

URAdapt

Managing Water at the Urban-Rural Interface: The key to climate change resilient cities

1. Brief recap of project
2. Project progress

IWMI - Addis, 24 February 2011



CC and the city within the basin

Central questions:

- What consequences will climate change have on water resource availability?

Changes outside the city boundaries that affect the city

- What influences urban growth and how do urban growth scenarios affect water needs and wastewater generation ?
- What consequences will CC have for wastewater disposal and management

How city impacts go beyond the urban boundary

Existing constraint : inability to meet even current water demands and wastewater management needs

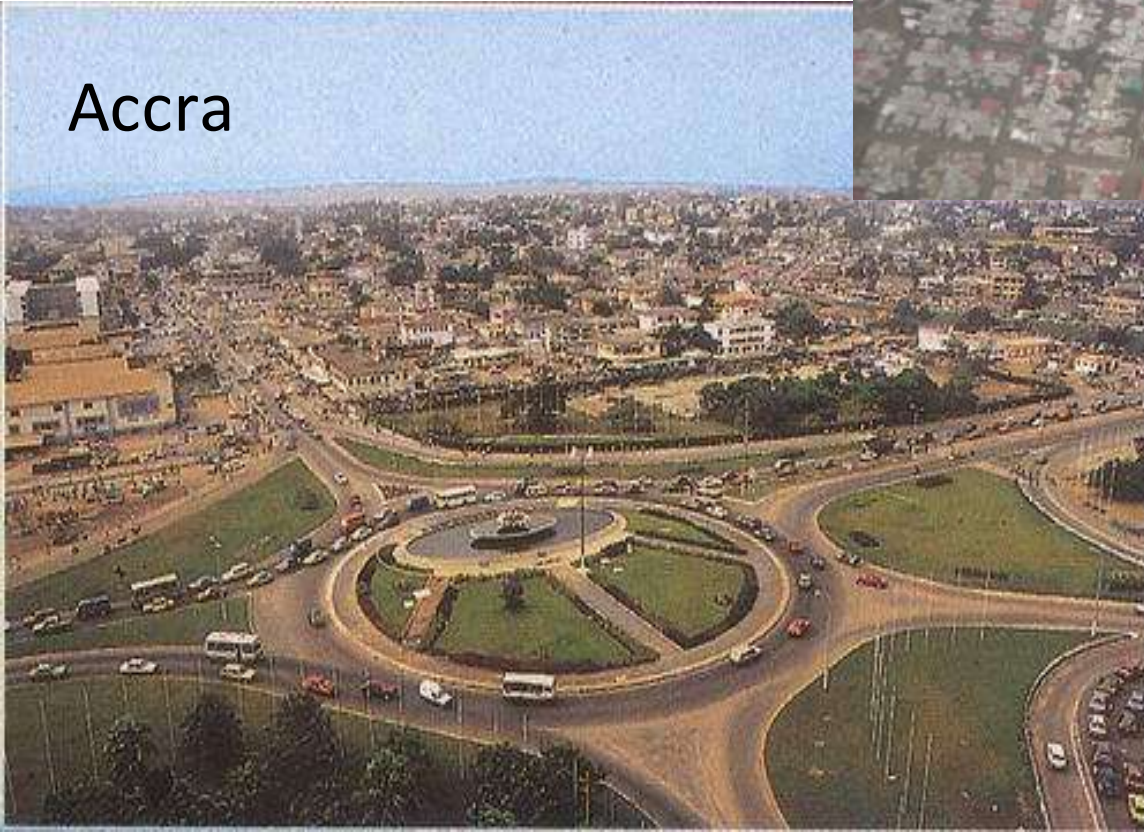
Existing vulnerability of the city which may be exacerbated by CC

Project

Addis



Accra

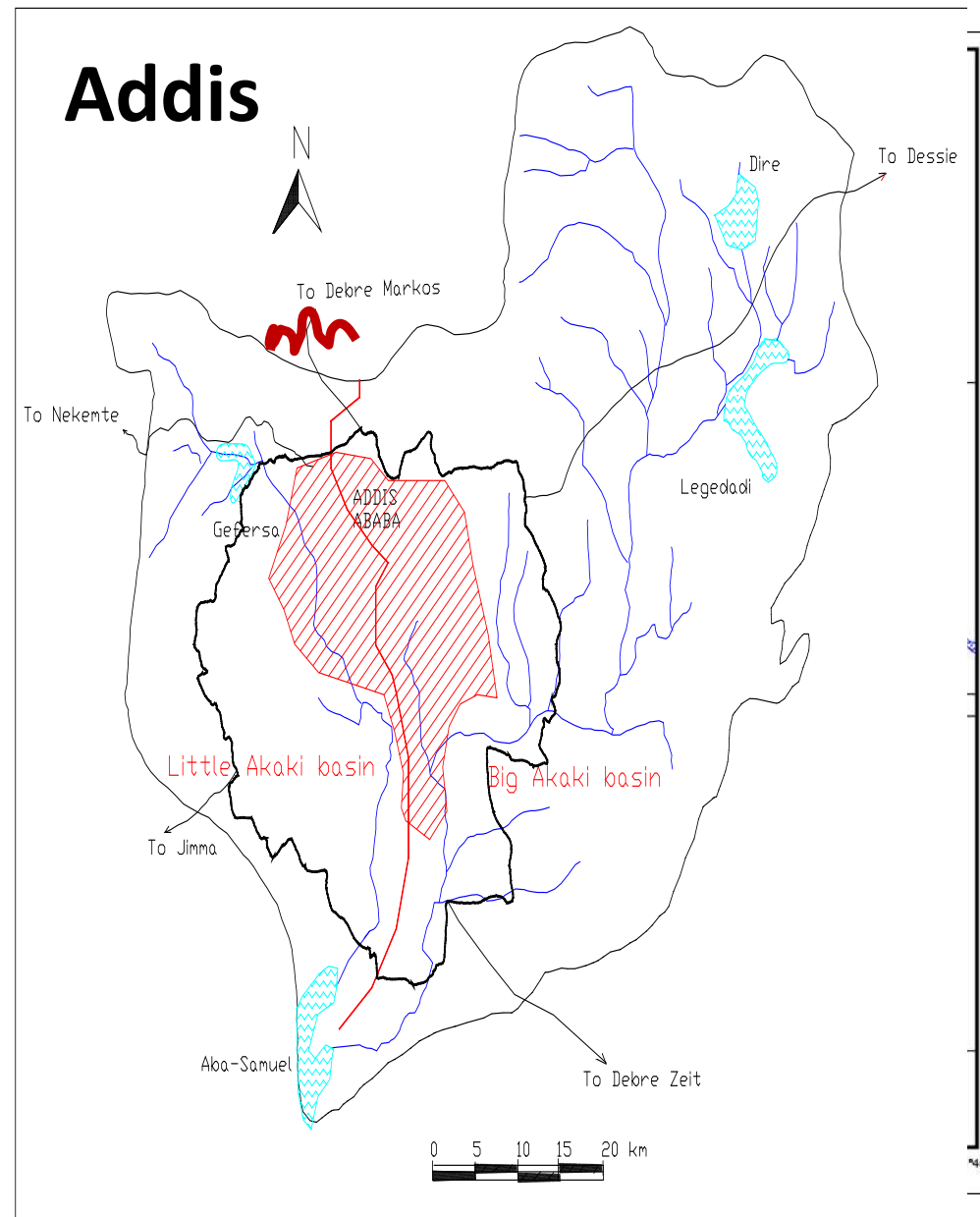
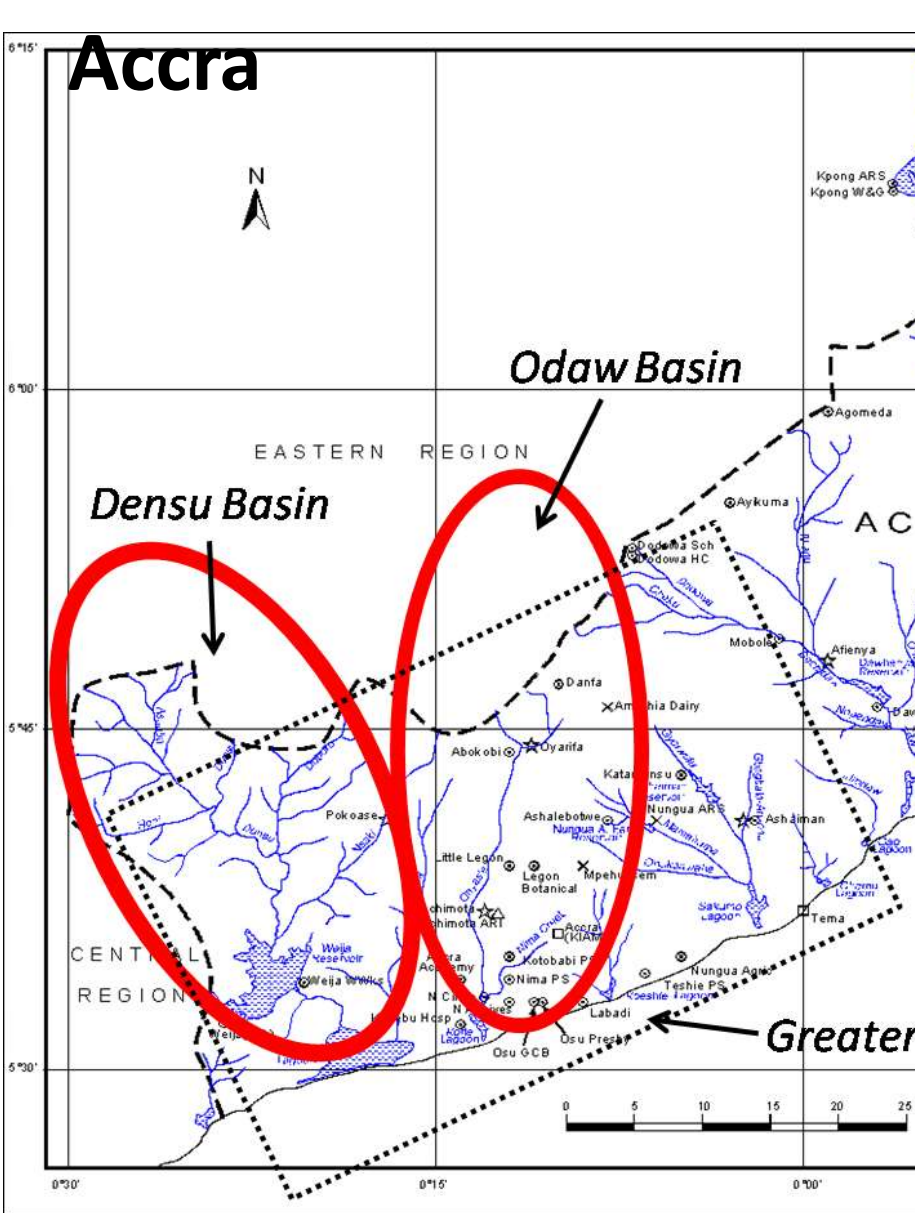


locations

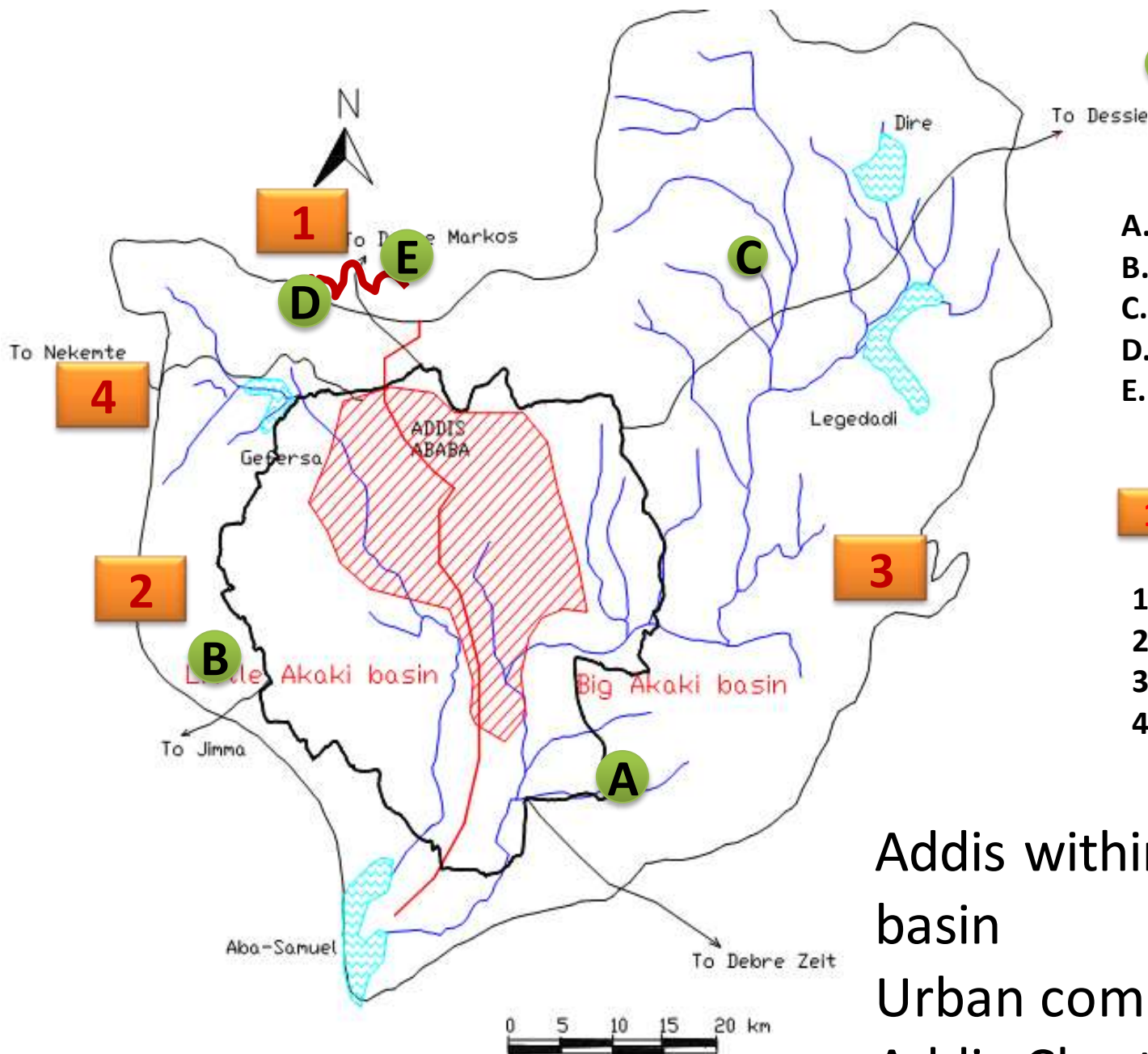
Objectives and Outputs

1. shared understanding of climate change and urban water amongst multiple SH
2. generate new knowledge using scenarios
3. a city level strategic action plan for adapting to climate change

- Interactive platform to move from Research to Strategic Action [[promoting a culture of adaptation planning for CC and water resources](#)]
- Hydrological scenarios of water availability, wastewater generation, and implications for agriculture
- Decision support for investment in integrated urban development
- Policy and institutional orientations on how to build climate resilient cities



Comparing and contrasting Accra and Addis



A Urban Centers Around Addis

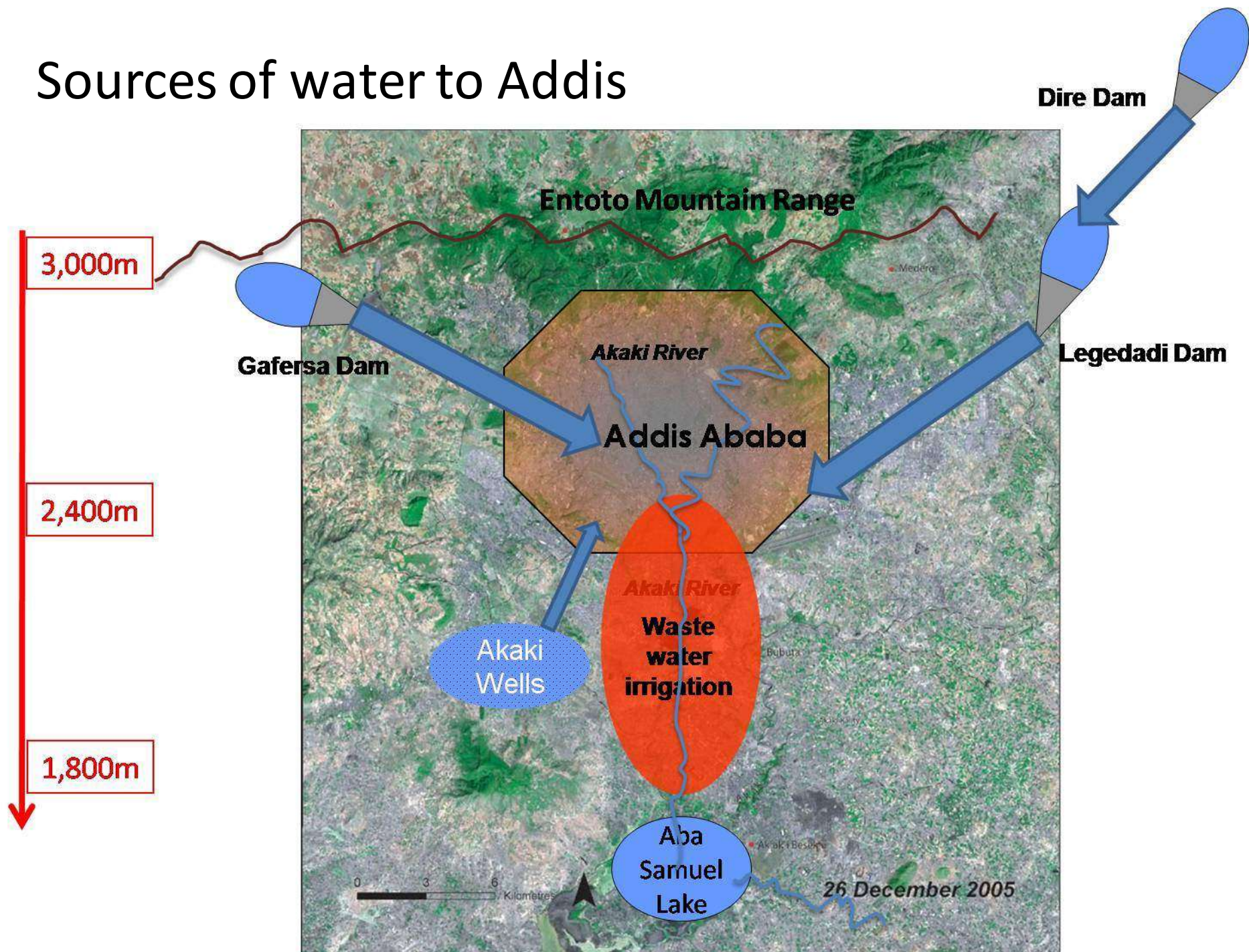
- A. Gelane/Dukem
- B. Sebeta
- C. Legetafo
- D. Burayou
- E. Sululta

1 Peaks (m/asl)

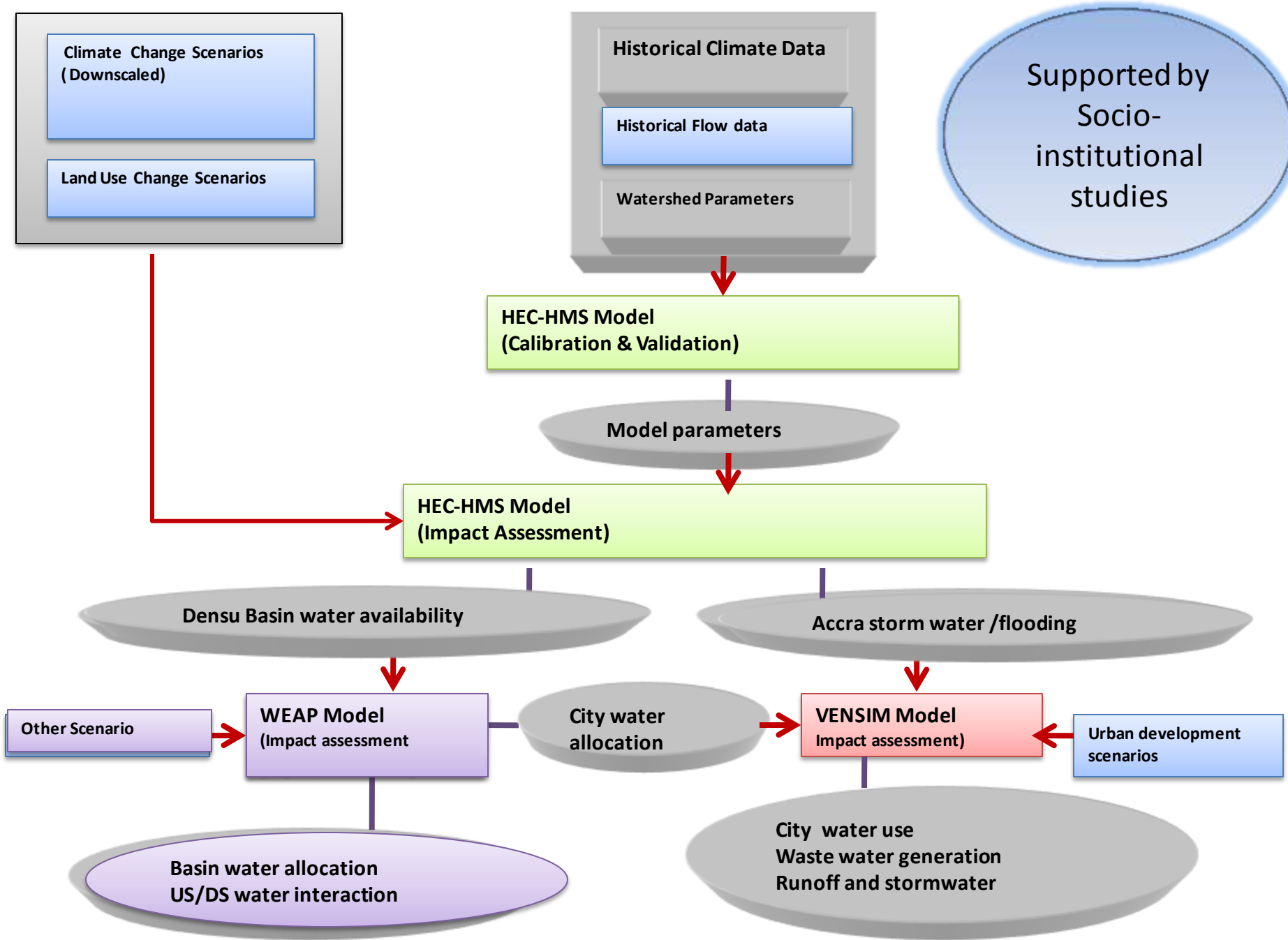
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2. Wechecha	3385
3. Yerer	3100
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Addis within the Akaki basin
Urban complexity -
Addis Charter

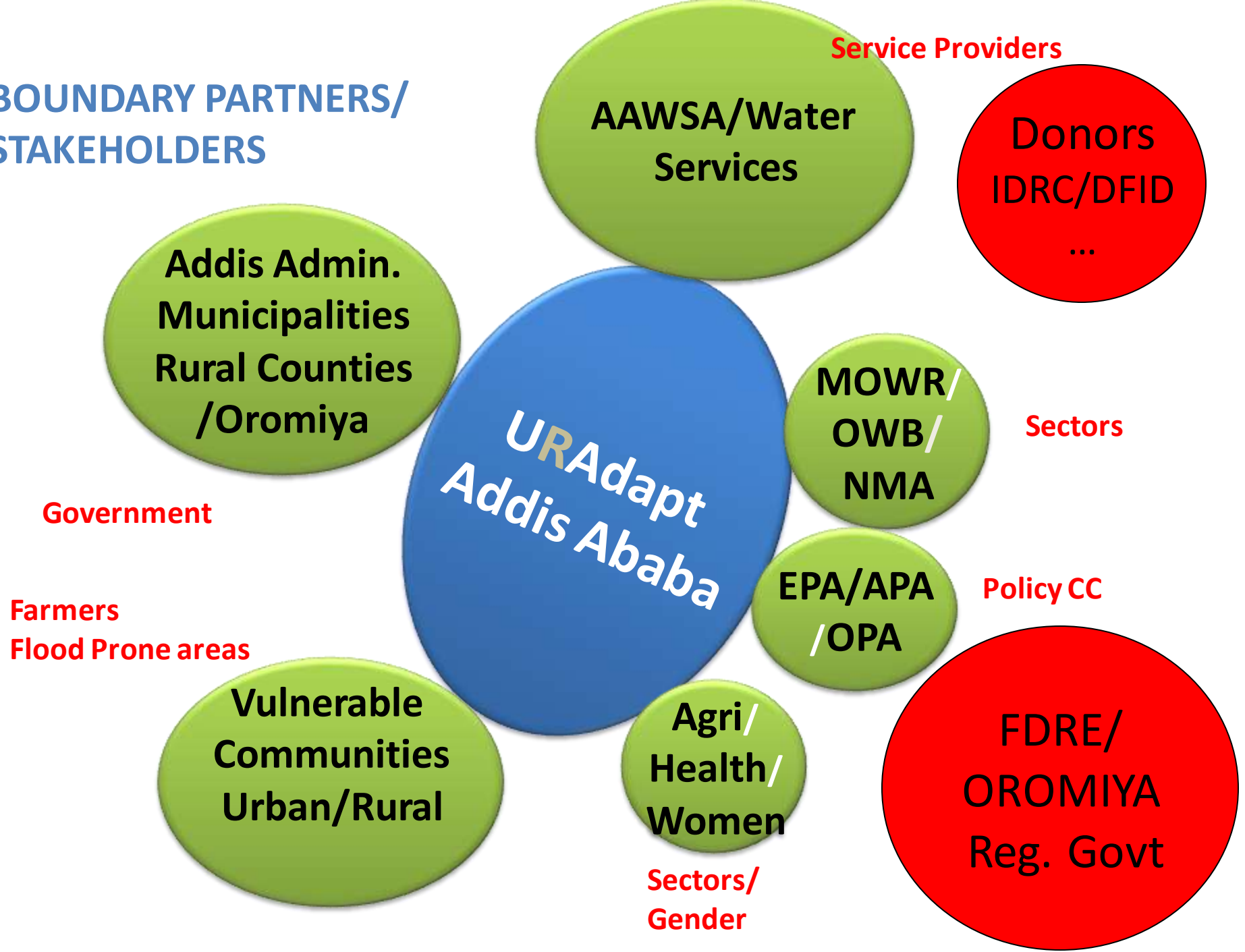
Sources of water to Addis



Hydrological Modelling Framework -- Accra



**BOUNDARY PARTNERS/
STAKEHOLDERS**



Re-SAP /GROUP(Core/Large)

CORE	LARGE
<ul style="list-style-type: none">▪ AAWSA▪ Oromiya Water Bureau▪ Ministry of Water Resources /Water and Energy/ Environmental Protection Agencies	<ul style="list-style-type: none">- Administration- National Metrology Agency- Agriculture Bureaus- Health Bureaus- Women Affairs- Vulnerable Communities- NGOs

Addis Abeba

Project Status

- Stakeholders identified
- Inception workshop carried out (**April 12/2010**)
 - Baseline Survey Framework Prepared
 - Data Collection Checklist Prepared
 - Research Topics Identified
 - Some Researches Completed/Started

PROJECT STATUS...

- Second Re-SAP workshop carried out (**August 05/2010**)
 - Baseline Survey Started
 - Further Data Collection Checklist Prepared
 - Research Topics Assigned to Master's Students
/Proposal Due for Sept 23/2010/ - Refer Next Slides

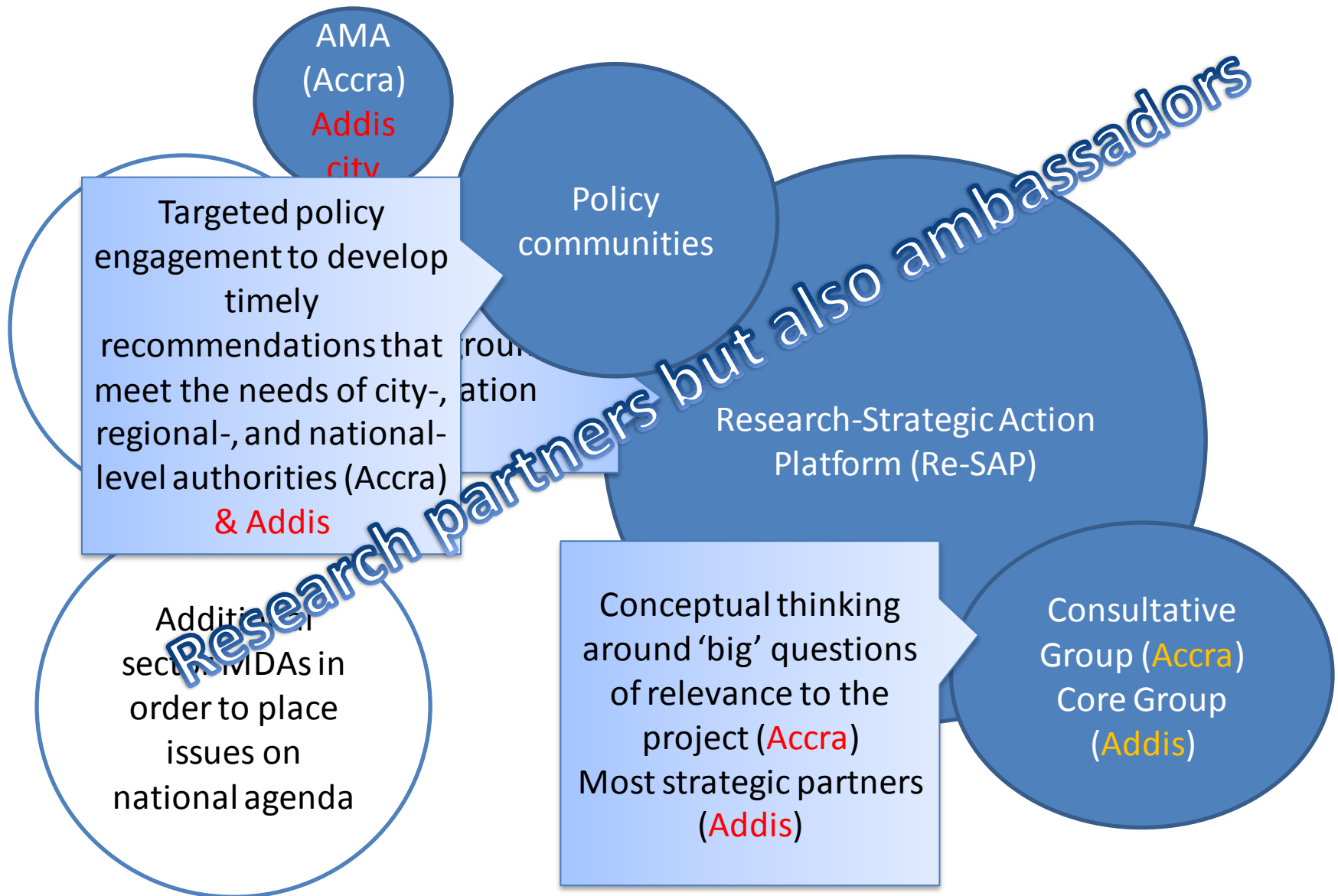
Summary of Research Topics and Themes

No.	Research Theme	Research Topic
I	Downscaling Future Climate Change <i>Leader: Dr. Semu</i> <i>Researcher: Semu & M.Sc Students</i>	1.1 Downscaling Climate Change in AA Area to Assess Climate Change Impacts on Water Availability and Extreme Hydrological Condition of Addis Ababa and its Surroundings (Ongoing) 1.2 : Sensitivity Analysis of the various parameters of the downscaling model that affects the accuracy of the model output 1.3 Comparative Analysis of Water Supply from Surface and Groundwater Sources for the City of Addis and its Surrounding (Current/Future) with and without climate change scenario (Ongoing)
II	Climate Change and Water Availability <i>Leader: Dr. Semu</i> <i>Researcher: Semu, Geremew & M.Sc Students</i>	
III	Climate Change and Water Quality <i>Leader: Dr. Semu/Geremew</i> <i>Researcher: Geremew & M.Sc Students</i>	3.1: Evaluation of the current and future water quality situation of Addis and its surrounding with and without climate Change Scenario

Summary of Research Theme and Topics

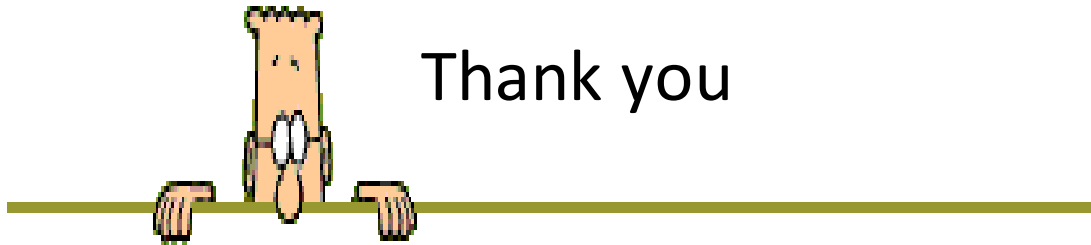
No.	Research Theme	Research Topic
IV	Climate Change and Dynamics of Urban-Rural Interaction <i>Leader: Geremew</i> <i>Researcher: Geremew, Semu & M.Sc Stud.</i>	4.1: Evaluation of current and future Urban-Rural water interactions: A case of Addis and sprouting towns around (assigned –progress slow)
V	Climate Change, Water Management and community <i>Leader: Geremew</i> <i>Researcher: Geremew, Daan & M.Sc Students</i>	5.1: Evaluation Water/Waste water manage aspects of with and without Climate change scenario - VENSIM Approach (ongoing) 5.2: Mapping of vulnerable groups and climate change hot spots: A case of Addis and surrounding areas 5.3: Water conservation and Demand Management
VI	Climate change and Institutions, Policy and Governance structures <i>Leader: Geremew</i> <i>Researcher: Geremew & Dr. Alebel</i>	6.1: <i>Assessment of current and future institutional, Policy and Governance Aspects of interacting Urban-Rural communities</i> (started) 6.2: <i>Evaluation of IWRM approach for Sustainable Urban-Rural interaction under climate change scenario</i> 6.3 <i>Economic Impacts of Climate Change</i>
VII	Climate Change and Storm water Management <i>Leader : Dr. Semu</i> <i>Researcher: Semu & M.Sc Students</i>	7.1 <i>Impact of Climate Change on Urban Drainage</i> (ongoing?) 7.2 <i>Impact of Built-up Environment on Run-Off Generation</i> (ongoing?)

Project interactions and interfaces



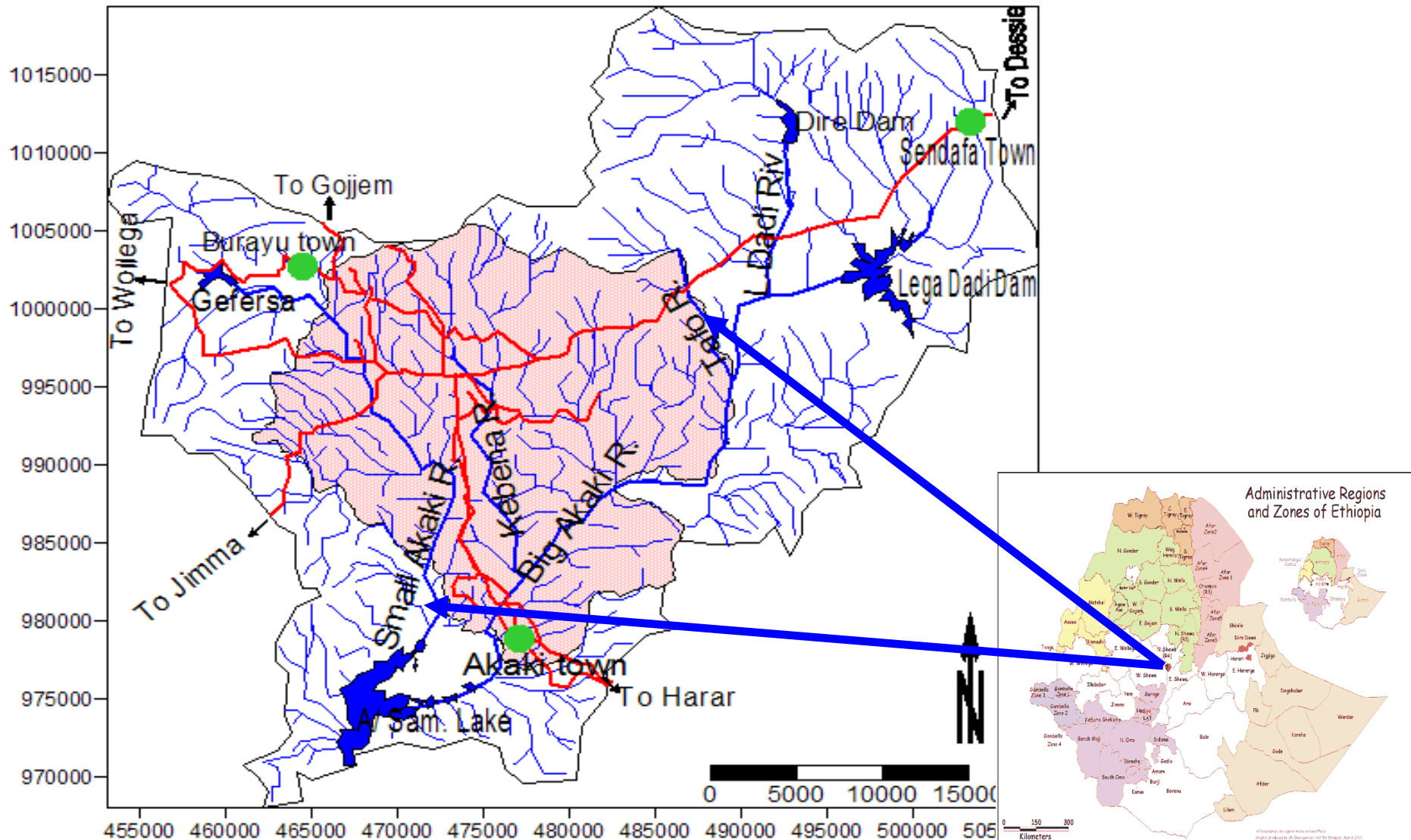
Keep up-to-date through our website:

<http://uradapt.iwmi.org>



**DOWNSCALING CLIMATE CHANGE AA
AREA TO ASSESS CLIMATE CHANGE
IMPACTS ON AVAILABILITY AND EXTREME
HYDROLOGICAL CONDITION (ONGOING)**

Study Area, Addis Ababa and surrounding



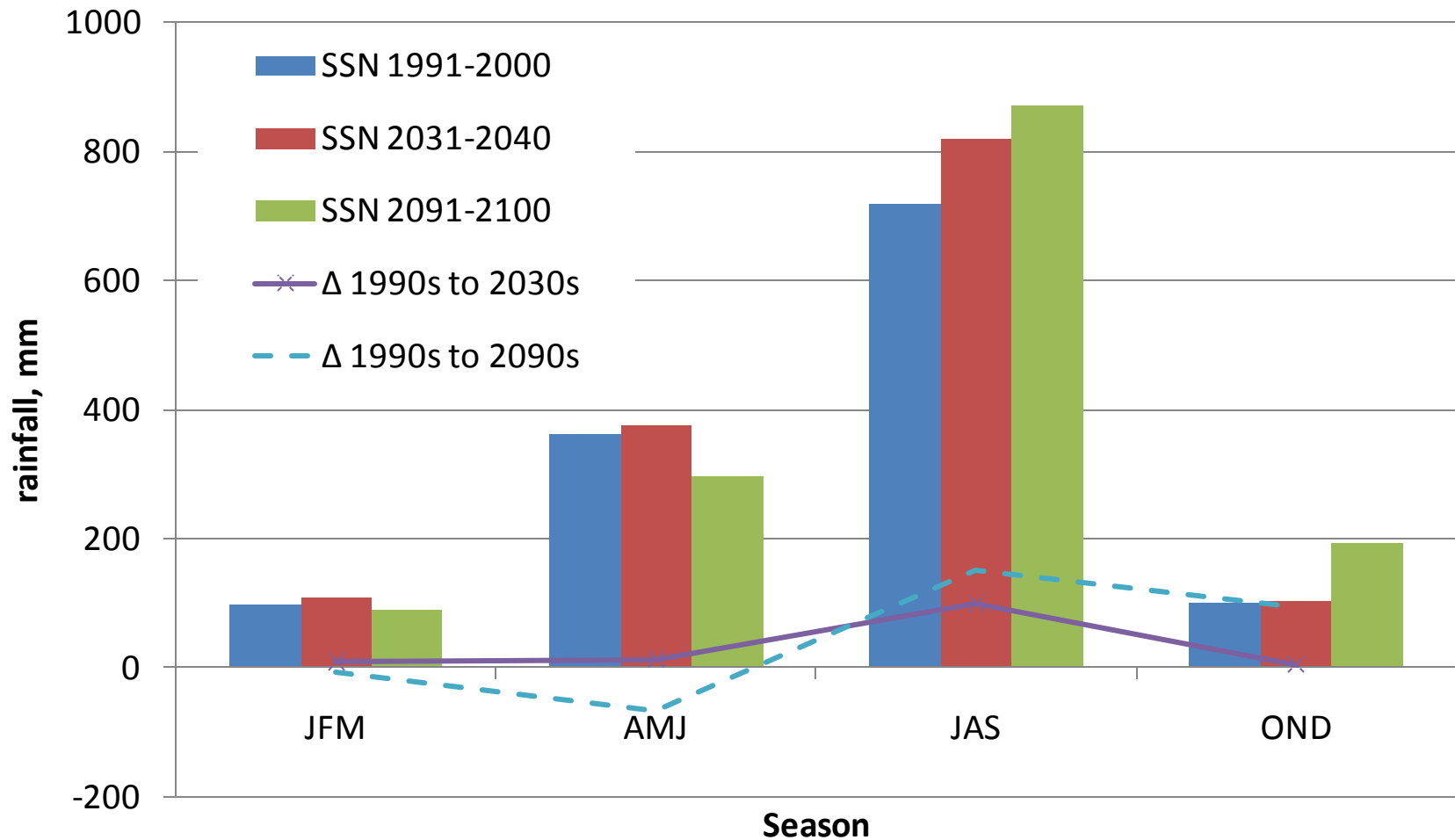
Objective of the Study

- Future climate change Scenario for Addis Ababa and Surrounding areas
 - ▣ GCM → RCM → LOCAL MODELING
- Water availability from surrounding Rivers under various climate change scenarios
- Extreme hydrological conditions including flooding (flood areas and extent) under various CC scenarios
- HEC-HMS CALI/VERIFICATION -> RUNOFF OUTPUT UNDER DIFFERENT CC SCENARIO

Results

- The model provides future scenario output for surface and atmospheric parameters
 - Precipitation
 - Temperature (mean, max and minimum)
 - Relative humidity
 - The wind speed at 10 m

Seasonal rainfall



Result shows

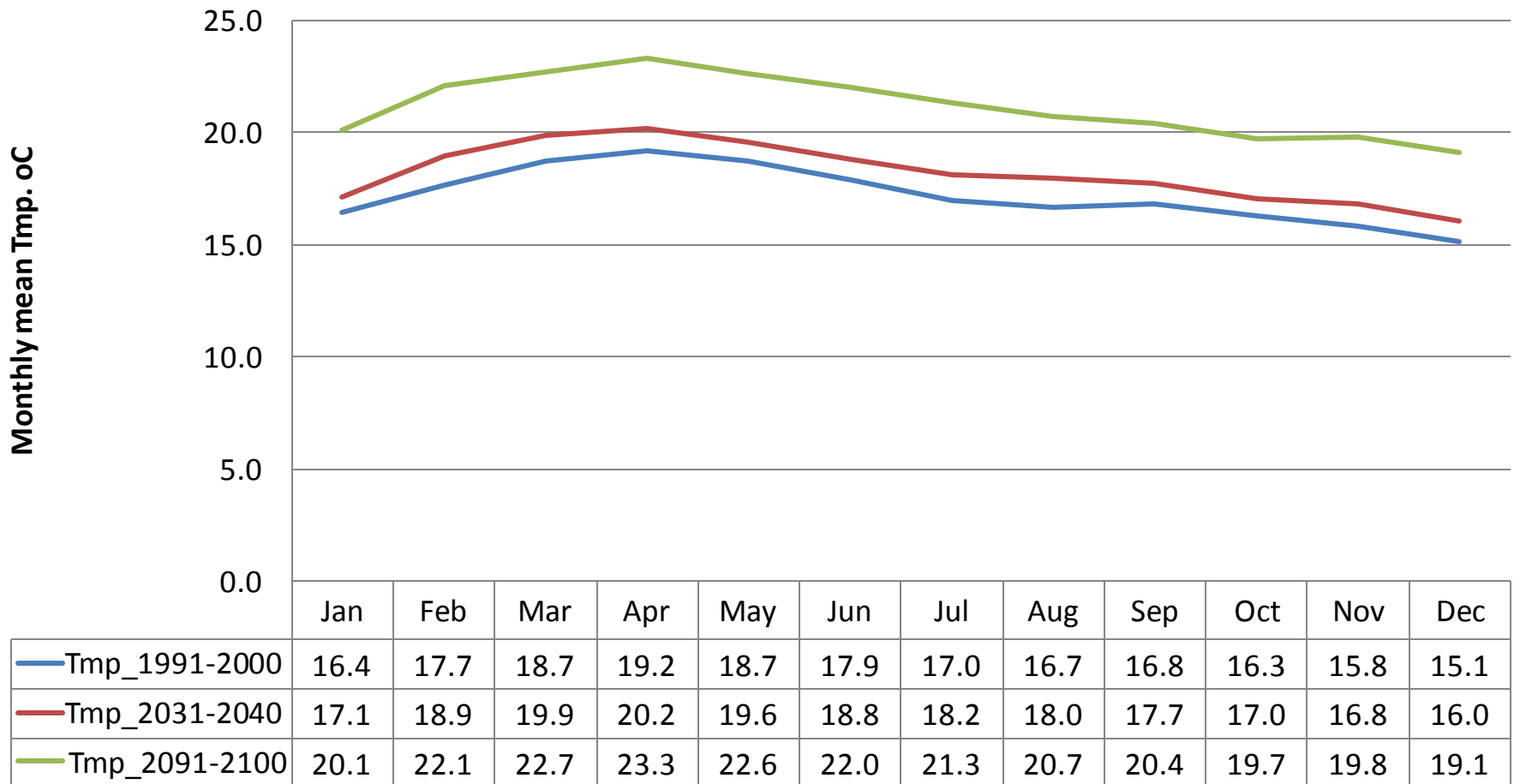
- Highly likely **increase of rainfall** during the rainy season **(July-August-September)** consistently in **2030s and even in 2090's**
- Significant **reduction** of rainfall during season **April-May-June**
- Significant **increase of rainfall** during the seasons of **Oct-Nov-Dec**
- In terms of annual volume, there will **increase of total rainfall annually**

What does it mean?

- *Likely increase of flooding and community vulnerability to flood damage?*
- *Likely change the way we design our drainage structures*
-
- *Need multi-disciplinary professions in the detection of impacts and adaptation*

Seasonal Temperature

Temperature scenario in 1990's, 2030's and 2090's



Remarks about Temperature

- Consistent increase of temperature as predicted by **IPCC – 0.370c/dekad**
- Relatively no much change in terms of seasons
- What does it mean in terms of real life on the ground????
 - *Movement of malaria to highland areas like Addis Ababa*
 - *More water consumption*
 - *More energy consumption*
 - *Change in biota of the study area*