Understanding riverine wetland-catchment processes using remote sensing data and modelling

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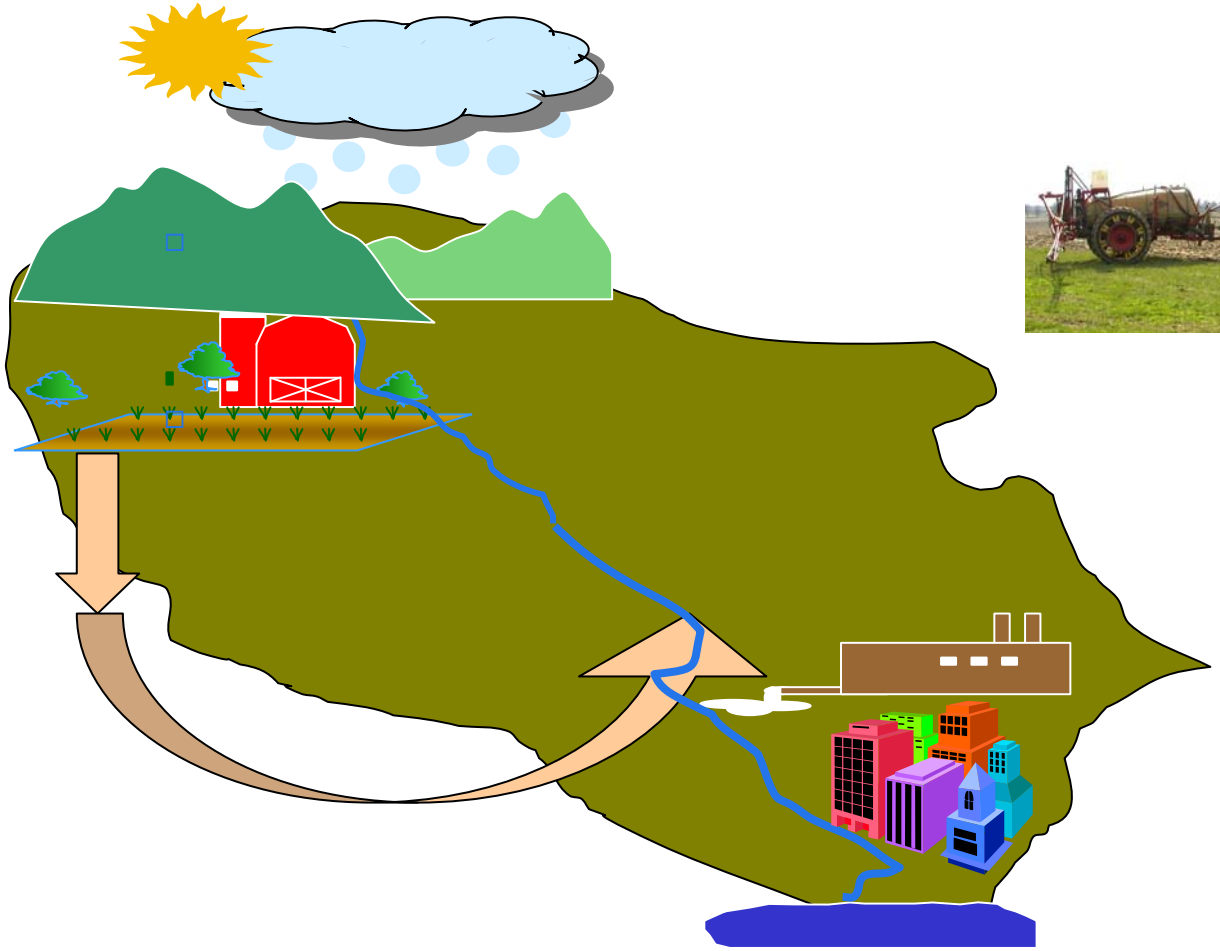
UNESCO-IHE Institute for Water Education
Department of Hydroinformatics and Knowledge Management

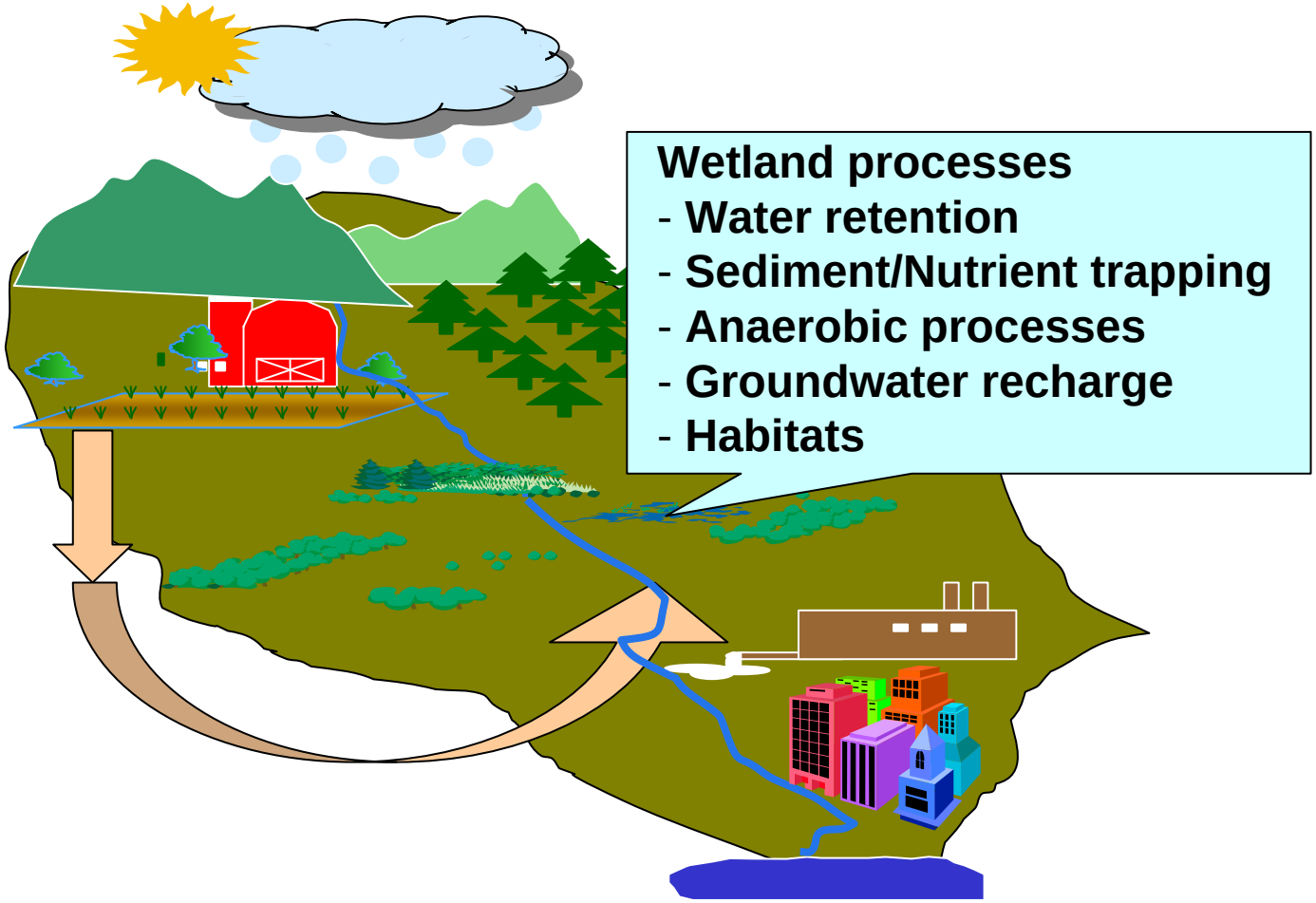
Catchment modelling

- Hill slope hydrology
- Inclusion of agricultural processes



Water quality: from river reach to river basin

- Hill slope hydrology
- Inclusion of agricultural aspects
- Importance of natural landscape elements



How to represent wetland-catchment hydrology?

- What is the value of remote sensing data?
- How to model wetlands at catchment scale?

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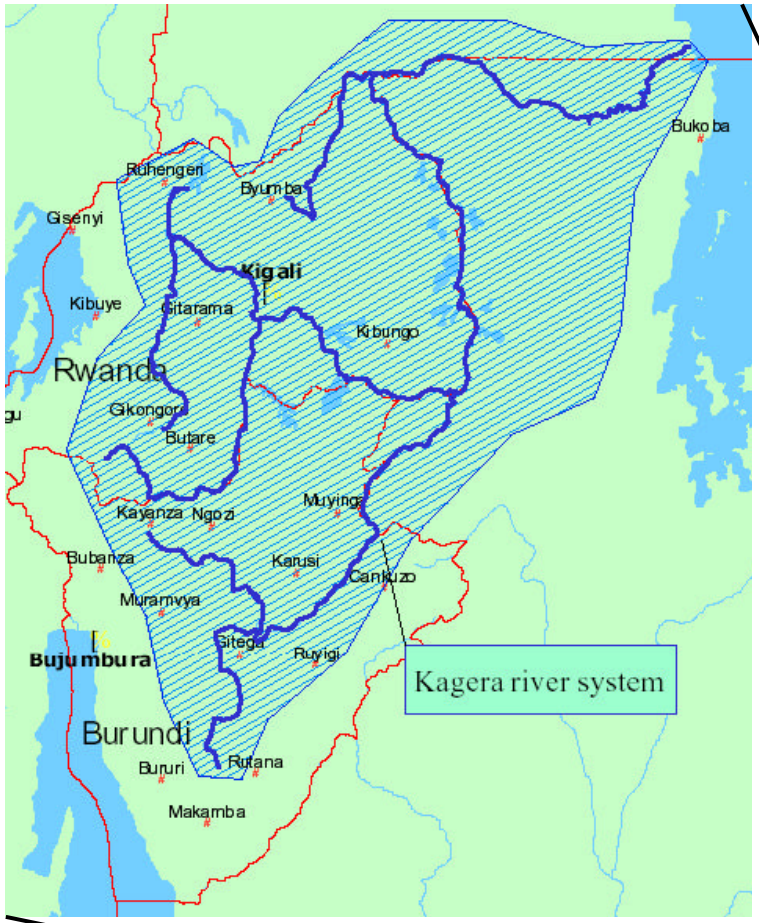
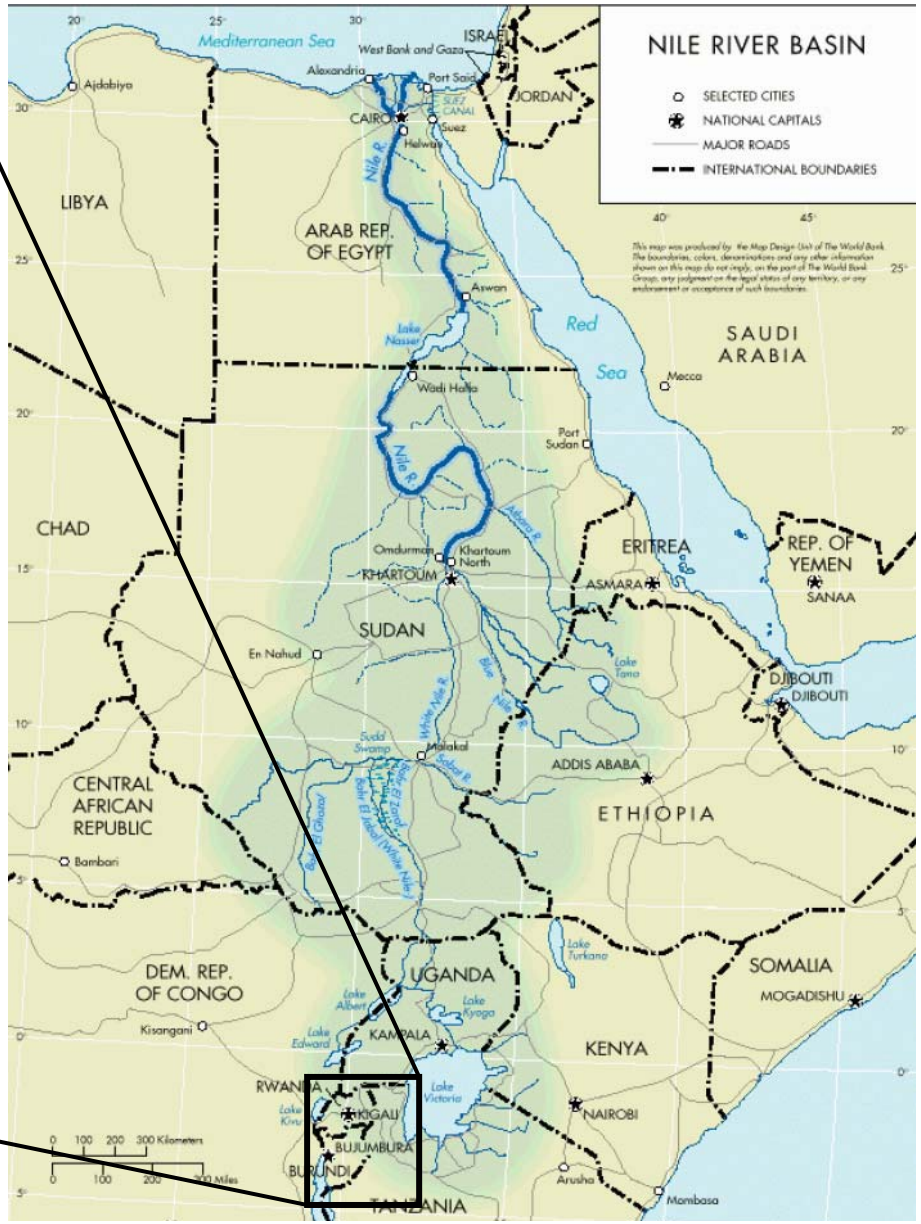
Kagera basin



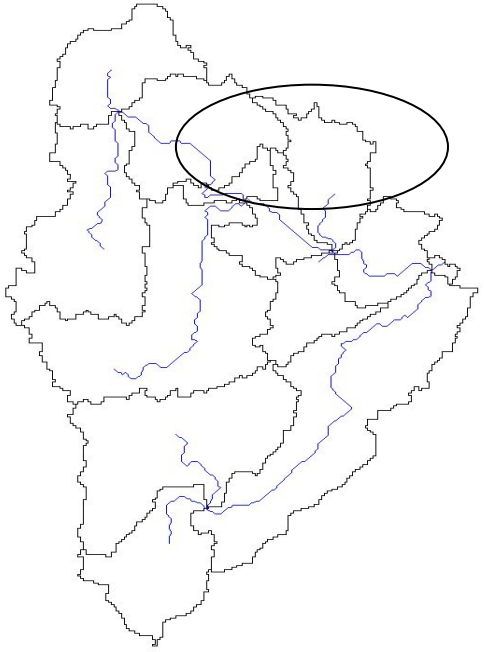


Study area

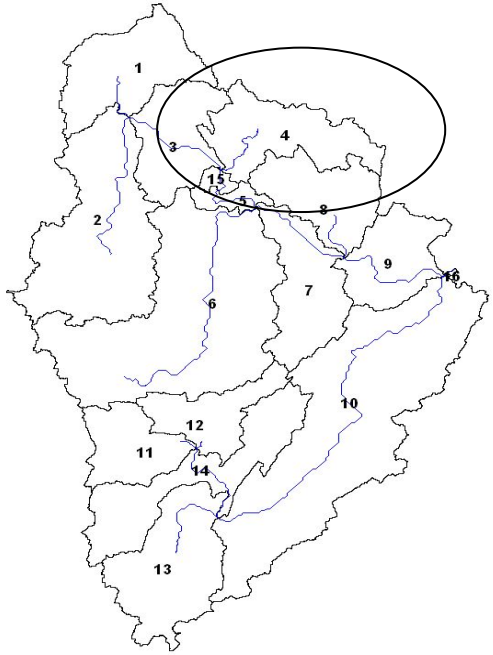
GIS/RS Data

- DEM: Watershed delineation

1 k DEM



90m DEM



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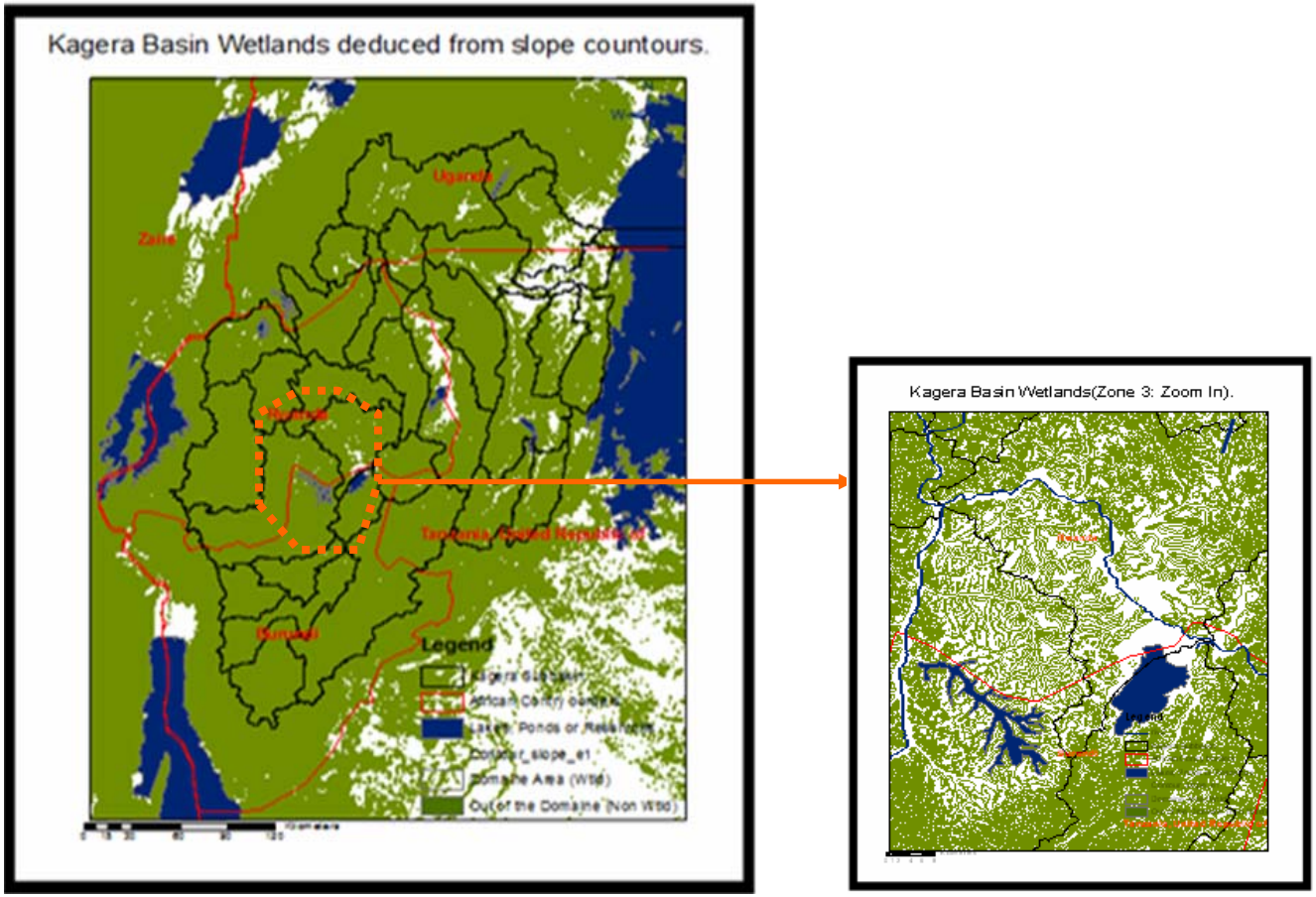
GIS/RS Data

- DEM: wetland delineation



GIS/RS Data

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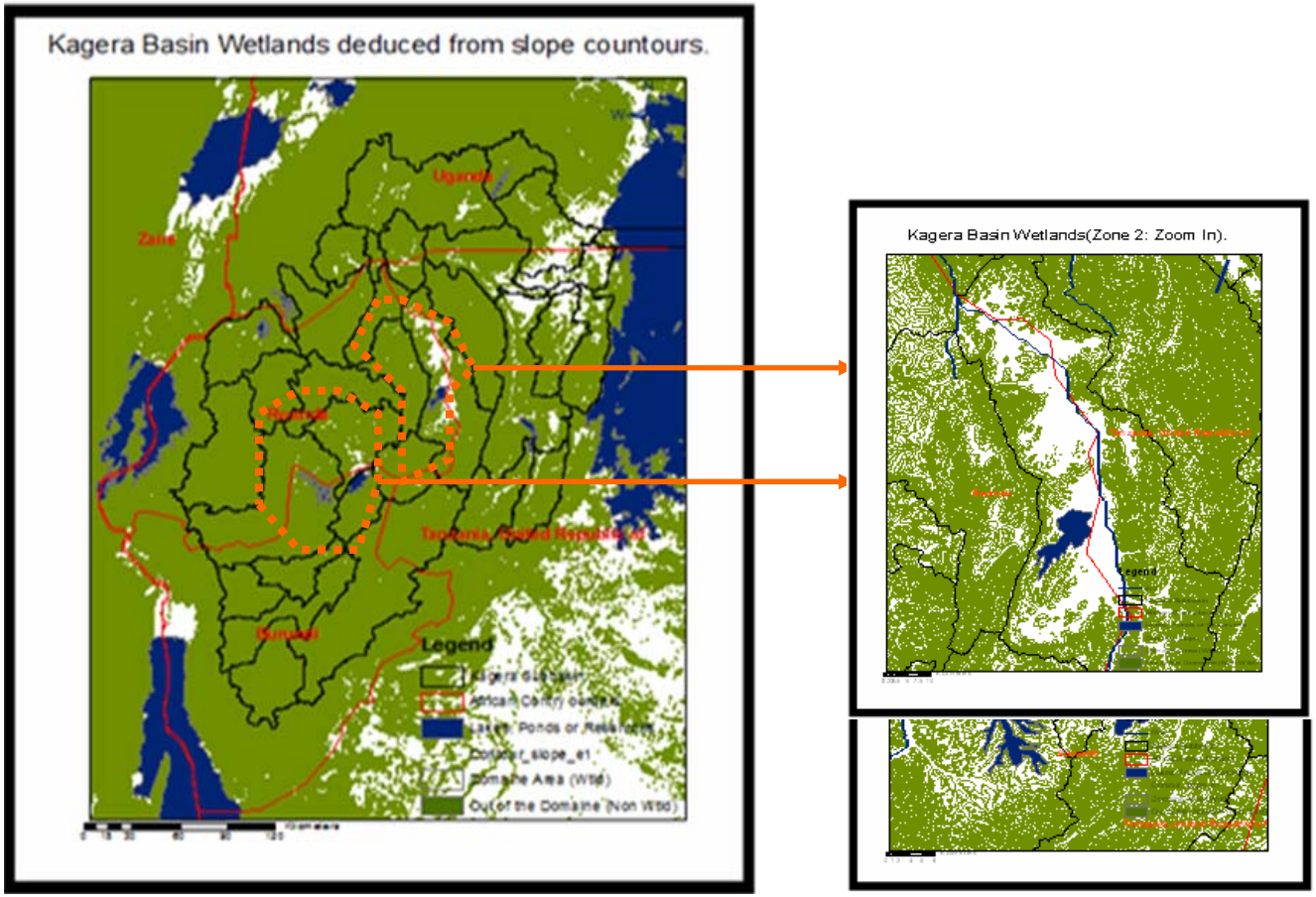

Remote sensing data

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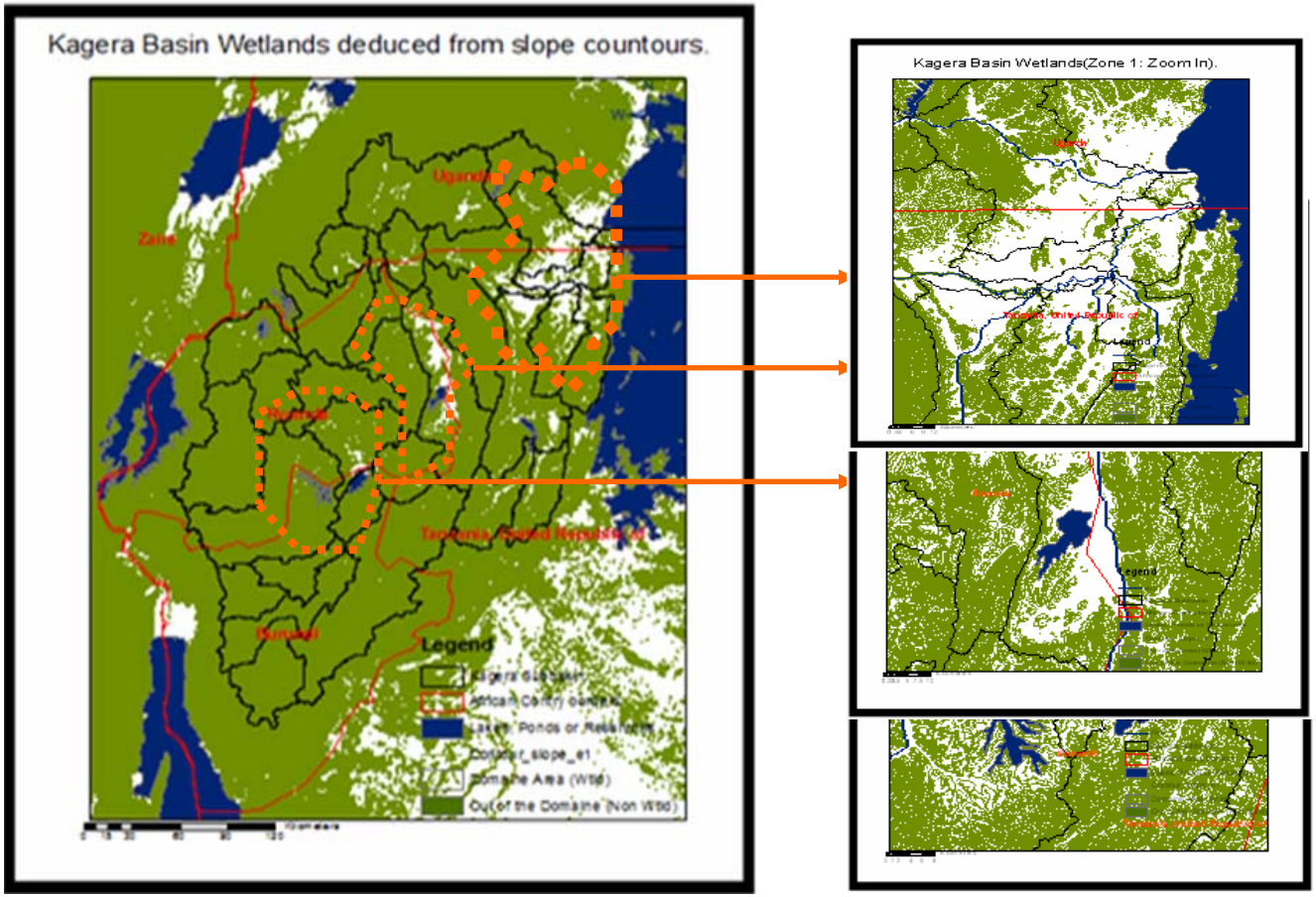

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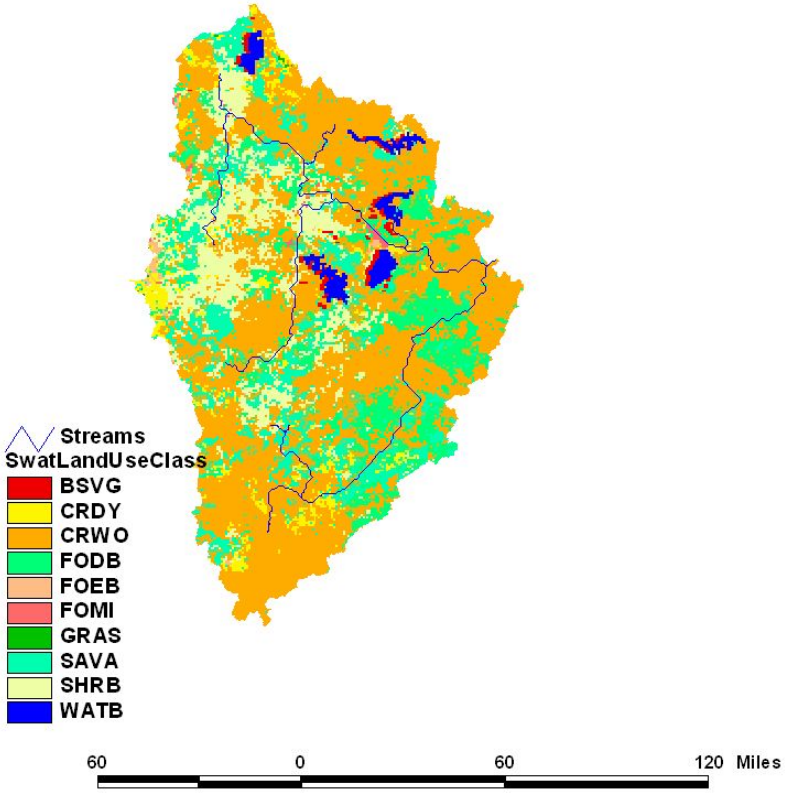
GIS/RS Data

- Soil data
- Land use data

}

Usefull for catchment modelling
Not well representing wetlands



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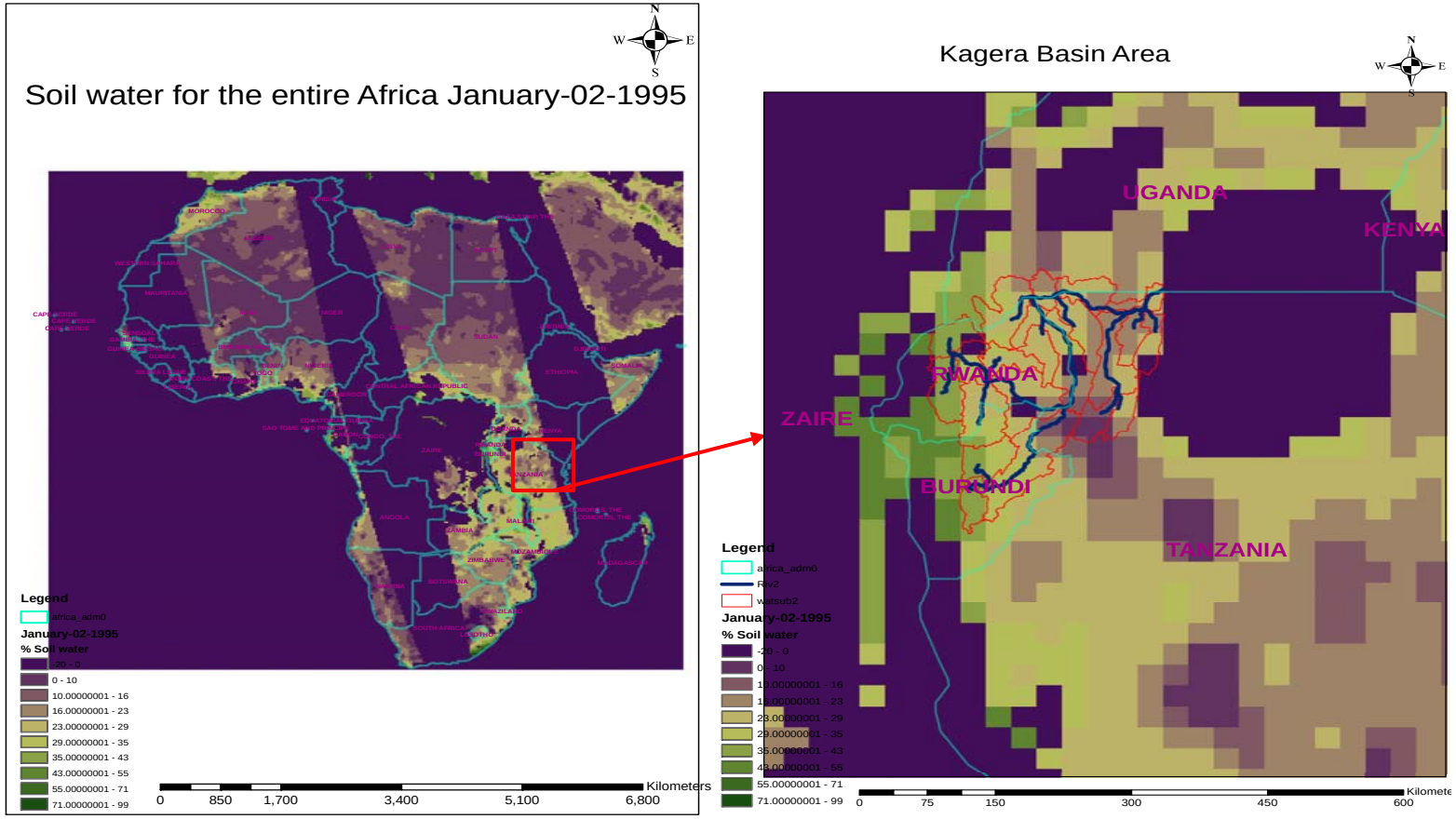
GIS/RS Data: soil water



- 25 km x 25 km
- University of Amsterdam

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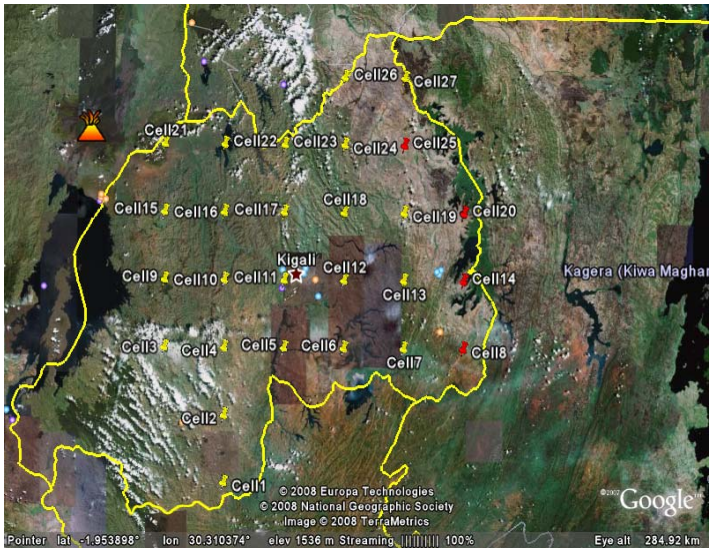
GIS/RS Data: soil water



- Wetland identification?
- Spatial resolution too low

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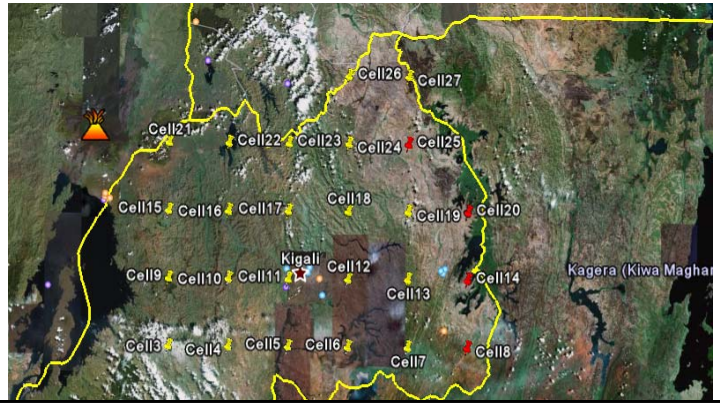
GIS/RS Data: soil water



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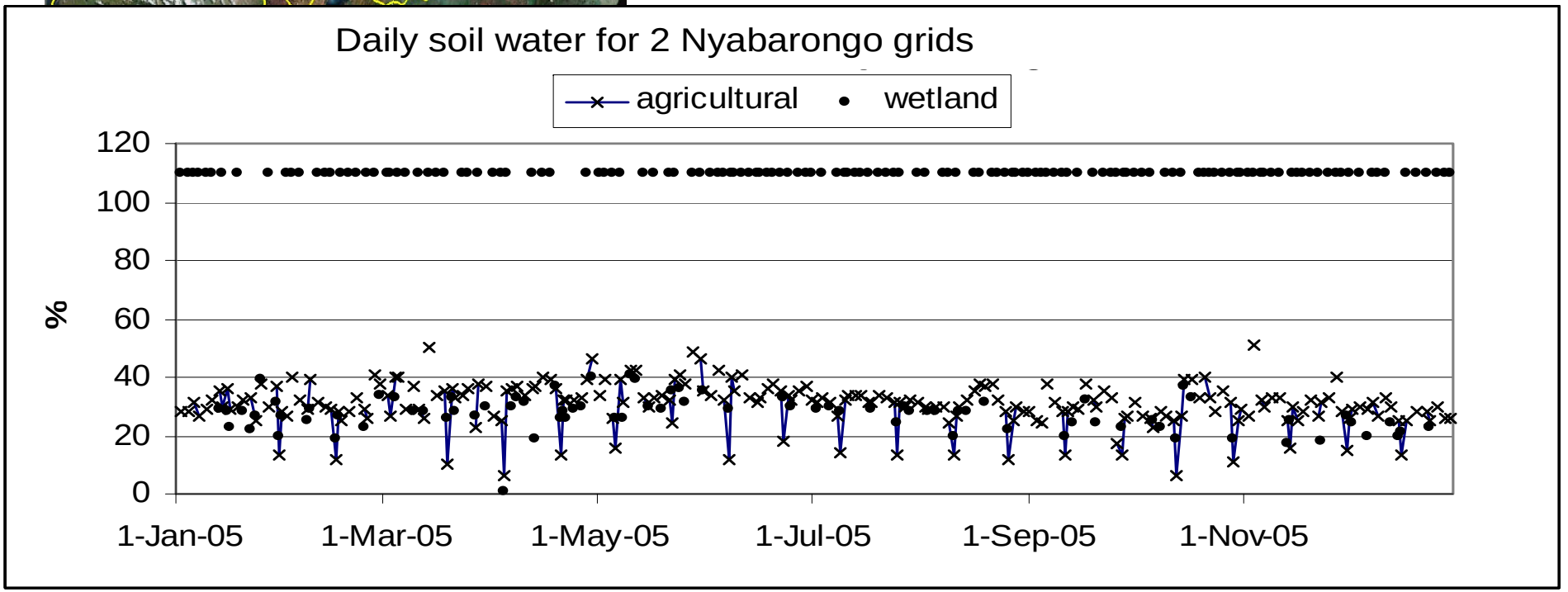

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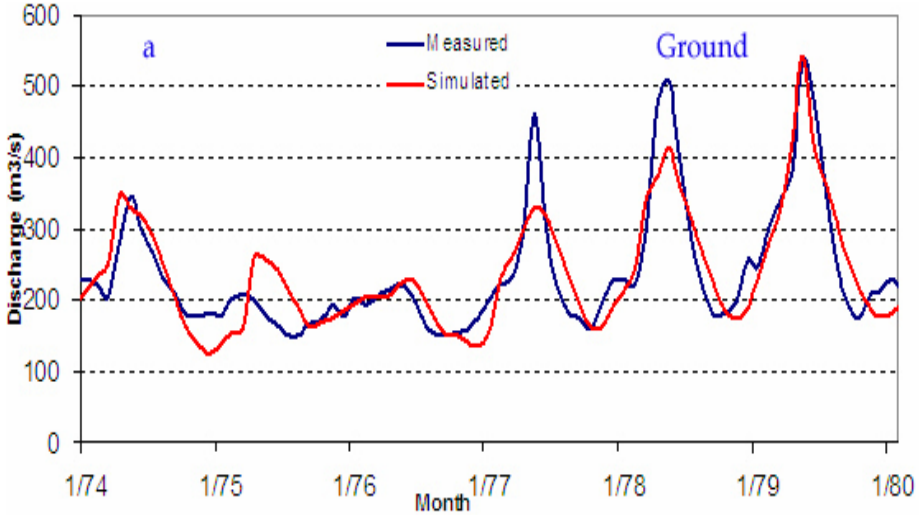
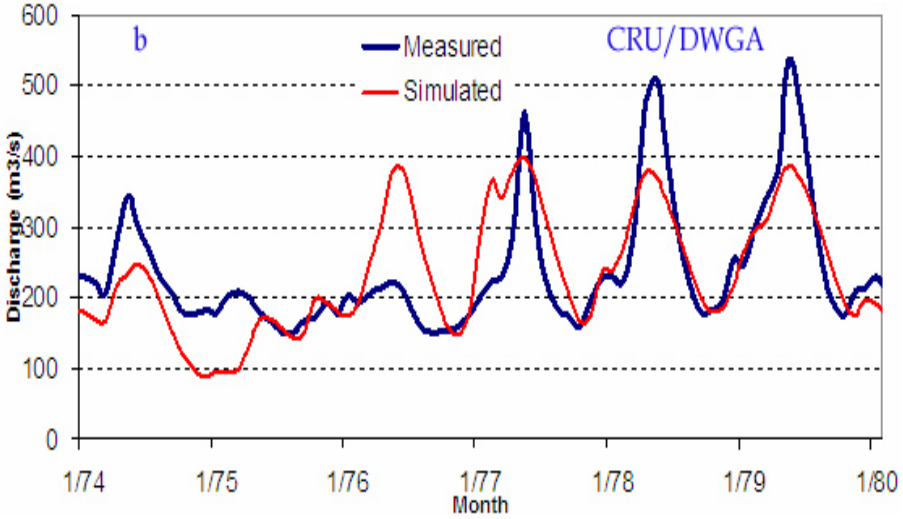
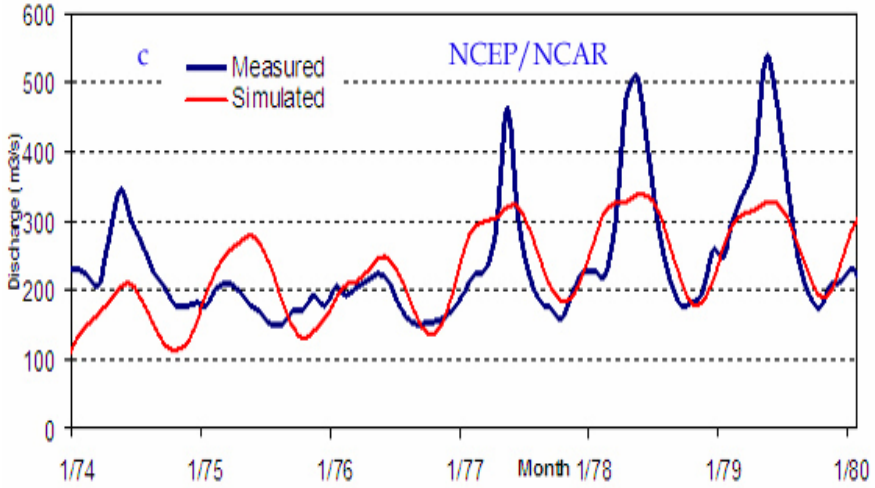
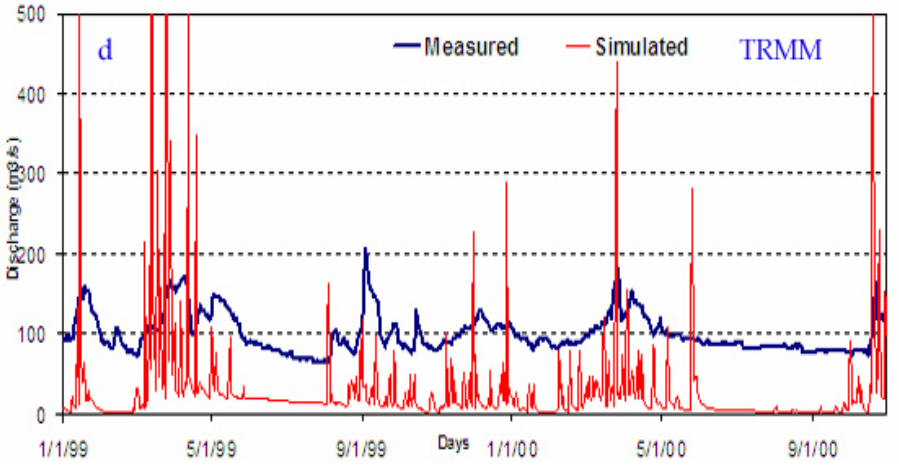
Rainfall data









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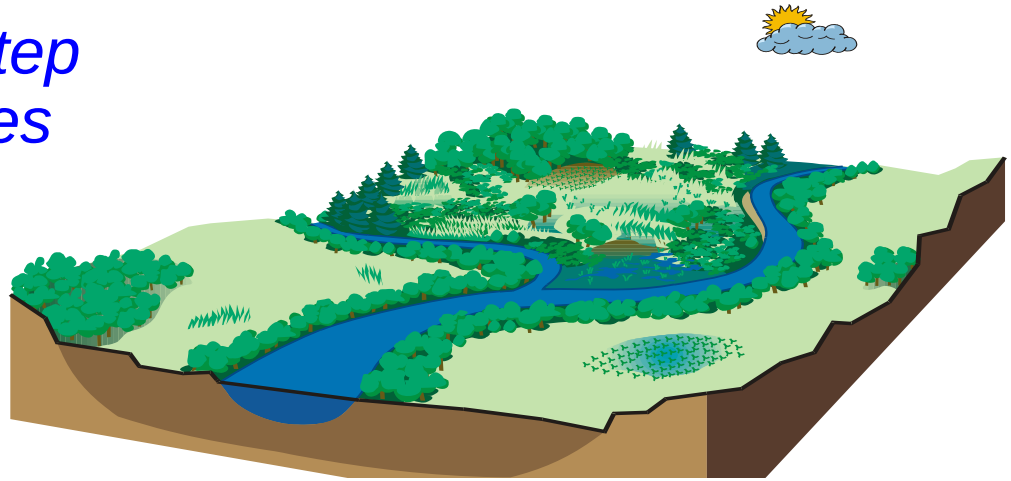
Soil and Water Assessment Tool

- Simulation of processes at land and water phase
- Spatially distributed (different scales)
- Semi physically based / empirical approaches
- Simulation of changes (climate, land use, management etc.)
- **Water quantities**, incl. different runoff components
- **Water quality**: Nutrients, Sediments, Pesticides, Bacteria, (algae and oxygen), etc.

…. all that on a daily time step and at different spatial scales and (more or less) readily available data sets!!



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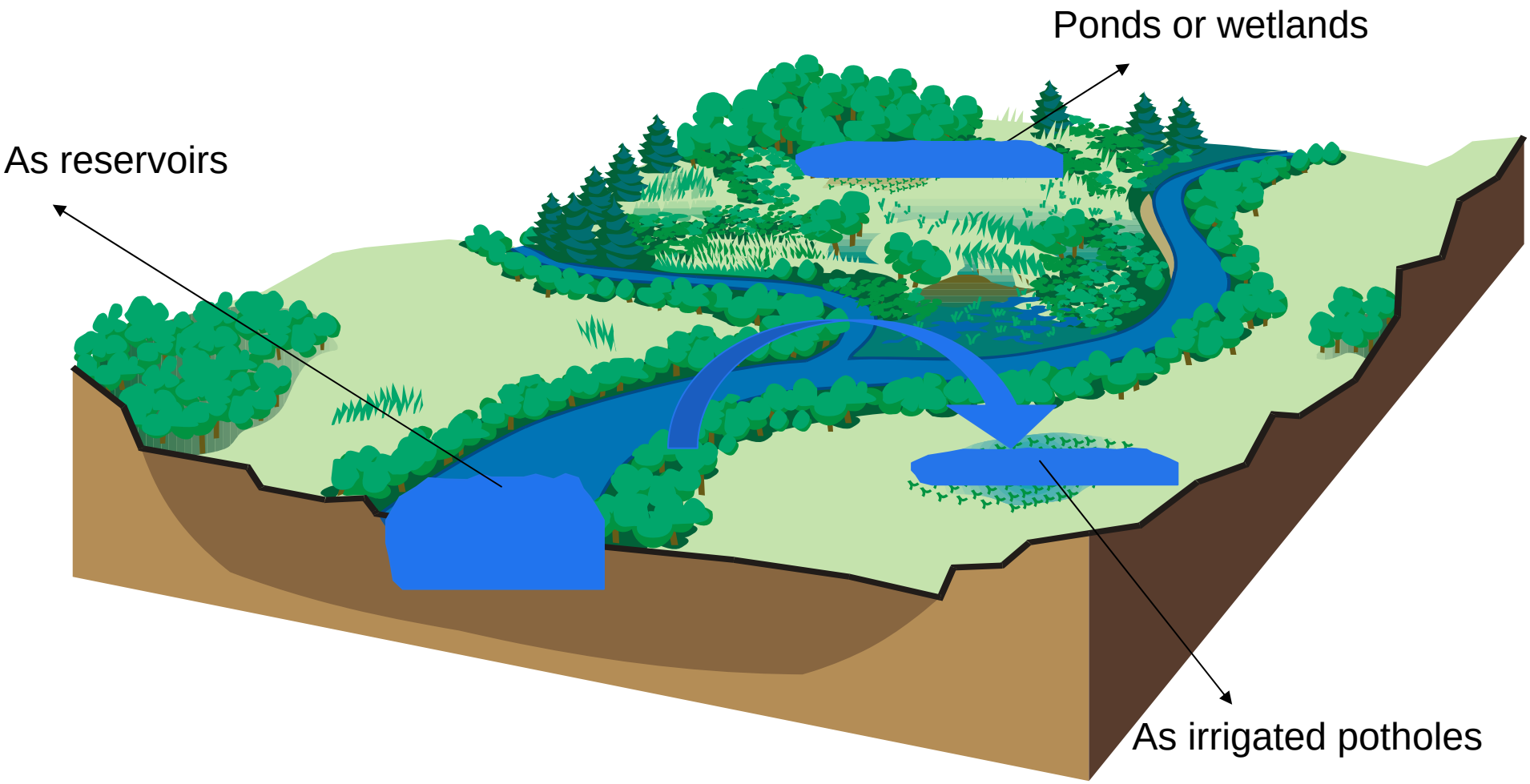
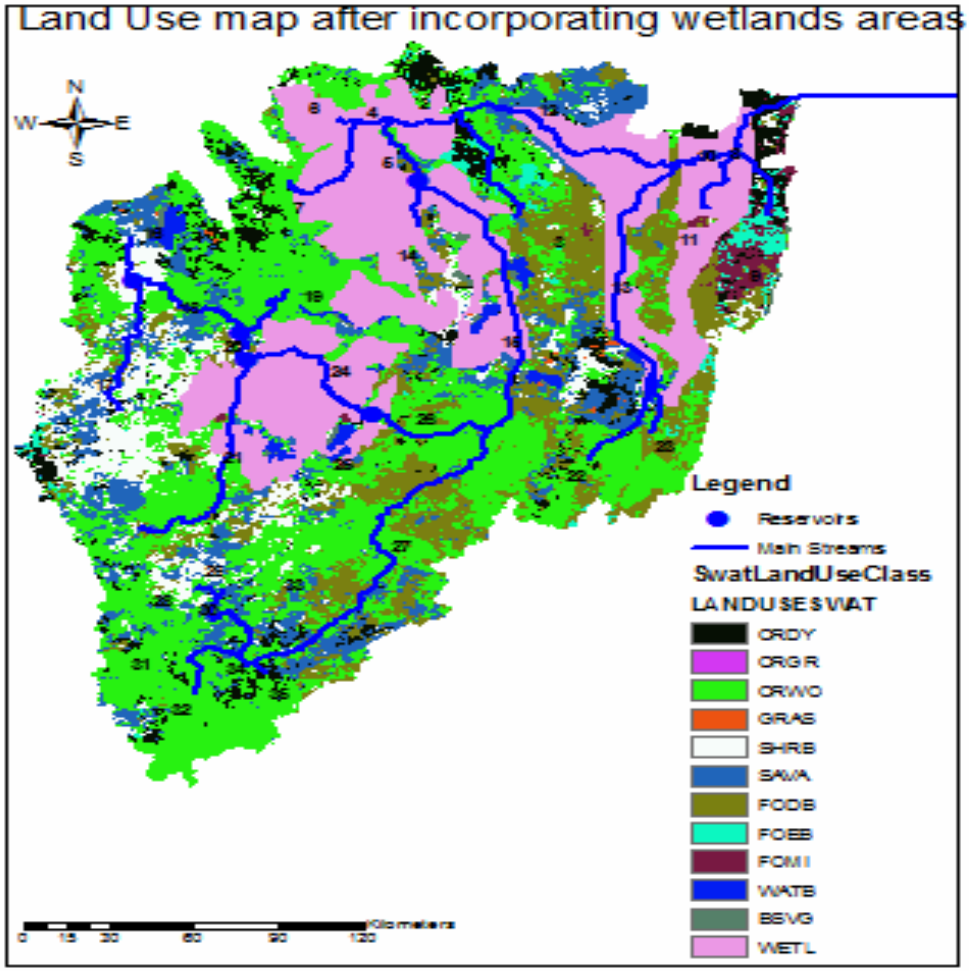
Wetland representation



New land use map

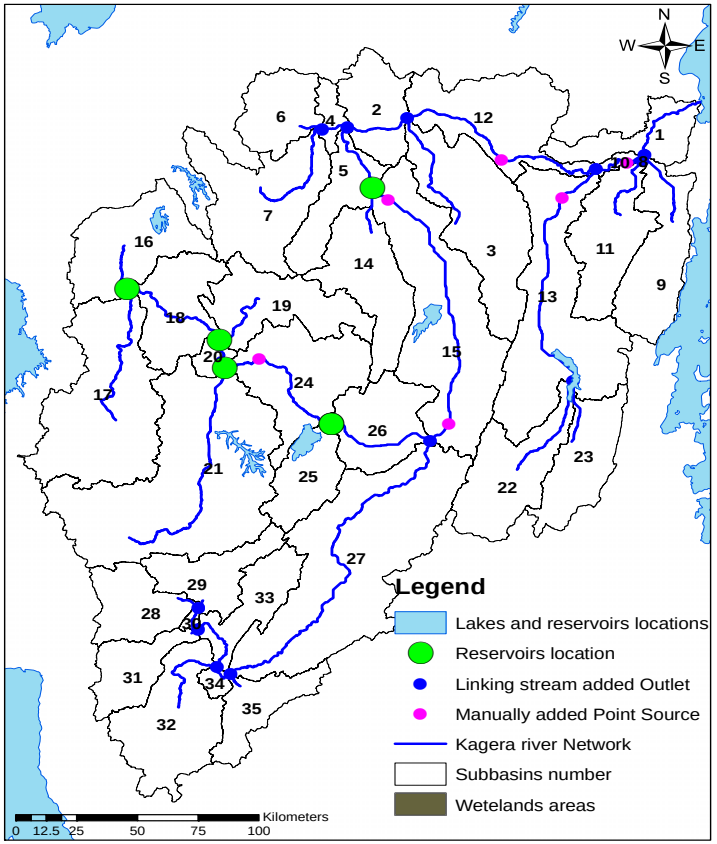
- Slope (DEM)
- Google earth



SWAT model

- Wetlands located in the south part of Rwanda, and north of Burundi, eastern part of Rwanda and West of Tanzania
- Total number of Subbasin is 35, and HRU number is 323

Wetlands delineation, including Lakes and Reservoirs



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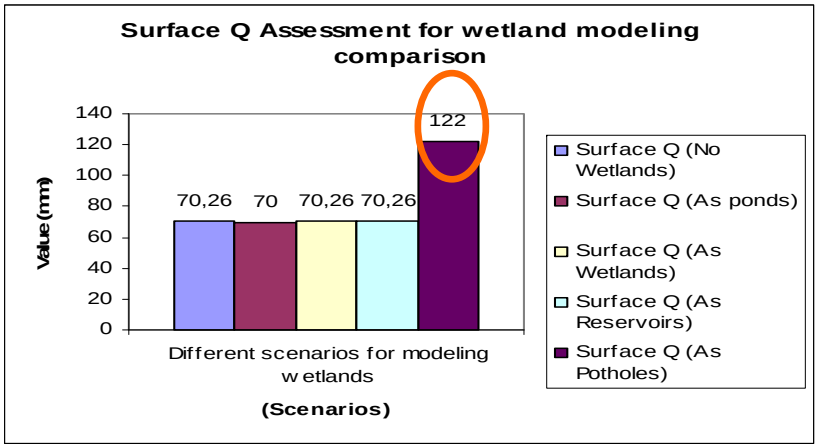
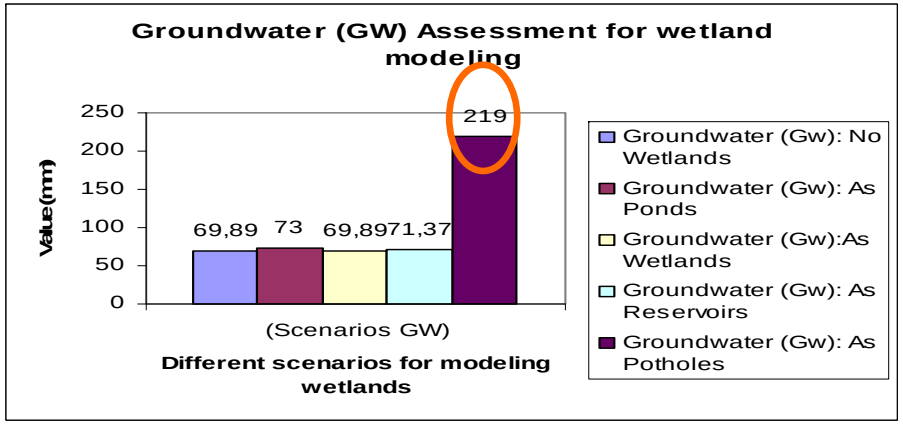
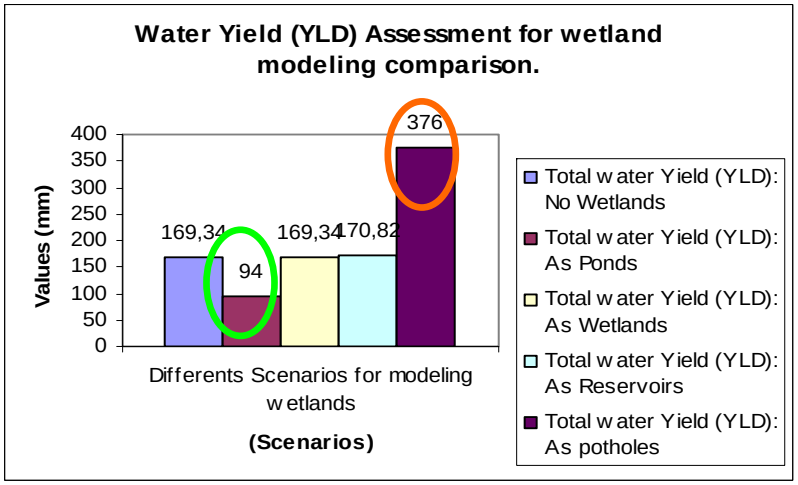
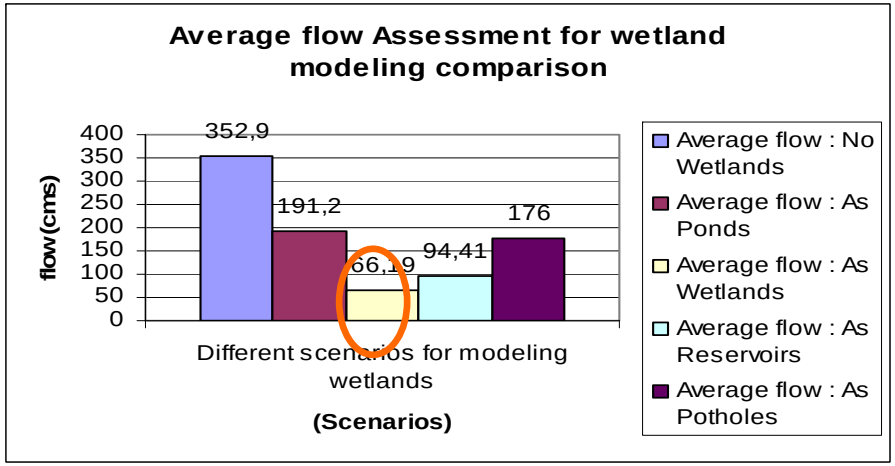
Preliminary results









Conclusion (1): RS Data

Data	Catchment	Wetland
DEM	YES	YES (slopes)
Land use map	YES	NO
Soil map	YES	NO
Soil water (25 km x 25 km)	YES/NO?	NO
Satellite rainfall data	YES/NO	-

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Conclusion (2): modelling

- Many different types of wetlands
- Different modeling concepts
- Need to link concept-type

HOW TO PAY

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Address: Martinus Nijthoflaan 1, Delft, NL
Account no: 41.22.03.960
IBAN: NL13ABNA0412203960
Account Name: UNESCO-IHE
Address: Westvest 7, Delft, The Netherlands
Reference: 60035771

Deadline for payment is September 15, 2008

LODGING

HOTELS should be reserved as soon as possible. A list will be provided on the website.

UNESCO-IHE Student Hostel offers lodging at a rate of Euro 27/night + Euro 50/person registration cost (limited availability).
If interested, please make arrangements as soon as possible: accommodation@unesco-ihe.org

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UNESCO-IHE is instrumental to the strengthening of efforts by other universities and research centres in increasing knowledge and skills of professionals working in the water sector. The 190 Member States of UNESCO will have access to the knowledge and services of UNESCO-IHE in human and institutional capacity-building, which is vital to their efforts in the achievement of Millennium Development Goals, the Johannesburg Plan of Implementation and other global water objectives. UNESCO-IHE visions a world in which people manage their water and environmental resources in a sustainable manner, and in which all sectors of society, particularly the poor, can enjoy the benefits of basic services.

The Institute executes the following functions:

- Functioning as an international standard-setting body for postgraduate water education programmes and continuing professional training;
- Building human and institutional capacities through education, training and research;
- Setting up and managing networks of educational and water sector institutions and organisations world-wide;
- Functioning as a 'policy forum' for UNESCO Member States and other stakeholders; and
- Exercising an advisory function on water education to partner organisations and other members of the UN water family.

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