

Hydrogeological System Analysis of Middle Awash Basin

By

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Supervisors:

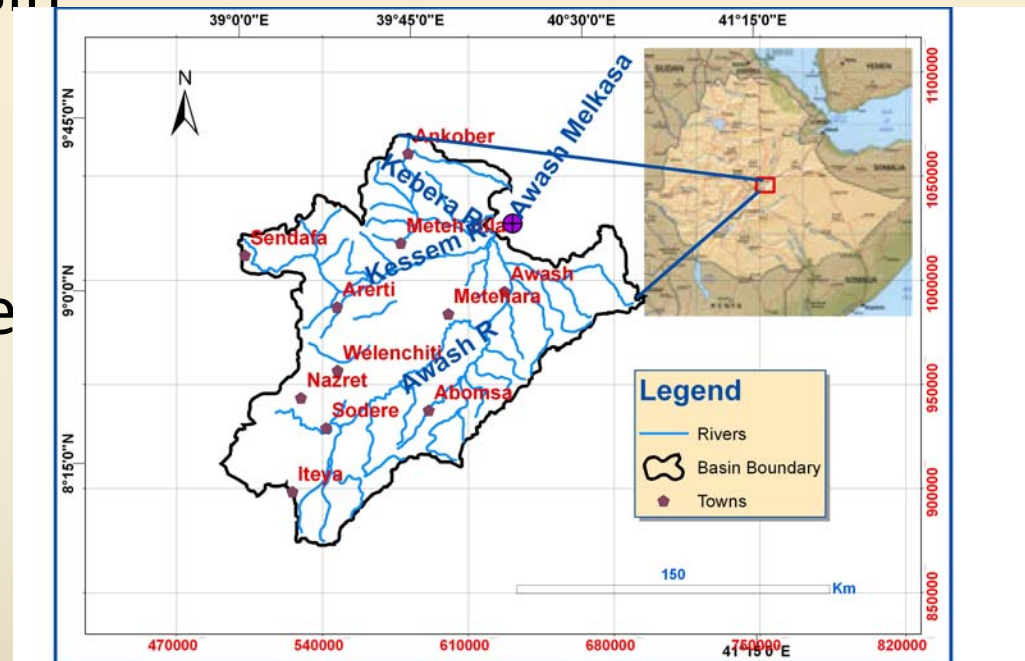
**Professor Moumtaz Razack
University of Poitiers, France**

&

**Dr. Dagnachew Legesse
Addis Ababa University, Ethiopia**

Location of the Study Area

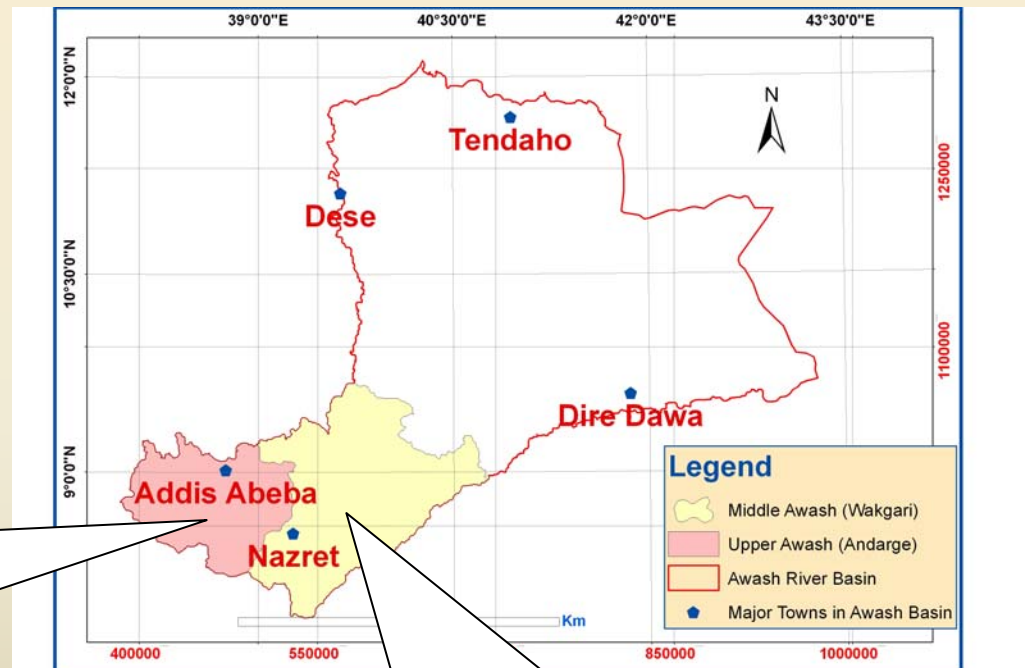
In the middle Awash basin within the geographic coordinates of $7^{\circ},50'$ to $9^{\circ},30'$ N latitude and $38^{\circ},55'$ to $40^{\circ},45'$ E longitude



Rationale for selection of the study area

1. Hydrogeological functioning

To produce detail hydrogeological map of middle Awash basin in complement with that of upper Awash basin



Upper Awash
Andarge Study Area
(Groundwater Modelling)

Middle Awash
Wakgari Study Area
(Hydrogeological System Analysis)

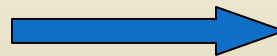
II. Demand-driven

- Groundwater becomes the main source for water supply for the area



Understand the hydrogeological systems and groundwater budget of the area for sustainable and effective use

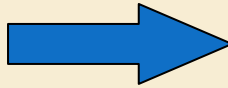
- The complex occurrence of groundwater in the area (complex rift systems)



To understand the groundwater occurrence, flow mechanism and its hydrochemical evolution process with environmental controlling (rift formation) factors

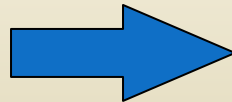
Objectives

General objective



Study the mechanism of GW recharge, GW and surface water interactions, mechanism of hydrochemical evolution, characterize and delineate the distribution of rift aquifers.

Specific Objective



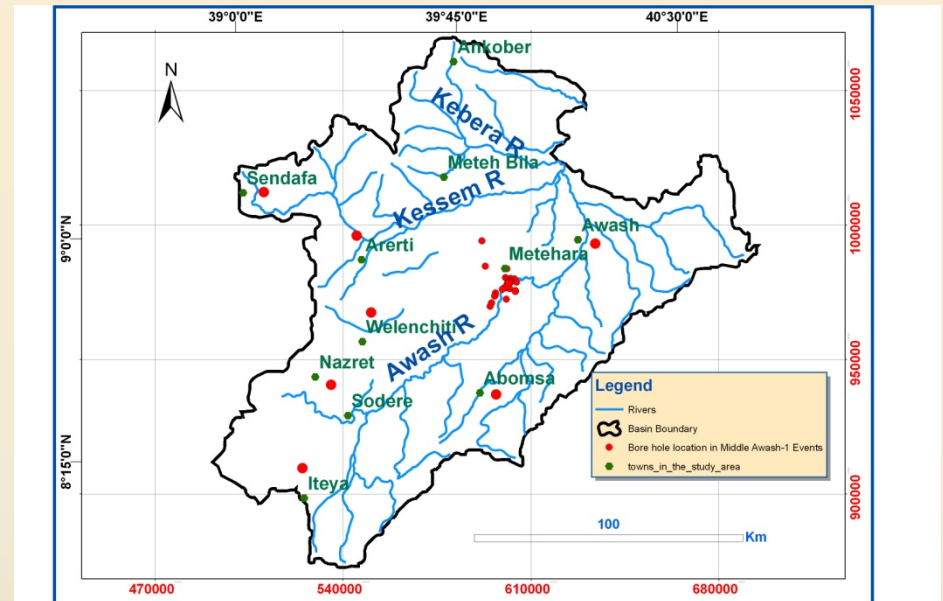
- Characterize and delineate the aquifers systems
- Describe the existing various recharges systems

Specific Objective cont 'd

- Understand the role of rift formation on groundwater hydrodynamics
- Study the interaction of groundwater with lake waters and that of the Awash River along its course
- Numerical and hydrogeochemical modeling of the groundwater system in one or more selected areas
- Analysis hydrochemistry and isotope hydrology and use the data for hydrogeological system analysis
- Analysis role of various rift faults and fractures on the movement and occurrence of groundwater

Methodology

- The research will be conducted through the application of integrated approaches using
- Borehole data
 - Groundwater level
 - Well log
 - Pump test
 - Water chemistry



Methodology Cont 'd

Generate primary data

- Infiltration rate using various scientific standards and models
- Geophysical image profiling to depict the deep underlying hydrogeological process, underlying geology and structures in some selected

Methodology cont 'd

- Systematic sampling
 - Groundwater
 - Surface water
 - Rain water
 - Soil
- Analysis of water chemistry and environmental isotope tracers to understand rock-water interaction, groundwater recharge and flow systems.

Methodology cont 'd

Use remote sensing and GIS

- To estimate evapotranspiration and recharge condition
- Delineate land cover, land use
- Identify geological structures that will have significant role in groundwater hydrodynamics



Resources for the research

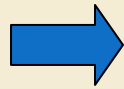
Will be covered by CIFEG under the frame work of MAWARI transect project of the Ethiopian component.

Research Period

The expected duration of the research is three years starting from October 2007.

Research output and Application

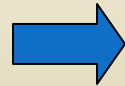
Output:



Produce detail hydrogeological Map of Middle Awash Basin with a scale of

1:400,000

Application



Useful for sustainable and effective use of the groundwater resource



Thank you!!!