

# FLOOD & DROUGHT MANAGEMENT TOOLS



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***Planning for Floods and Droughts  
in a Transboundary Basin Context***

*Tuesday 10<sup>th</sup> of May 2016*



# Agenda

## Planning for Floods and Droughts in a Transboundary Basin Context

Tuesday 10th of May 2016



- Introduction (*Peter Bjornsen, UNEP-DHI*)
- Data to planning (*Oluf Jessen, DHI*)
- Interactive session (all)
- Technical wrap-up (*Bertrand Richaud, DHI*)
- Stakeholder perspective (*Katharine Cross, IWA*)

# The project team at IWC8



**Katharine Cross**  
(IWA)

**Bertrand Richaud**  
(DHI)

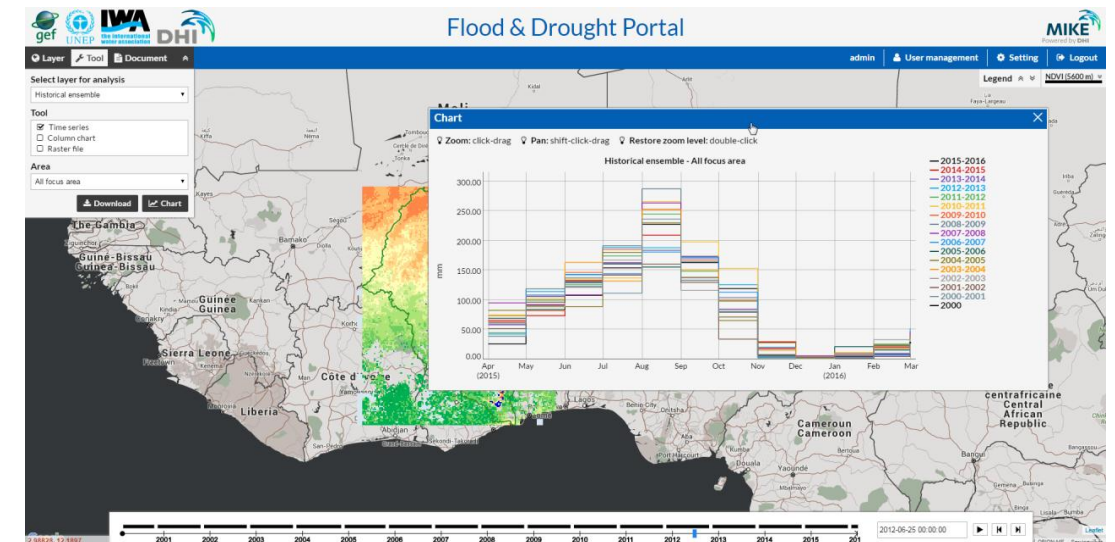
**Raul Glotzbach**  
(IWA)

**Oluf Jessen**  
(DHI)



# Session objective

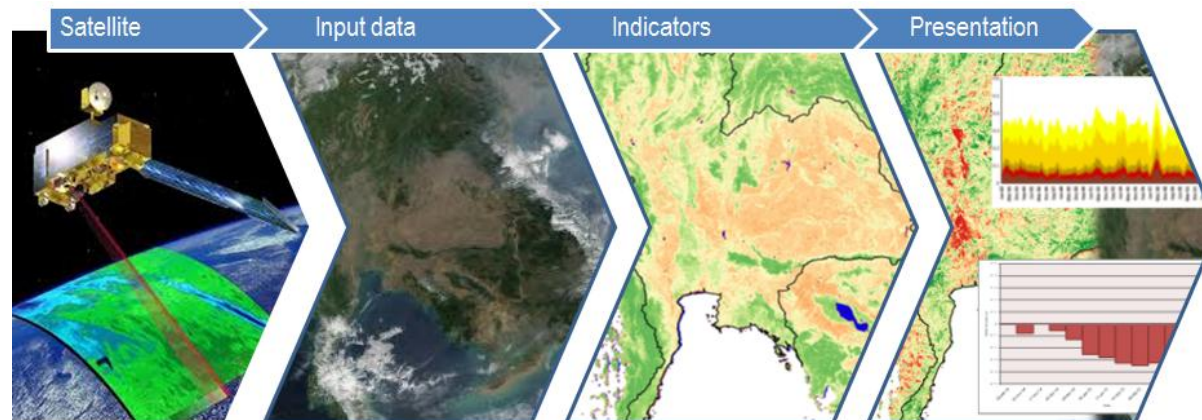
- Present project outcome related to “data for planning”
- Discuss data availability and requirements related to planning in a transboundary context
- Exchange knowledge and current practices through group session and discussion



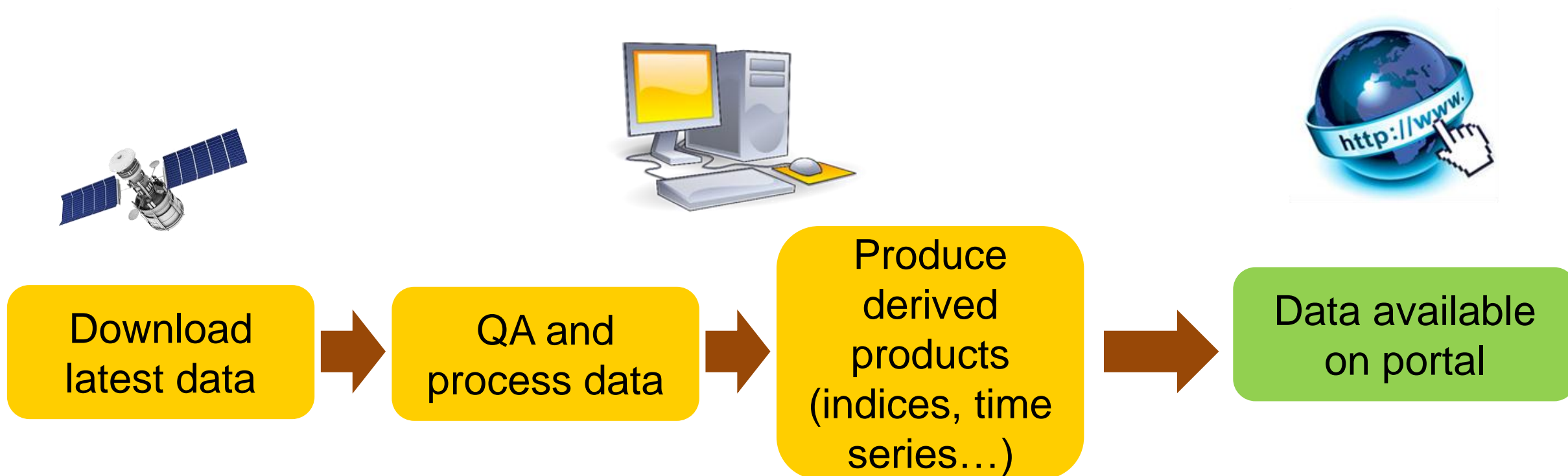
# Data availability is the key for planning

- Data availability is a key concern in many of the GEF basins
- The project needs to ensure availability of a “basic” set of data for any GEF basin

Freely available global data will be made accessible in near real time through a web-based data portal



# Overall workflow



**Available data for planning or management related to water resource, drought or flood**

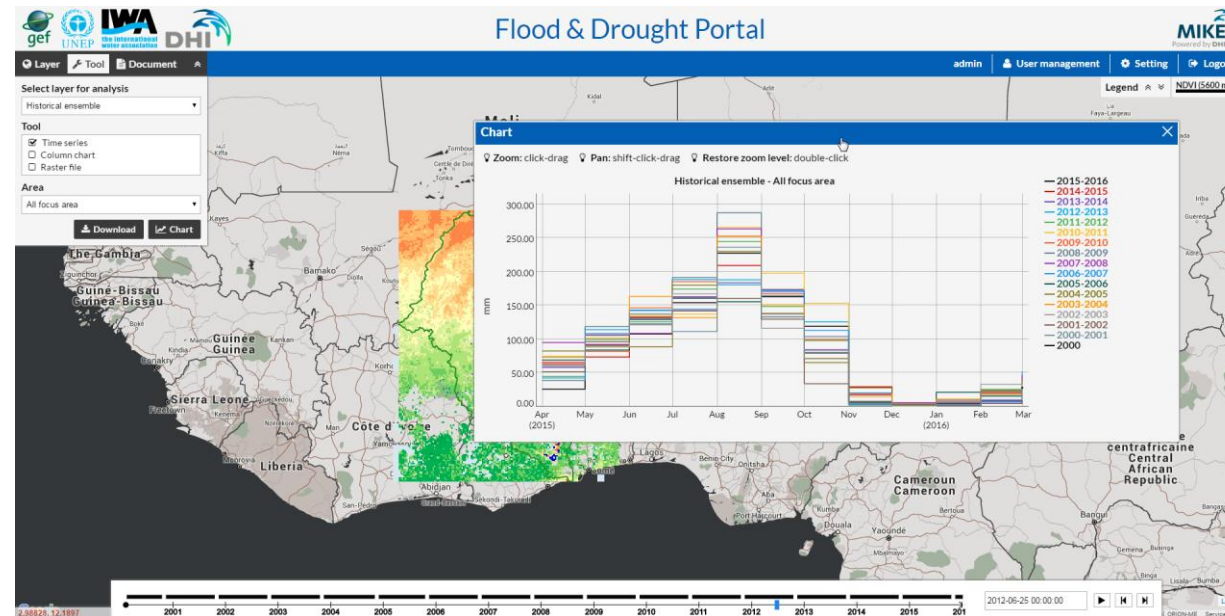
# Data portal



Seasonal forecast data

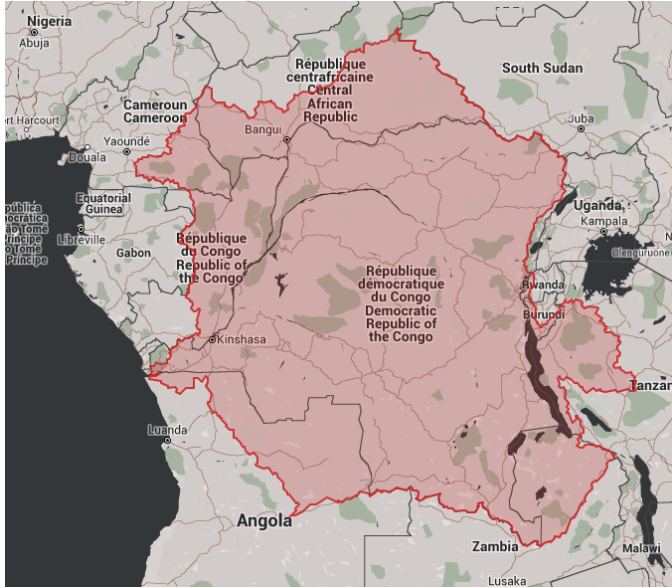
Near real time remote sensing data

Climate change information

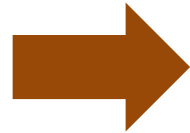


**Ensure data availability for all GEF basins**

# Workflow for a new user



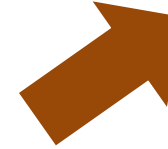
User selects a basin



Basin already  
in operation

?

yes



Data available  
on portal

no



Data initiation  
process





# Data workflow

## Data initiation

*Configure basin setup  
Download historical data*

## Operational workflow

*Maintain updated data*

# Data types

Data type	Source	Resolution
Rainfall	TRMM	0.25 degree
Temperature	MODIS	5 km
Seasonal forecast	CFSv2	1 degree
Climate change	CORDEX	0.44 degree
Vegetation	MODIS	5.6 km
Soil moisture	Copernicus	0.1 degree

# Live demo



## Live demo of the data portal



# Group sessions

- **Group work**
  - 3 or 4 groups in total
  - One person at each group with a computer
  - **Task: Evaluate and discuss selected data types**
    - Step 1: 15 min group work
    - Step 2: 10 min discussion
- **Technical wrap-up (*Bertrand, DHI*)**
- **Stakeholder perspective (*Katharine, IWA*)**



# Group session

## CLIMATE



Climate is a key resource asset

**Exercise objective:**

- Use the data to assess rainfall patterns
- Evaluate the use of indicators

**TRMM rainfall**

The Tropical Rainfall Measuring Mission (TRMM) is especially useful in precipitation years, such as design, flood management

Spatial resolution  
Temporal resolution

## SEASONAL FORECAST

**Model based prediction**

**Exercise objective:**

- Use the data to predict climatology based on historical data
- Evaluate the use of improvements

**Seasonal forecast:**

The Climate Forecasting System (CFS) provides medium to long range prediction and a set of National Centers for Environmental Prediction (NCEP) data

## CLIMATE

**Historical climate data for the future when limited.**

**Exercise objective:**

- Use the data to predict climatology based on historical data
- Evaluate the use of improvements

**Climatology:**

Climatology is the average of a variable over a long period of time

**Examples of applications:**

List specific applications where TRMM data could be used:

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

**Relevant indicators:**

List a maximum of 5 indicators which could be derived from TRMM data (e.g. Standardized precipitation Index 1-month)

- (1) \_\_\_\_\_
- (2) \_\_\_\_\_
- (3) \_\_\_\_\_
- (4) \_\_\_\_\_



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# Group sessions

## Examples of applications:

List specific applications where TRMM data could be used:

- Identification of drought prone areas
- Water resource assessment on different scales
- Input to technical tools as models
- ...

## Relevant indicators:

List a maximum of 5 indicators which could be derived from TRMM data (e.g. Standardized precipitation Index 1-month)

- (1) How does the rainfall from the previous season compare to the historical records
- (2) trends in extreme events over the past decade
- (4)
- (5)

Chao Phraya

## Group sessions (step 1 – 15 min)

- **Card:** Read "Climate" description
- **Data portal:**
  - Open web portal
  - Locate rainfall products
- **Discussion:**
  - Identify applications where this rainfall product might be useful
  - Discuss relevant indicators

## Group sessions (step 2 – 10 min)

- Group outcomes to be discussed with other groups

*Depending on time the process will be repeated for other data types*



# Group log in

Link: <http://193.3.62.89/Cactus/map>

Username/Password:

group 1: **iwc81/iwc81**

group 2: **iwc82/iwc82**

group 3: **iwc83/iwc83**

group 4: **iwc84/iwc84**

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**To learn more visit:**

<http://fdmt.iwlearn.org>





# Data portal

Data portal adds GEF basins to the operational workflow when users register for the basins.

The operational workflow updates basin data in near real time (data updated every 2<sup>nd</sup> day)

Registration

Name

Organisation

Username

Email

Password

Retype password

Focus area

Volta

Register

User registration at first login

User selects GEF basin to work in.

All GEF basins will be added to the list



# Data portal

Large selection of data available for the user.

Further data to be added later.

All data updated in near real time

### Favourite data

#### Rainfall

- ☒ Rainfall
  - ☒ Historical ensemble
  - ☐ SPI 1 month
  - ☐ SPI 3 month
  - ☒ SPI 6 month

#### Rainfall forecast

- ☒ Seasonal forecast
- ☒ Forecast SPI 1 month

#### Vegetation

- ☒ NDVI (5600 m)
- ☒ NDVI deviation (5600 m)
- ☐ NDVI composite (5600 m)

#### Soil water index (SWI)

- ☒ SWI
  - ☐ SWI composite
  - ☐ SWI percentile
  - ☒ SWI percentile (1 month)

The Tropical Rainfall Measuring Mission (TRMM) is the first Earth Science mission dedicated to studying tropical and subtropical rainfall. It measures precipitation that falls within 35 degrees north and 35 degrees south of the equator.

Spatial resolution: 0.25 degree

Temporal resolution: resampled to daily rainfall product from 2000 to present

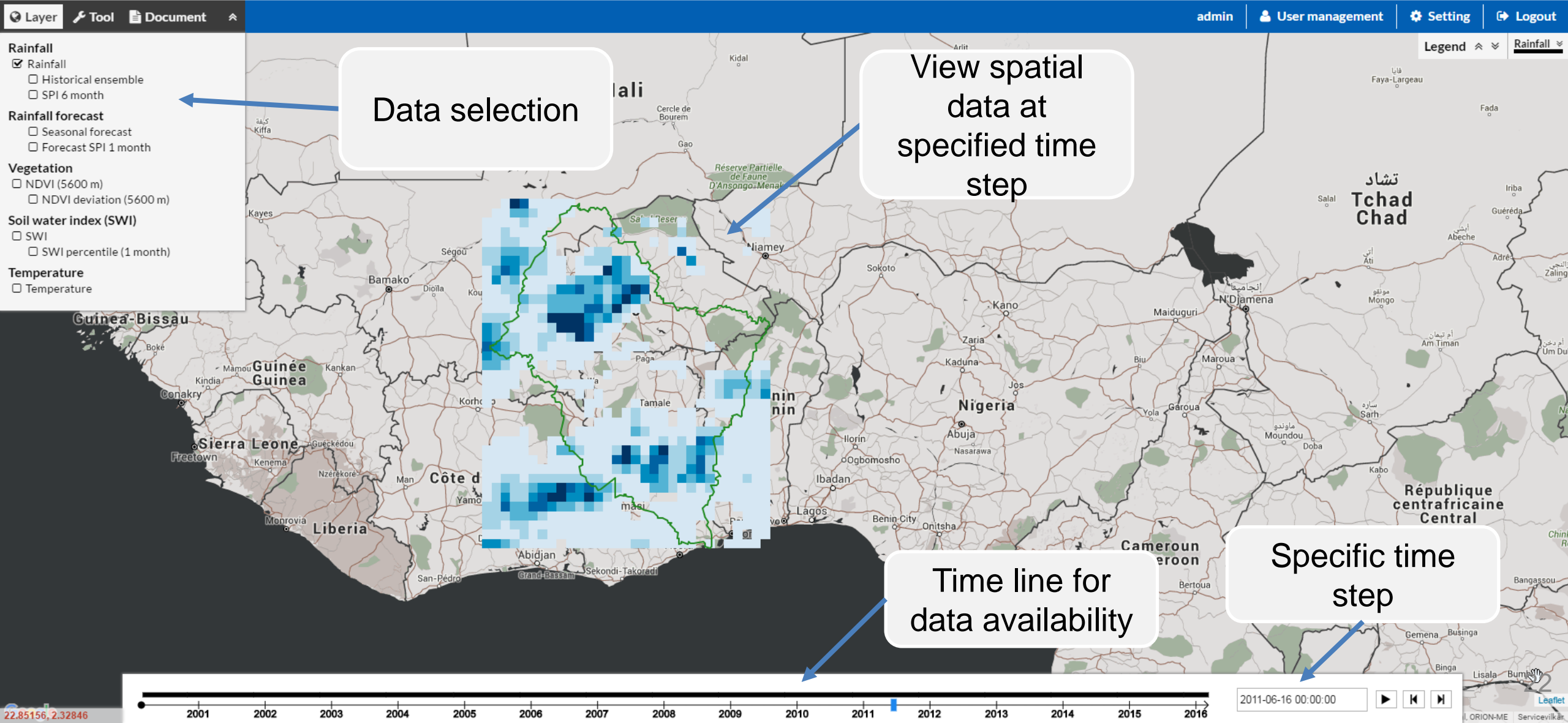
Source: <http://trmm.gsfc.nasa.gov>

✕ Cancel

✓ Update user settings

# Data portal

## Flood & Drought Portal



# Data portal

Flood & Drought Portal

193.3.62.89/Cactus/map

Apps Color - Style - Google d Ny fane Helsingør Kommune M Flood & Drought Mana UNEP-DHI Indicator Gu Allerød Kommune Mod Flood & Drought Data F

gef UNEP IWA the international water association DHI

## Flood & Drought Portal

admin User management Setting Logout

Layer Tool Document

Select layer for analysis

Rainfall

Tool

☐ Time series

☒ Raster file

Start

2016-01-01

End

2016-03-09

Extract

Raster

File: Rainfall\_20160101\_to\_20160309.nc

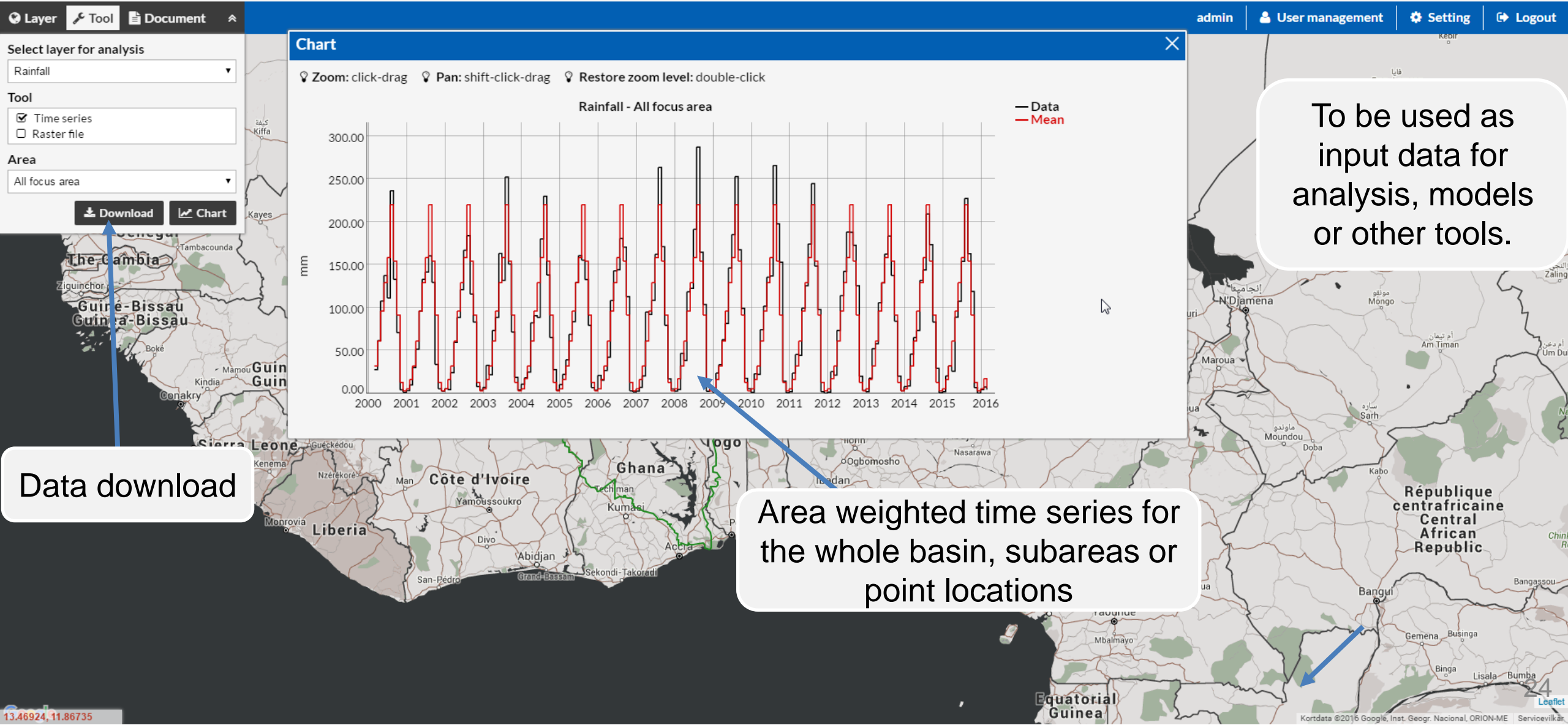
Size: 0.32 Mb

Download

Download raster data

# Data portal

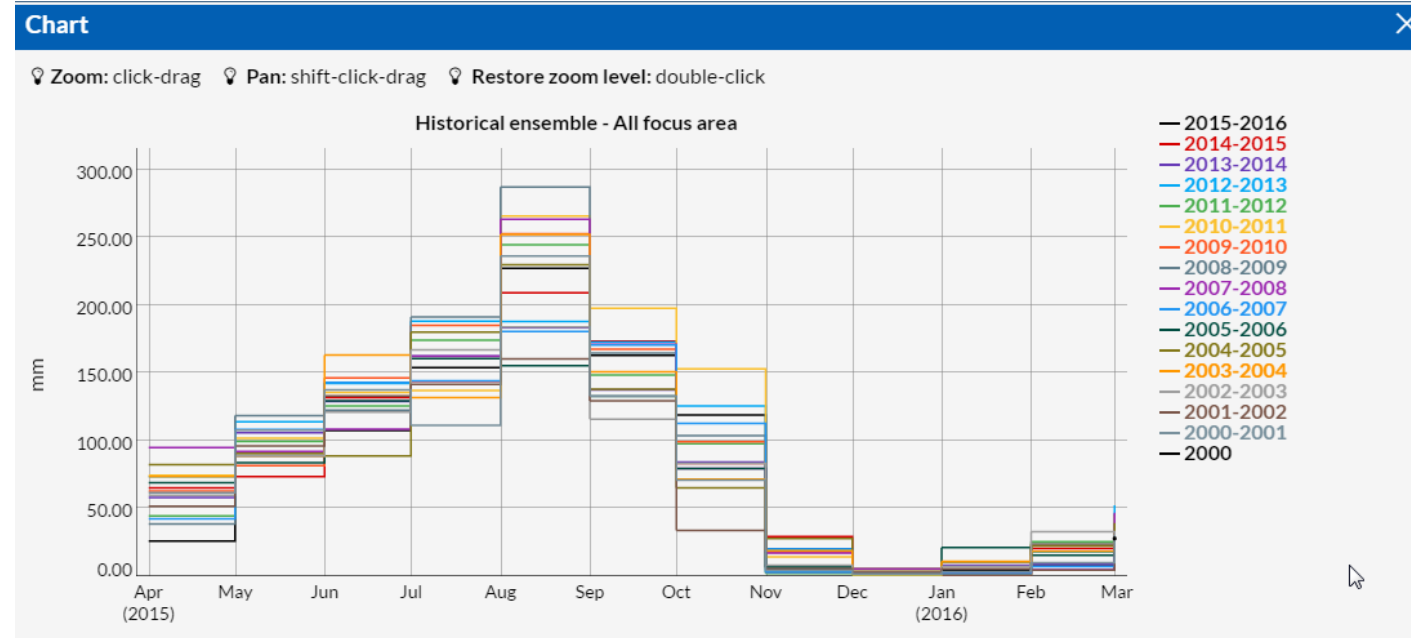
## Flood & Drought Portal



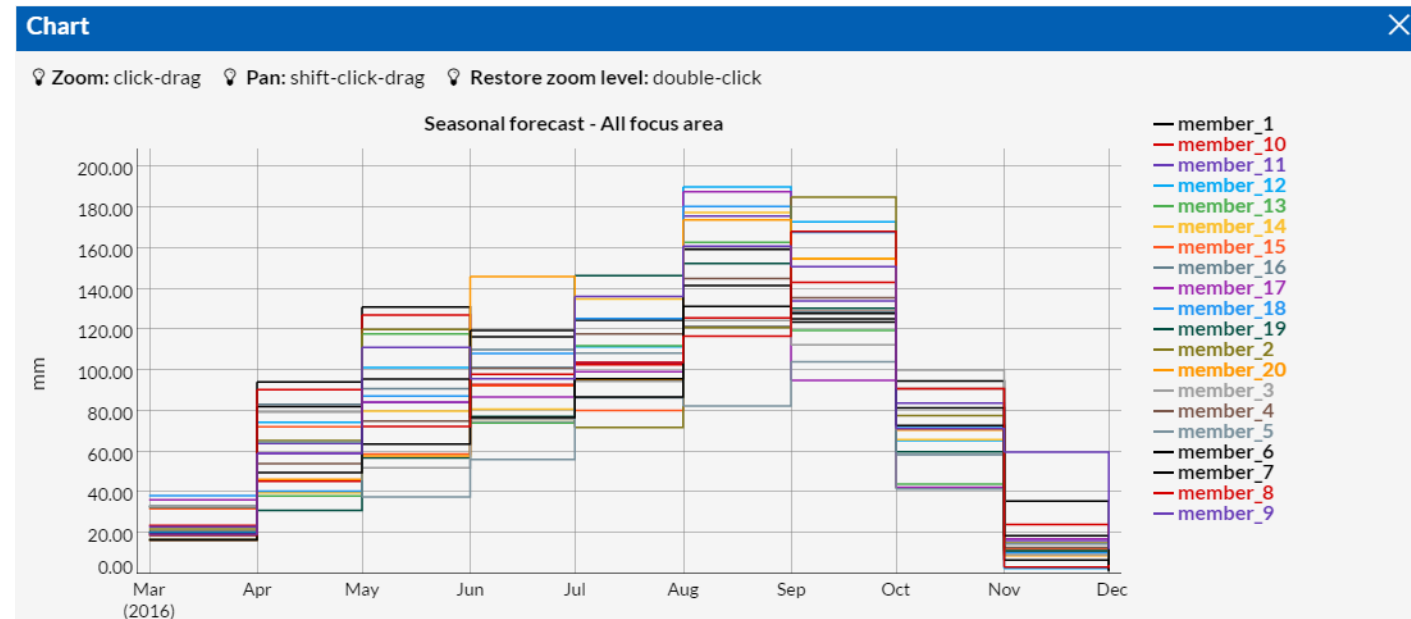


# Data portal – climate forecast

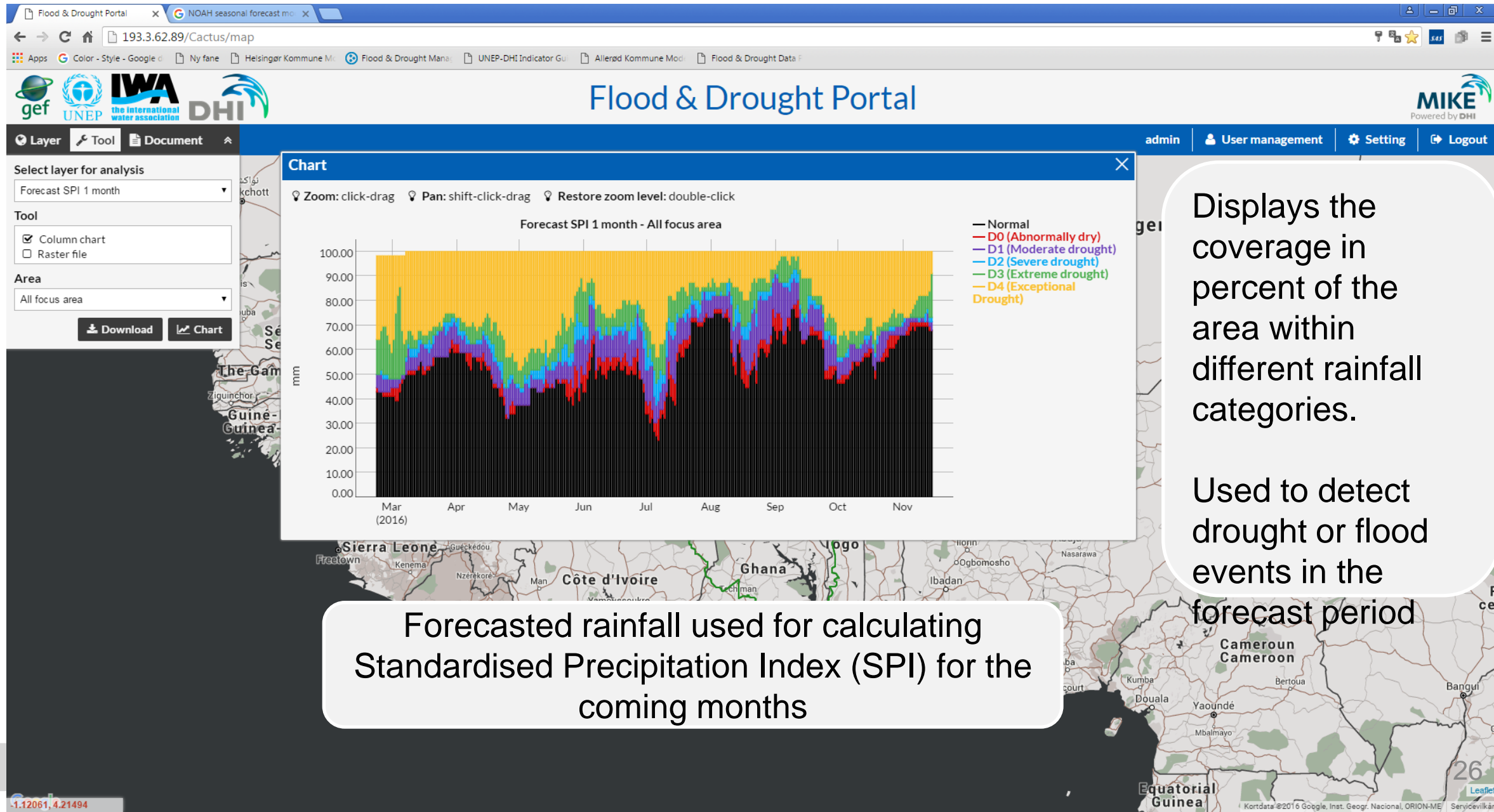
Climatology – ensembles based on historical rainfall



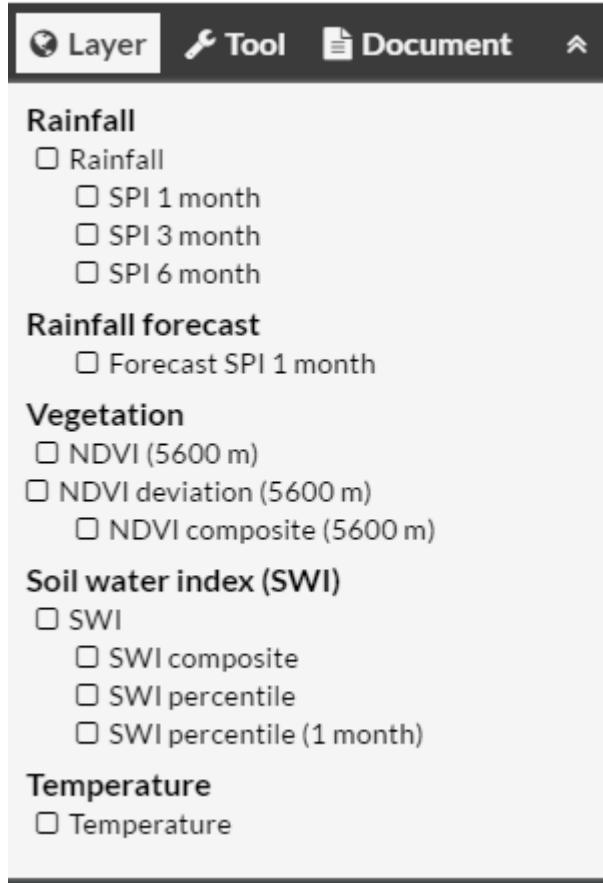
Seasonal forecast – 9 month forecast with 20 members. Updated every 5 day.



# Data portal – climate forecast



# Data portal – drought data



Drought assessment based on rainfall, vegetation and soil moisture.

A number of indices are calculated to evaluate the drought status.

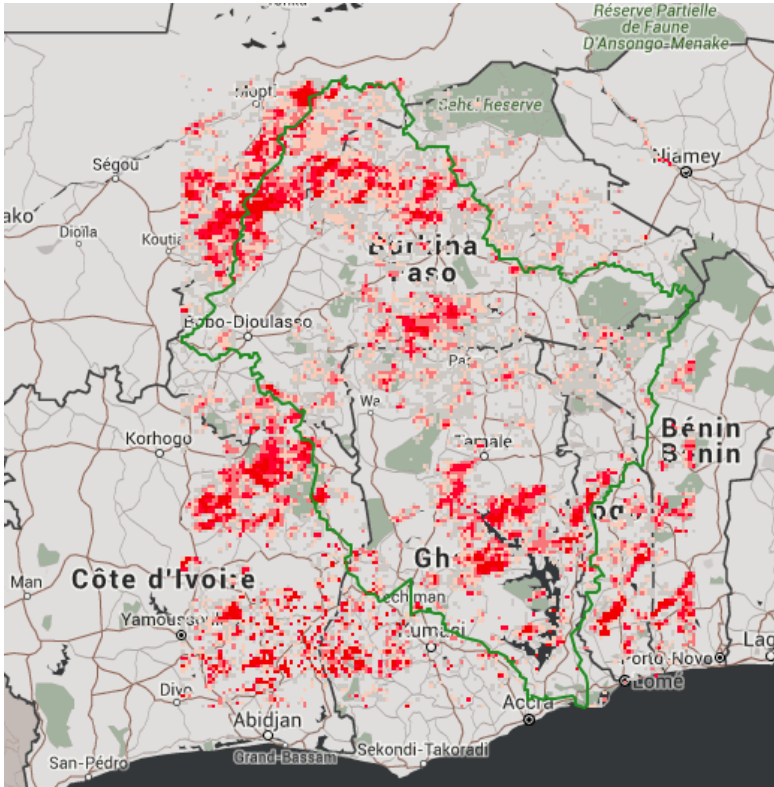
Drought indices are presented as drought categories.

Category	Description	Impact
Normal	Normal	Normal conditions
D0	Abnormally Dry	Short-term dryness some water deficit
D1	Moderate Drought	Some damage to crops
D2	Severe Drought	Crop or pasture losses likely; water shortages common
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses

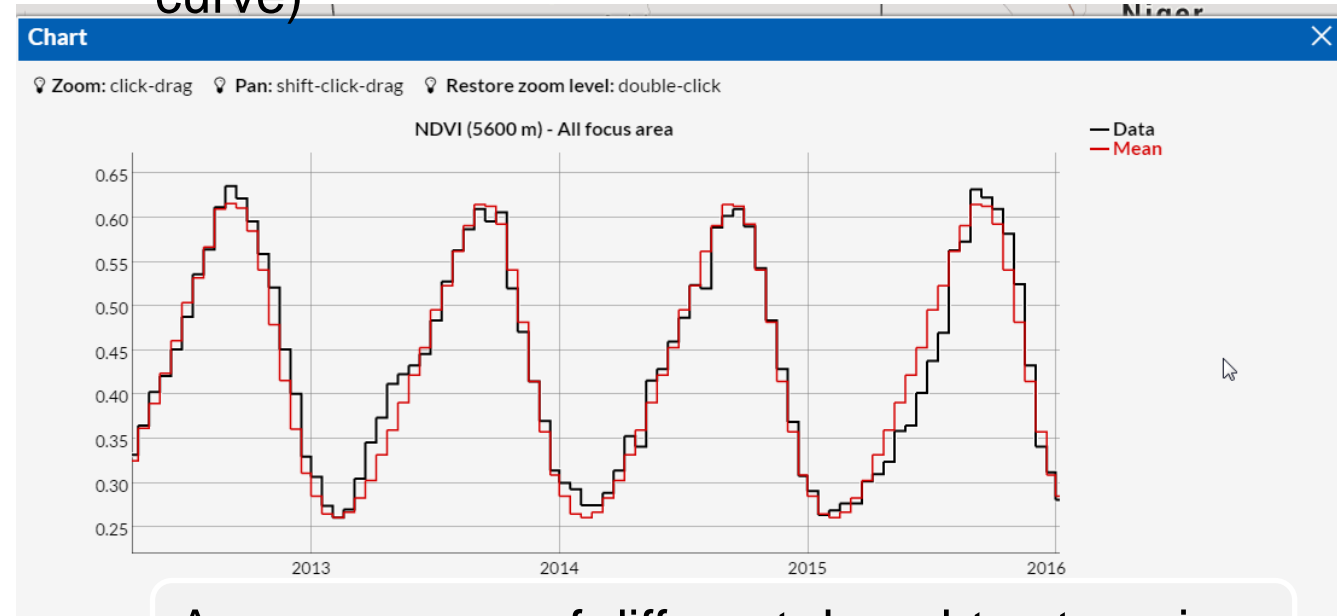
Source: U.S. Drought Monitor Classification Scheme

# Data portal – drought data

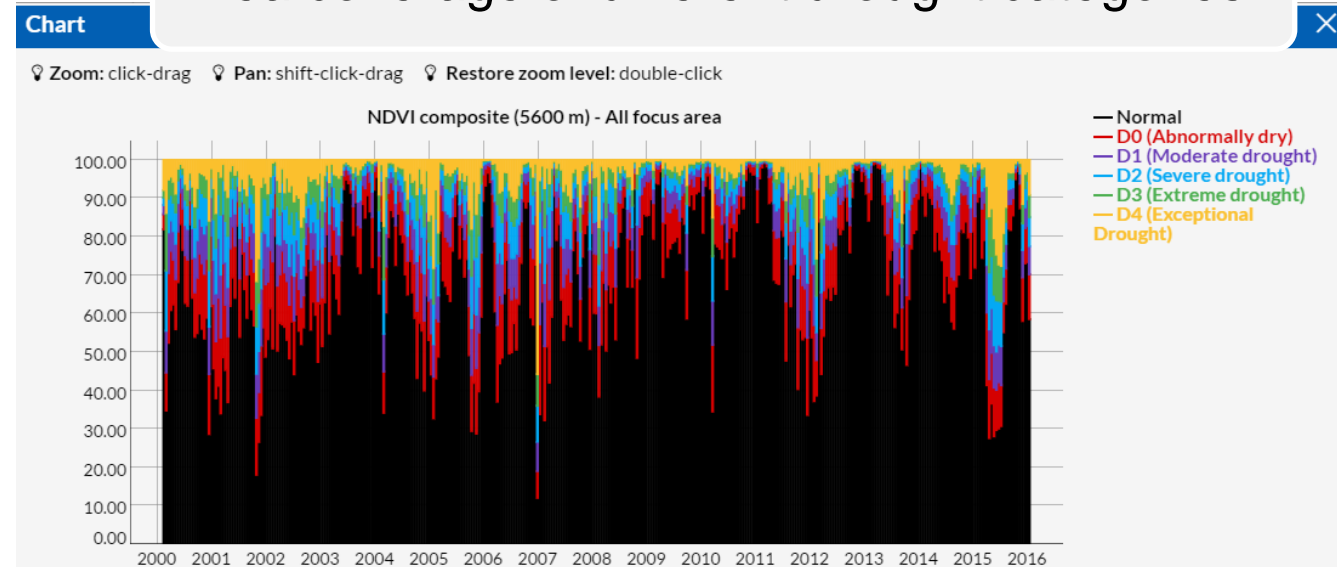
Spatial drought impact based on indices shown for a specific time step



Weighted time series for a date type and comparison with the long term mean (red curve)

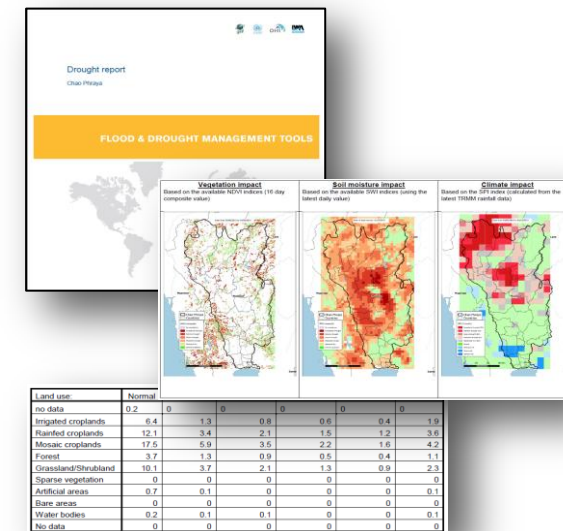
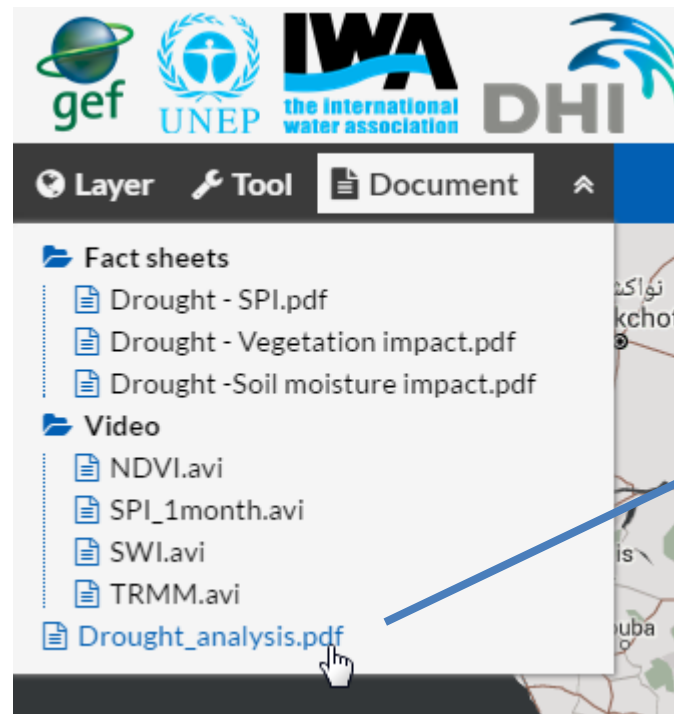


Area coverage of different drought categories



# Data portal – disseminating

Automated flood and drought analysis will be generated for the pilot basins and made available from the portal as pdf files.



# Data portal – plan for 2016

- Flood related data to be evaluated and added
- Released for project stakeholders during Q2 2016
- Risk maps related to drought and flood will be evaluated and potentially added
- Linkage to other project tools to be strengthened



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*Volta*

*Lake Victoria*

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