URAdapt

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

Water supply–demand management for GAMA in light of climatic and non-climatic drivers

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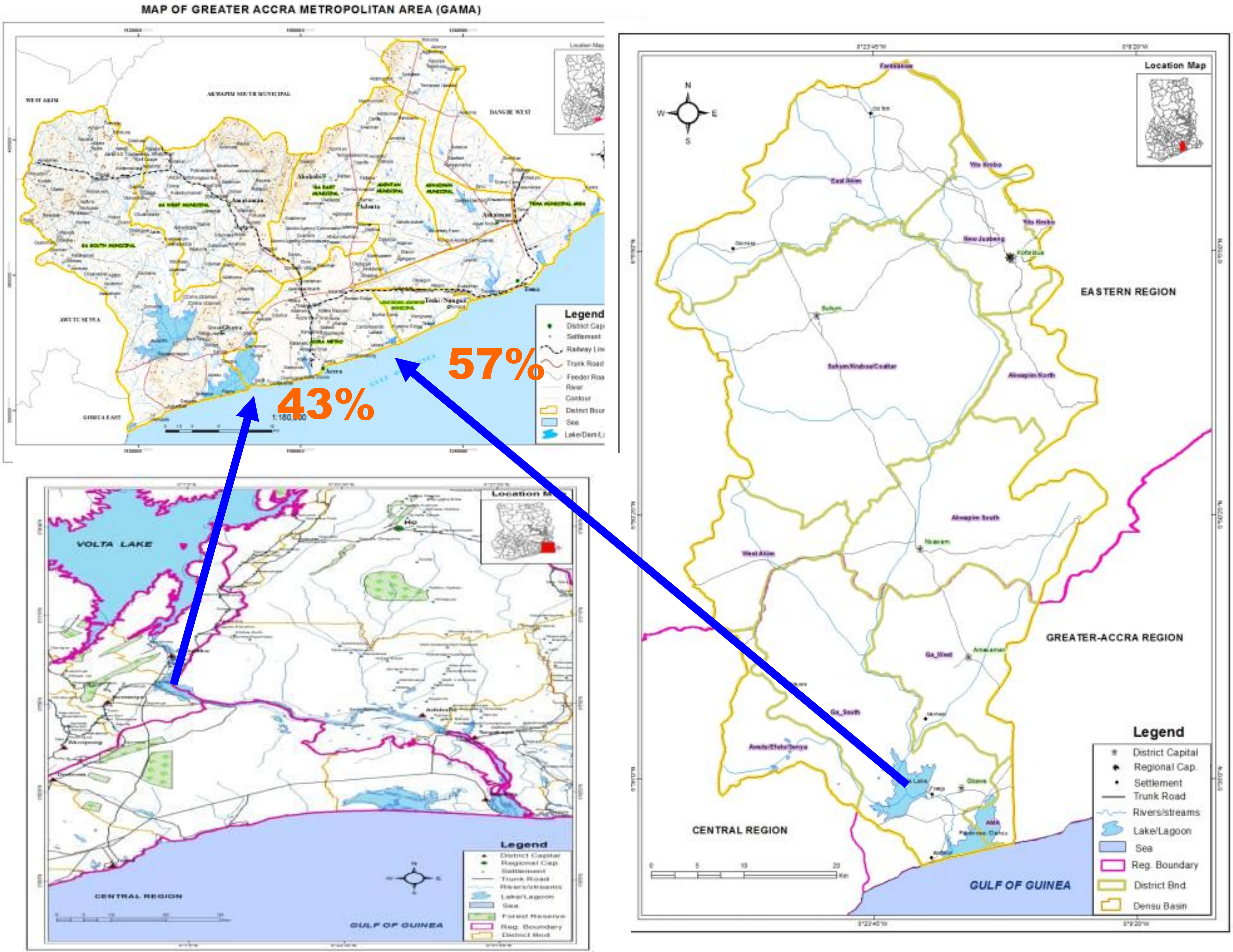
POLICY ROUNDTABLE-ACCRA
Coconut Grove Hotel, Nov. 30, 2012

Funder


MAP OF GREATER ACCRA METROPOLITAN AREA (GAMA)
57%
43%
Legend
District Cap
Settlement
Railway Lin
Trunk Road
Feeder Roa
River
Contour
District Boun
Sea
Lake/Dam/L
VOLTA LAKE
CENTRAL REGION
GULF OF GUINEA
Legend
District Capital
Regional Cap.
Settlement
Trunk Road
Rivers/streams
Lake/Lagoon
Sea
Forest Reserve
Reg. Boundary
District Bnd.
Location Map
EASTERN REGION
GREATER-ACCRA REGION
CENTRAL REGION
GULF OF GUINEA
Legend
District Capital
Regional Cap.
Settlement
Trunk Road
Rivers/streams
Lake/Lagoon
Sea
Reg. Boundary
District Bnd.
Densu Basin

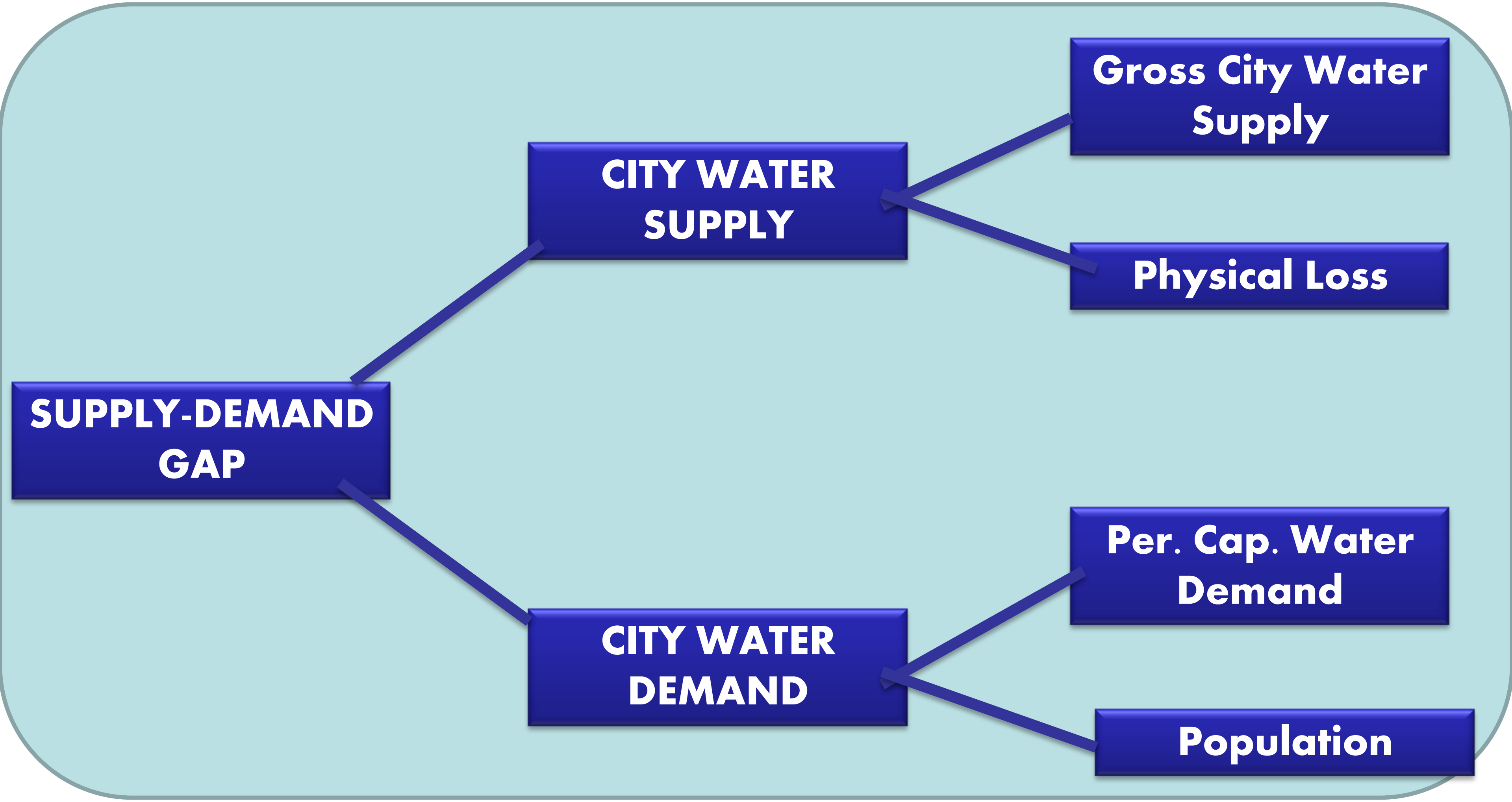
Study objectives :

1. Evaluate water supply-demand gap for Accra under current conditions and plausible future scenarios.

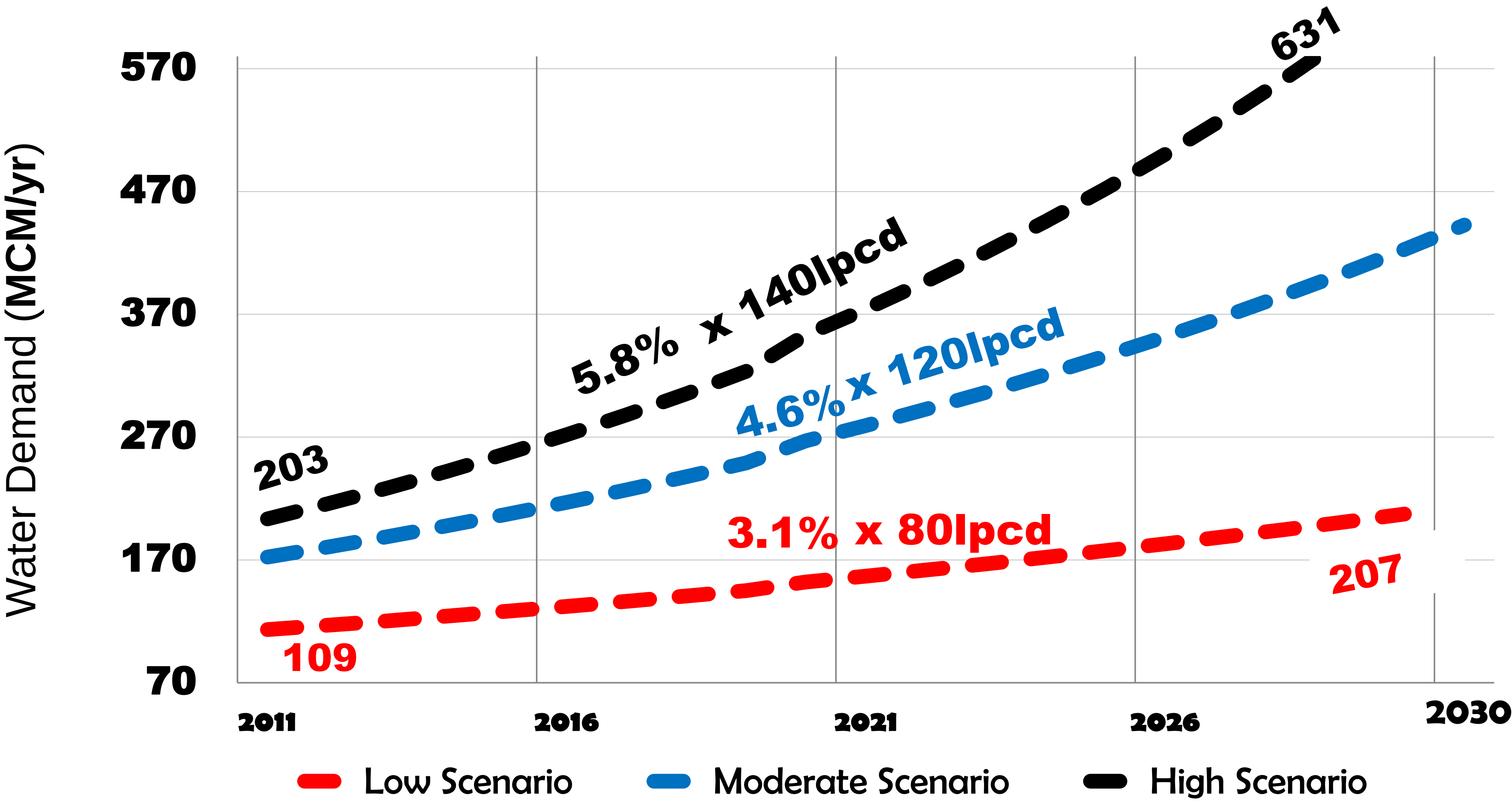
2. Model the impact of climate change on surface water availability in the Densu Basin.

3. Determine the implications for bridging the water supply-demand gap of GAMA.

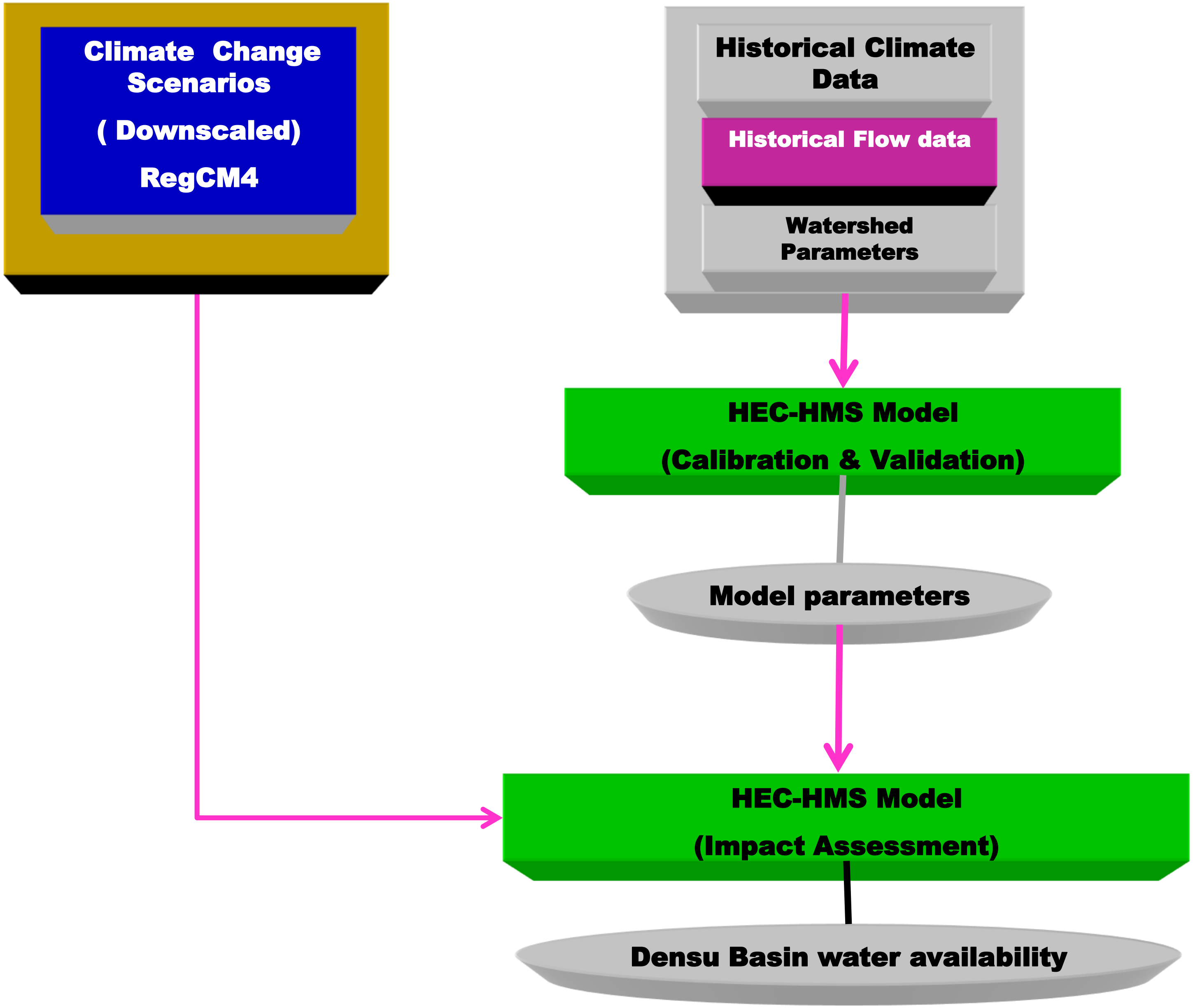
City water supply-demand modelling with VENSIM



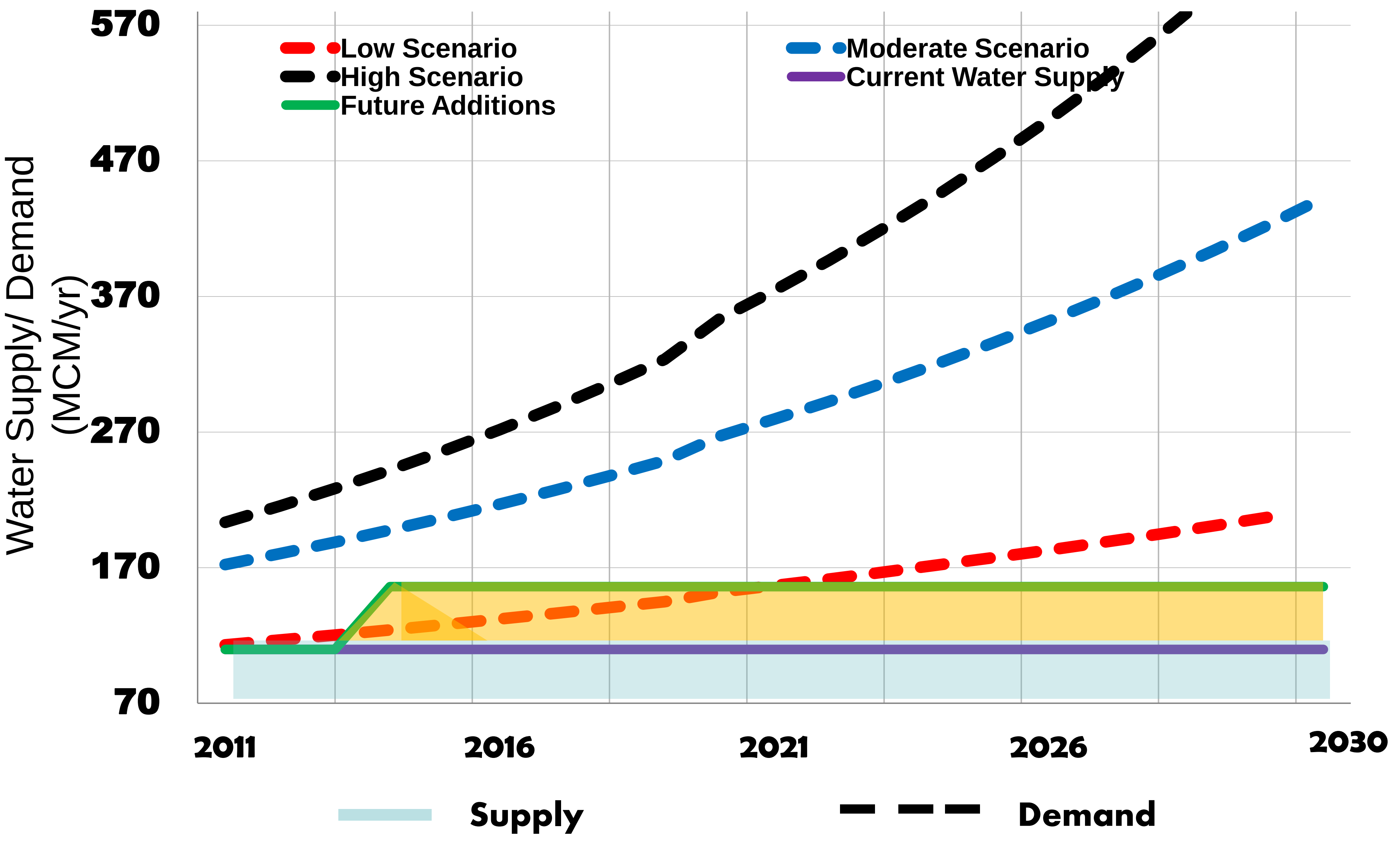
Water Demand



Modelling Framework



Supply – Demand Gap

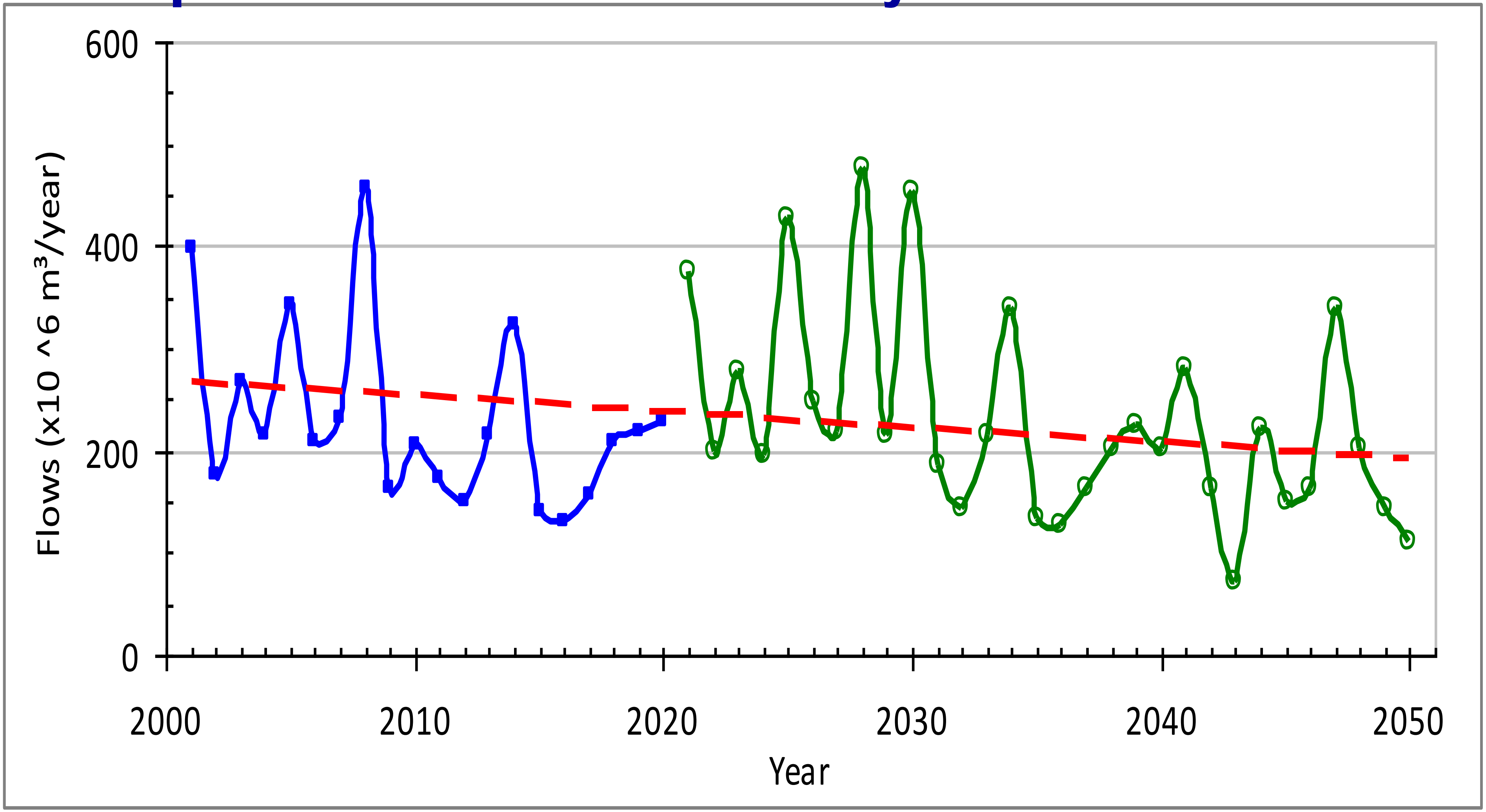


Response to the supply-demand gap

Improve/Expand the water supply and distribution system

Implications for supply-demand gap management

CC impact on Densu water availability



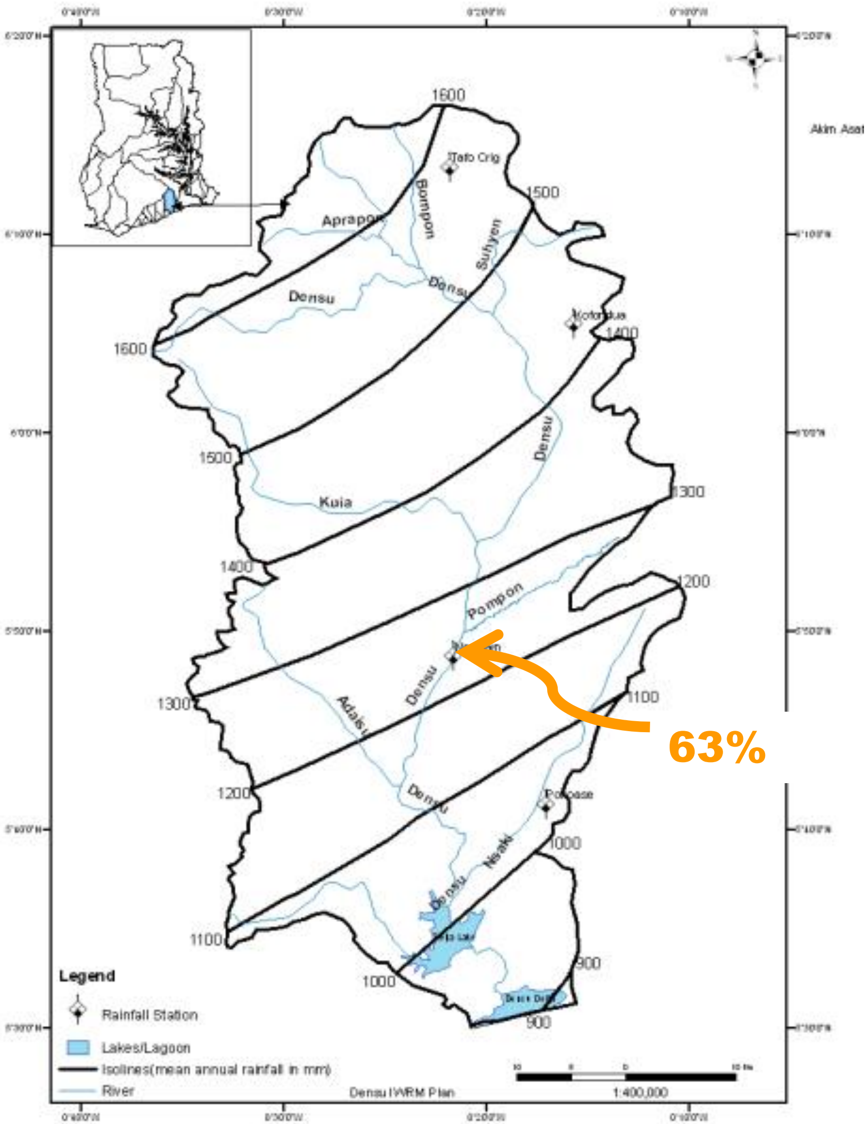
Predicted inflow to the Weija lake for the A1B CC scenario

Implications for supply-demand gap management II

Current surface water abstraction in the Densu basin:

Water abstraction points	Abstraction (million m^3/yr)	% of estimated basin runoff
Upper catchments	2.96	1
Weija	93.09	33
Total	96.05	34

Implications for supply-demand gap management III



Holistic basin WRM

- involving all stakeholders
- Promoting water conservation and use efficiency

In short: Implement IWRM plan in the basin.

Implications for supply-demand gap management IV

Lower Volta water availability

Climate change scenario	Annual renewable water for the Lower Volta (10^9 m^3) (de Condappa *et al.*, 2008)	Water withdrawals for GAMA			
		2011		2015	
		Volume (10^9 m^3)	% of Lower Volta Flows	Volume (10^9 m^3)	% of Lower Volta Flows
Baseline	29.1	0.157	0.54	0.223	0.77
Dry scenario	24.2	0.157	0.65	0.223	0.92
Wet scenario	33.5	0.157	0.47	0.223	0.67

Implications for supply-demand gap management V

Abstract more from the Lower Volta

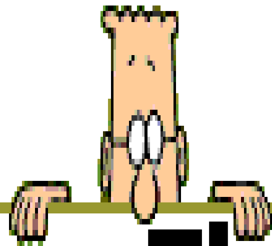
- ❖ Consider more use of groundwater (GW) – require further studies on:
  - GW availability and reliability
  - Potential for artificial GW recharge
- ❖ Encourage rainwater harvesting for both potable and non-potable use – requires feasibility studies to determine:
  - How much can be harvested
  - Cost effectiveness of RWH
  - Efficient RWH systems
  - RW quality and quality improvement

Conclusion

There is a municipal water supply-demand gap for GAMA well into the future.

Climate change impacts would exacerbate this condition.

An integrated approach coupling the Densu and Volta basins, and balancing upstream water abstractions in the Densu is recommended to manage this gap.



Thank you

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