NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL

Nile Basin River Flow Forecasting System

BY Mbedathir Zaroug

Outline

- Introduction
- NB-RFFS
- Drought monitoring and forecasting
- Toolkits

Introduction

- **Under Goal 5 of the NBI 10 year strategy**, the Nile-SEC intends to develop a short term to seasonal river flow forecasting.
- **Providing information about volume of stream flow** that can be expected at particular points in the river network of a basin in advance.
- **The lead time could range from few days to seasons.**
- NB-RFFS will be used for **operational decision making**.
- Help **managing the releases from water storage facilities** thereby conserve water;
- **improve planning decisions on cropping; improve safety of water infrastructure, and provides opportunities to extract water** during different flow peaks.

Preparatory phase:

Preparatory phase:

- Review and Lesson learned from International Experiences in River Flow Forecasting (FFS)
- Lesson learned from Current Use of FFS in the Nile Basin.
- User Needs assessment.
- Conceptual design (Short-range forecast and Seasonal forecast).

NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL

german cooperation
DEUTSCHE ZUSAMMENARBEIT

giz

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

CIWA

6th Nile Basin Development Forum - Ethiopia 2021

Development of the river flow forecast

NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL

Inception prepared
Software Framework developed
Model adapters developed
Forecast dissemination platform developed
Nile Basin operational forecast model developed
Testing and Implementation of the system
Drought forecasting
Toolkits for dam operation and irrigation

german cooperation
DEUTSCHE ZUSAMMENARBEIT

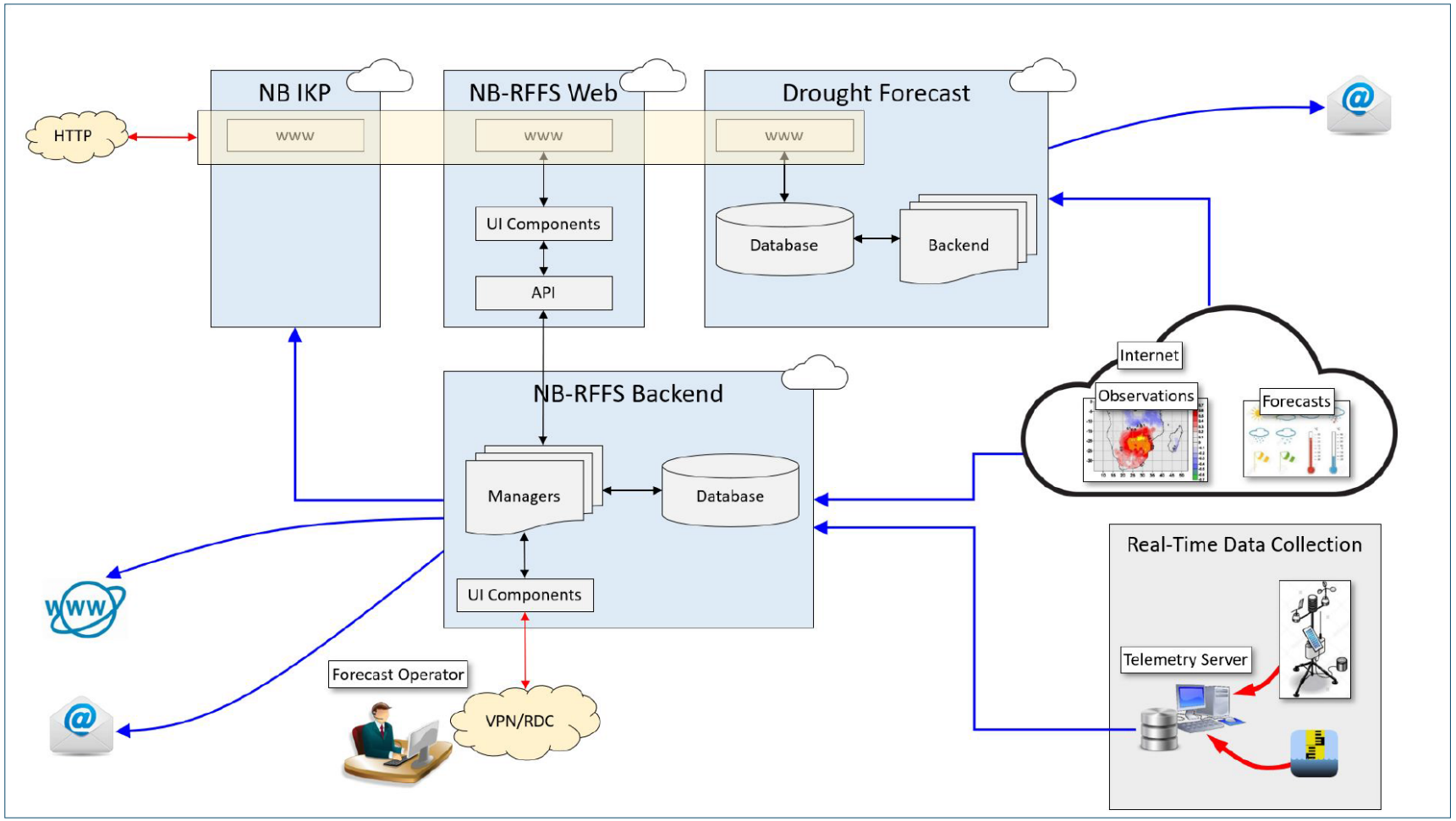
giz

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

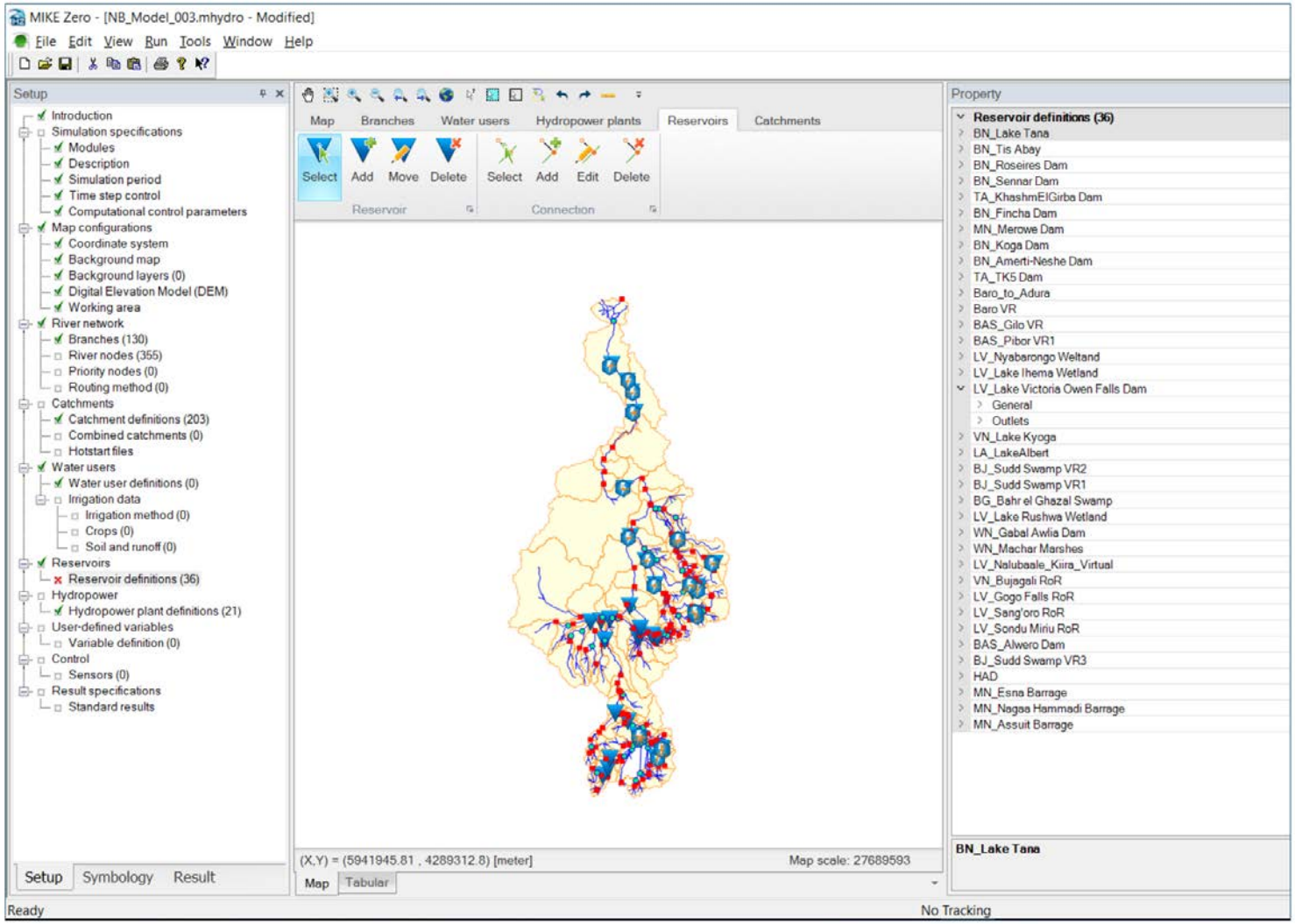
CIWA

2021
6th Nile Basin Development Forum - Ethiopia

Development of the Nile Basin River Flow forecasting system



NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL



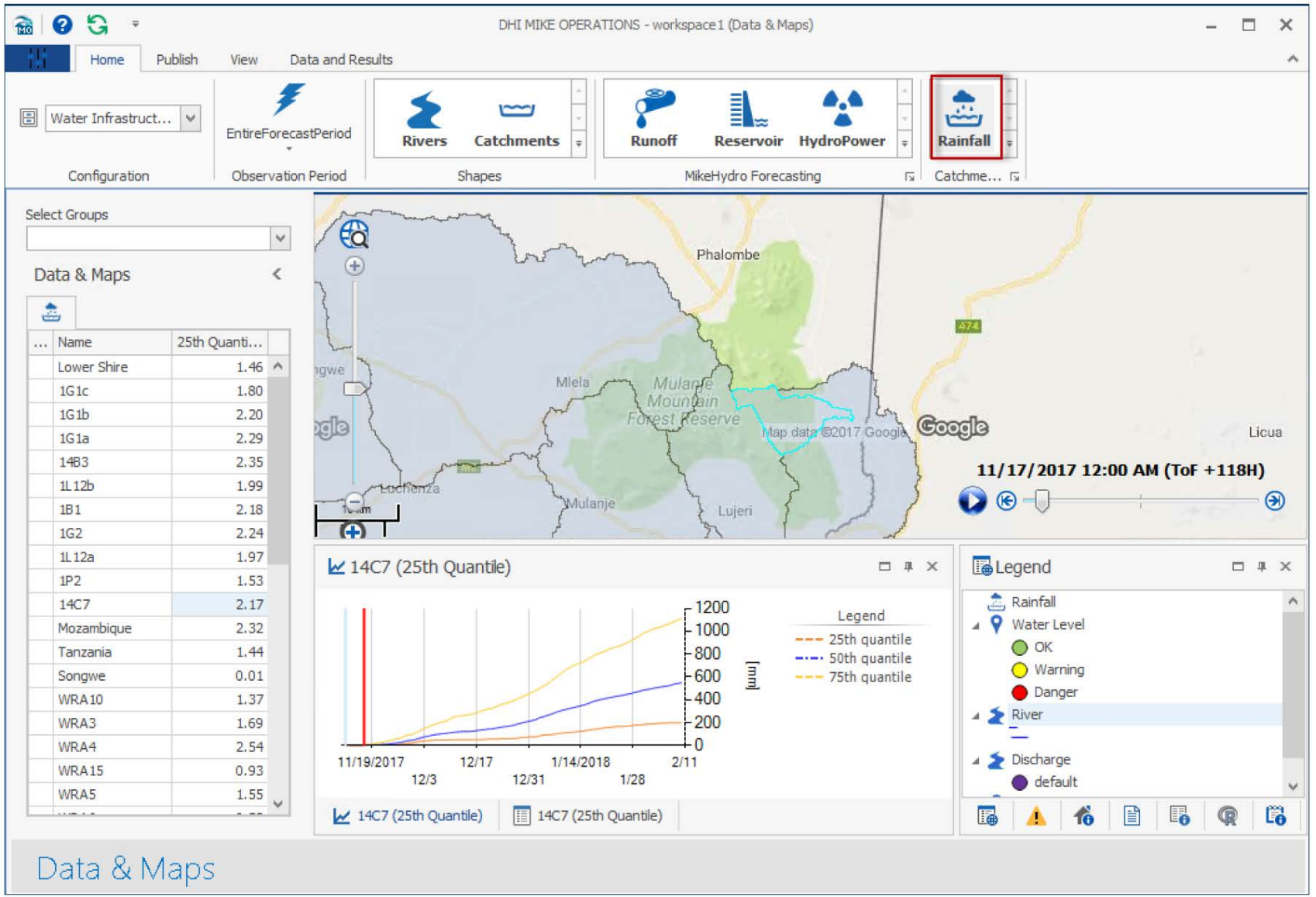
german cooperation
DEUTSCHE ZUSAMMENARBEIT

giz

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

CIWA

6th Nile Basin Development Forum - Ethiopia 2021


DHI MIKE OPERATIONS - workspace1 (Data & Maps)
Home
Publish
View
Data and Results
Water Infrastruct...
Configuration
EntireForecastPeriod
Observation Period
Rivers
Catchments
Shapes
Runoff
Reservoir
HydroPower
MikeHydro Forecasting
Rainfall
Catchme...
Select Groups
Data & Maps
... Name 25th Quanti...
Lower Shire 1.46
1G1c 1.80
1G1b 2.20
1G1a 2.29
14B3 2.35
1L12b 1.99
1B1 2.18
1G2 2.24
1L12a 1.97
1P2 1.53
14C7 2.17
Mozambique 2.32
Tanzania 1.44
Songwe 0.01
WRA10 1.37
WRA3 1.69
WRA4 2.54
WRA15 0.93
WRA5 1.55
Phalombe
Mlela
Mulanje Mountain Forest Reserve
Map data ©2017 Google
Google
Licua
Luchenza
Mulanje
Lujeri
11/17/2017 12:00 AM (ToF +118H)
14C7 (25th Quantile)
1200
1000
800
600
400
200
0
[mm]
11/19/2017
12/3
12/17
12/31
1/14/2018
1/28
2/11
Legend
25th quantile
50th quantile
75th quantile
14C7 (25th Quantile)
14C7 (25th Quantile)
Legend
Rainfall
Water Level
OK
Warning
Danger
River
Discharge
default
Data & Maps

NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL

Flood and Drought Portal

MIKE Powered by DHI

DATA AND INFORMATION | Last Update: 2020-01-19 | User: admin | Workgroup: Private | Area: Nile

Data | Reporting

Select | Status | GIS layers

- Rainfall (TRMM)
  - Historical ensemble (TRMM)
  - Monthly mean (TRMM)
  - SPI 1 month
  - SPI 3 month
  - SPI 6 month
  - Rainfall deviation 30-day (TRMM)
  - Effective drought Index (EDI)

Tool

- Time series
- Column chart
- Raster file

Area

Subareas

Select subarea

- White Nile 5
- Lake Victoria
- Nile 1
- el Allaqi

Download all | Chart

SPI 1 month
Ext. dry
Very dry.
Mod. dry
Normal

Chart

1m | 6m | 1y | All | Zoom: click-drag | Pan: shift-click-drag | + Add to favorites

SPI 1 month - Subareas - White Nile 6

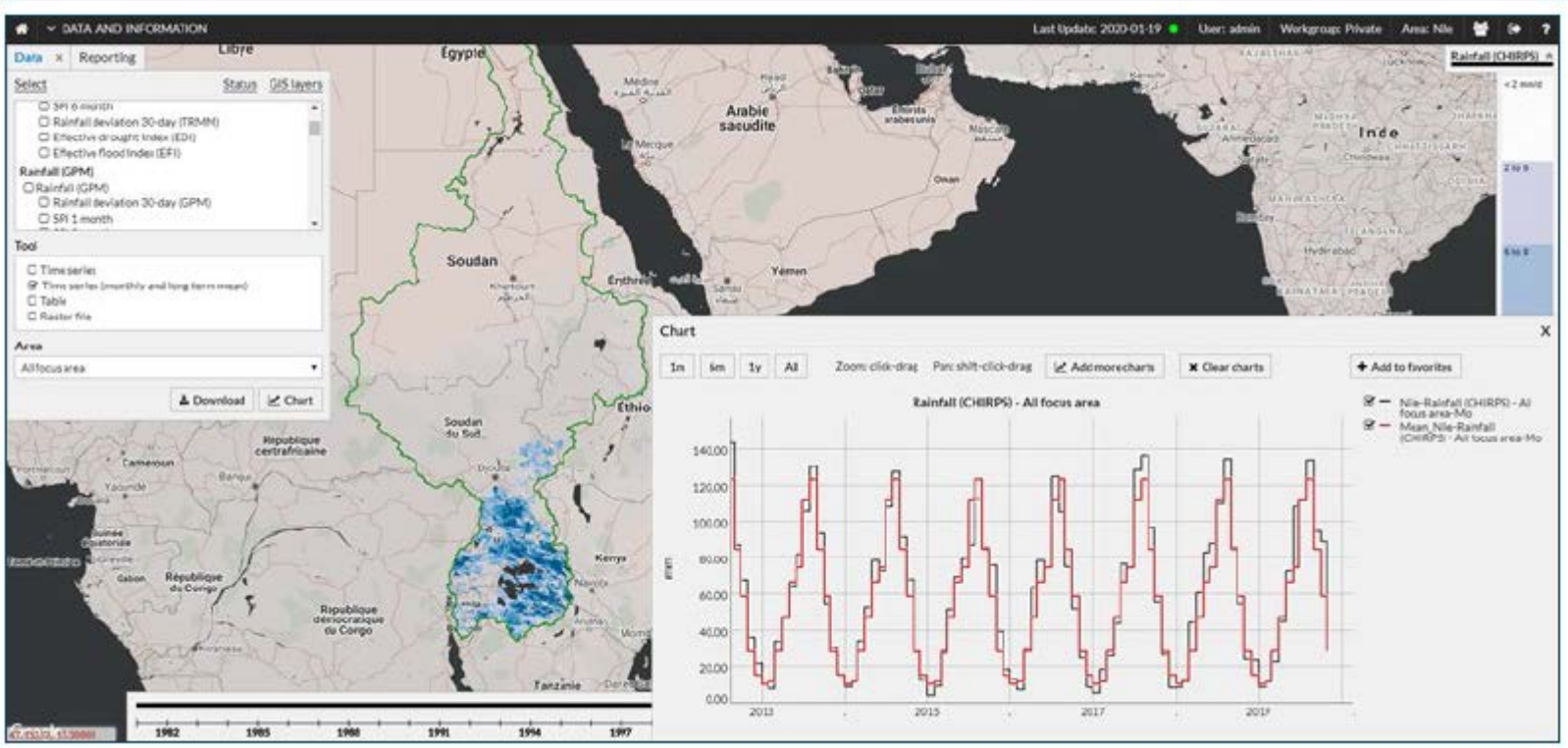
Percentage

Ext. wet
Sev. wet
Mod. wet
Normal
Mod. dry
Very dry.
Ext. dry

german cooperation
giz
THE WORLD BANK IBRD • IDA | WORLD BANK GROUP
CIWA

6th Nile Basin Development Forum - Ethiopia 2021

NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL



german cooperation
DEUTSCHE ZUSAMMENARBEIT

giz

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

CIWA

6th Nile Basin Development Forum - Ethiopia 2021

NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL

DHI

NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL

Bulletin of the Drought Monitoring and Forecasting Component of the Nile Basin River Flow Forecasting System (NB-RFFS)

OPERATIONAL DROUGHT REPORT
Date of issue: 31 October 2020

This report has been automatically generated

german cooperation
DEUTSCHE ZUSAMMENARBEIT

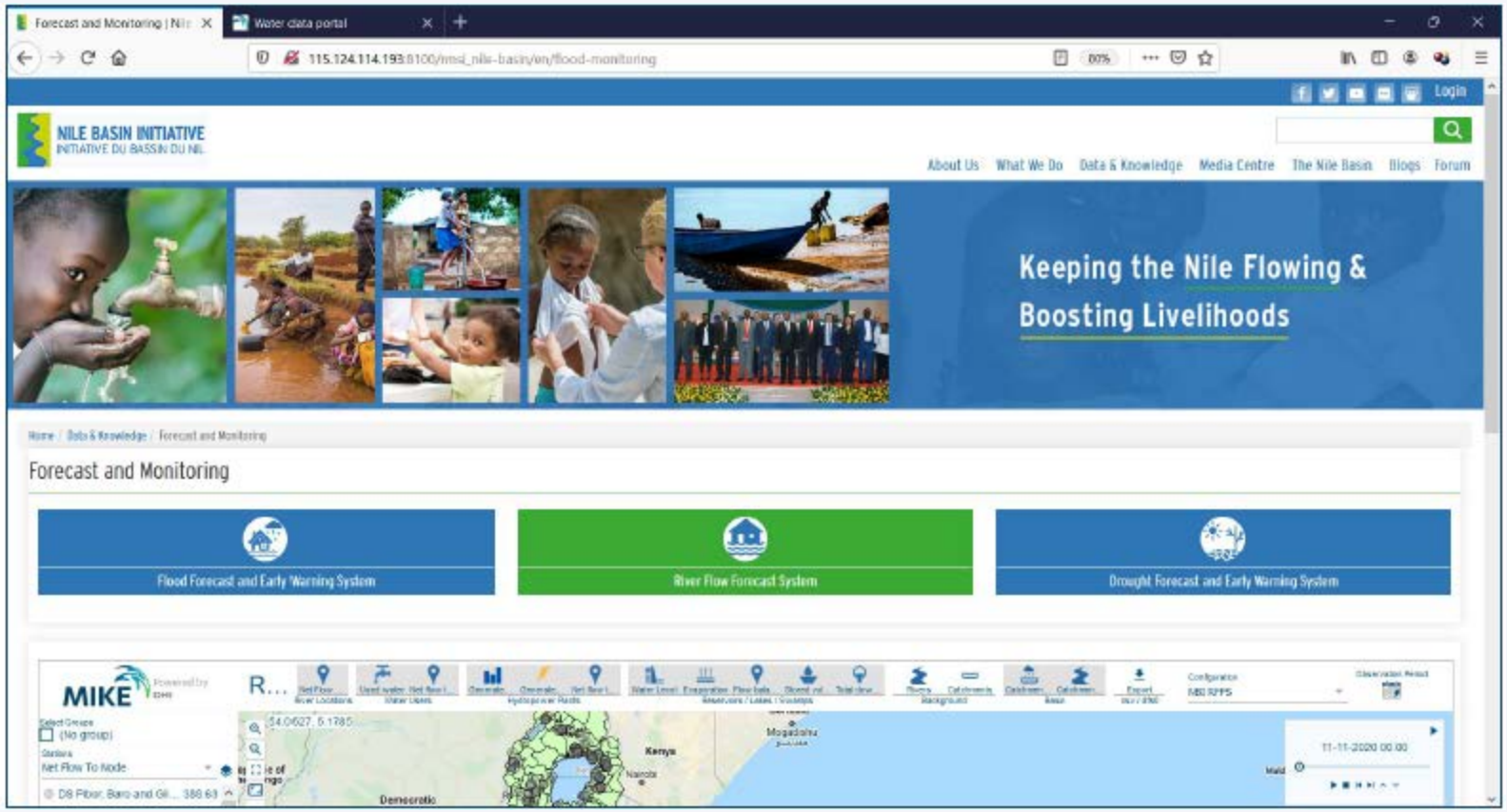
giz

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

CIWA

6th Nile Basin Development Forum - Ethiopia 2021

NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL



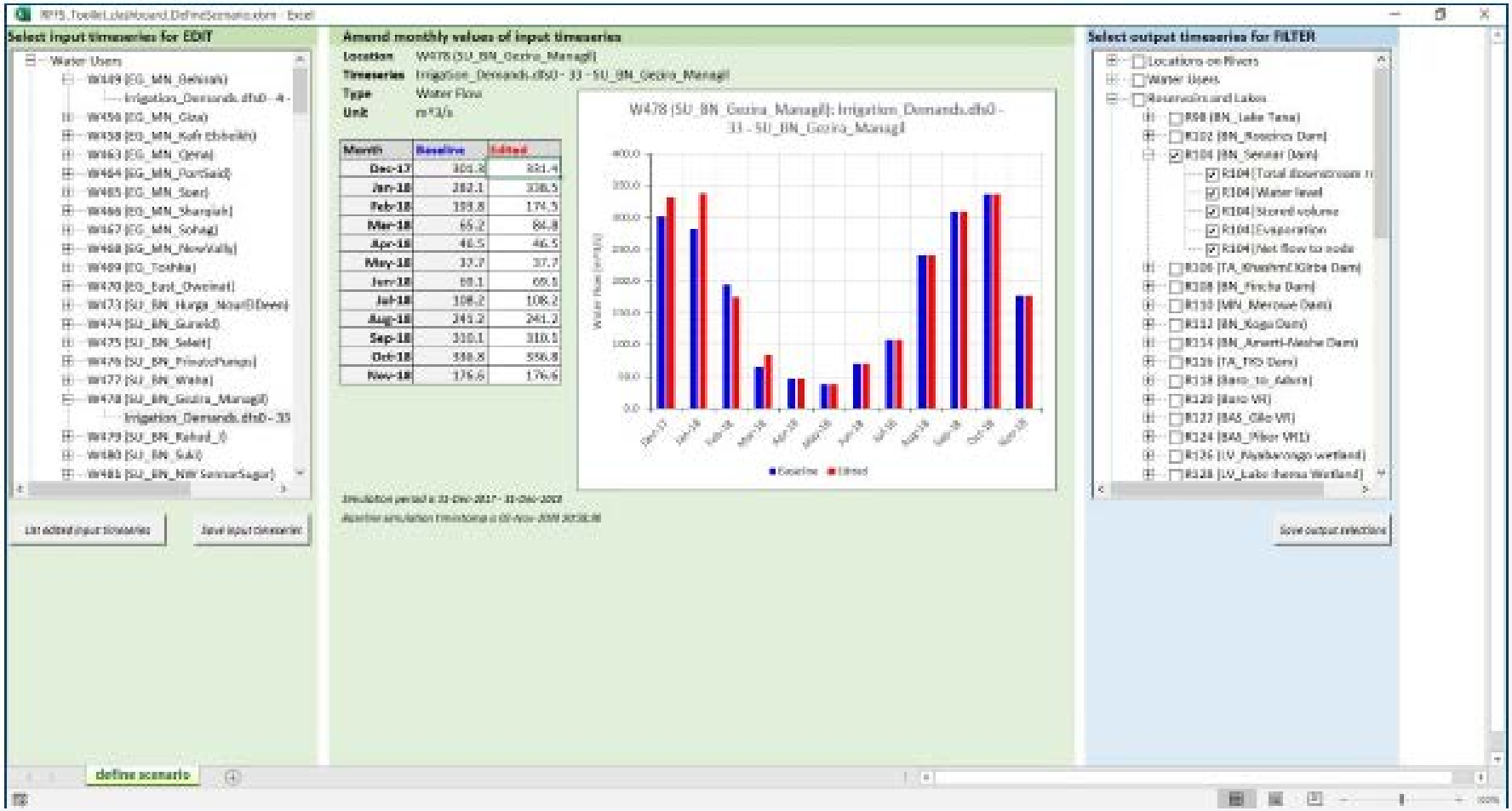
german cooperation
DEUTSCHE ZUSAMMENARBEIT

giz

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

CIWA

6th Nile Basin Development Forum - Ethiopia 2021


Select input timeseries for EDIT
Water Users
W449 [EG_MN_Behirah]
Irrigation_Demands.dfs0 - 4 -
W456 [EG_MN_Giza]
W458 [EG_MN_Kafr Elsheikh]
W463 [EG_MN_Qena]
W464 [EG_MN_PortSaid]
W465 [EG_MN_Suez]
W466 [EG_MN_Sharqiah]
W467 [EG_MN_Sohag]
W468 [EG_MN_NewVally]
W469 [EG_Toshka]
W470 [EG_East_Oweinat]
W473 [SU_BN_Hurga_NourElDeen]
W474 [SU_BN_Gurwid]
W475 [SU_BN_Selait]
W476 [SU_BN_PrivatePumps]
W477 [SU_BN_Waha]
W478 [SU_BN_Gezira_Managil]
Irrigation_Demands.dfs0 - 33
W479 [SU_BN_Rahad_I]
W480 [SU_BN_Suki]
W481 [SU_BN_NW SennarSugar]
List edited input timeseries
Save input timeseries
Amend monthly values of input timeseries
Location W478 (SU_BN_Gezira_Managil)
Timeseries Irrigation_Demands.dfs0 - 33 - SU_BN_Gezira_Managil
Type Water Flow
Unit m^3/s
Month Baseline Edited
Dec-17 301.3 331.4
Jan-18 282.1 338.5
Feb-18 199.8 174.5
Mar-18 65.2 84.8
Apr-18 46.5 46.5
May-18 37.7 37.7
Jun-18 69.1 69.1
Jul-18 108.2 108.2
Aug-18 241.2 241.2
Sep-18 310.1 310.1
Oct-18 556.8 556.8
Nov-18 176.6 176.6
W478 (SU_BN_Gezira_Managil): Irrigation_Demands.dfs0 - 33 - SU_BN_Gezira_Managil
Baseline
Edited
Select output timeseries for FILTER
Locations on Rivers
Water Users
Reservoirs and Lakes
R98 (BN_Lake Tana)
R102 (BN_Roseires Dam)
R104 (BN_Sennar Dam)
R104 (Total downstream
R104 (Water level
R104 (Stored volume
R104 (Evaporation
R104 (Net flow to node
R106 (TA_Khashm El Girba Dam)
R108 (BN_Fincha Dam)
R110 (MN_Merowe Dam)
R112 (BN_Koga Dam)
R114 (BN_Amerti-Nesha Dam)
R116 (TA_TRS Dam)
R118 (Baro_to_Adura)
R120 (Baro VR)
R122 (BAS_Gilo VR)
R124 (BAS_Pibor VR1)
R126 (LV_Nyabarongo wetland)
R128 (LV_Lake Ihema Wetland)
Save output selections
define scenario

NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL

Not secure | watertools-portal.azurewebsites.net/portal/workspaces/5066783a-f1cf-46e5-930c-262254d58dca/landing

Available application(s)

NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL

River Flow Forecasting

Access to 9-months forecasts of river flows and other basin states (such as reservoir volumes) at 206 forecast locations in the entire Nile basin. The forecasts are updated daily.

NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL

Drought Monitoring and Forecasting

Access to near-real-time data, drought indicators, climate forecasts and climate change data. The satellite-based datasets are updated daily.

NB-RFFS v2 staging

This is the stable version of MIKE Operations Web 2.0. This app visualizes the NBI river flow forecasting system.

About Nile Basin Forecasting System

The Nile Basin Forecast System is an integrated real-time multi-functional forecasting system that supports the Nile Basin Initiative and its stakeholders in (1) river flow forecasting providing short-term to seasonal river flow forecasts, and (2) seasonal drought forecasting providing seasonal hydrological and meteorological drought forecasts for the entire Nile basin. Furthermore, it supports investigating the consequences of alternative infrastructure operation rules for dams and key water users using the flow forecasts generated. The components of the system are the following:

1. Nile Basin River Flow Forecasting System (NB-RFFS): Flow forecasts are produced based on a river basin model developed with MIKE Hydro Basin. The model's rainfall-runoff model covers the entire Nile basin with 203 catchments. All main river reaches and water uses are also modelled. Furthermore, the model contains 42 reservoirs including lakes and wetlands, and 21 hydropower plants. Every day, forecasts are made for 8 different types of state variables, such as water flows or water volumes. In total 462 state variables are forecasted at 206 forecast locations. The key inputs into the rainfall-runoff model component of the system are rainfall forecasts automatically retrieved from CFSv2 (NOAA's coupled forecast system model version 2) and GEFS (NOAA's Global Ensemble Forecast System) for a forecast period of 9 months. The model's simulation time step is daily.

german cooperation
DEUTSCHE ZUSAMMENARBEIT

giz

THE WORLD BANK
IBRD • IDA | WORLD BANK GROUP

CIWA

2021
6th Nile Basin Development Forum - Ethiopia

Important links

- *http://watertools-portal.azurewebsites.net/portal/workspaces/5066783a-f1cf-46e5-930c-262254d58dca/landing*
- *https://www.flooddroughtmonitor.com/DataApp/*
- http://watertools-portal.azurewebsites.net/portal/workspaces/5066783a-f1cf-46e5-930c-262254d58dca/applications/41918734-ac43-40af-a520-464027880f68/landing

NILE BASIN INITIATIVE
INITIATIVE DU BASSIN DU NIL
THANK YOU!