Transboundary freshwater security governance train

Interactive Online Session:
International Water Law and Climate Change

20 April 2021

Global Water Partnership | 25 YEARS

INTERNATIONAL WATER LAW ACADEMY

WUHAN UNIVERSITY

Event Moderator

Dr. Yumiko Yasuda

Senior Network and Transboundary Water Cooperation Specialist, GWP

- Yumiko leads GWP's thematic work on transboundary water, and is the lead faculty of the MOOC on Transboundary Freshwater Security, designed and directed the production of the course.
- Her area of expertise lies in the analysis of water and environmental governance, water diplomacy, political economy analysis surrounding natural resources management, with a focus on transboundary rivers and non-state actors' engagements in natural resources management.
- Dr. Yasuda obtained her PhD degree from the Centre for Water Law, Policy and Science at the University of Dundee, MA in environmental policy from the Tufts University, and MSc in environmental science from Tsukuba University. Her research on the Mekong has culminated in the publication of a book entitled "Rules, Norms and NGO Advocacy Strategies: Hydropower Development on the Mekong River" by Routledge in 2015.

Fun fact! Yumiko performed stand-up comedy in Scotland.

The biggest achievement in life:
Still working on it!

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Event Chairs

Professor Otto Spijkers

Founding Staff Member, International Water Law Academy, Wuhan University

Dr. Barbara Janusz-Pawletta

Vice-Rector on International Cooperation at the Kazakh-German University (DKU)

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Founding Staff Member of the International Water Law Academy (IWLA), Professor at the China Institute of Boundary and Ocean Studies (CIBOS) and at the Research Institute of Environmental Law (RIEL) of Wuhan University

- Otto Spijkers studied international law at the University of Amsterdam, New York University School of Law, and the Hague Academy of International Law. He studied philosophy at the University of Amsterdam and the University of Malta. He obtained a Diplôme approfondi de langue française.
- Prior to joining the IWLA of CIBOS, Professor Spijkers was Lecturer of Public International Law at Utrecht University, and researcher at the Utrecht Centre for Water, Oceans and Sustainability Law.
- He also was a visiting lecturer at the Grotius Centre for International Legal Studies of Leiden University, Xiamen University's China International Water Law Programme, the Università degli Studi di Salerno (Italy), and the Association pour la promotion des droits de l'homme en Afrique centrale (APDHAC) of the Université Catholique d' Afrique Centrale (Yaoundé, Cameroon).

Fun fact! Otto recently got a Chinese name, 高海平. His name is inspired by his height – Otto is very tall – and the fact that he was born near the ocean.

Biggest achievement in life: finding a home in lots of different countries.

Professor Otto Spijkers

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Vice-Rector on International Cooperation, Kazakh-German University (DKU)

- Barbara Janusz-Pawletta has obtained her Master Degree on Law in the Jagiellonen University in 2003. And through 4 years she has become a Doctor on Law in Freie Universität Berlin.
- Her teaching and research fields cover legal framework and institutional interstate cooperation including water and energy nexus. She is looking at the worldwide and regional practices especially in Central Asia to facilitate interstate cooperation in managing sustainable management of water resources.
- Dr. Janusz-Pawletta has been dealing with worldwide and best regional practices facilitating sustainable interstate cooperation related to production and maintenance of renewable energies by using water potential.
- Since 2004, Dr. Janusz-Pawletta has on hers account more than 35 research publications in various sources, including foreign ones.
- She is the editor-in-chief of the Journal of the Central Asian Journal of Water Research (CAJWR), which is open-access, peer-reviewed e-Journal dedicated to all aspects of water management in the region of Central Asia.
- In addition to her position with the DKU, Barbara is a member at the Technical Committee of the Global Water Partnership (GWP) and at International Law Association within the Committee "Role of International Law in Sustainable Natural Resource Management for Development". She also serves as the UNESCO Chairholder for water management in Central Asia.

Dr. Barbara Janusz-Pawletta

"Fun fact! Barbara loves the piano music, but cannot play it anymore, so she is teaching to play piano her 4 sons.

Biggest achievement in life: happy and big family.

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Speakers

1. **Ms. Sonja Koeppel**, Secretary of the Water Convention and co-Secretary of the Protocol on Water and Health at UNECE
2. **Dr. Nagaraja Rao Harshadeep**, Global Lead for Disruptive Technology in the Sustainable Development Practice Group, World Bank
3. **Mr. Didier Zinsou**, Director of Niger Basin Observatory

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國際水法中心 INTERNATIONAL WATER LAW ACADEMY
武漢大學 WUHAN UNIVERSITY

Secretary, Convention on the Protection and Use of Transboundary Watercourses and International Lakes (UNECE Water Convention)

- Sonja Koeppel currently leads the Water team at the United Nations Economic Commission for Europe and serves as secretary to the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention) as well as co-secretary to the UNECE/ WHO-Europe Protocol on Water and Health.
- She has worked for more than 10 years in the Water Convention Secretariat, for example coordinating the activities on climate change adaptation.
- Before joining UNECE, Sonja worked for UNEP in Nairobi and studied environmental sciences, policy and management, as well as social sciences.

Biggest achievement in life: Sonja has played the cello in 6 different orchestras since her childhood.

Sonja Koeppel

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Nagaraja Rao Harshadeep

Global Lead, Disruptive Technology, World Bank

- Harsh is a Global Lead for Disruptive Technology at the World Bank. In 25 years at the World Bank, he has led and advised several environmental, water, and natural resources operational projects and analytical support around the world. This includes work on GreenTech, watershed management, integrated basin planning and management, transboundary waters, pollution, critical ecosystems, safeguards, and climate resilience.
- He represents the Sustainable Development practice group in a Bank-wide Disruptive Technology working group, co-leads the Bank's HydroInformatics focal area, and has also been a Global Lead for Watersheds. He also leads a Disruptive KIDS (Knowledge, Information & Data Services) Helpdesk to provide support to operational teams on modern technologies.
- Earlier, he worked with other international organizations, academia, and the private sector on environment, water analytics and water conflicts. He holds a Bachelor of Technology in Civil Engineering from the Indian Institute of Technology (IIT-Madras), a Master's in Environmental and Resource Engineering from Syracuse, and a PhD in Water Resources and Environmental Systems Engineering from Harvard University.

Fun fact: Harsh used to travel over 250 days a year across the world for over two decades at the Bank and is currently going through withdrawal with the pandemic travel restrictions!

The biggest achievement in life: Beginning life at a time that allowed me to see the implications of such accelerated changes in technology!

Didier Sèyivè Zinsou

Director, Niger Basin Observatory

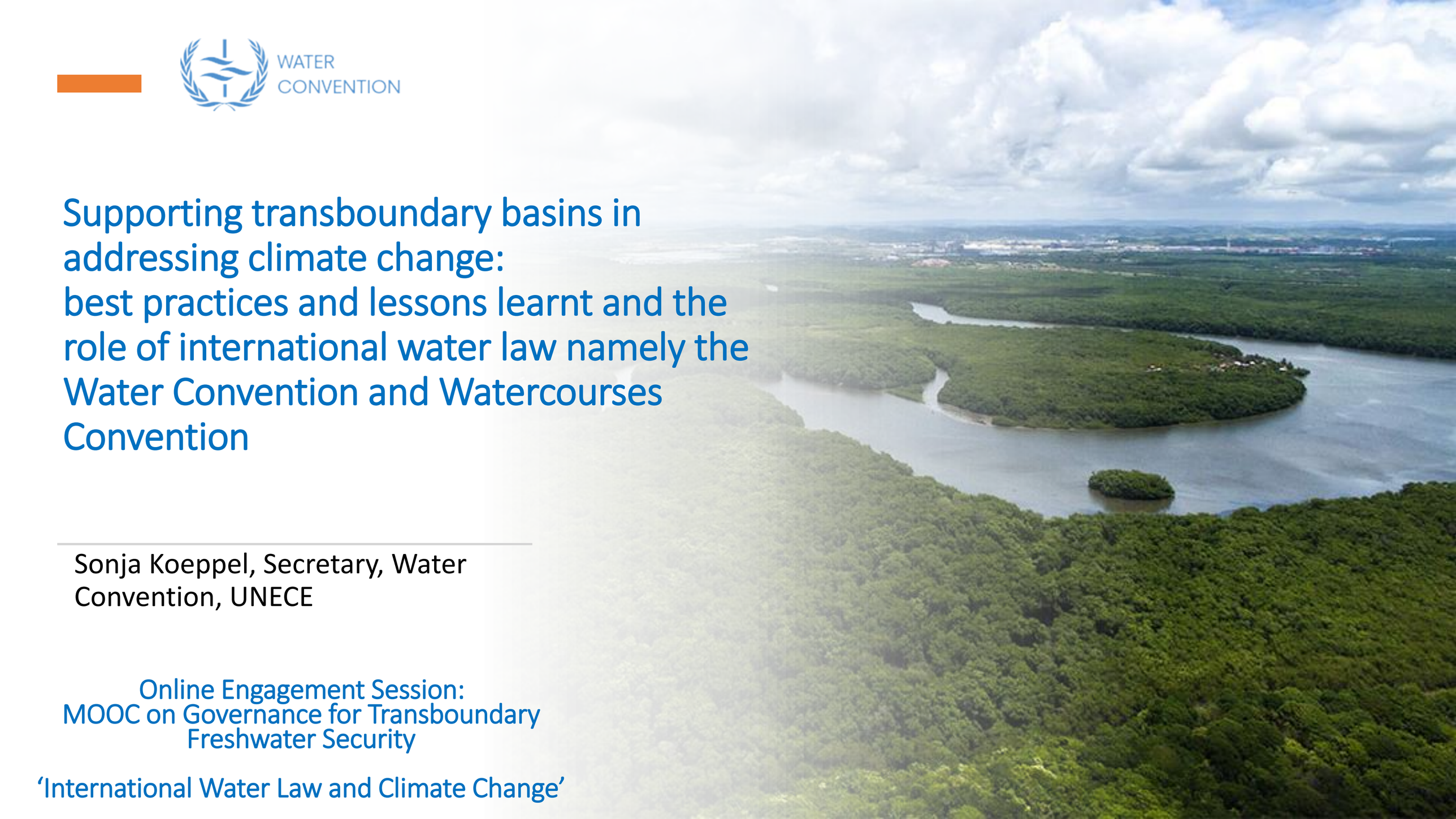
- Didier Sèyivè Zinsou, born in Cotonou, Republic of Benin, Engineer in Rural Engineering, he started his professional career for a short period in a consulting firm and then in the Beninese administration, in particular in the General Directorate of Water of Benin before joining the Executive Secretariat of the Niger Basin Authority.
- At the Niger Basin Authority (NBA), he worked as a Water Resources Specialist for more than ten years in monitoring the development of water resources, both surface and groundwater.
- Since October 2019, he has been promoted to the position of Director of the Niger Basin Observatory where he has the immense task of monitoring the development of water and the environment (natural and human) of the Niger Basin and producing technical notes on the state of this environment and also providing advisory support on environmental issues in the Niger basin.

Fun fact, taken from an African proverb: "Words are like eggs, once you've dropped them, you can't take them back".

The biggest achievement in life: to constantly challenge himself to move forward.

WATER CONVENTION

Supporting transboundary basins in addressing climate change: best practices and lessons learnt and the role of international water law namely the Water Convention and Watercourses Convention



Sonja Koeppel, Secretary, Water Convention, UNECE

Online Engagement Session:
MOOC on Governance for Transboundary Freshwater Security

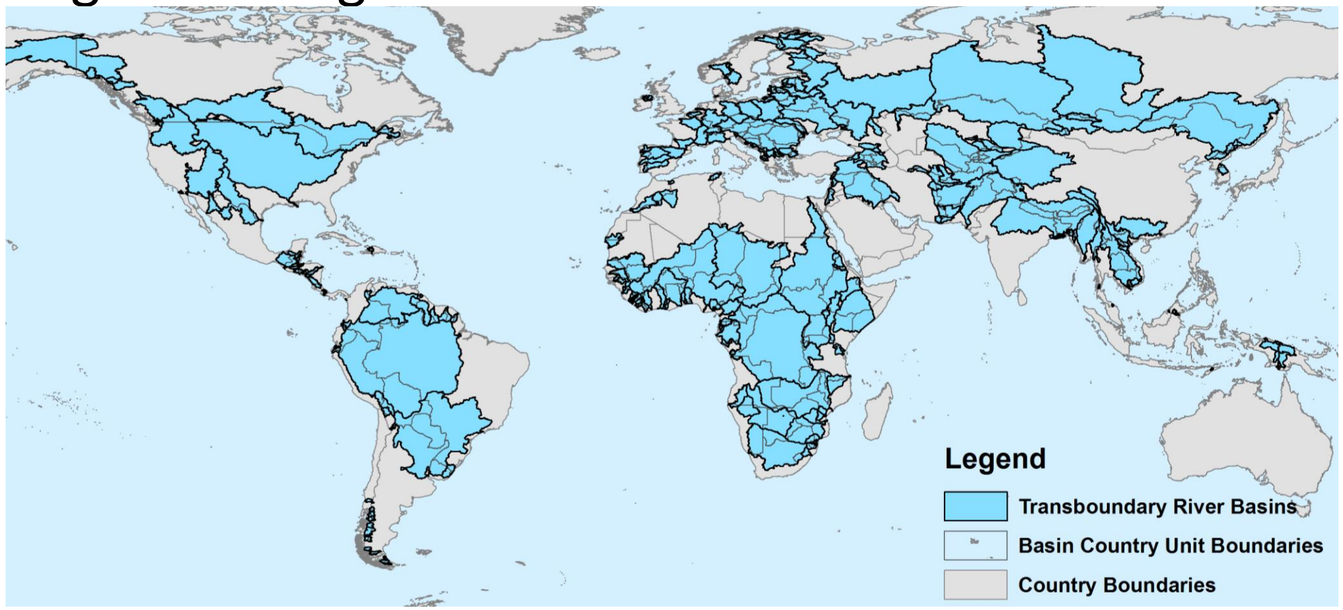
'International Water Law and Climate Change'

Why transboundary cooperation in climate change adaptation?

- ✓Addressing floods and droughts more efficiently
- ✓Sharing data, enlarging the planning space and identification of better priorities and avoiding mal-adaptation
- ✓Reducing uncertainties
- ✓Supporting sustainable development and regional integration
- ✓Possibly supporting adaptation planning at the country level

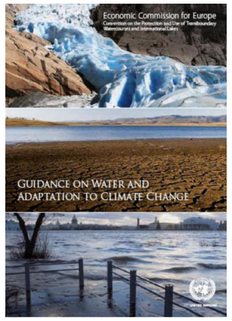
Sharing costs and benefits

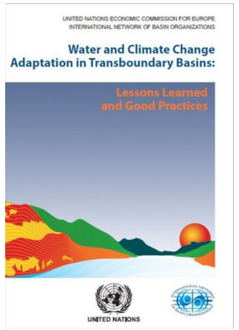
http://twap-rivers.org/

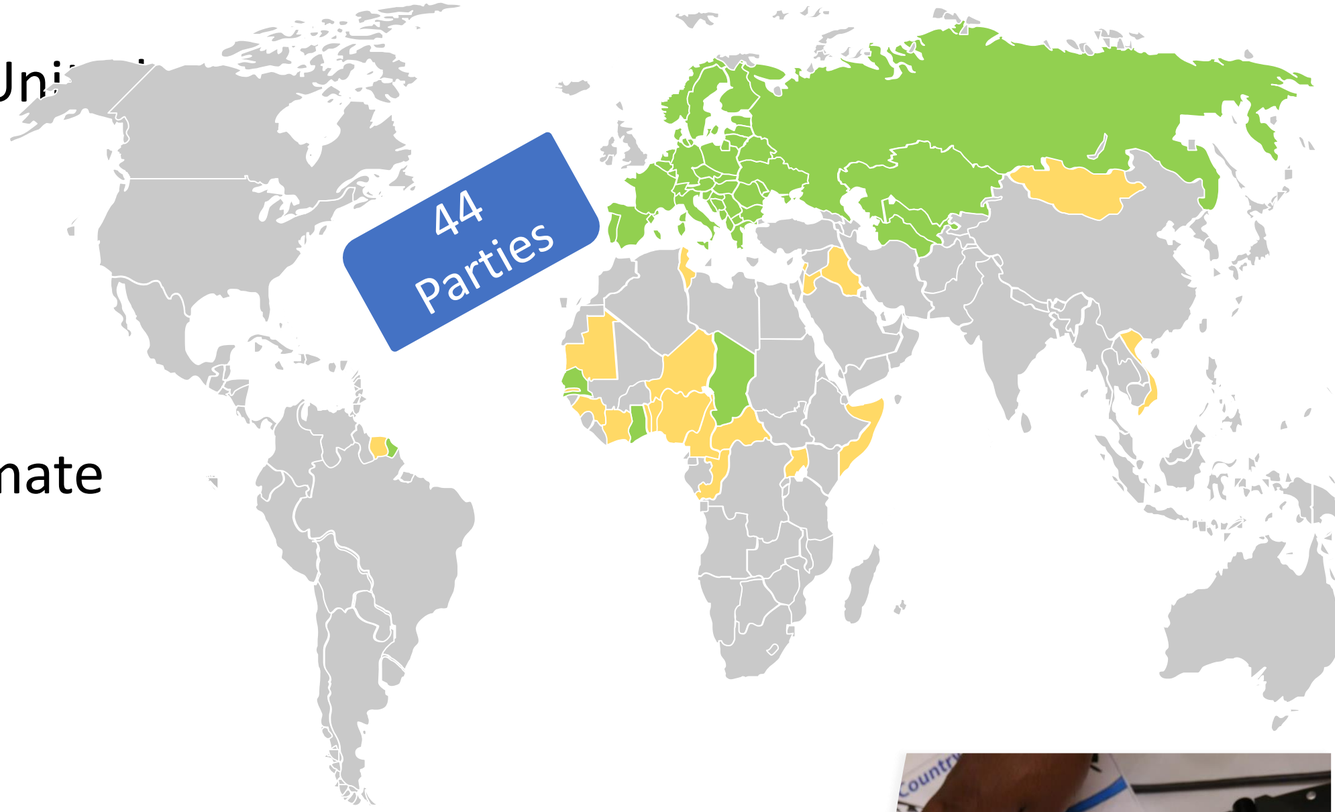


Water Convention

- Unique global legal and intergovernmental Uni… Nations framework on transboundary cooperation which offers capacity building, sharing knowledge and experience
- Task Force on Water and Climate since 2006
- Guidance and publications on water and climate

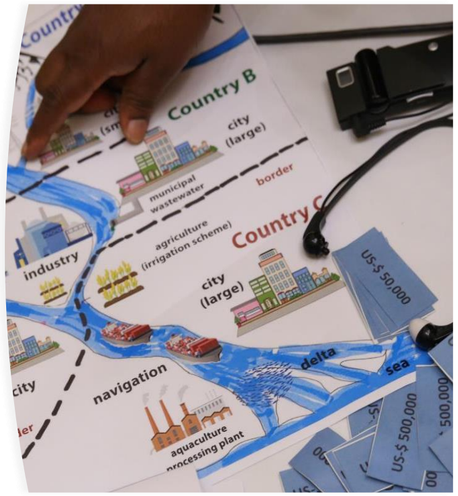






- Global Network of basins working on climate change adaptation
- Promoting water and climate in global processes

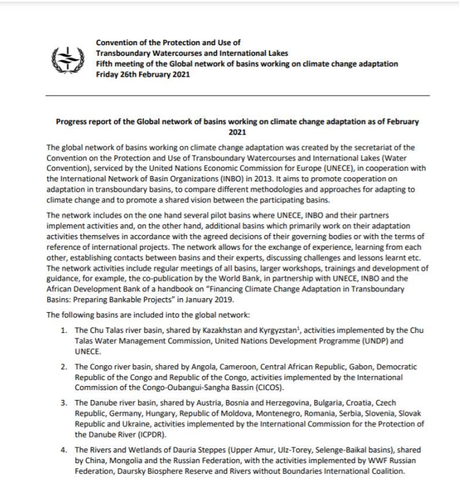
- Regular global workshops
- Pilot projects



Global network of basins working on climate change adaptation

- Coordinated by the Water Convention and INBO since 2013
- Regular meetings to exchange experience and knowledge and sharing best practises, challenges and lessons learnt
- Developing, implementing and financing climate change adaptation in transboundary basins
- 17 basins are currently part of the network

Other basins are very welcome to join!



Convention of the Protection and Use of
Transboundary Watercourses and International Lakes
Fifth meeting of the Global network of basins working on climate change adaptation
Friday 26th February 2021

Progress report of the Global network of basins working on climate change adaptation as of February 2021

The global network of basins working on climate change adaptation was created by the secretariat of the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Water Convention), serviced by the United Nations Economic Commission for Europe (UNECE), in cooperation with the International Network of Basin Organizations (INBO) in 2013. It aims to promote cooperation on adaptation in transboundary basins, to compare different methodologies and approaches for adapting to climate change and to promote a shared vision between the participating basins.

The network includes on the one hand several pilot basins where UNECE, INBO and their partners implement activities and, on the other hand, additional basins which primarily work on their adaptation activities themselves in accordance with the agreed decisions of their governing bodies or with the terms of reference of international projects. The network allows for the exchange of experience, learning from each other, establishing contacts between basins and their experts, discussing challenges and lessons learnt etc. The network activities include regular meetings of all basins, larger workshops, trainings and development of guidance, for example, the co-publication by the World Bank, in partnership with UNECE, INBO and the African Development Bank of a handbook on "Financing Climate Change Adaptation in Transboundary Basins: Preparing Bankable Projects" in January 2019.

The following basins are included into the global network:

1. The Chu Talas river basin, shared by Kazakhstan and Kyrgyzstan[1], activities implemented by the Chu Talas Water Management Commission, United Nations Development Programme (UNDP) and UNECE
2. The Congo river basin, shared by Angola, Cameroon, Central African Republic, Gabon, Democratic Republic of the Congo and Republic of the Congo, activities implemented by the International Commission of the Congo-Oubangui-Sangha Bassin (CICOS).
3. The Danube river basin, shared by Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Republic of Moldova, Montenegro, Romania, Serbia, Slovenia, Slovak Republic and Ukraine, activities implemented by the International Commission for the Protection of the Danube River (ICPDR).
4. The Rivers and Wetlands of Dauria Steppes (Upper Amur, Ulz-Torey, Selenge-Baikal basins), shared by China, Mongolia and the Russian Federation, with the activities implemented by WWF Russian Federation, Daursky Biosphere Reserve and Rivers without Boundaries International Coalition.

https://unece.org/environmental-policy/events/fifth-meeting-global-network-basins-working-climate-change-adaptation

Chu Talas river basin, Congo river basin, Danube river basin, Rivers and Wetlands of Dauria Steppes, Dniester river basin, Drin river basin, Lower Mekong river basin, Meuse river basin, Neman river basin, Niger river basin, North Western Sahara Aquifer System (NWSAS), Rhine basin, Sava river basin, Senegal river basin, Sixaola river basin, Lake Victoria basin, Volta river basin

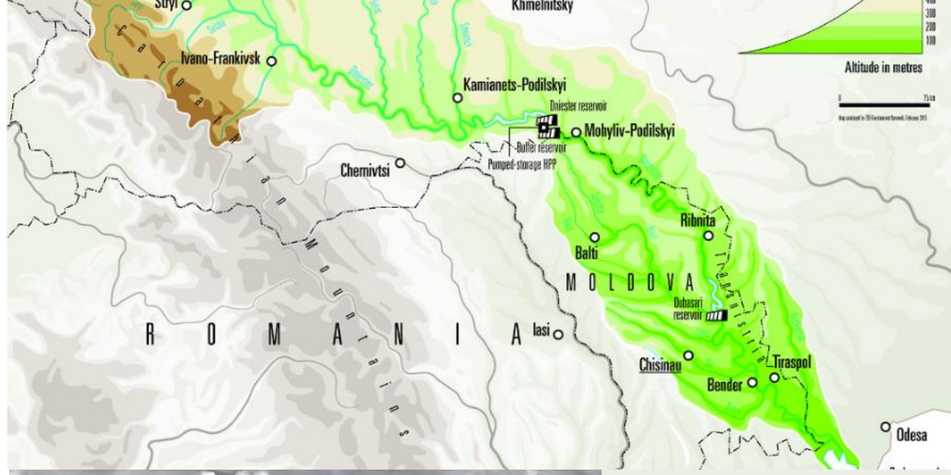
Recommended steps in transboundary climate change adaptation

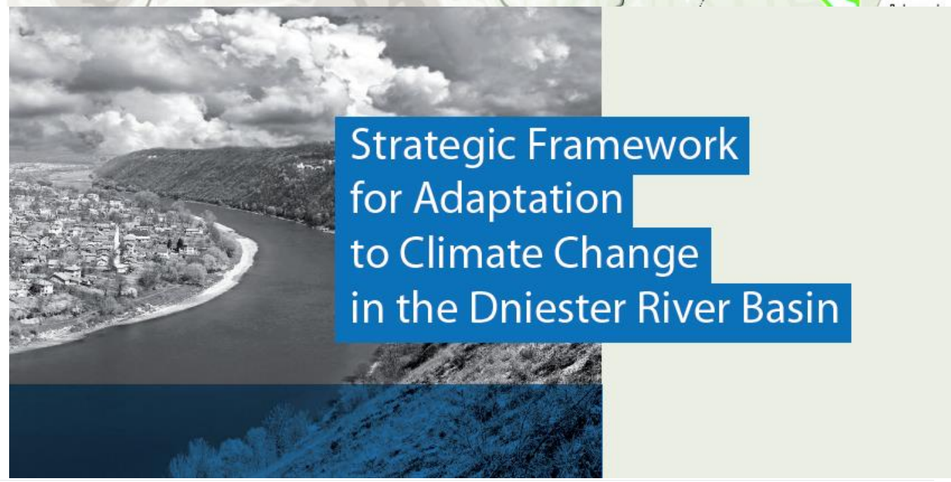
- Analysis of climate change impacts
- Vulnerability assessment
- Development of a joint transboundary adaptation strategy and plan
- Implementation of priority adaptation measures
- Integration of adaptation measures into the basin and flood risk management plans as well as national strategies and plans (NDCs, NAPs, and others)

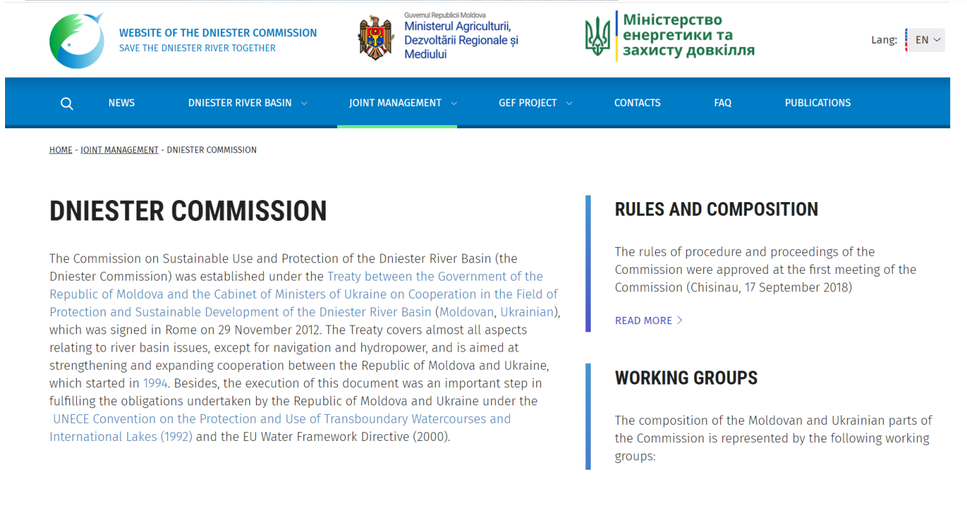
Good examples worldwide: Chu-Talas, Danube, Dniester, Neman, Rhine Lake Victoria, Mekong and Niger…

Case study example 1: Dniester basin

- The **Dniester basin** shared by Moldova and Ukraine (projects by UNECE, OSCE, UNDP, UNEP)
- Cooperation on climate change adaptation started with flood management activities
- Strategic Framework for Adaptation to Climate Change was endorsed in 2015 and followed by development of its Implementation Plan
- These activities increased the adaptive capacity in the basin and facilitated the entry into force of the transboundary Dniester Treaty in 2017 and the establishment of the Dniester Commission in 2018

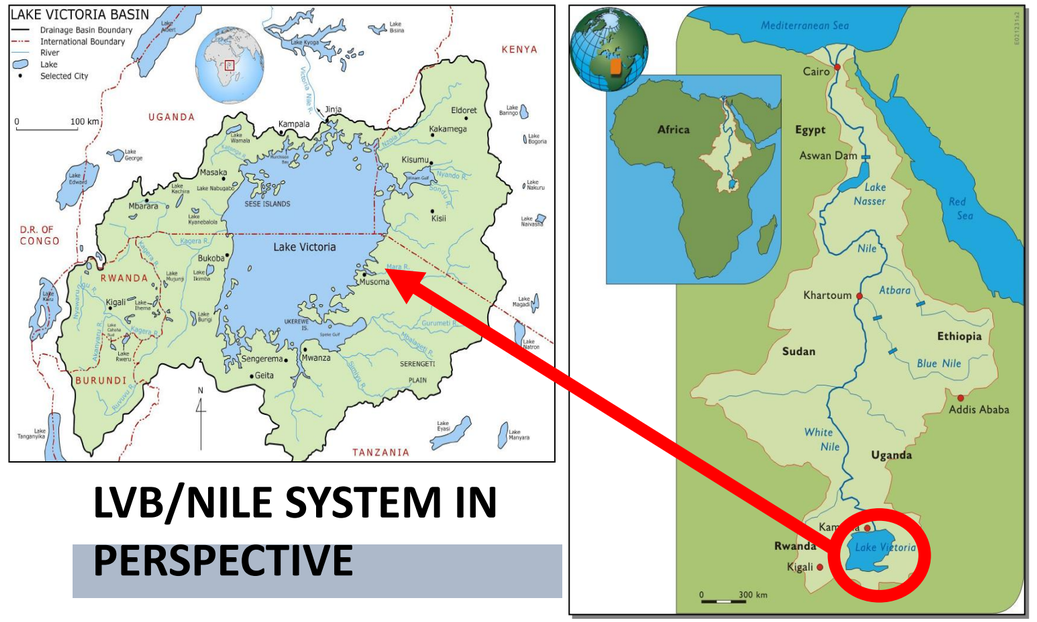




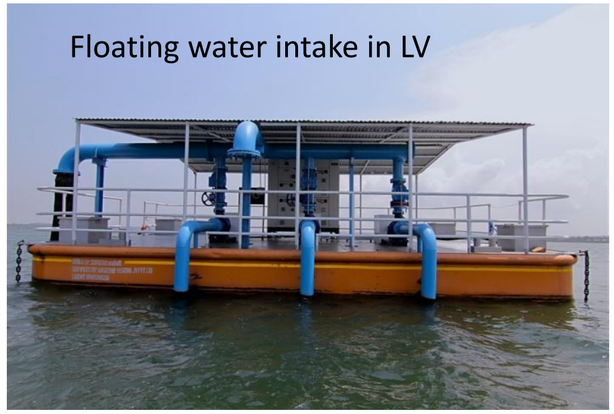


Case study example 2: Lake Victoria basin

- **Lake Victoria basin** is shared by Burundi, Kenya, Rwanda, Tanzania and Uganda
- Climate change adaptation strategy and plan based on climate impact analysis covering floods and droughts developed by lake Victoria basin commission
- Project *Adapting to climate change in Lake Victoria Basin* with support of the Adaptation Fund and UNEP implemented by LCBC
- Increasing climate resilience at regional, national and local levels through transboundary cooperation and adaptation action which also help to reduce conflicts



LVB/NILE SYSTEM IN PERSPECTIVE

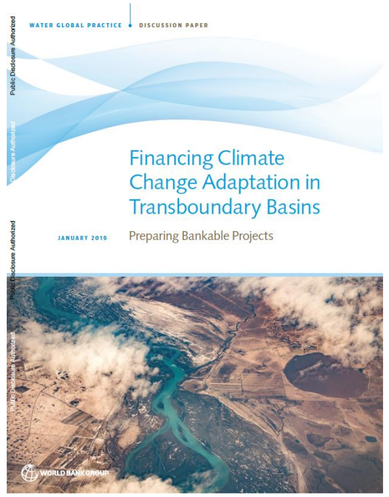


Wastewater treatment plant

Integration on WASH and health policies in transboundary management of Lake Victoria considering climate change perspective

Financing climate change adaptation in transboundary basins

- **Need to demonstrate added value and links to NDCs**
- **Transboundary/ regional organizations, if** accredited agencies can submit funding proposals to climate funds or apply in cooperation with partners
- **Options** for funding transboundary projects are **limited** compared to individual states



Examples of regional support

- Adaptation Fund
  - regional pilot programVolta, Lake Victoria, Drin, others
  - **20% total portfolio** under the regional window (US$151M)
  - about **13% portfolio** covers water management (US$100M)
- GEF International Waters
- Green Climate Fund

https://openknowledge.worldbank.org/handle/10986/31224?CID=WAT_TT_Water_EN_EXT&locale-attribute=en

Ingredients for success

- Bring together political and expert level
- Good communication
- Consultative process and inter-sectoral cooperation
- Data sharing and joint/coordinated monitoring
- Capacity building support
- Combine strategy development with concrete activities on the ground
- Support from basin organisations and partnership between different organisations
- Involvement of civil society

Conclusions and activities in 2021

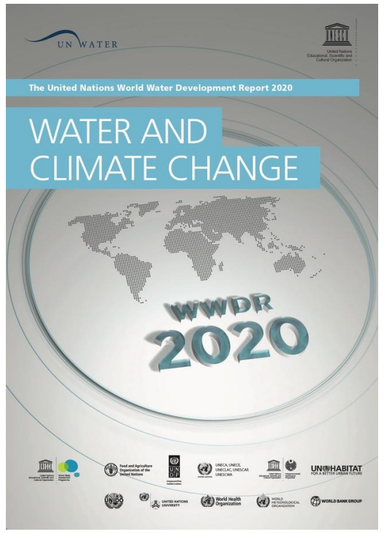
Climate change makes transboundary water cooperation even more challenging. On the other hand, cooperation on climate change adaptation and flood management can **facilitate broader transboundary cooperation and even support national adaptation**

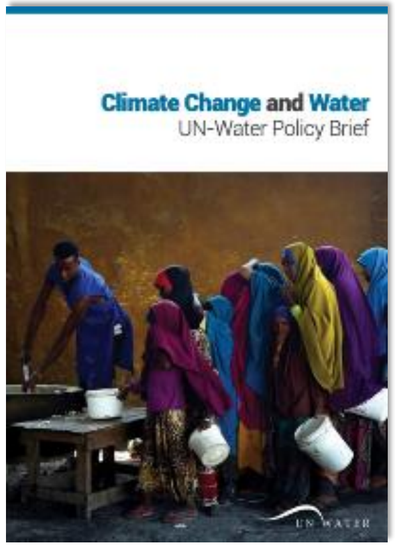
Date and venue	Meeting
26-28 April 2021, hybrid/virtual	3rd joint meeting of the Water Conventions Working Group on Integrated Water Resources Management and on Monitoring and Assessment
29 September - 1 October 2021	Ninth session of the Water Convention Meeting of the Parties
1-12 November, Glasgow	COP26 with hopefully a water day and a water pavillion

https://unece.org/info/events/unece-meetings-and-events/environmental-policy/water-convention

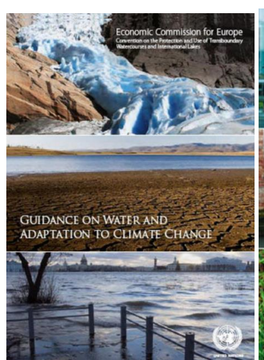
Additional relevant resources

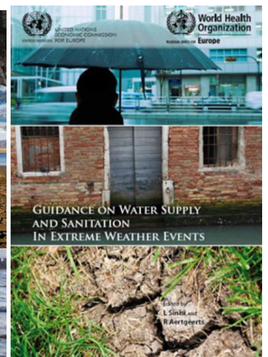
- UN-Water World Water Development Report “Water and Climate Change”, 2020
- UN-Water Policy Brief on Climate Change and Water, 2019

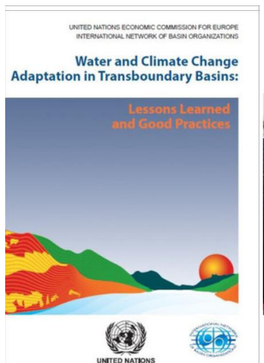


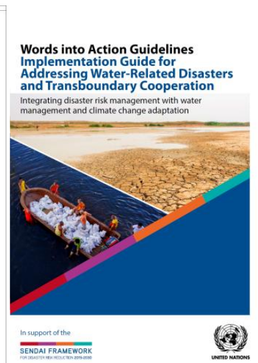


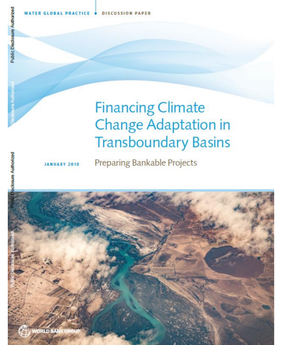
- Towards sustainable renewable energy investment and deployment, 2020
- Financing Climate Change Adaptation in Transboundary Basins: Preparing Bankable Projects, 2019
- Implementation Guide for Addressing Water-Related Disasters and Transboundary Cooperation, 2018
- Water and Climate Change Adaptation in Transboundary Basins: Lessons Learned and Good Practices, 2015
- Guidance on Water and Adaptation to Climate Change, 2009

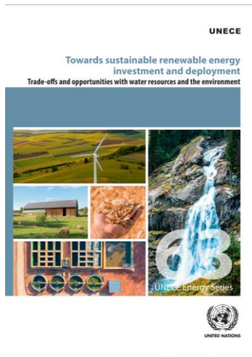












Thanks for your attention!

Water Convention Secretariat contact:
Palais des Nations, Geneva, Switzerland
sonja.koeppel@un.org
hanna.plotnykova@un.org (for climate change)
water.convention@un.org

For more information:
www.unece.org/env/water/

Big Data, Disruptive Tech & Climate

Dr. Nagaraja Rao Harshadeep (Harsh)

Global Lead (Disruptive Technology)

WORLD BANK GROUP

Transboundary freshwater security governance train

Interactive Online Session: International Water Law and Climate Change

20 April 2021

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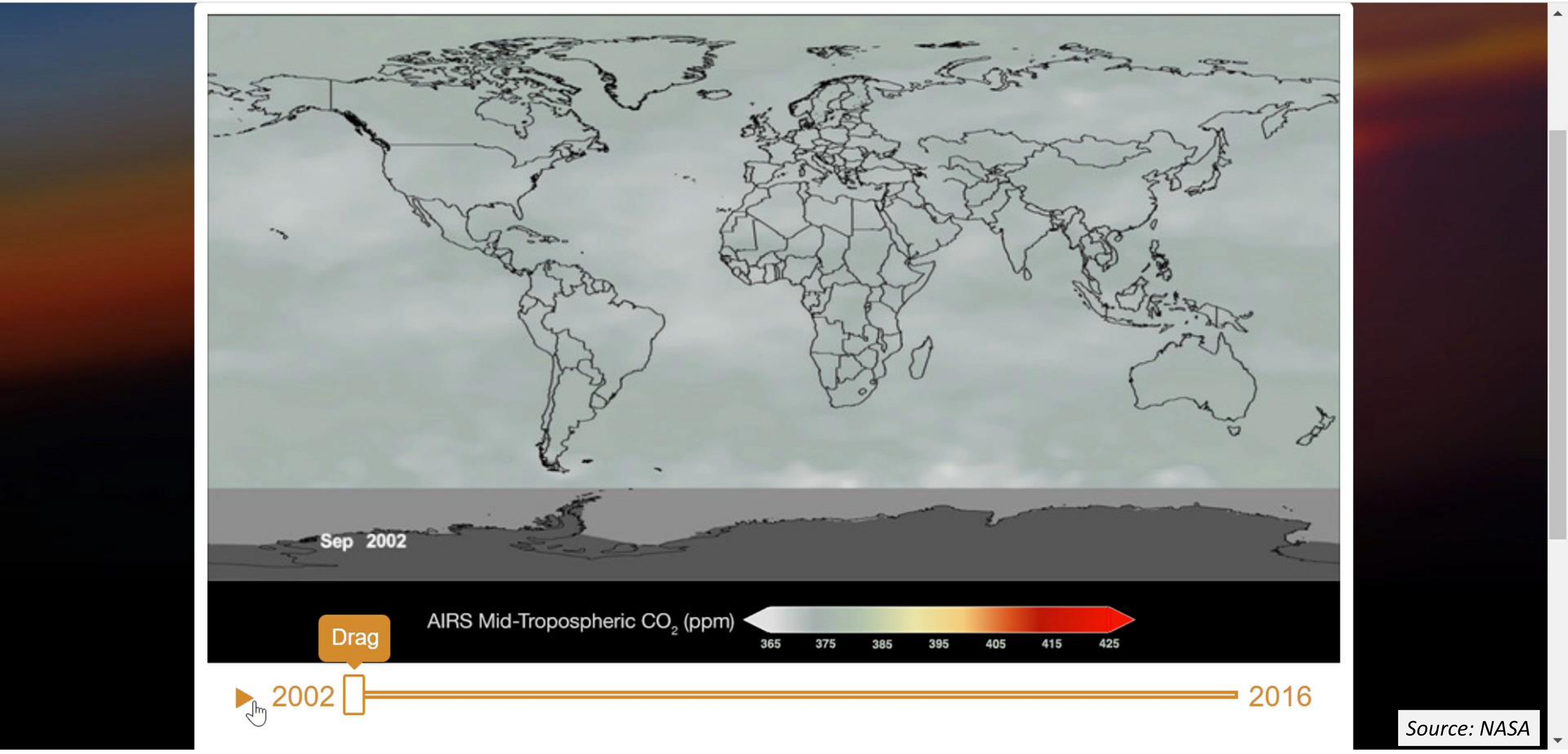
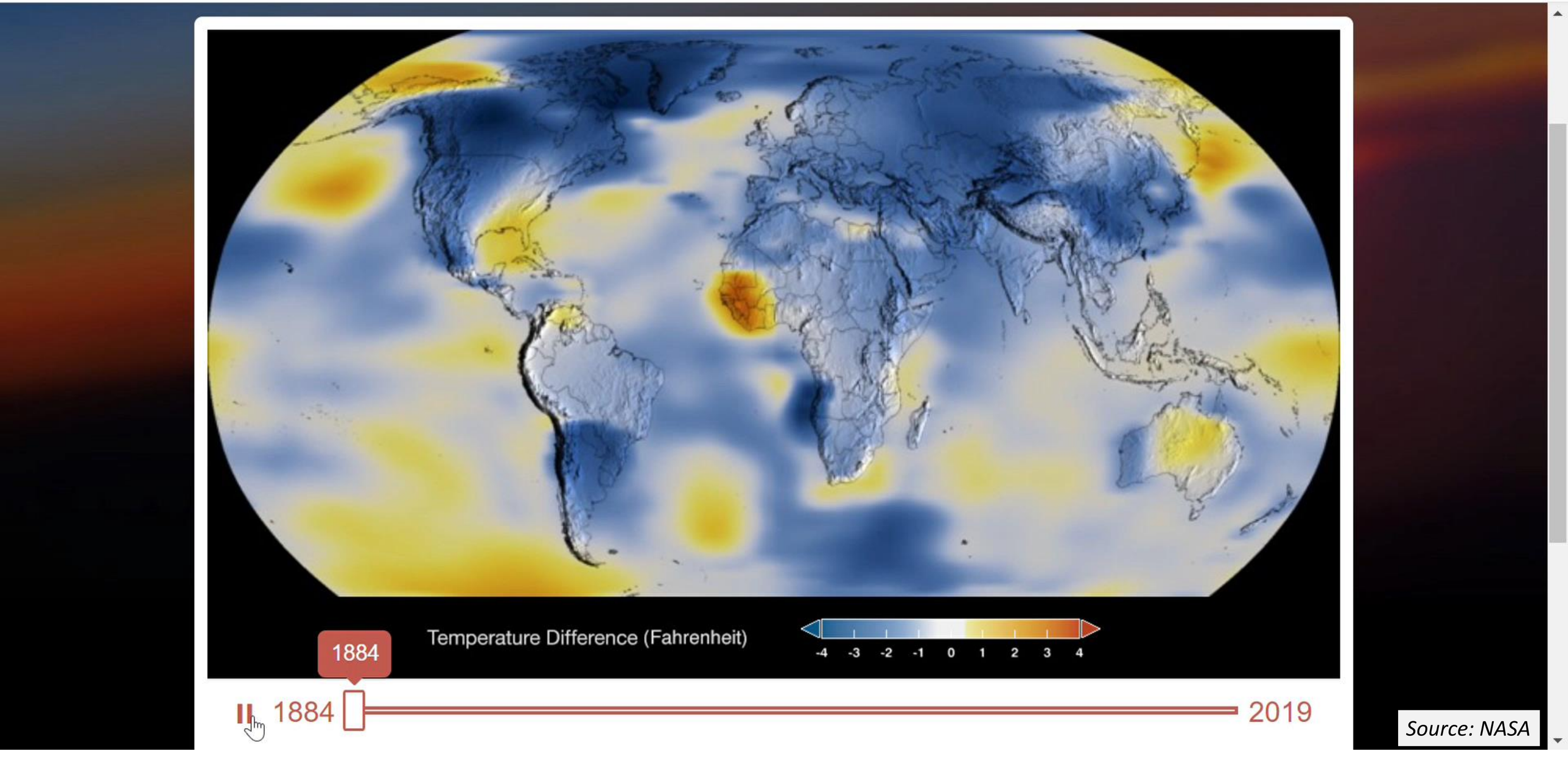
Rising Global CO_2 levels



Source: NASA

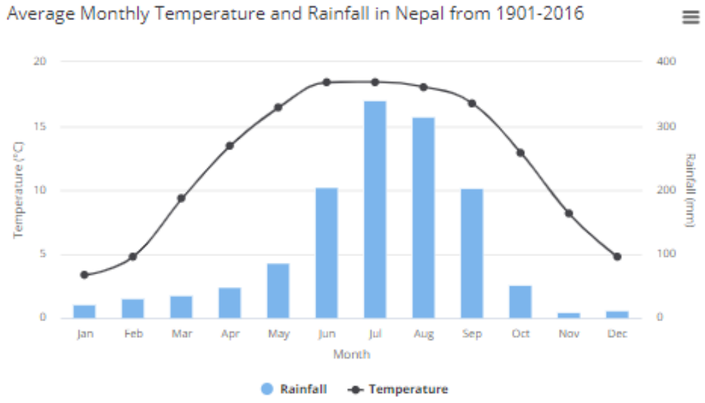
Rising Global Temperatures

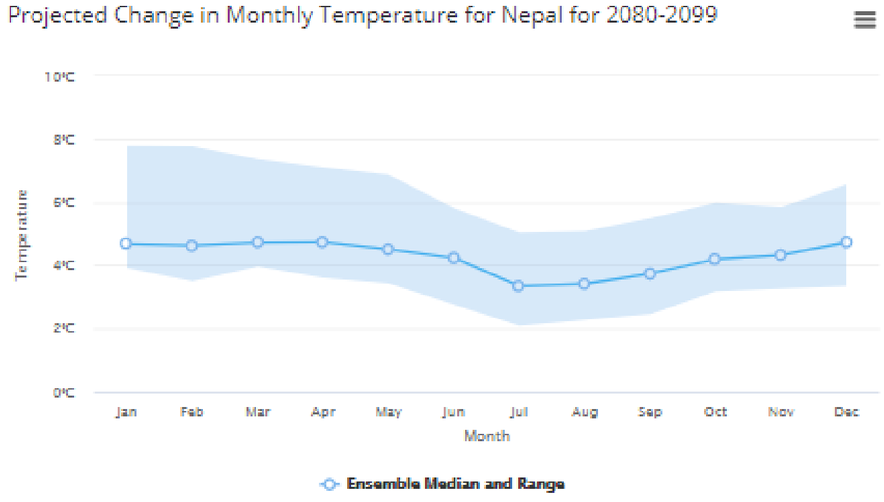


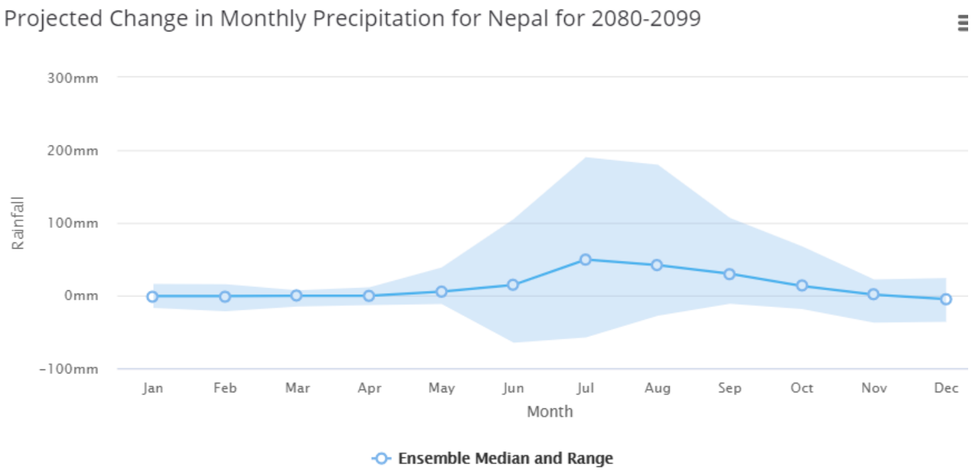
Source: NASA

Average Monthly Precipitation

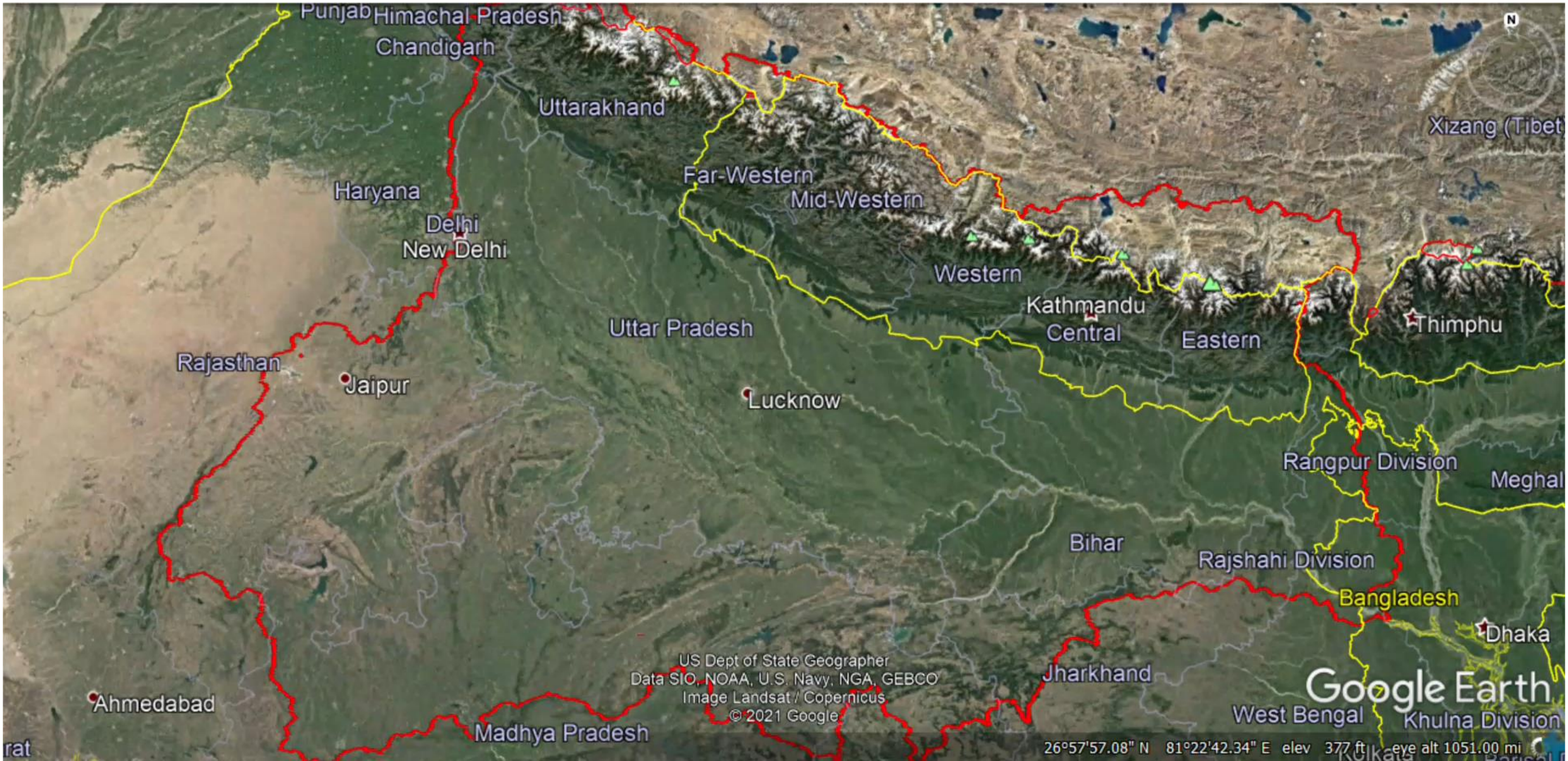
Data source:
Administrative border : Gadm
Precipitation: WorldClim



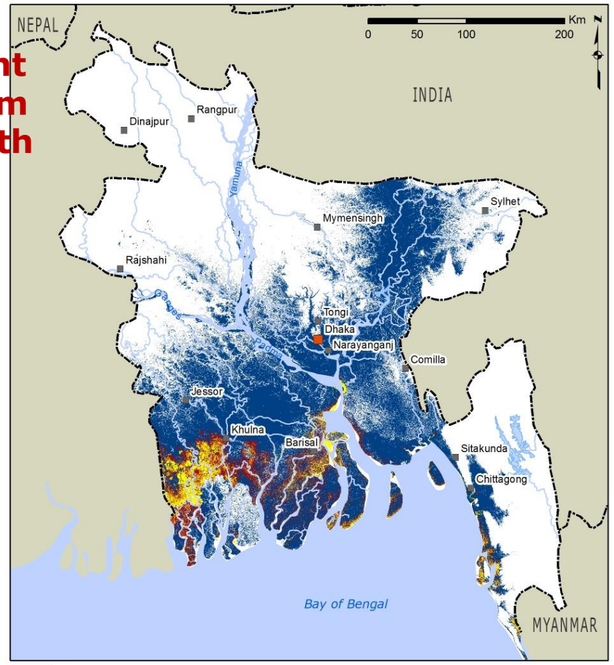




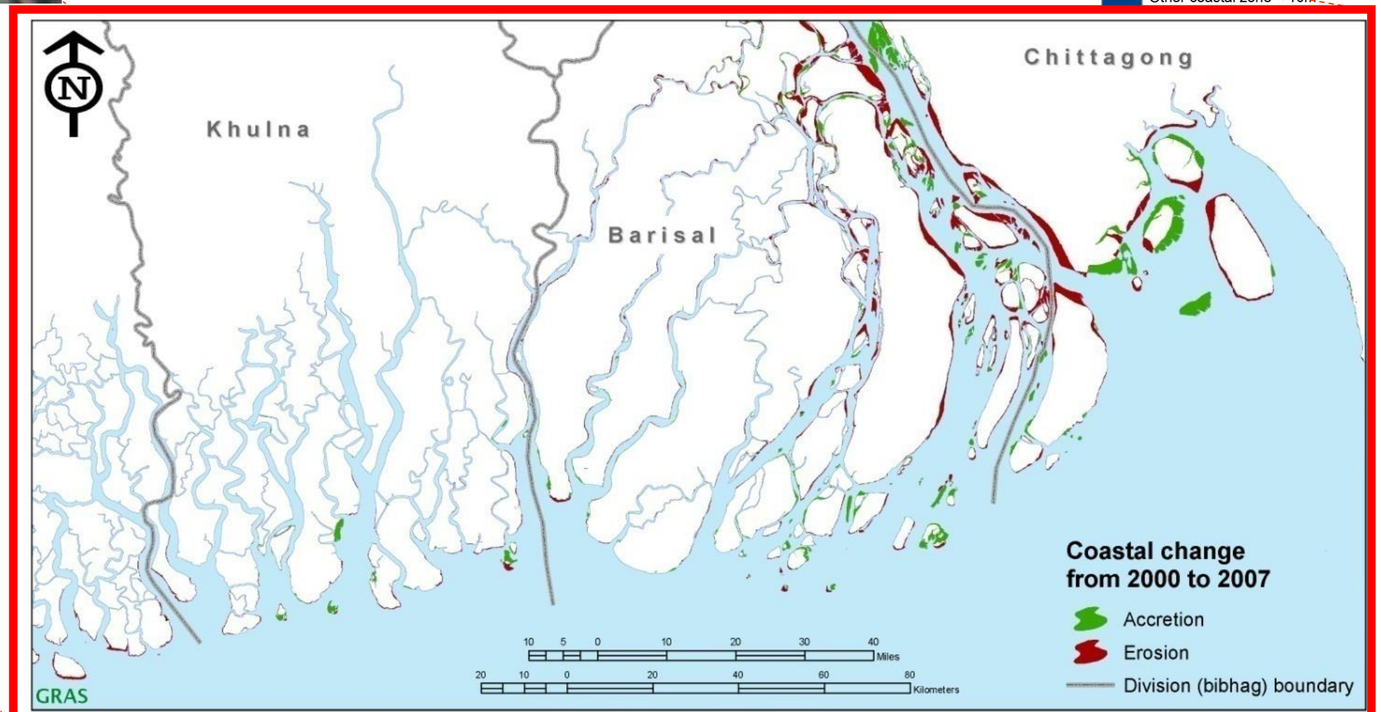
The Ganges Basin & Climate Change



Bangladesh – Current and Future Sea Storm Surge associated with sea-level rise of 1m



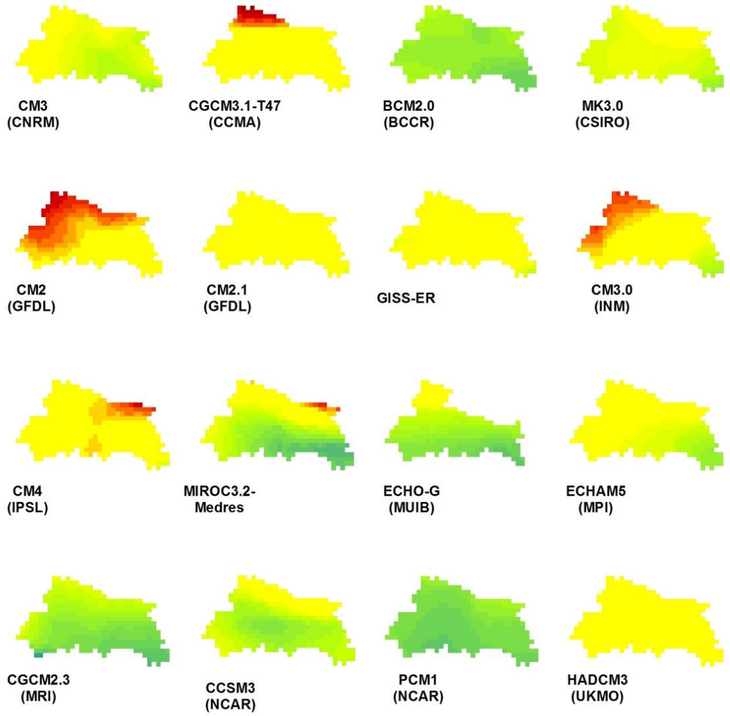
Sea levels will rise



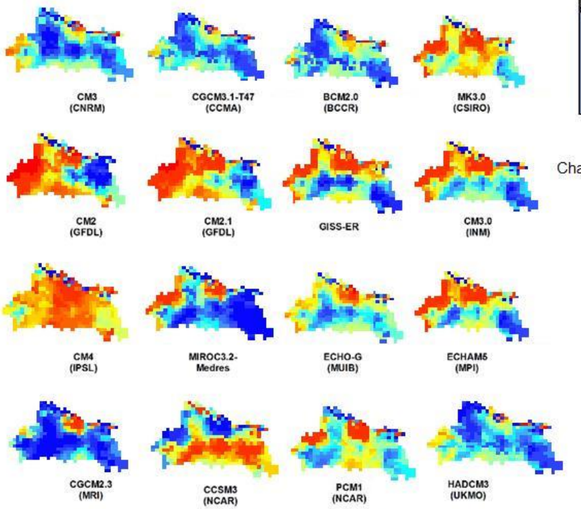
Hydrology will change

Change in Temperature (Degrees Celsius)

> +4
+3.5
+3
+2.5
+2
+1.5
+1



TEMPERATURE

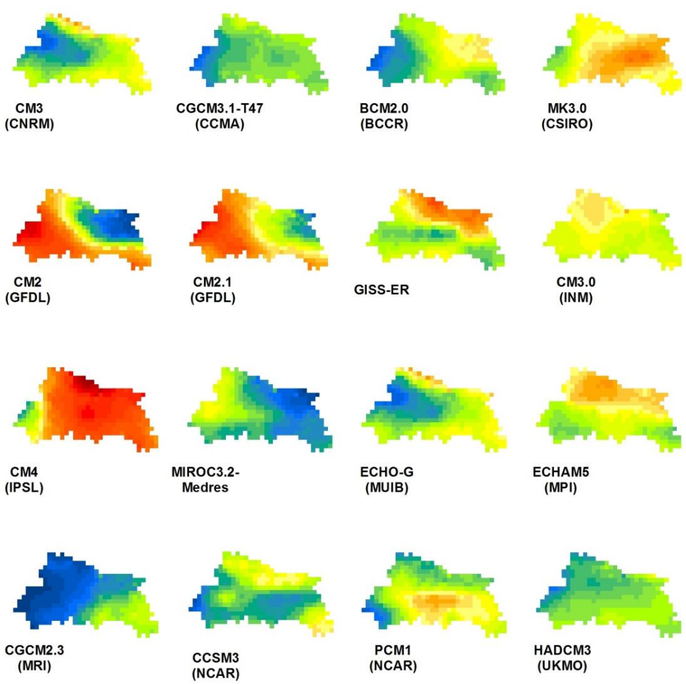


Changes in Water Yield (%)

-40 - -35
-35 - -30
-30 - -27.5
-27.5 - -25
-25 - -22.5
-22.5 - -20
-20 - -17.5
-17.5 - -15
-15 - -12.5
-12.5 - -10
-10 - -7.5
-7.5 - -5
-5 - -2.5
-2.5 - 0
0 - 2.5
2.5 - 5
5 - 7.5
7.5 - 10
10 - 12.5
12.5 - 15
15 - 17.5
17.5 - 20
20 - 22.5
22.5 - 25
25 - 27.5
27.5 - 30
30 - 35
35 - 40
40 - 50
50 - 75

This map shows the predication change in water yield (wy) by the considered wy of the GCMs models, under the A2 scenario for 2040 - 2069 as compared to the baseline 1969 - 2001. Map displays gridded data (cell size=0.5dd).
Sources: WCRP'S CMIP3 (Meehl et al., 2007), downscaled by the World Bank (2011)
Disclaimer: The boundaries, colors, denominations, and other information shown in any map do not imply any judgment on the part of the World Bank concerning the legal status of any territory or the endorsement or acceptance of such

RUNOFF



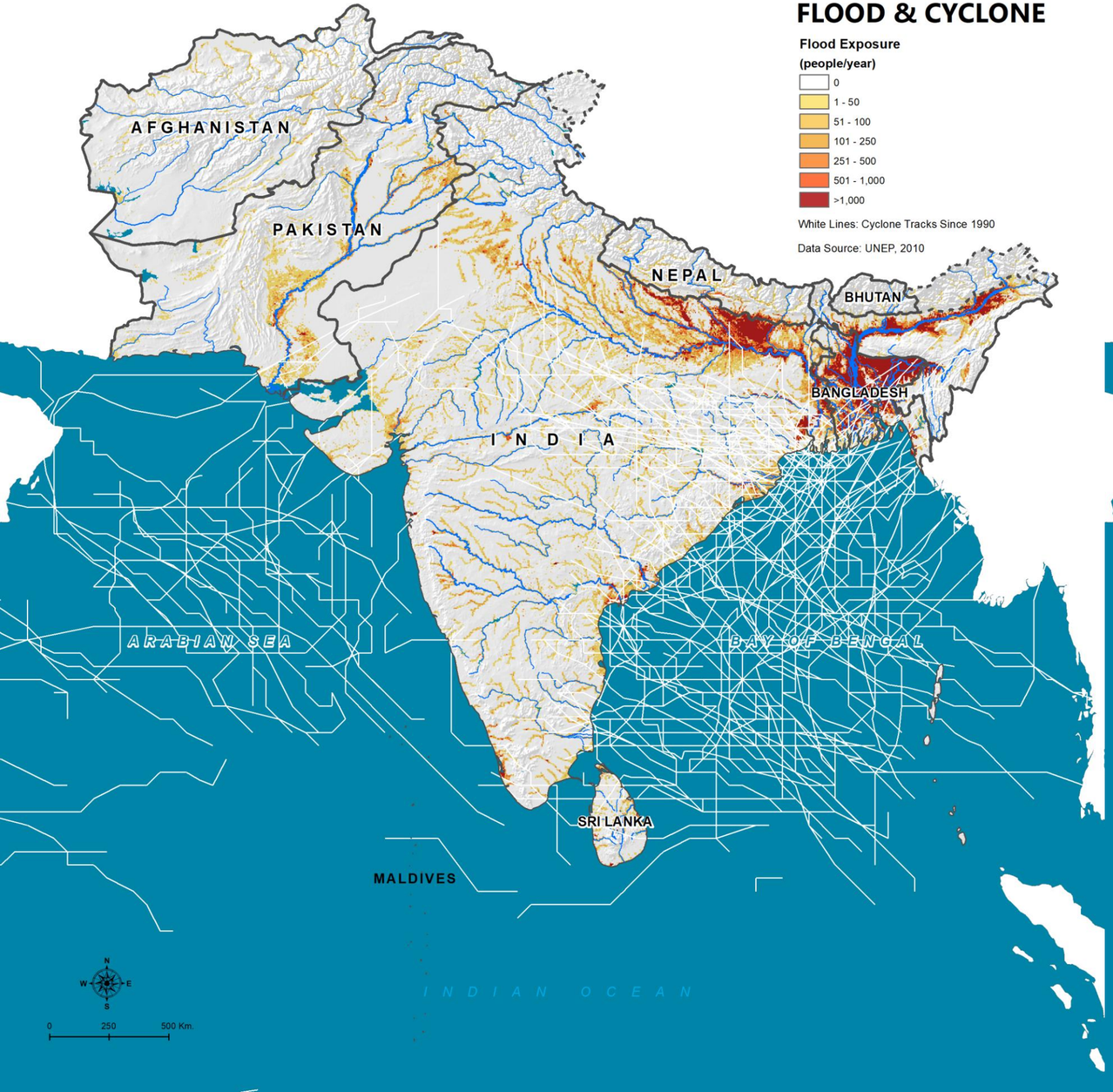
PRECIPITATION

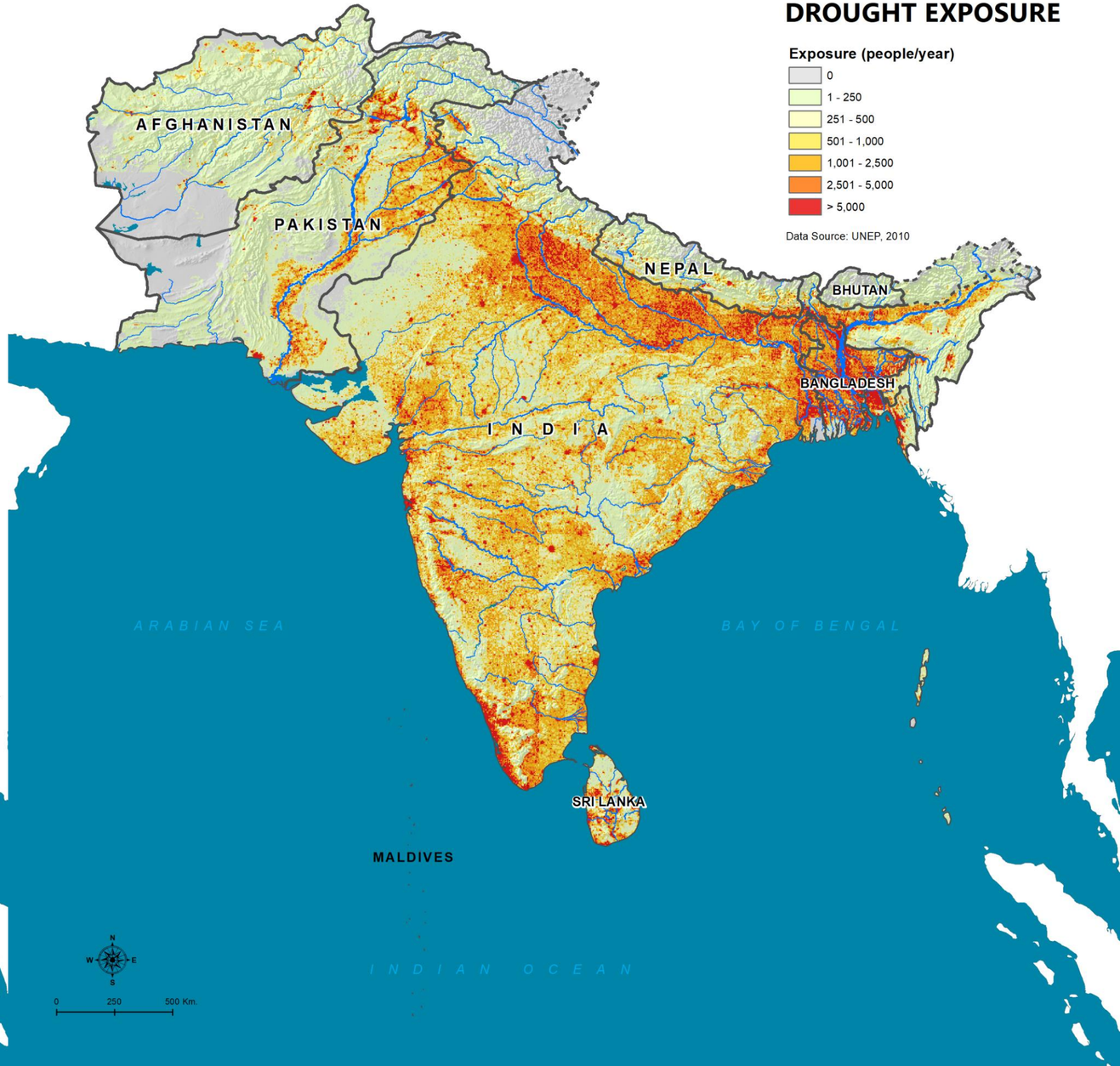
Change in Precipitation (%)

<-50
-50 - -40
-40 - -35
-35 - -30
-30 - -27.5
-27.5 - -25
-25 - -22.5
-22.5 - -20
-20 - -17.5
-17.5 - -15
-15 - -12.5
-12.5 - -10
-10 - -7.5
-7.5 - -5
-5 - -2.5
-2.5 - 0
0 - 2.5
2.5 - 5
5 - 7.5
7.5 - 10
10 - 12.5
12.5 - 15
15 - 17.5
17.5 - 20
20 - 22.5
22.5 - 25
25 - 27.5
27.5 - 30
30 - 35
35 - 40
40 - 50
50 - 75
75 - 100
100 - 150
>150
No Data

Sources: WCRP's CMIP3 (Meehl et al. 2007), downscaled by Maurer et al. (2008).

Natural Disasters could Intensify

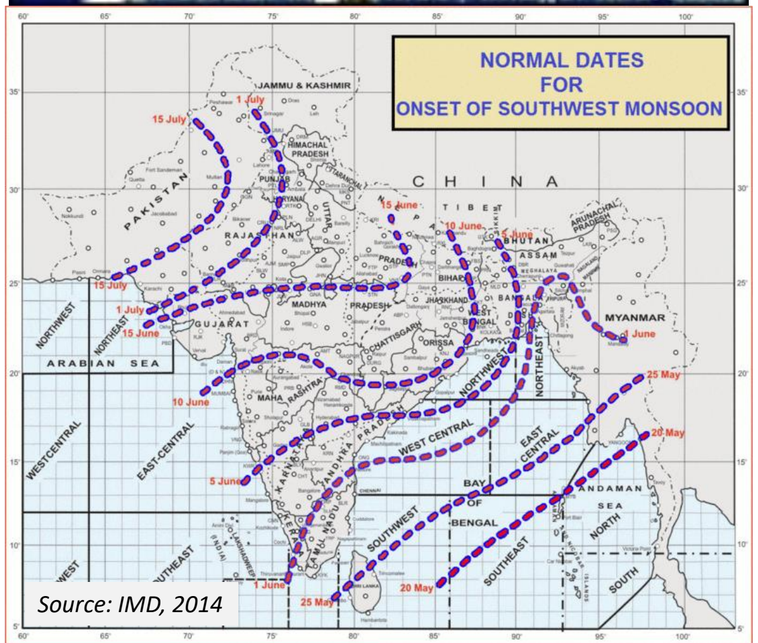




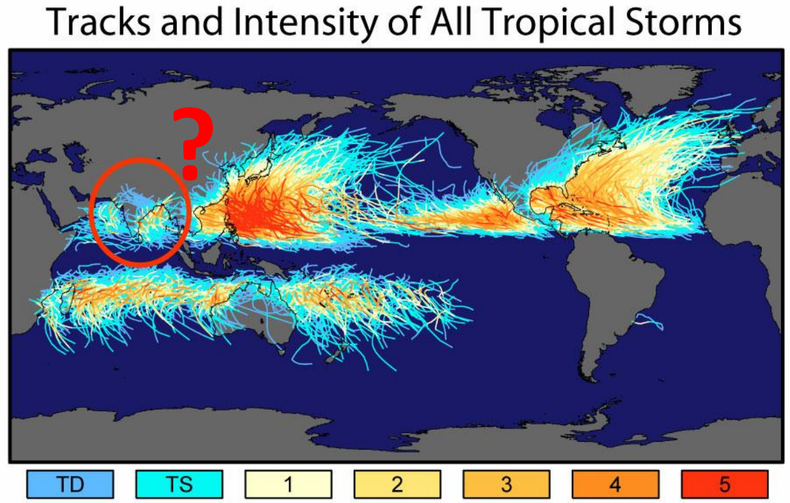
There are additional uncertainties…

Monsoon System

?

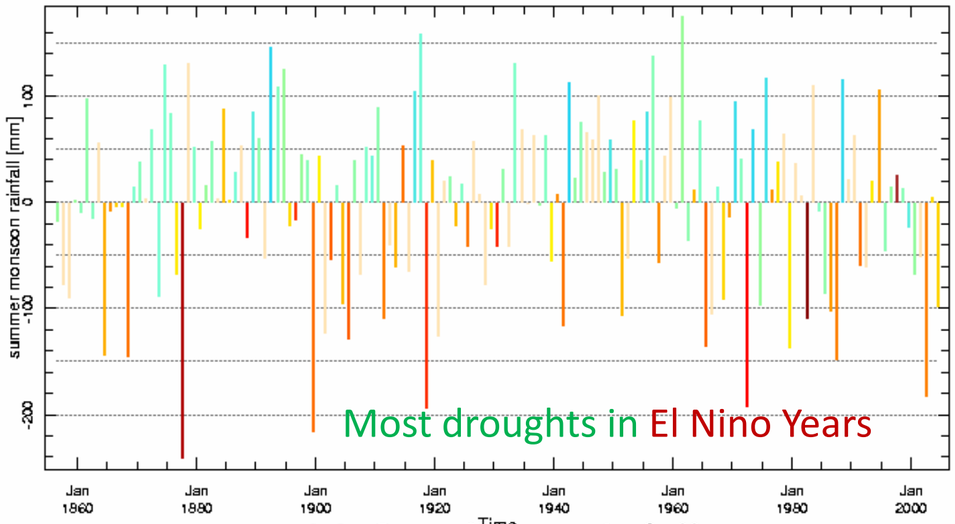


Source: IMD, 2014



The map is based on all storm tracks available from the National Hurricane Center and the Joint Typhoon Warning Center through September 2006 (nearly 150 years of tropical cyclones).
http://news.mongabay.com/2006/1107-nasa.html

Cyclones



ENSO & Indian Rainfall

ENSO

?

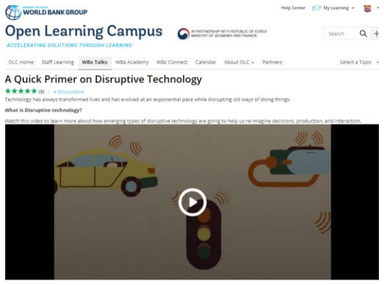
A new world of “Disruptive Technology”

“Disrupt” data value chains

- ***Data Collection***: Monitoring/Surveys (in-situ sensors/IoT/Biometrics, earth observation (satellite, aerial, UAVs), crowdsourcing, digitization…
- ***Data Management:*** Telemetry, 5G, cloud services, open data, Blockchain, …
- ***Data Analysis:*** Big data, Geospatial/ AI/Machine Learning, modeling/ scenario analysis, script repositories, Cloud/Edge/Quantum computing…
- ***Data Access:*** Open data APIs, data visualization, gamification, mixed reality-AR/VR, …
- ***Outreach:*** Platforms/Social Media/Portals/ Apps/e-books/Competitions…

“Disrupt” production value chains

- 3D/4D printing/additive manufacturing…
- “Digital Twins”
- Automation/SCADA…
- Robotics/ Autonomous transport…
- Advanced materials/nanotech/ biotech/genomics/energy tech/ green tech, ag tech…



http://www.appsolutelydigital.com/dt/

“Disrupt” stakeholder value chains

- Virtual social networks/ Digital Platforms…
- Sharing economy…
- Crowdsourcing, gamification, competitions (e.g. *hackathons*, *appathons…*)
- Mobile money, fintech, cryptocurrency…
- Blockchain enabled value chains
- Maker movement/DIY/Tech Incubators…
- Virtual learning/re-skilling…

We have NO data…

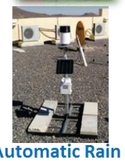
Of course we have data…

Data, data everywhere…

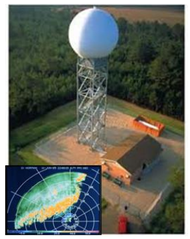
Information & Analysis Trends

What's Out?	What's In?
Paper Records/Publications	Digital Data/Portals/Apps/e-books…
Desktop Databases	"Analysis Ready" Cloud Data Services/APIs
Static, Infrequent data	Real-time data services & visualizations
Data Secrecy	Open, Public-Domain, Available
Unclear data pricing	Free open basic data services
Sectoral approaches	Multi-sectoral/ spatial approaches; AI
Fragmented activities	Shared vision partnerships; Interoperability
Desktop Modeling – "Retail"	Cloud Analytics – "Wholesale" Platforms
Supply-side inputs	Demand-driven to support decisions
"Come to my website & see my bit of data…"	Integrative, Collaborative Data Services & Customized Platforms/Dashboards/Apps

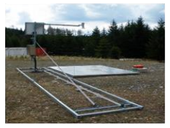
“Bottom-up” Monitoring Systems

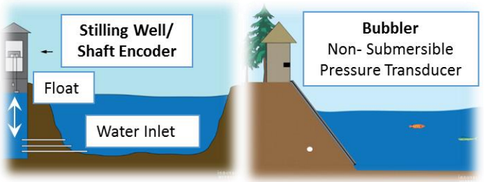
Automatic Rain Gauges



Doppler Radar

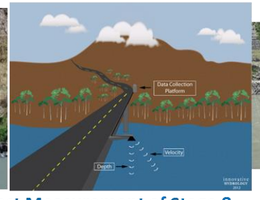



Snow Pack

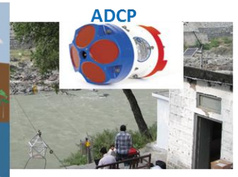


Shore-mounted Radar

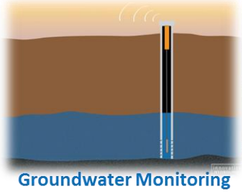
Bridge-mounted Radar

Non-Contact Measurement of Stage & Discharge



Automatic Cableway System

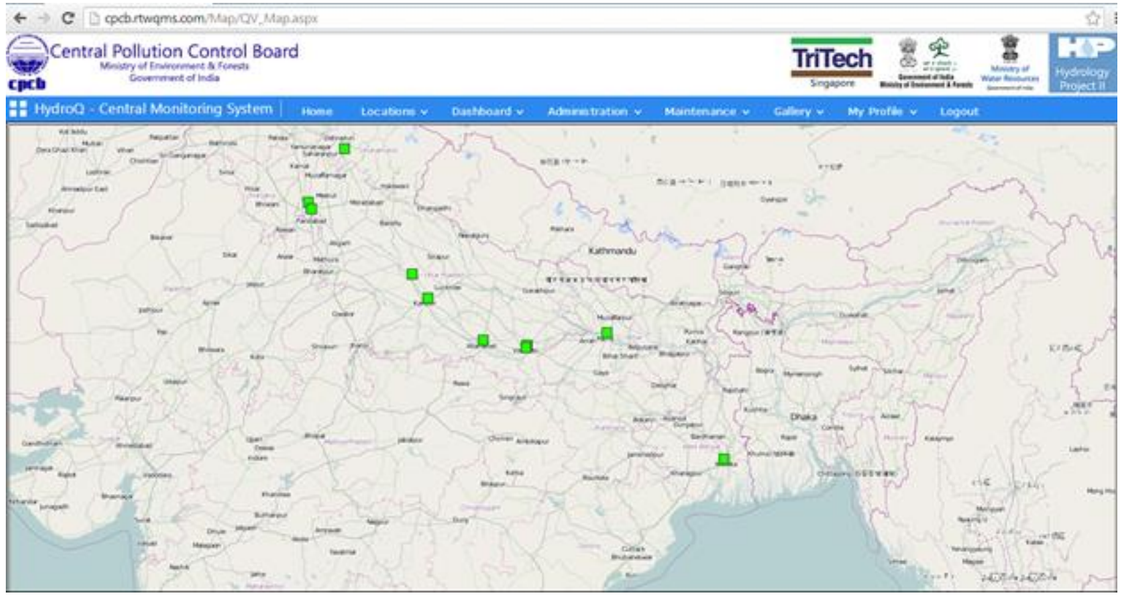


Groundwater Monitoring

Water Quality Monitoring

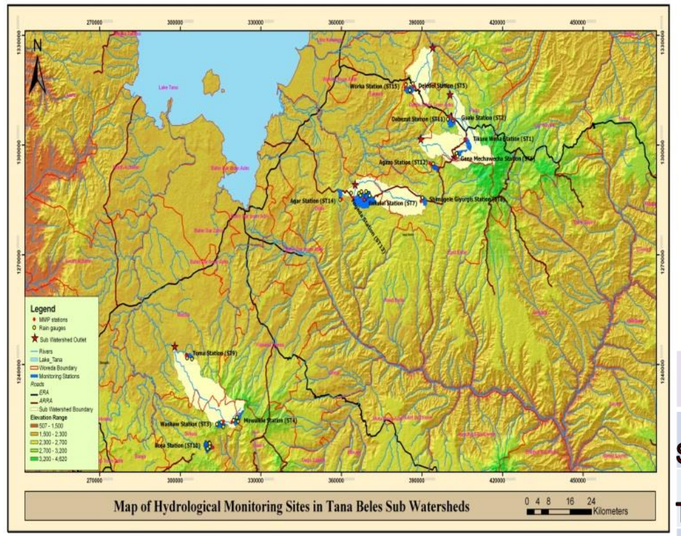
Field Kits

Laboratories




Crowdsourcing Monitoring

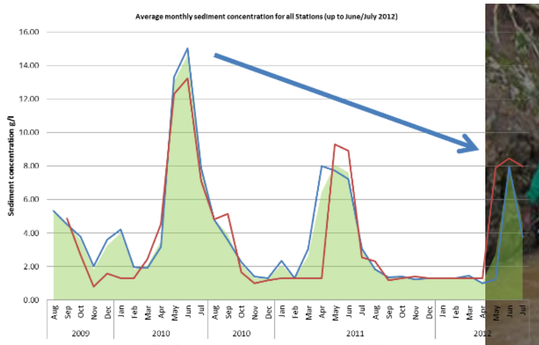
Community Monitoring



	2009	2010	2011	2012	Total
Staff	3132	11812	12409	6522	33875
Turbidity	3131	12069	12469	6624	34293
Rain	3116	>12777	>15000	>15000	>47000
Flow					>500
Sed samples	1425	4176	3139	1216	9956

Secchi Jug for turbidity

Sediment Concentration Analyses

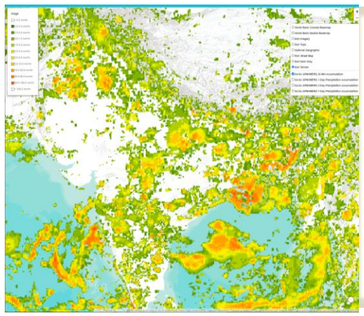


Ethiopia: Tana and Beles Integrated Water Resources Management Project

Thanks JB for some of the photos!

“Top-down” Monitoring Systems

Weather Products



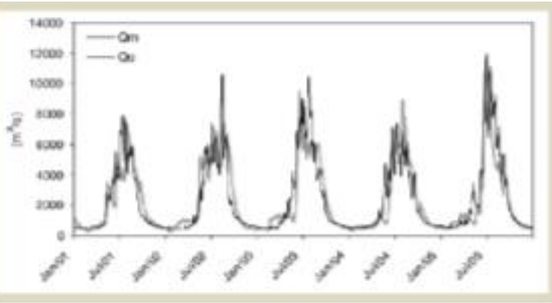
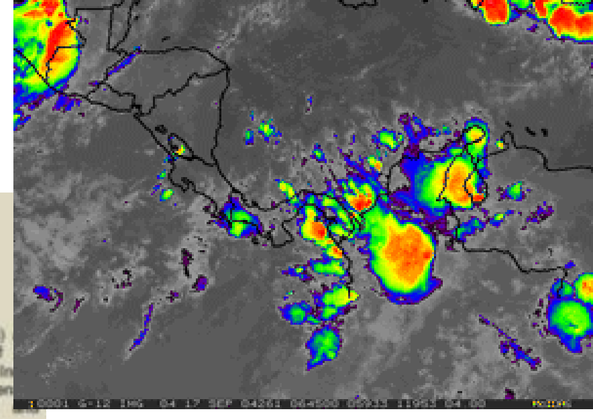
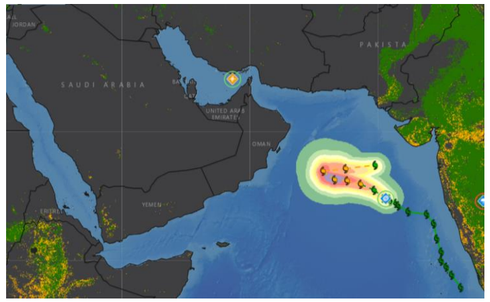


Figure 11 Observed (Qo) modelled (Qm) runoff Besham Qila, Upper In based on remotely sen (TRMM) snow cover precipitation data.

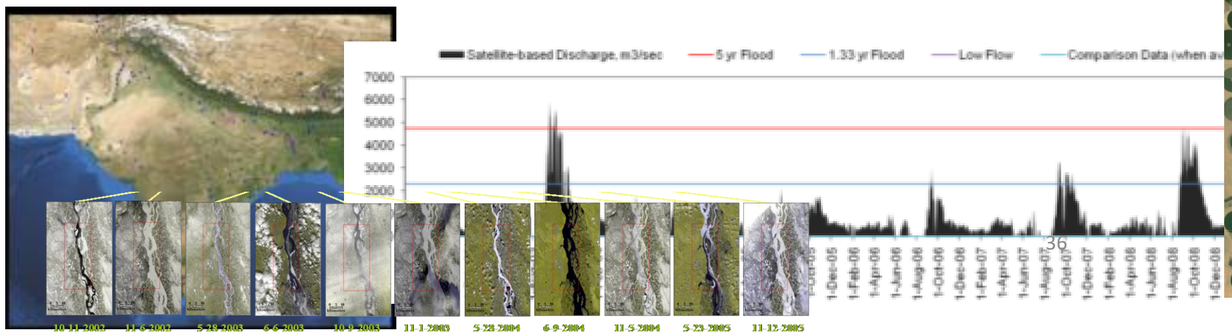
Source: Immerzeel et al. (2009)



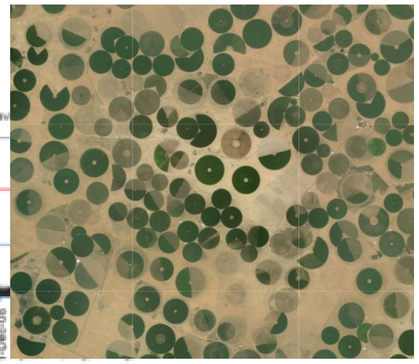
Disasters

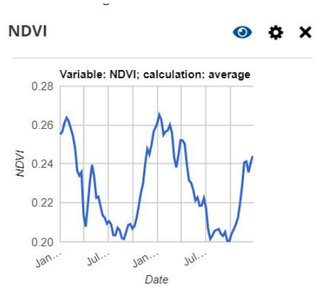


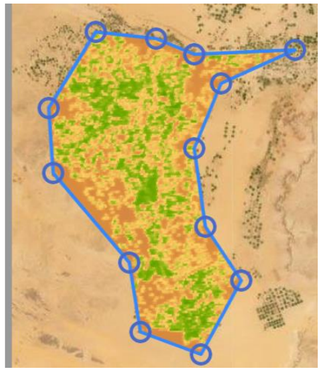
“Space-based Stream Gauge”



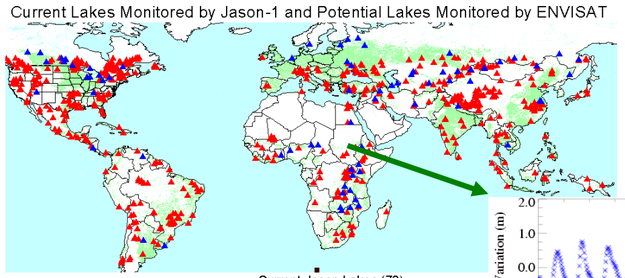
Land Cover Monitoring

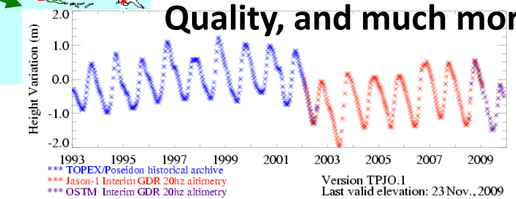




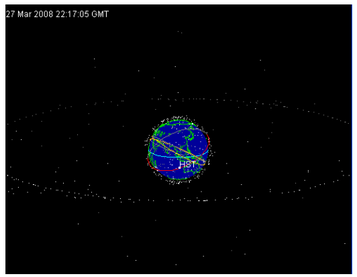


“Space-based Reservoir Levels”

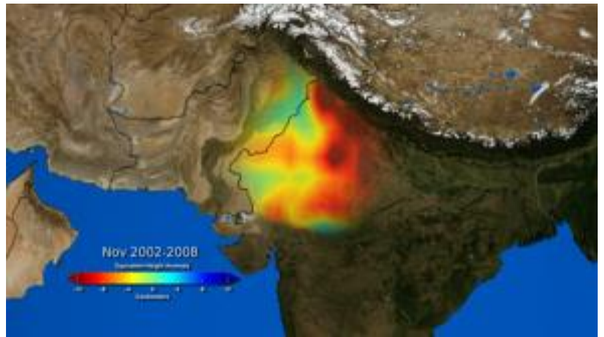


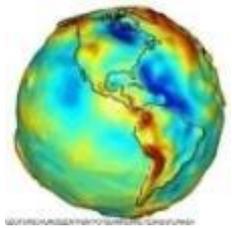


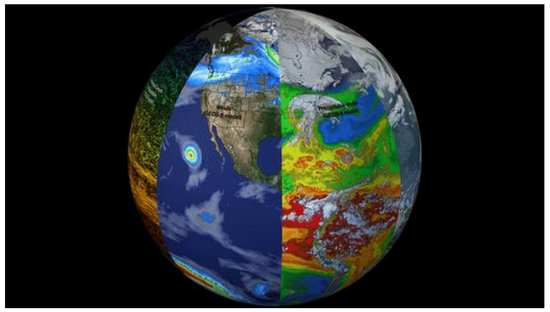
+ Snowcover, Glaciers, Soil Moisture, Temperature, Evapo-transporation, Landcover, Soil Moisture, Water Quality, and much more…

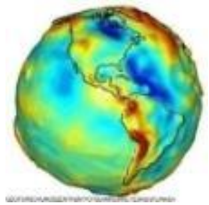


“Space-based Groundwater monitoring” e.g. GRACE

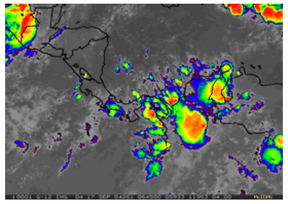




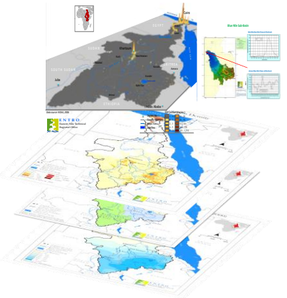




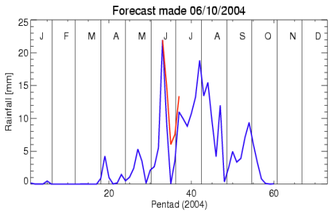
"Top-Down" Data Acquisition System



Satellite & Aerial Earth Observation



Data Rescue
GIS and other datasets



Data Management

Analytics/Models

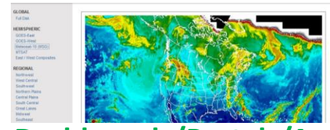
Big Data
Data Science

Platforms
APIs

"HydroInformatics"
Cloud Services

Machine Learning
& other AI

ChatBots
Crowdsourcing



Dashboards/Portals/Apps/e-books/AR/VR

Stakeholder Alerts

Operational Control Rooms

Manual Monitoring
Crowdsourcing

Automated Monitoring

"Bottom-up" Data Acquisition System → IoT

Complex Water Systems Models

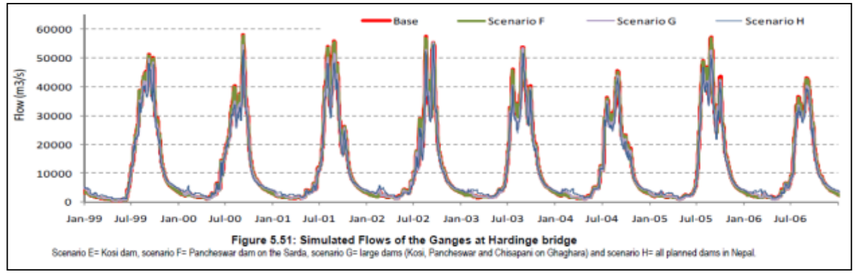
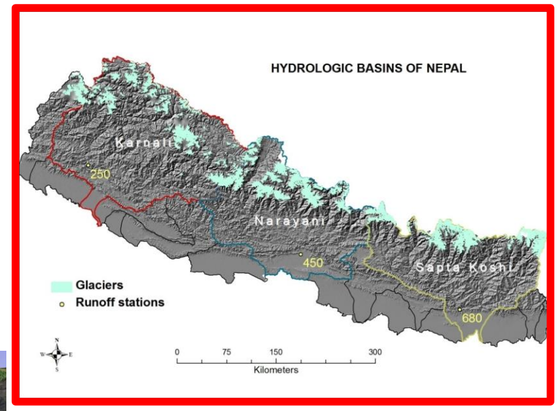
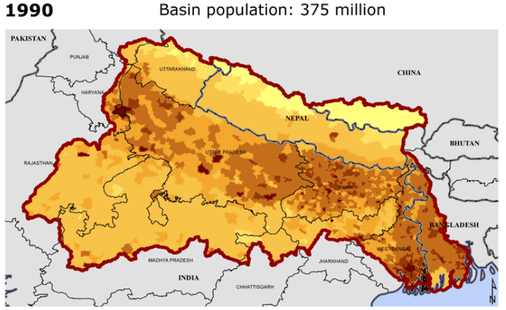
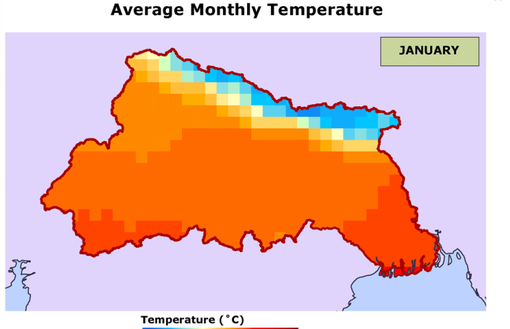


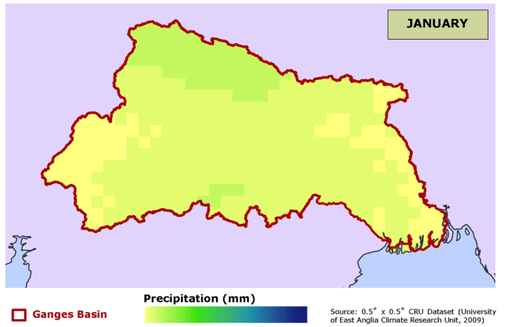
Figure 5.51: Simulated Flows of the Ganges at Hardinge bridge

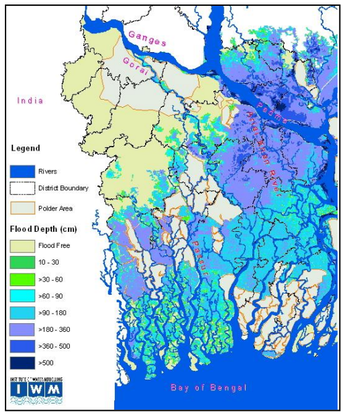
Scenario E= Kosi dam, scenario F= Pancheswar dam on the Sarda, scenario G= large dams (Kosi, Pancheswar and Chisapani on Ghaghara) and scenario H= all planned dams in Nepal.

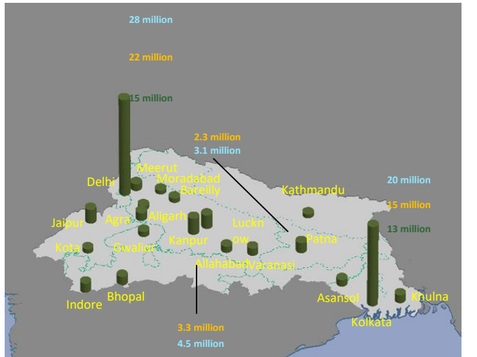


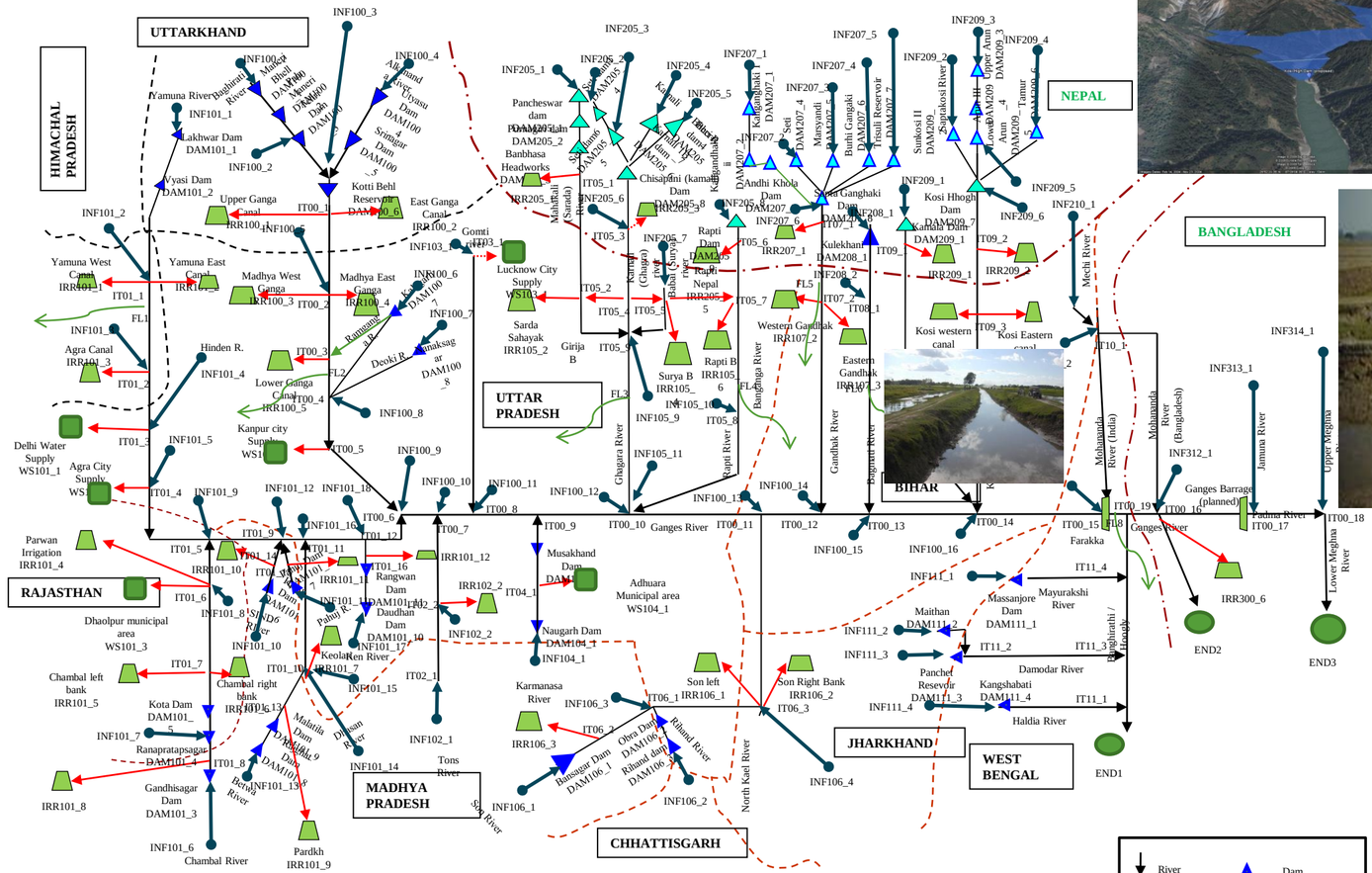








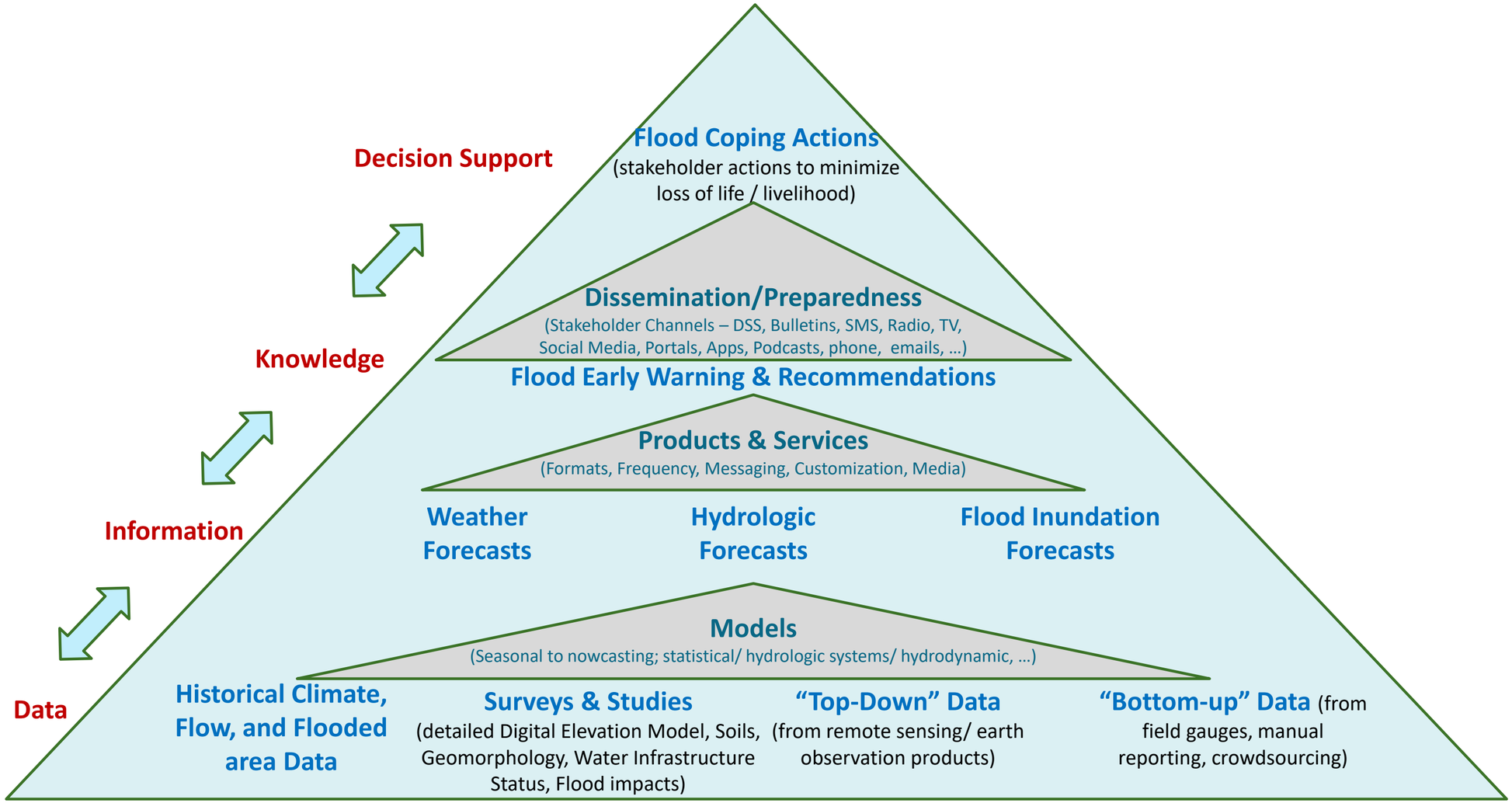




1025 Structures

The Data Value Chain

Example: Deciding on Coping with Floods



HydroInformatics Data Dashboard

https://spatialagent.org/HydroInformatics

Hydro Informatics Data Portal

Not secure | spatiala

All | Water | Disasters | Climate | Environment | Social | Economic

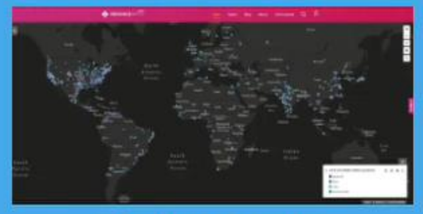
Lake Levels

Standardized Precpitation Index

GEOGloWS Streamflow Explorer

Earth Engine Water Watch

CHRS iRain



City Water Intakes

Glacier Inventory

Surface Water Explorer

Cropping Extent

Water Conflicts

Population Density

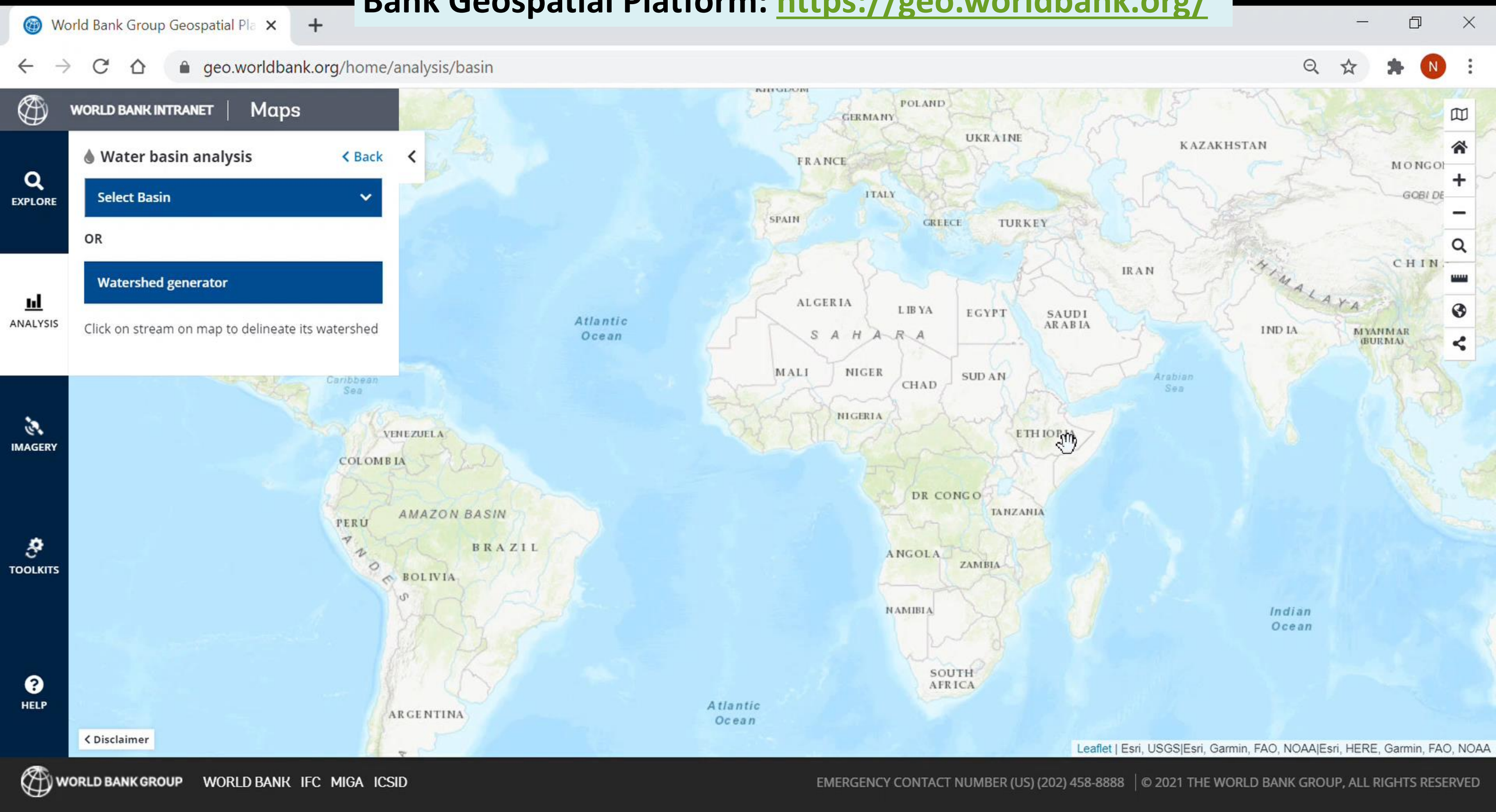
Land Cover Comparison

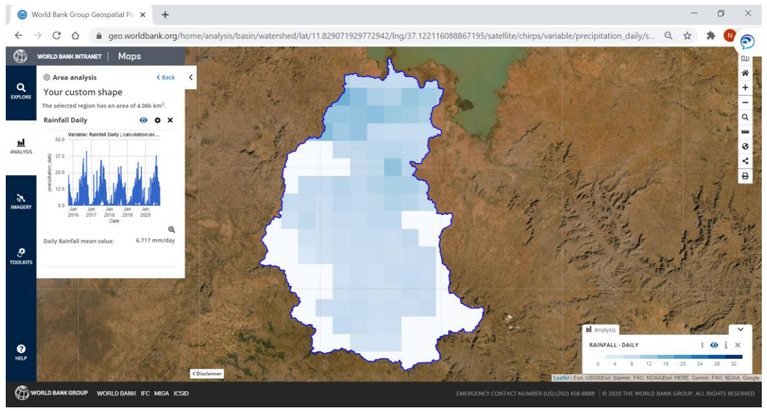
explore.htm

141/141 KB

Show all

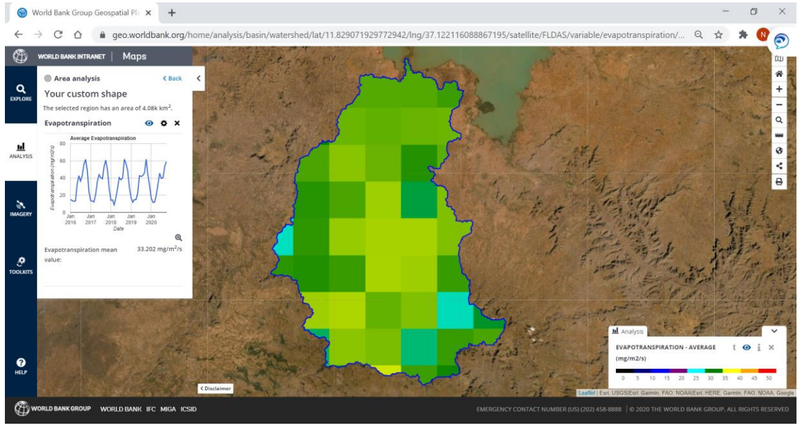
Bank Geospatial Platform: https://geo.worldbank.org/

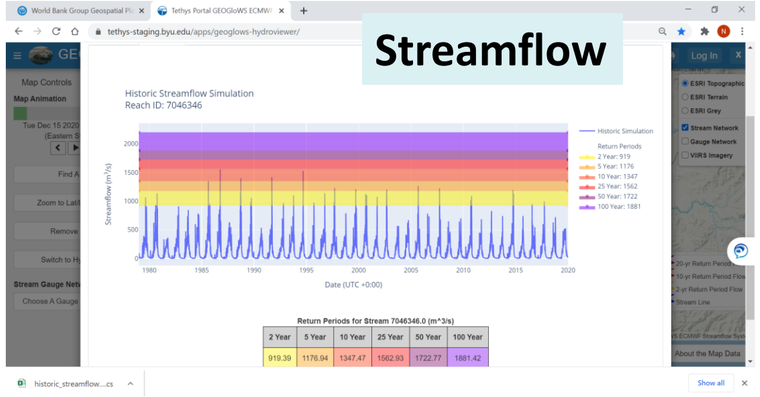




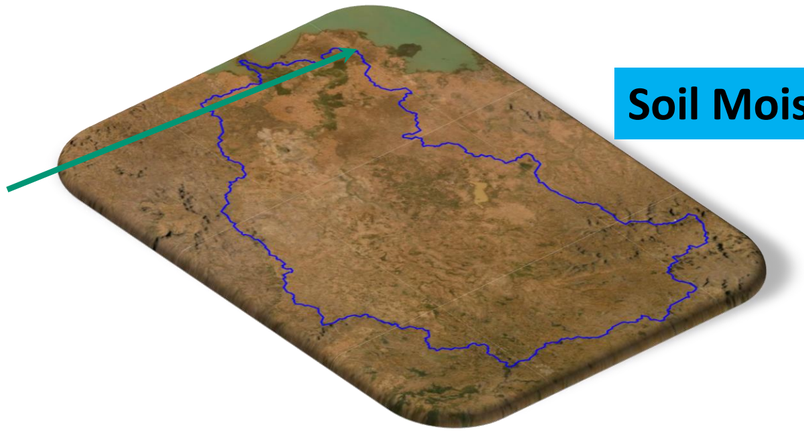
Precipitation

Evapotranspiration

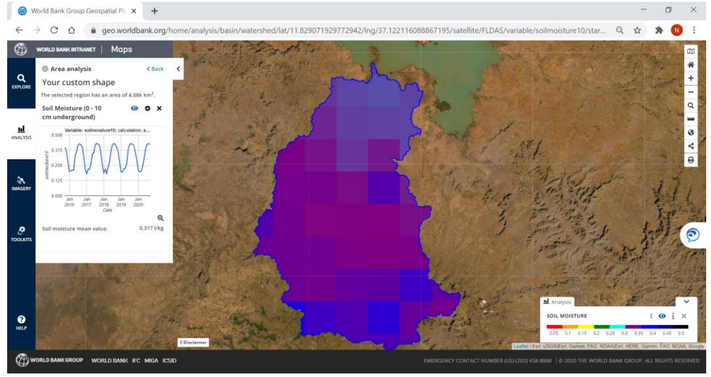




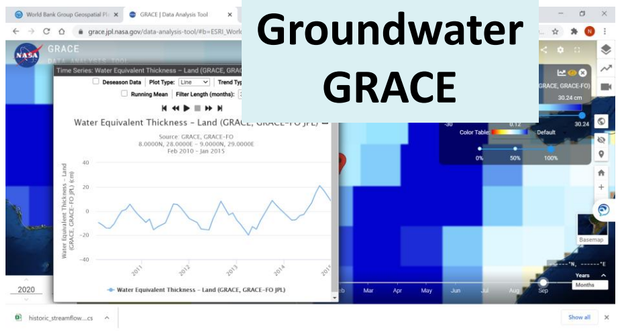
Streamflow



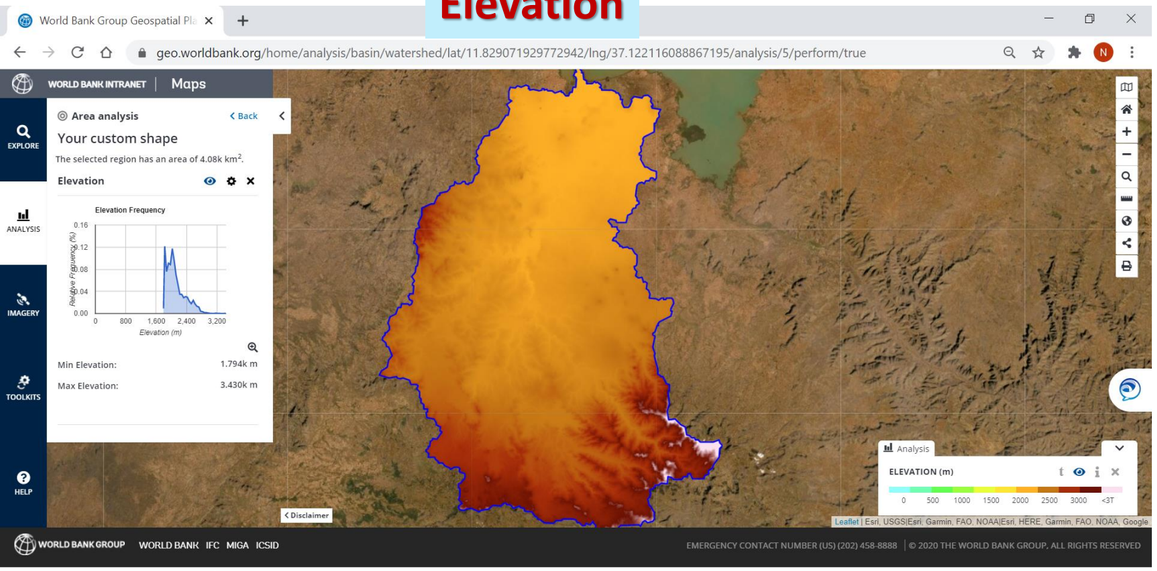
Soil Moisture



Groundwater GRACE

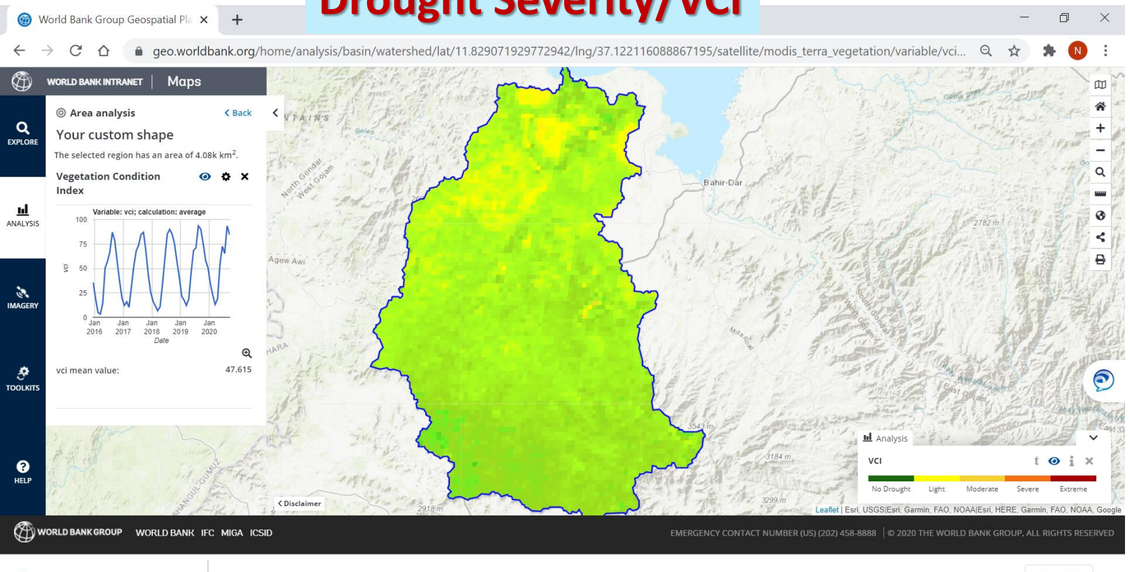


Elevation

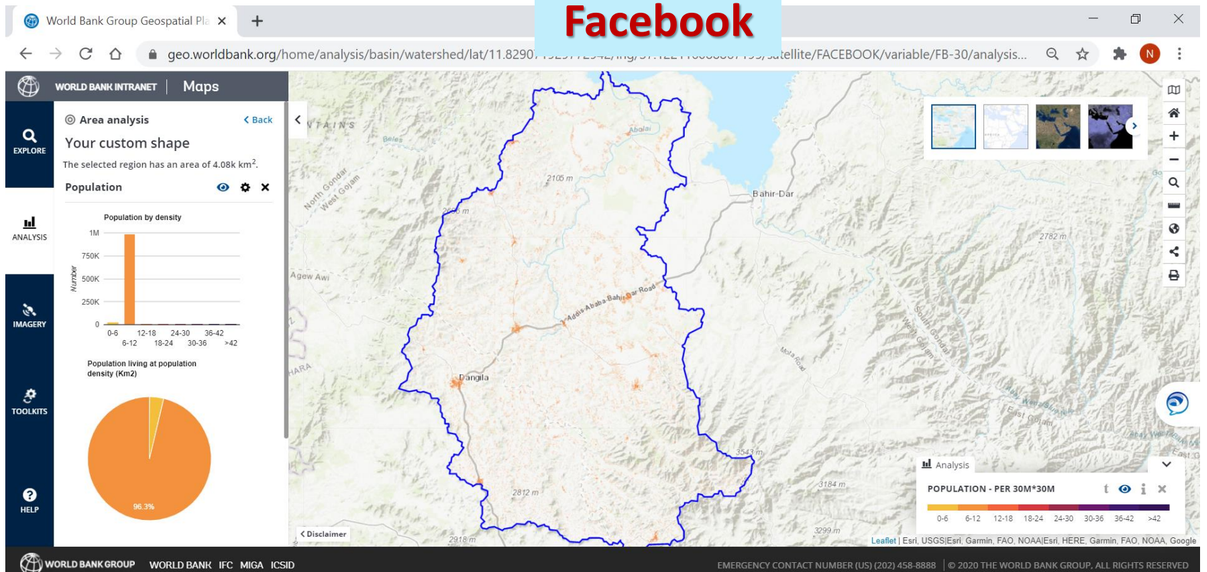


Population CIESIN

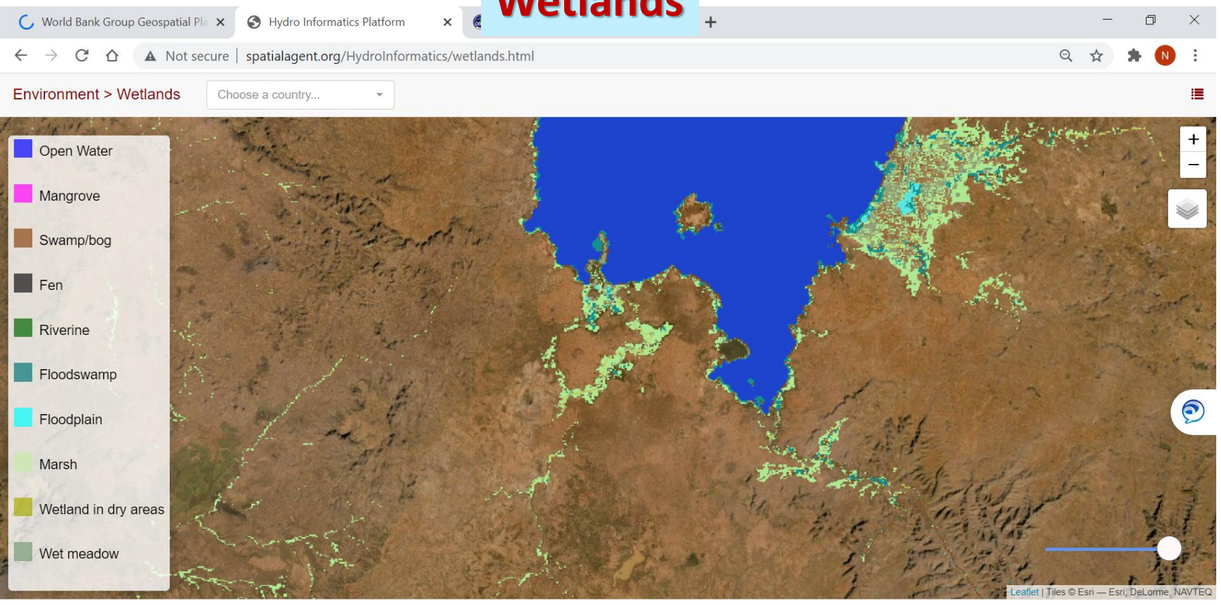
Drought Severity/VCI



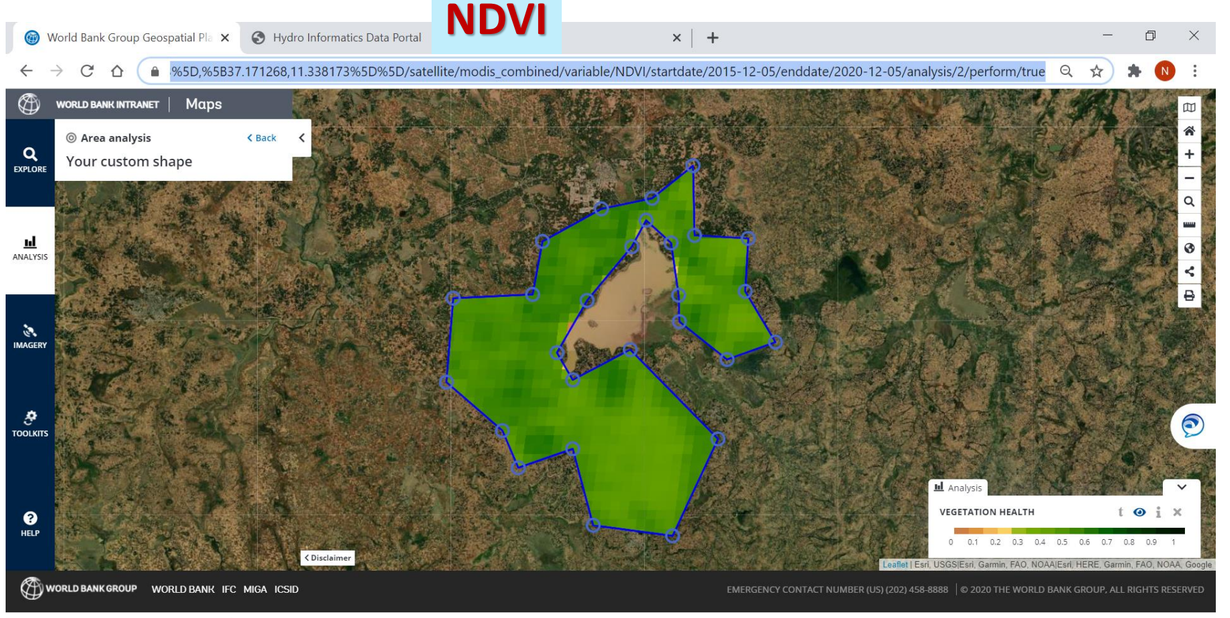
Population Facebook



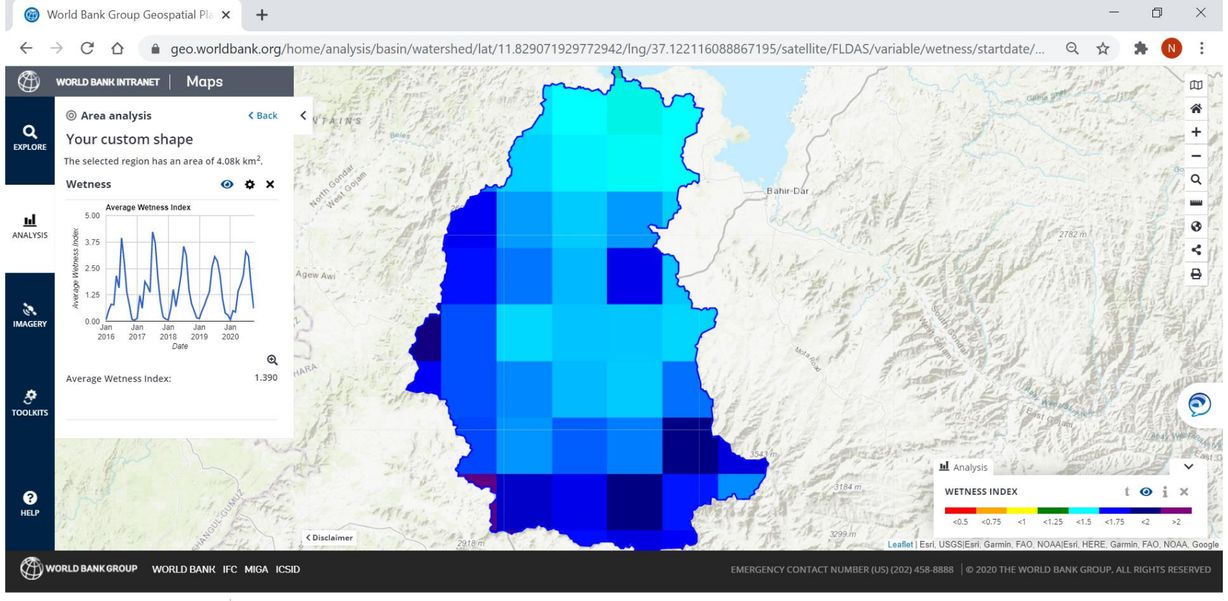
Wetlands



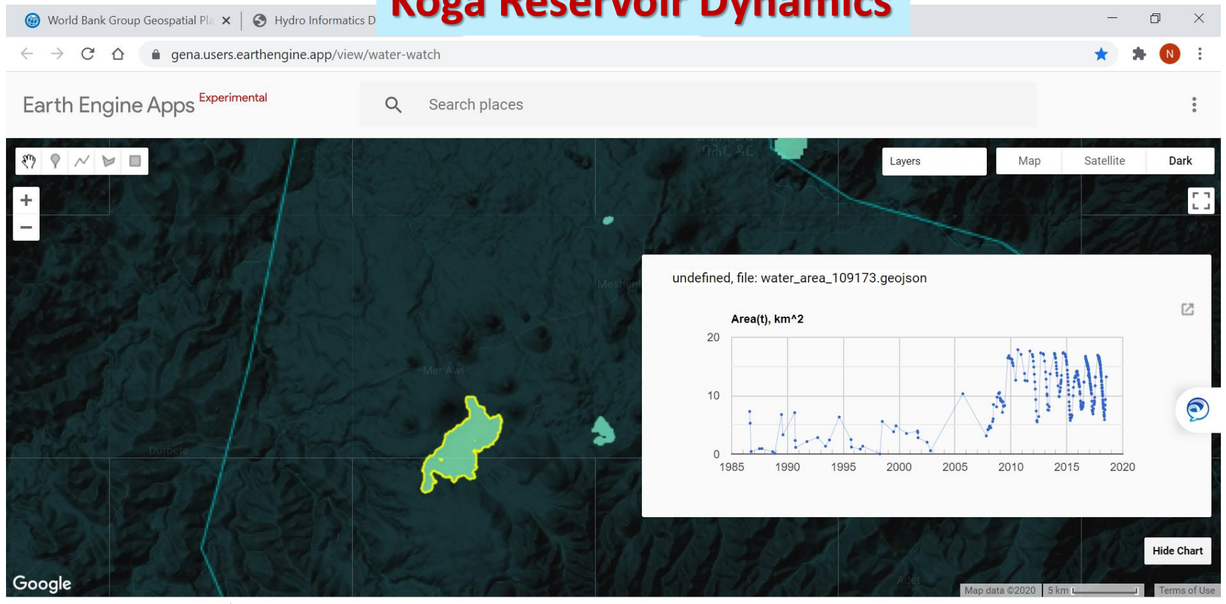
NDVI



Wetness



Koga Reservoir Dynamics



Satellite Altimetry

tics Data Portal | G-REALM - Home

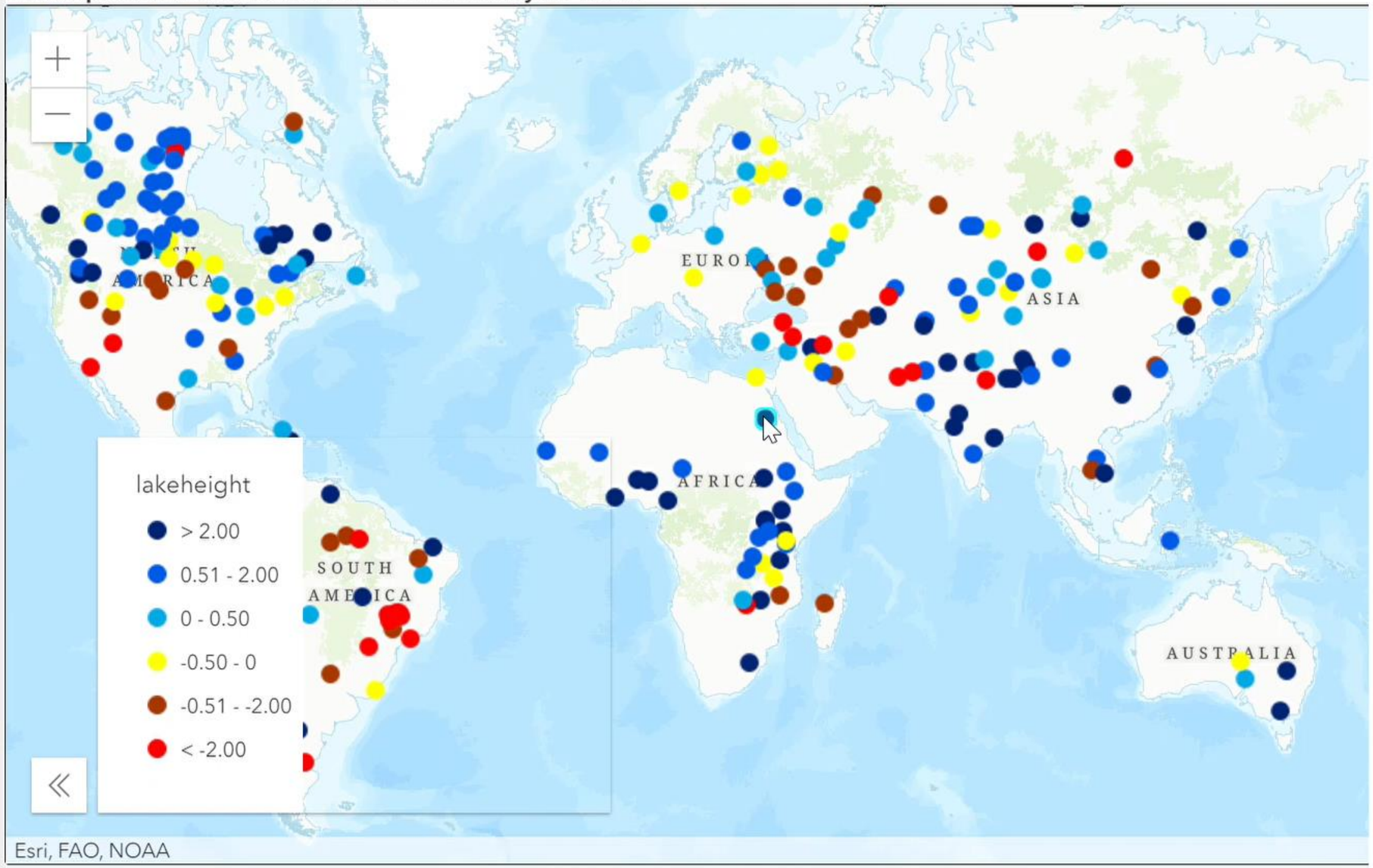
ipad.fas.usda.gov/cropexplorer/global_reservoir/

SARAL
Sentinel-3A

Altimetry Data
NASA PODAAC
AVISO
NOAA

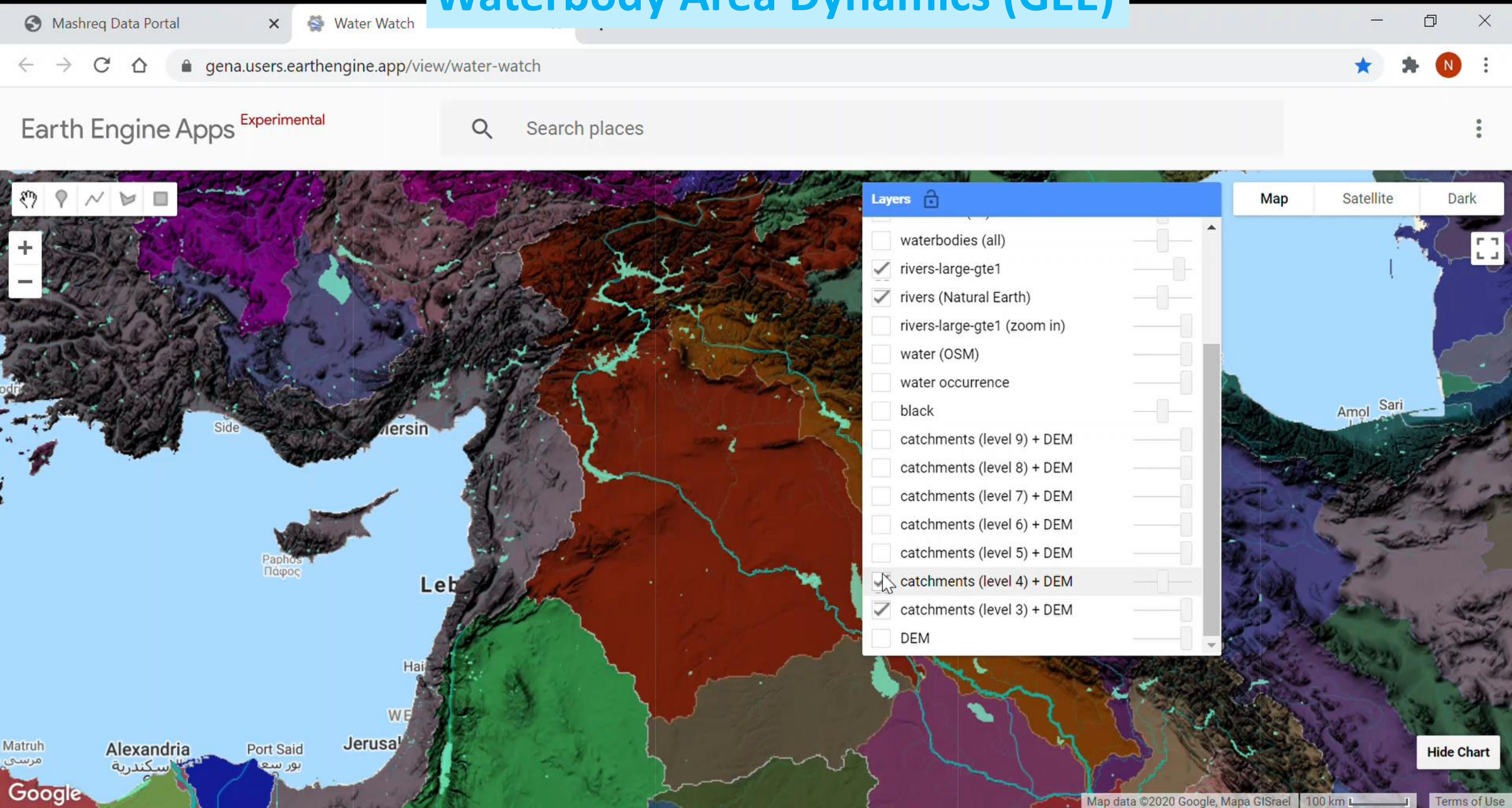
Ground-based Data and Information
NIDIS US Reservoirs
US Reservoirs
NOAA Great Lakes Environment Canada Lakes/Reservoirs
NRCS US Reservoirs
US Bureau of Reclamation
USGS USA Lakes/Reservoirs
South Africa Reservoirs
ILEC Lakes Info Database
HYDROLARE – Lakes and Reservoirs
GLWD – Global Lakes and Wetlands

Status products with datum based on a multi-year mean



Click here to add your Comments/Feedback

Waterbody Area Dynamics (GEE)



Exciting Evolving World of HydroInformatics

Tethys Portal GEOGloWS ECMWF

tethys-staging.byu.edu/apps/geoglows-hydroviewer/

GEOGloWS ECMWF Streamflow Hydroviewer

Log In

Map Controls

Map Animation

Sat Mar 06 2021 10:0
(Eastern Standa

Find A Rea

Zoom to Lat/Lon

Remove Map

Switch to Hydro

Stream Gauge Network

Choose A Gauge Netw

ESRI Topographic
ESRI Terrain
ESRI Grey
Stream Network
Gauge Network
VIIRS Imagery

20-yr Return Period Flow
10-yr Return Period Flow
2-yr Return Period Flow
Stream Line

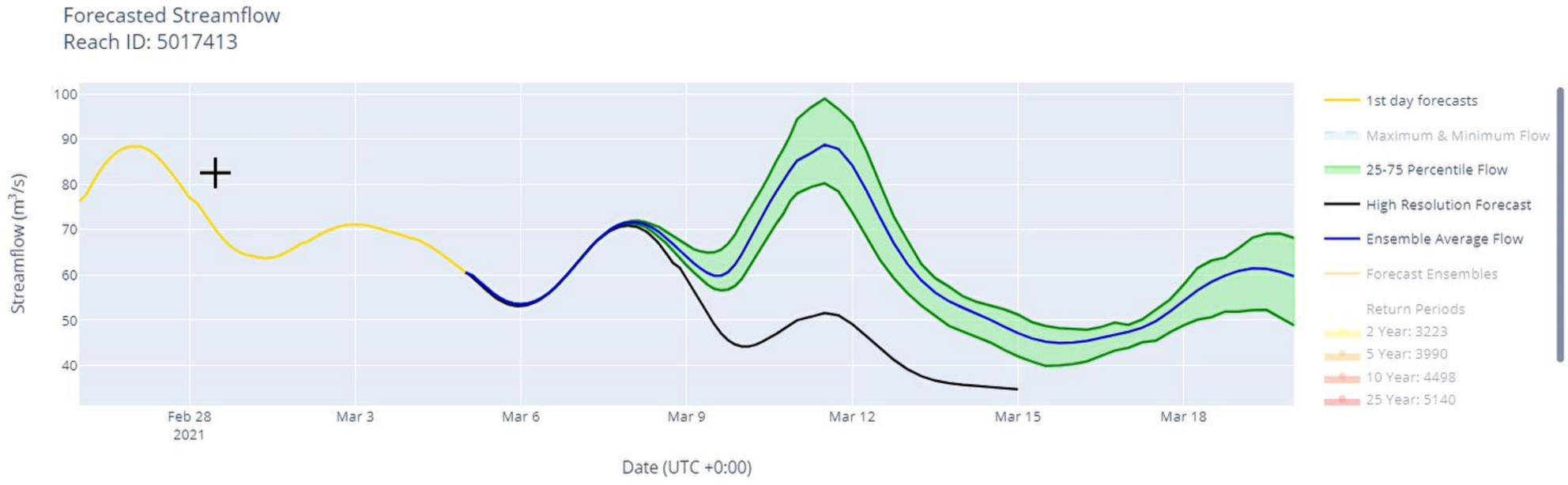
About the Map Data

Streamflow Results **(Ready)**

Forecasts | Historical | Bias Correction

Forecast Date:

03/05/2021



Percent of Ensembles that Exceed Return Periods

Dates	Mar 05	Mar 06	Mar 07	Mar 08	Mar 09	Mar 10	Mar 11	Mar 12	Mar 13	Mar 14	Mar 15	Mar 16	Mar 17	Mar 18	Mar 19	Mar 20
2-yr Return Period	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Tethys Portal GEOGloWS ECMWF

tethys-staging.byu.edu/apps/geoglows-hydroviewer/

GEOGloWS ECMWF Streamflow Hydroviewer

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Map Controls

Map Animation

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(Eastern Standa

Find A Rea

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Stream Gauge Network

Choose A Gauge Netw

ESRI Topographic
ESRI Terrain
ESRI Grey
Stream Network
Gauge Network
VIIRS Imagery

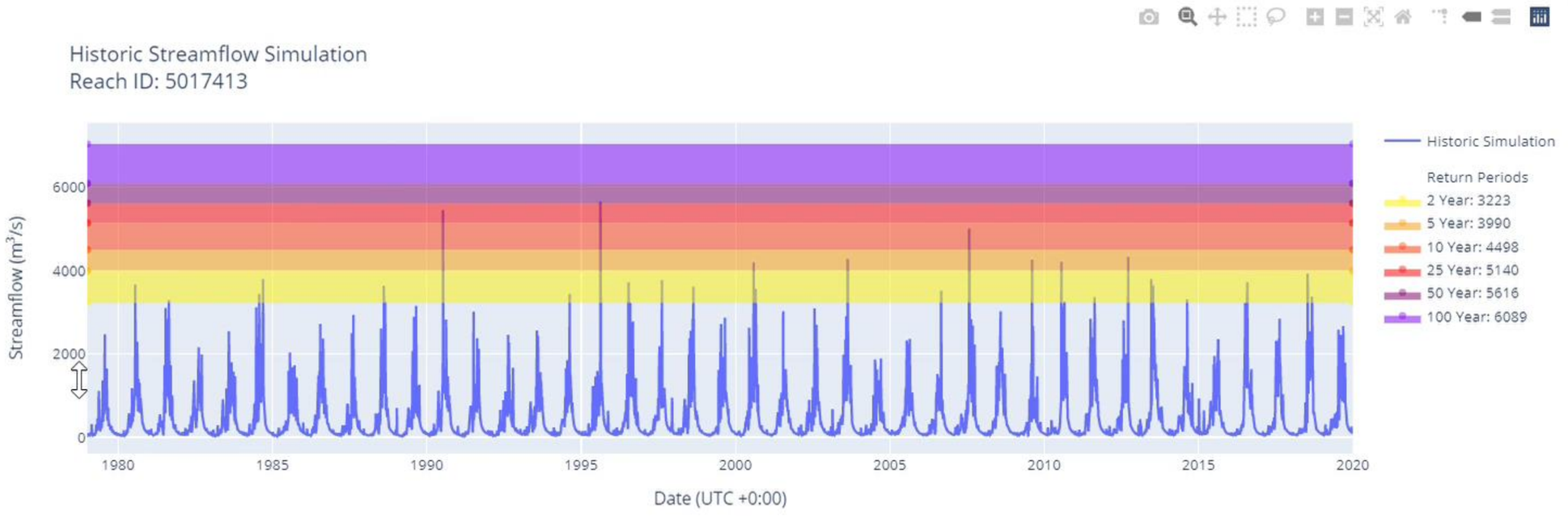
20-yr Return Period Flow
10-yr Return Period Flow
2-yr Return Period Flow
Stream Line

OGloWS ECMWF Streamflow Sys

About the Map Data

Streamflow Results **(Ready)**

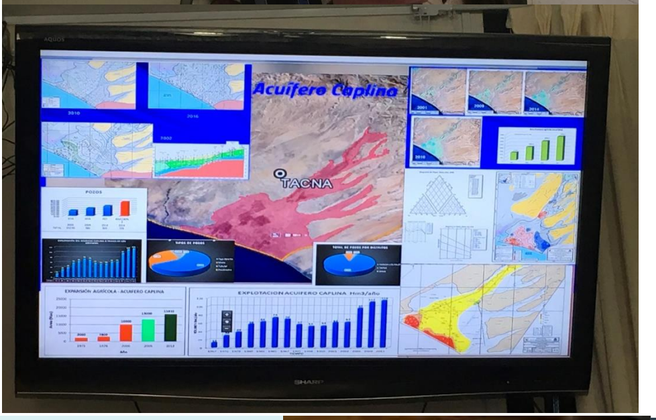
Forecasts | Historical | Average Flows | Flow-Duration | Bias Correction



Return Periods for Stream 5017413.0 (m^3/s)

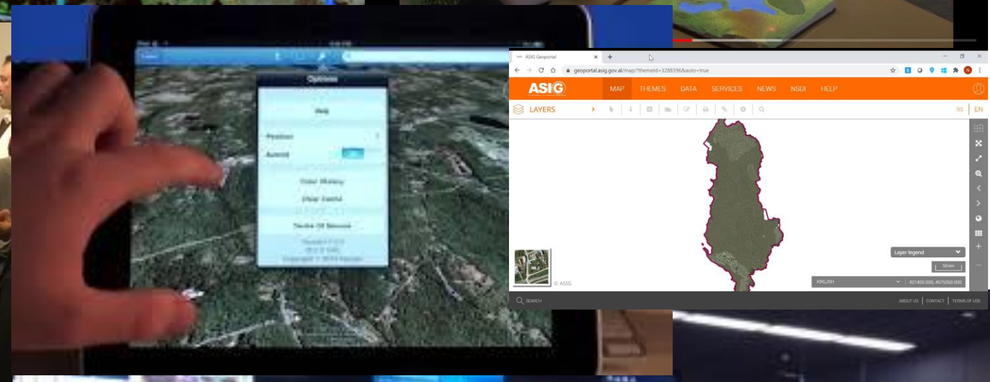
2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
3223.57	3990.83	4498.82	5140.67	5616.83	6089.47

Large Displays



TouchScreens

Physical Interactive Models



Touch Tables

VR

Touch Projectors

International Water Law & Climate: Big Data

Many aspects to consider…

- **Big Data Types:** In-situ sensors, Earth Observation (satellite, aerial/drones), UUVs,… social media, **Type of Institution** (Govt, Private Sector, CSOs, Academia, Individuals, Regional/Global), **Scale of Use** (Global… Regional… National… Individual); Inland/Ocean; MRV (mitigation)
- **Collection:** Data Generation, Crowdsourcing, Collection incentives, Disputed Areas? Collation, Public/Private Ownership, …
- **Analytics:** Desktop vs Cloud Analytics? Proprietary/Free/Shared/ Open Scripts/ Models? Competing/"official" models/scenarios? Centralized vs Decentralized?
- **Services & Use:** "Shared" Data vs Open Online Services (e.g. OGC, APIs), Access reliability? Subscription services? IPR, Licensing, Privacy, Cybersecurity, Liability (e.g. for flood/drought Type I & II errors), Global Public Goods?

=> Needs better reflection in Transboundary Water Law

Didier Sèyivè ZINSOU

Directeur de l'Observatoire du Bassin du Niger, Secrétariat Exécutif de l'Autorité du Bassin du Niger

Interactive Online Session:
International Water Law and Climate Change

20 April 2021

Global Water Partnership | 25 YEARS

INTERNATIONAL WATER LAW ACADEMY

武漢大學 WUHAN UNIVERSITY

Intégration des planifications nationales dans le Plan d'Investissement Climat du Bassin du Niger

- Quelques réponses mises en place par l'ABN en réponse à la question de la gestion du changement climatique dans un bassin transfrontalier, *cas du Bassin du Niger* :

- Tous les documents de planification et de mise en œuvre des actions de développement du Bassin (Vision, PADD, PI, PS, PO, PIC) sont issus des documents de planification des priorités des neuf pays et du BN en matière d'actions prioritaires de développement, d'adaptation et à impact transfrontalier.

- À la demande des Ministres des Finances de l'ABN, lors de la table ronde ministérielle sur l'avenir du fleuve Niger, tenue le 19 avril 2015 à Washington DC, au titre des réunions de printemps de la Banque Mondiale et du FMI, un Plan d'Investissement pour le Renforcement de la Résilience au Changement Climatique du BN - abrégé en Plan d'Investissement Climat, « PIC » a été préparé et présenté à la COP 21. Le PIC et est en cours de mise en œuvre et contribue au renforcement de la résilience climatique des écosystèmes et des populations du BN.

- Le PIC est un ensemble cohérent d'actions et d'investissements concrets prend en compte les priorités des principaux documents de planification existants (PANA, PNA, contributions déterminées au niveau national) tant des pays que du niveau régional (Plan Opérationnel 2016 – 2024).

- Le PIC comme un instrument de mobilisation du financement climatique : Préparation avec les pays la BAD et des partenaires, financement et mise en œuvre en cours du Programme Intégré Développement d'Adaptation au CC dans le BN (PIDACC/ BN) avec 308,948 millions mobilisés de différentes sources de financement et du Fonds Vert pour le Climat

Dialogue des acteurs de l'ABN en matière d'adaptation au changement climatique

❖Un cadre de dialogue permanent est établi et fonctionnel avec :

- les pays à travers les différents organes/instances mis en place par l'ABN (le Comité Régional de Pilotage –CRP- pour le bilan et la programmation annuels ~~le~~ des projets et programmes), les ateliers et fora régionaux sur différentes thématiques sur l'eau et le changement climatique ;
- la coordination nationale et les membres des Structures focales nationales (SFN) et ;
- les coordinations nationales et régionale des usagers des ressources du bassin (CNU/CRU) ;

❖La participation de l'ABN aux activités de planification et de revue-bilan des actions d'adaptation au CC dans les pays.

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INTERNATIONAL WATER LAW ACADEMY
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Mesures de coopération transfrontalière dans le domaine du droit international de l'eau et le changement climatique

- Harmonisation des procédures et des équipements du système de S suivi des ressources en eau (stations hydrométéorologiques, Base de données –BDD-) ;
- Echange permanent d'informations sur l'hydrologie et l'environnement ;
- Utilisation d'outils de gestion de l'eau et des aléas consensuellement adoptés (Modèle d'Allocation des ressources en eau, Règlement d'eau pour la gestion coordonnée des barrages, Système de prévision des crues et étiages, ..) ;
- Appui aux pays à travers des actions transfrontalières ou à impact transfrontière suivant les différents axes de planification stratégique (L'eau comme levier de développement économique, la préservation des écosystèmes du bassin, le financement innovant et durable, la coopération avec les Etats et partenaires et la performance organisationnelle). Les différentes actions à mener dans le bassin s'inscrivent re désormais dans les différents axes sus-énumérés.
- Autres types de mesures d'adaptation promues par l'ABN à travers ses programmes et projets :
  - 1- Développement de la résilience des écosystèmes et des ressources naturelles : *Protection des ressources et des écosys*tèmes, *Renforcement de la gestion partagée des ressources naturelles*
  - *2-* Développement de la résilience des populations : *Développement des infrastructures à buts multiples, Mesures d'accompagnement et de protection sociale*

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Bénéfices potentiels de l'ABN et de la coopération transfrontière

- Renforcement du mandat de l'ABN en matière de coopération et de gestion des ressources transfrontalières du bassin favorisant ainsi une intégration régionale ;
- Mise en œuvre de ces actions permettant ainsi d'accroître la résilience et d'améliorer le niveau de vie des populations et de mieux sécuriser tant les populations que et les ressources naturelles du bassin ;
- Harmonisation des approches d'adaptation et l'édification d'une vision commune pour prévenir les aléas, promouvoir les meilleures pratiques d'adaptation et éviter la mal-adaptation ;
- Capitalisation des bonnes pratiques et mise en place de référentiels harmonisés pour orienter la conception, la mise en œuvre et le suivi des actions à impact transfrontalier ère (adaptation au CC, gestion et valorisation des connaissances).

International water law and climate change: 1997 Watercourses Convention

International water law provides directions about actions to take and to avoid in shared basins also in the face of climate change

1997 United Nations Watercourses Convention: Article 5 and 6

- Watercourse States shall participate in the use, development and protection of an international watercourse in an **equitable and reasonable manner**. This requires taking into account all relevant factors and circumstances, including geographic, hydrographic, hydrological, **climatic,** ecological and other factors of a natural character

Article 27 – emergency management

- Watercourse States shall, individually and, where appropriate, jointly, take all appropriate measures to prevent or mitigate conditions related to an international watercourse that may be harmful to other watercourse States, whether resulting from natural causes or human conduct, such as **flood or ice conditions**

International water law and climate change: 1992 Water Convention

Aims of the Water Convention: protect and ensure the quantity, quality and sustainable use of transboundary water resources by facilitating and promoting cooperation.

Provisions relevant for climate change:

- Prevent, control and reduce transboundary impacts including those related to adaptation to or mitigation measures (art. 2)
- Riparian Parties shall establish and implement joint programmes for monitoring the conditions of transboundary waters, including **floods** and ice drifts, as well as **transboundary impact (art. 11)**
- Use waters in a reasonable and equitable way
- Cooperate on the basis of equality and reciprocity
- Set joint water quality objectives, use best available technology, exchange information, follow the precautionary principle, develop joint monitoring and common research, assist each other…

Thanks to all the speakers & participants!

Interactive Online Session: River Basin Organisations and the implementation of legal commitments'

16 March 2021

Global Water Partnership | 25 YEARS

INTERNATIONAL WATER LAW ACADEMY

武漢大學 WUHAN UNIVERSITY