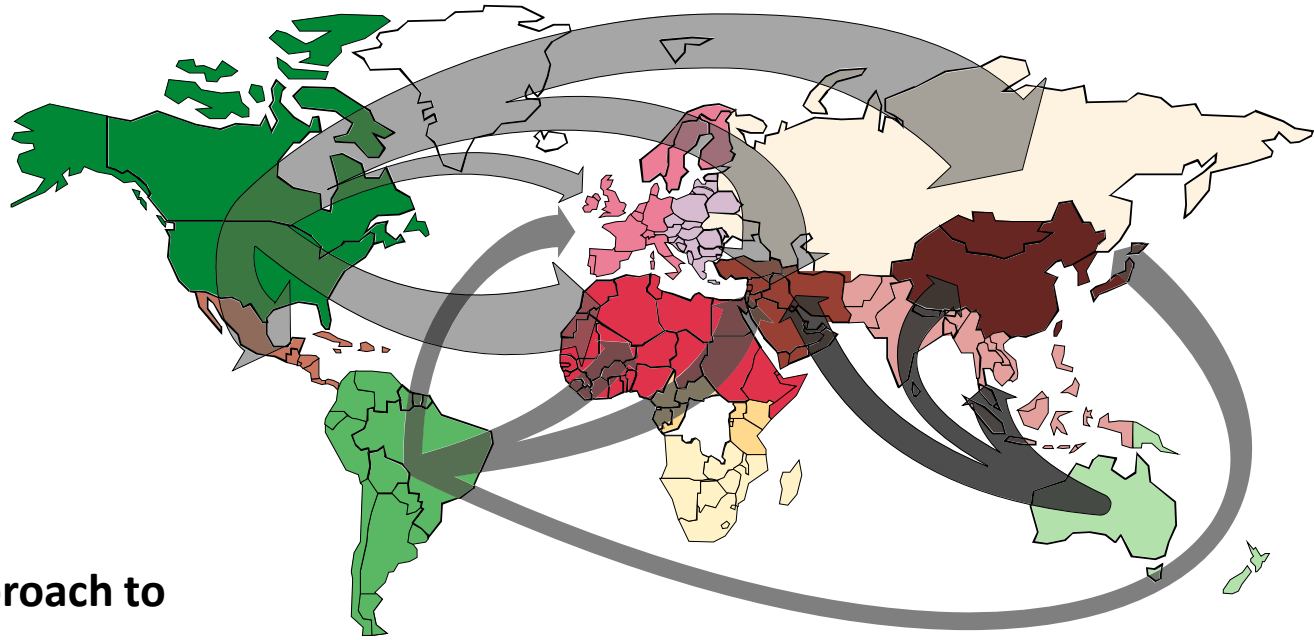




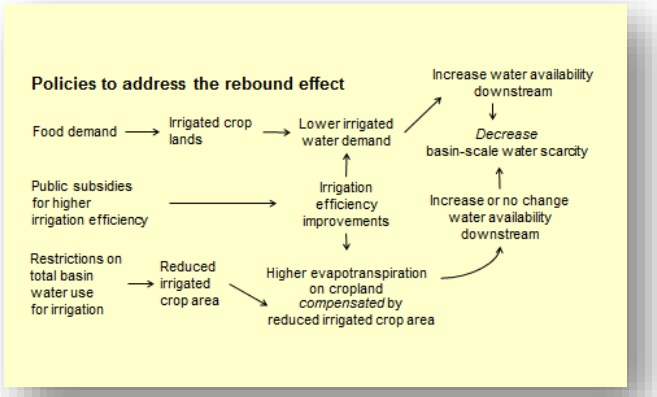
Crop Conditions in May 2016 showing devastating effects of southern Africa drought that left millions in need of humanitarian assistance

GEOGLOWS data can support a range of W-E-F Analysis Frameworks:

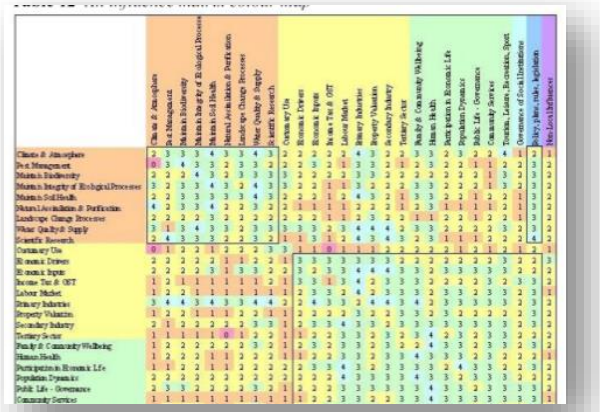
GEOGLOWS and GEOGLAM data could help assess the virtual water flows as a means of characterizing the effects of trade on the movement of water usage represented by food trade.



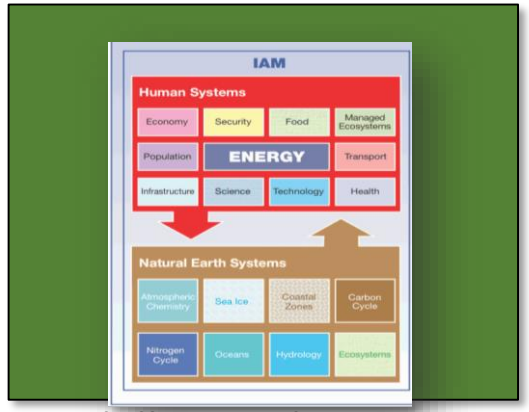
Earth observations are needed for a general systems approach to the W-E-F Nexus (mod. Alcamo)



Systems mapping



Cross impact analysis



Modelling and scenario analysis

Challenge: Taking advantage of Citizen Science data in our current analysis system

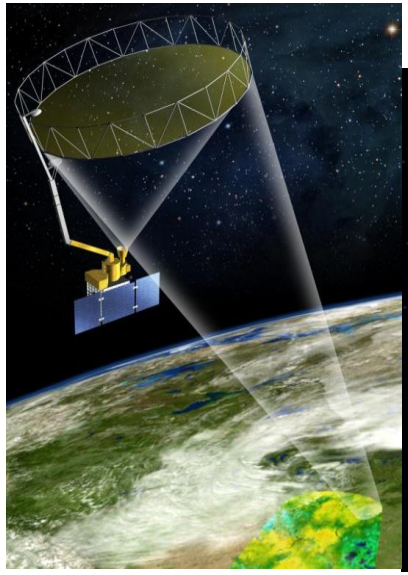
Citizen Science (GJ)

The ubiquitous nature of the cell phones creates a unique resource for acquiring images and data that could be used to validate and complement conventional data sources. (GJ)

CS: Water pollution measurements (SSH)

Integration?

Earth Observations



Water Cycle Variables

Land Use Change Monitoring

Summary

GEOGLOWS promises to provide data, analyses and tools to address water management issues on multiple scales. It draws upon the full range of GEO capabilities and the products of space agencies and other data agencies. It addresses priority water issues and is open to working with “groups” which wish to define the data and science requirements for the policy problems they are addressing (e.g. W-E-F Issue)

Want to get involved?

Join a GEOGLOWS Working Group and/or launch a regional or local application that uses GEOGLOWS data services

For more information contact: Richard.Lawford@morgan.edu