

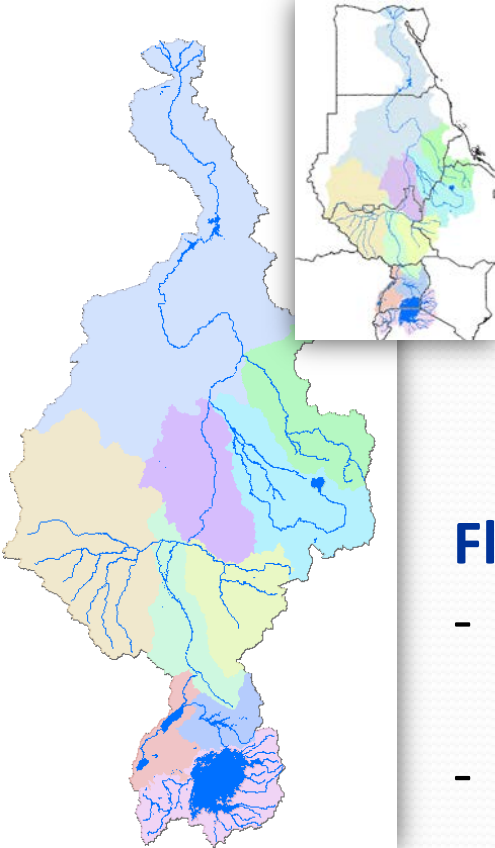


# The Nile Basin Decision Support System

*Analytic tool for water resources planning  
jointly developed by Nile Riparians*

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# The Nile Basin



## Basic data:

- Shared by 11 countries
- Area: 3.2 million km<sup>2</sup>
- Average annual discharge:  $\approx 85$  (+/-) BCM
- Population of basin countries  $\approx 400$  + Mill
- Population in the basin  $\approx 230$ + Mill

## Flow contribution by regions

- 86 % from Ethiopian highlands; *highly seasonal flows; > 70 % of flow in 3 months*
- 14 % from Equatorial Lakes

- All flow generated most upstream; yet upstream parts least developed → *growing population and economies upstream → pressure for development*
- Downstream parts nearly totally dependent on flow from upstream; → concerns of possible impacts by upstream
- Balancing development in mutually beneficial manner for the riparians  
primary target of NBI



- Sustainable management of shared waters need cooperation among riparians at all stages– from planning to implementation to management and monitoring
- Joint planning and management of water resources measures (dams, canal, etc) should also be seen as confidence building activities
- Joint planning needs tools that are owned and trusted by all riparians
- Therefore, such tools need to be developed in a transparent and participatory manner
- Use of jointly developed tools can:
  - Help build confidence in planning outcomes
  - Foster technical collaboration (learning by doing)
  - Expand level of understanding of common issues,
- The Nile Basin Decision Support System (NB DSS) is analytic tool developed by the Nile riparians

# The Nile Basin Decision Support System

*(Developed during 2007 – 2012; still evolving)*



*The Nile Basin Decision Support System is a comprehensive analytical framework that offers:*

- The software framework for storage, processing, interpretation and visualization of data*
- Suite of models for simulating river-lake/reservoir systems*
- Toolset for analyses of water resources problems, evaluate alternative scenarios*
- Suite of tools for generating information needed for decision making*
- Toolsets for collaborative decision making in water resources*

# Nile Basin DSS: Key Components



- **Data/information management system**

- Time Series analysis toolkit
- Basic GIS functionality
- Integrated database
- Ensemble generator (for probabilistic analysis)

- **Modeling System**

- Water balance and allocation model
- Rainfall-runoff modeling tools
- Hydrodynamic modeling
- Soil erosion process model
- Crop water requirement
- Model linking/nesting tool

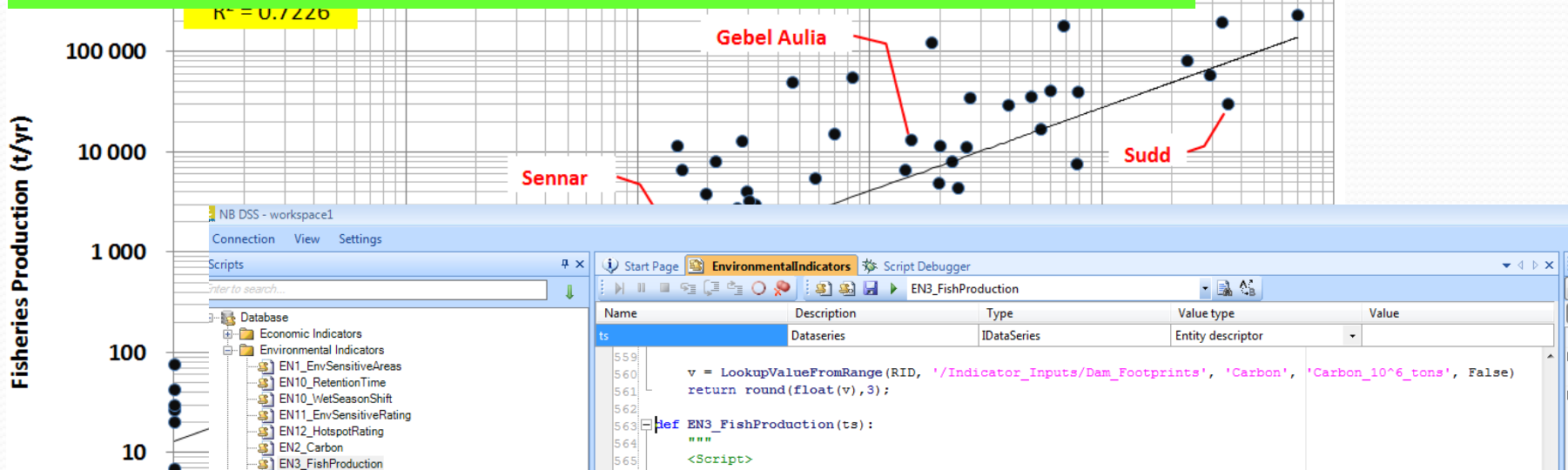
- **Decision making/Analysis tools**

- Scenario management (including indicator calculation)
- Multi-objective optimization
- Economic analysis tools
- Multi-criteria analysis tool



## Integrating environmental objectives in decision making

**A response function.. predicting fish = f(impoundment area,)**



**DSS Script implementing response function**

	EN8 Blue Nile ds. Border	EN2 Border Dam	EN3 Border	EN11 Border	EN3 Roseires	EN3 Sennar	EN3 Merowe	EN5 Main Nile ds. Blue Nile	EN11 Merowe
Id	13	15	17	18	110	112	114	115	116
Unit									
ENIMP_Scenario 1 WU	-1	2.263	1191.6	51.9	2613	292.5	1720.3	-3	28.7
ENIMP_Scenario 3 WU	0	2.263	1034.4	33.7	2677.5	324.2	1720.3	-3	27.7
ENIMP_Scenario 3a WU	-1		1034.4	29.8	2622.8	292.5	3393	-3	53.7

**Environmental indicators for each scenario**



# What Nile Basin DSS it provides ...



- **Multiple functionality** needed for water resources planning *ranging from data processing to modeling, scenario analyses to multi-criteria decision making*
- An **integrated framework**
- **Generic system that** can be applied at different scales
- **Data security:** *multi-level user access control; data protection, metadata and change log to record history of data processing,*
- **Expandable software architecture**
- **Multiple deployment options:** on institutional networks (LAN) or as single – standalone installation
- ***A continuously evolving software system ...***

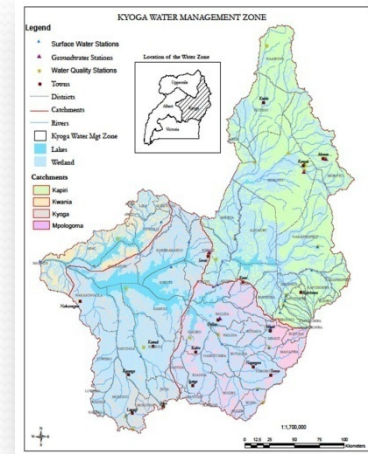


# Catchment Planning using NB DSS

## Case Study: Awoja Catchment, Uganda

**Objective:** to prepare a catchment management plan for the Awoja Catchment, Lake Kyoga sub-basin, covering

- Agreed investments in infrastructure and other interventions; and
- Water management interventions and actions



NBI Secretariat provides:

- Technical support to national project team and consultants
- Training to national project team

