OPEN SOLUTIONS FOR SDG MONITORING: INTRODUCTION TO THE UROMIYEH CASE STUDY

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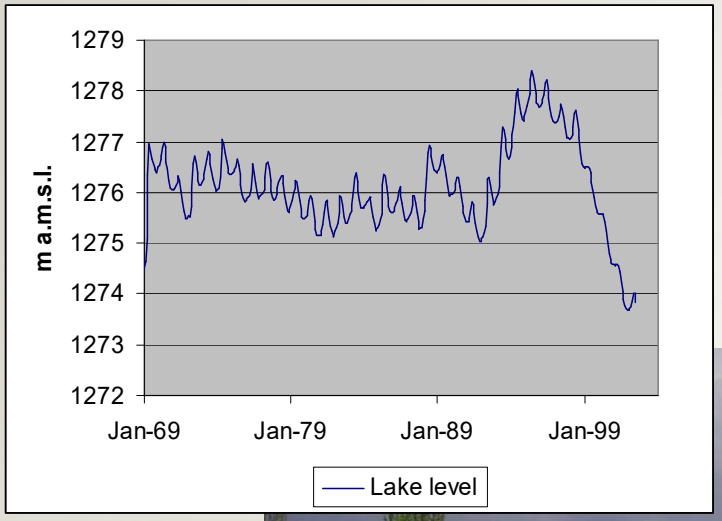
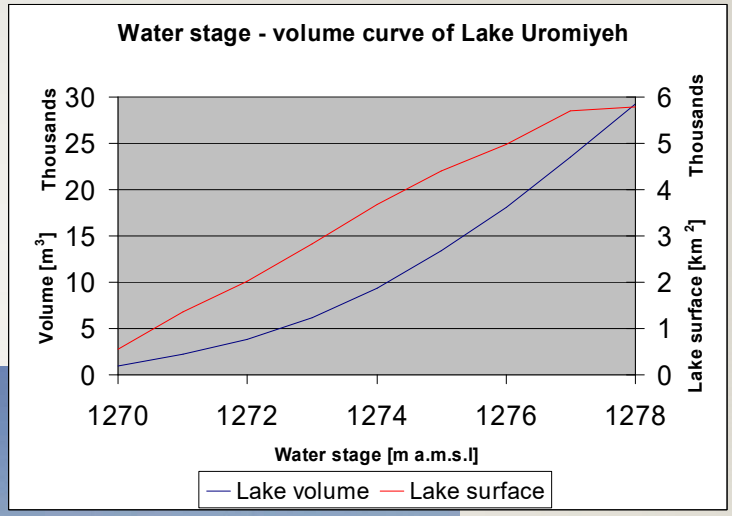
ITC

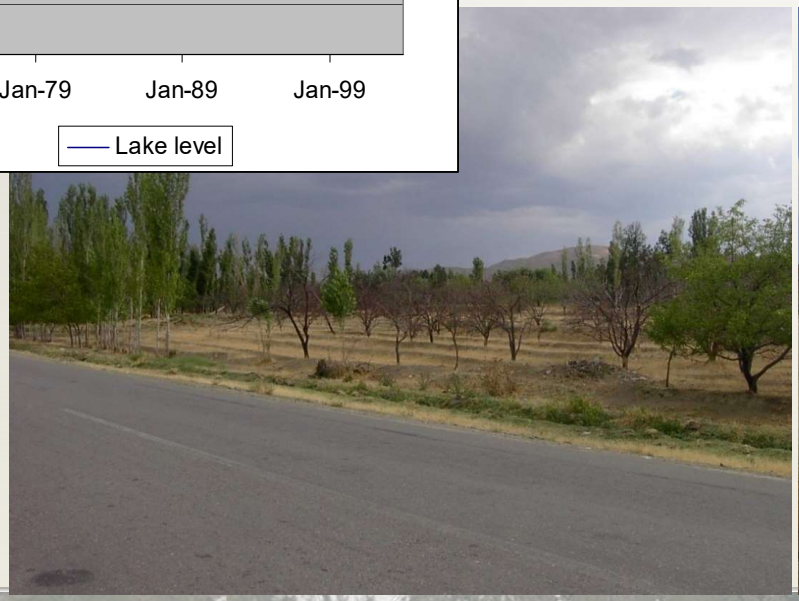
The case study area: Lake Uromiyeh, Iran

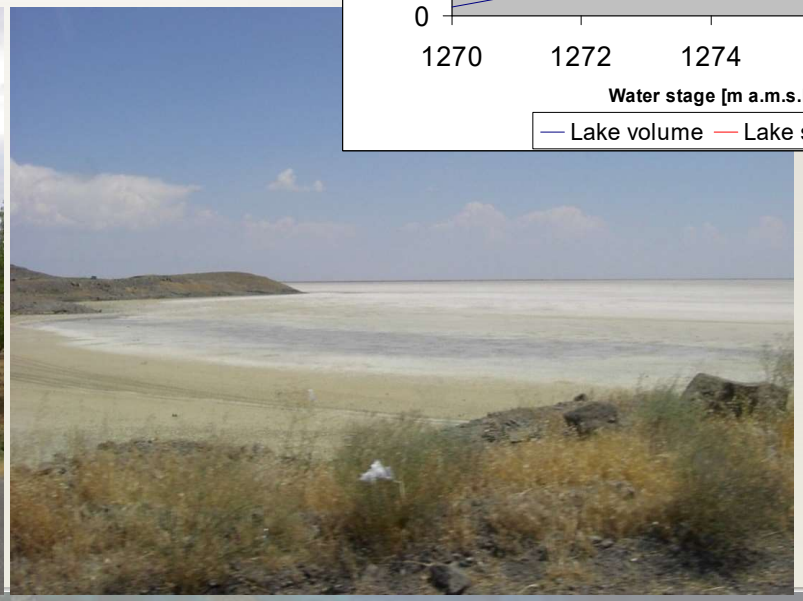
- Hypersaline lake located at the NW of Iran.
- Its basin covers about 54000 km2 and climate is semi-arid,
- Average annual rainfall of about 350 mm/year (250 at the lake, 1200+ in the mountains).
- Shallow lake (6-8 m deep – when it is full) and has no outflow.

Problem: water allocation between agriculture and the ecosystem

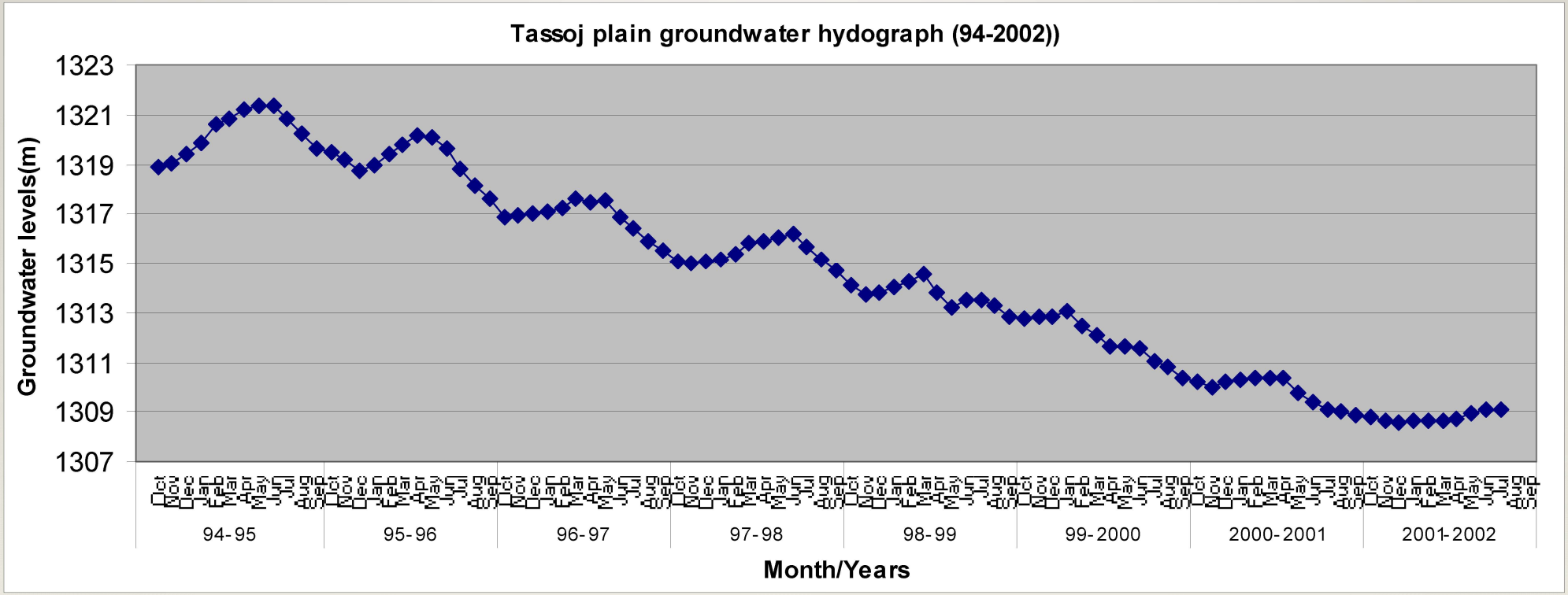








Groundwater over-exploitation



Shoreline retreat in 2005 – nowadays it is much worse…

Land use types in the region

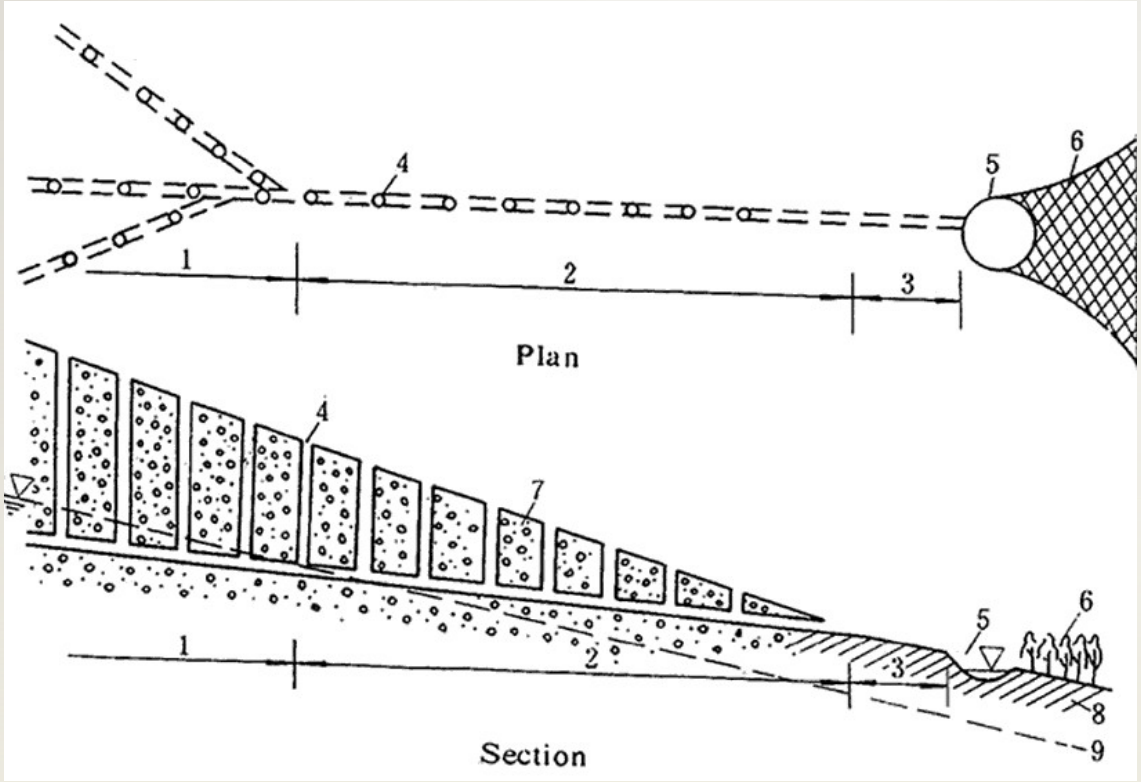
Rain-fed agriculture in the mountains

Irrigated areas on the footslopes

Irrigated areas near the lake

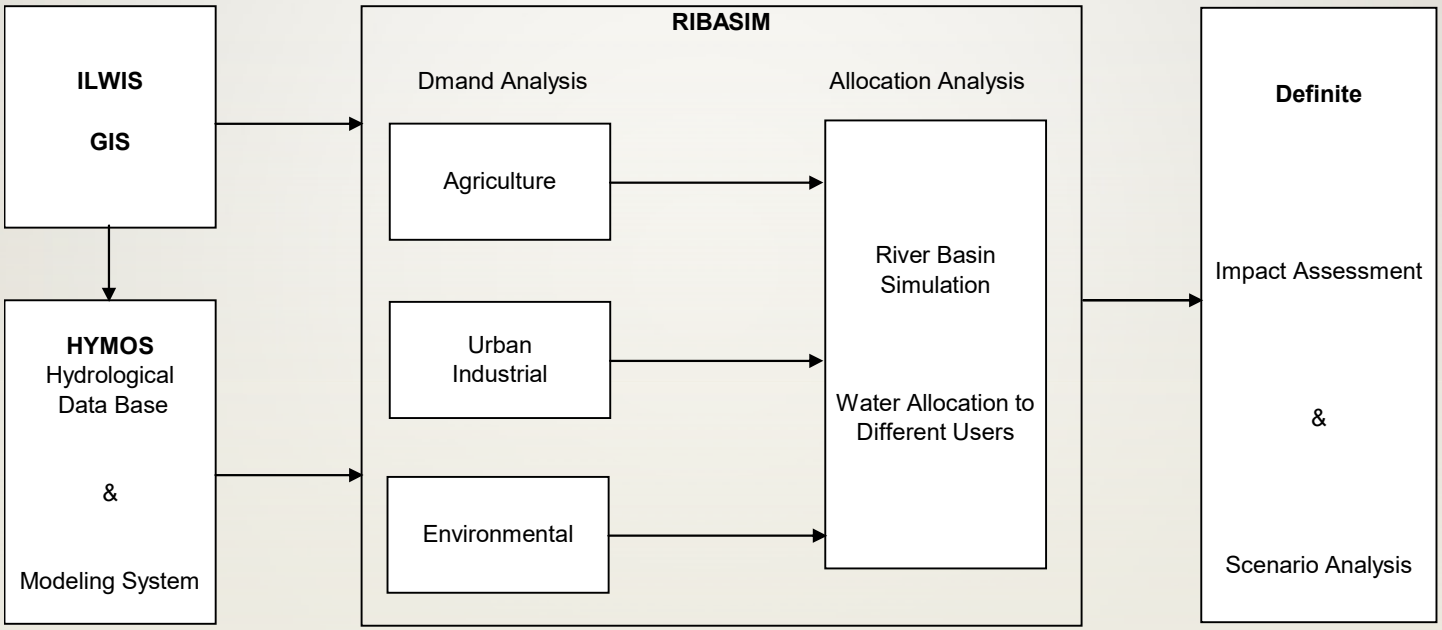
Quanat

General schematic for a qanat

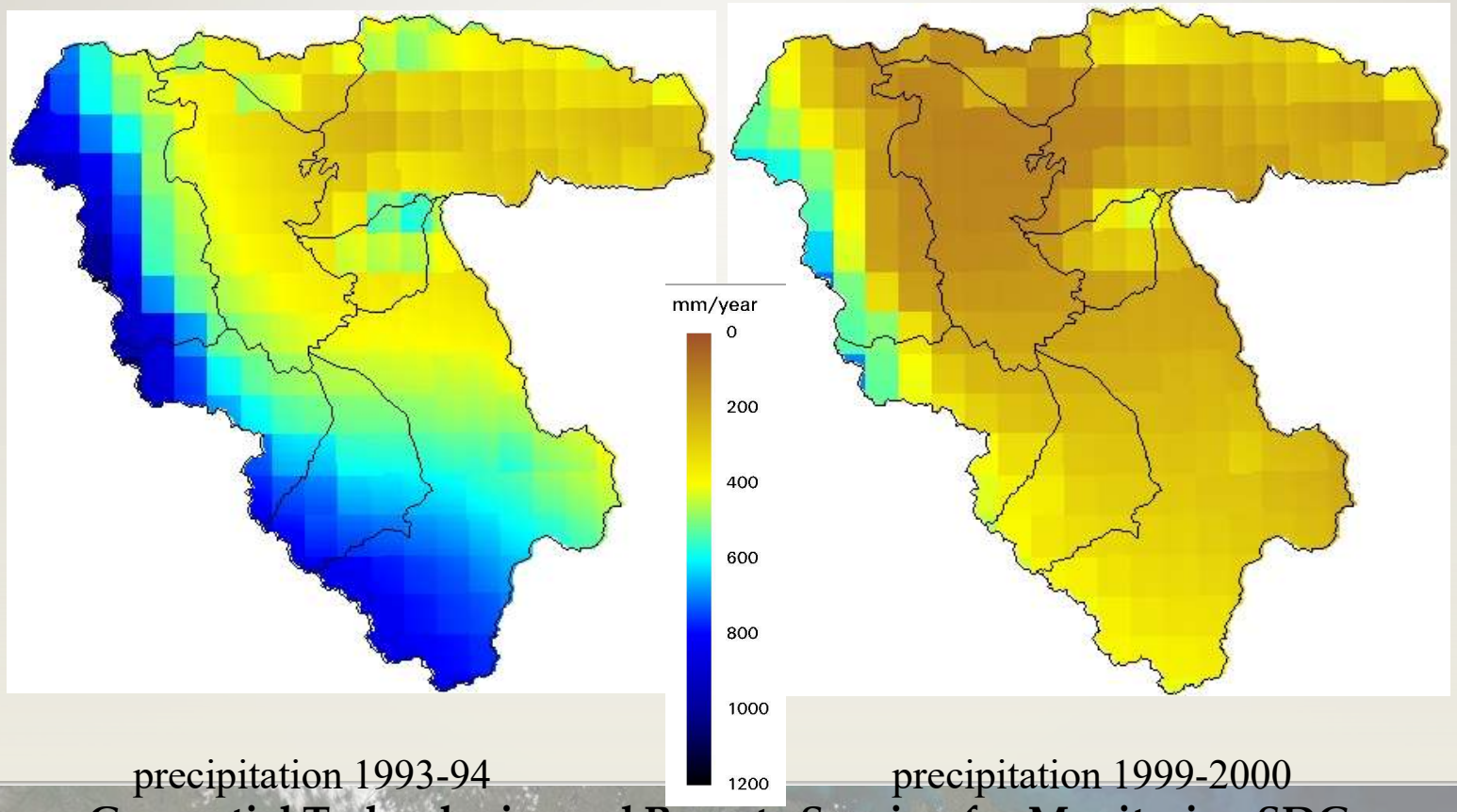


(1) Infiltration part of the tunnel
(2) Water conveyance part of the tunnel
(3) Open channel
(4) Vertical shafts
(5) Small storage pond
(6) Irrigation area
(7) Sand and gravel
(8) Layers of soil
(9) Groundwater surface

Modelling approach to IWRM in Uromiyeh



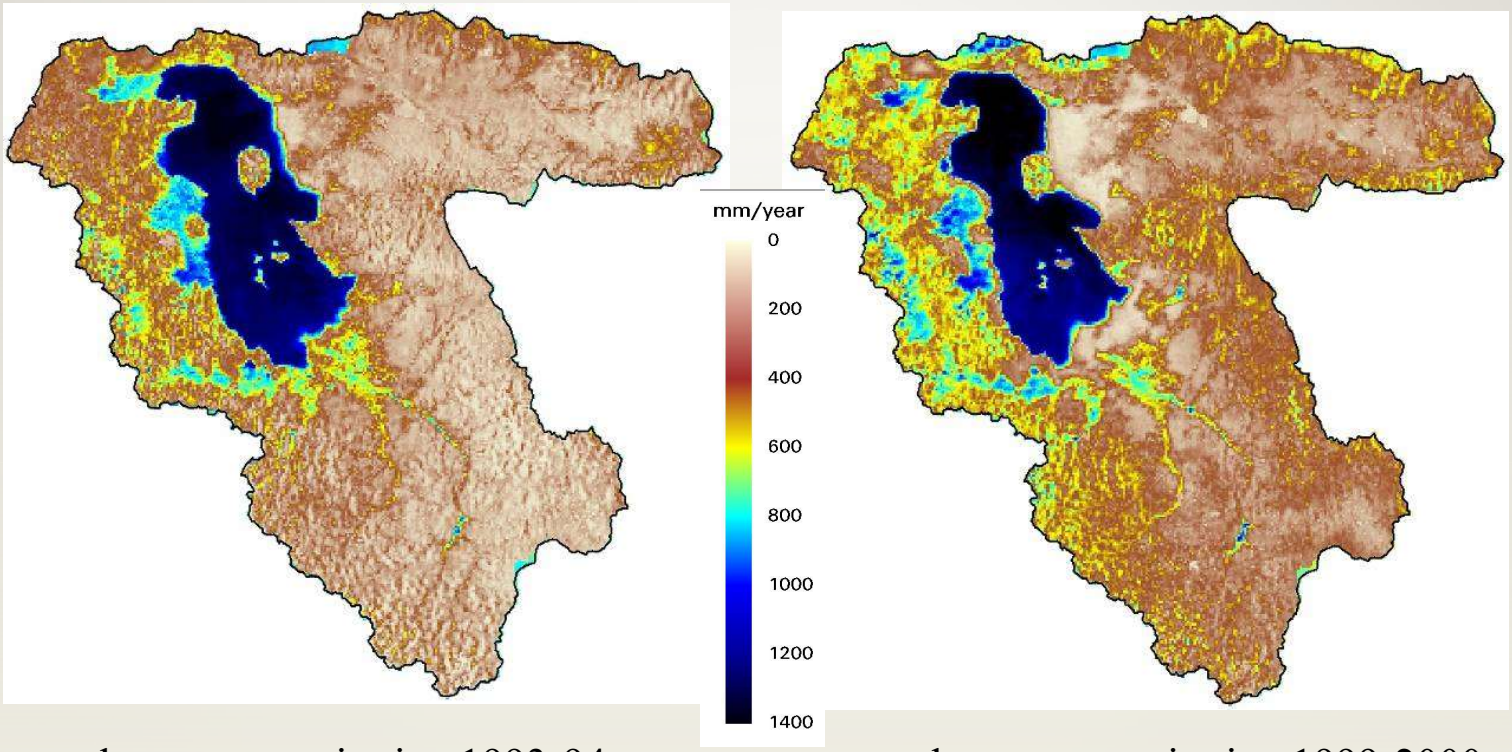
Input to the system: precipitation (rain and snow)



precipitation 1993-94

precipitation 1999-2000

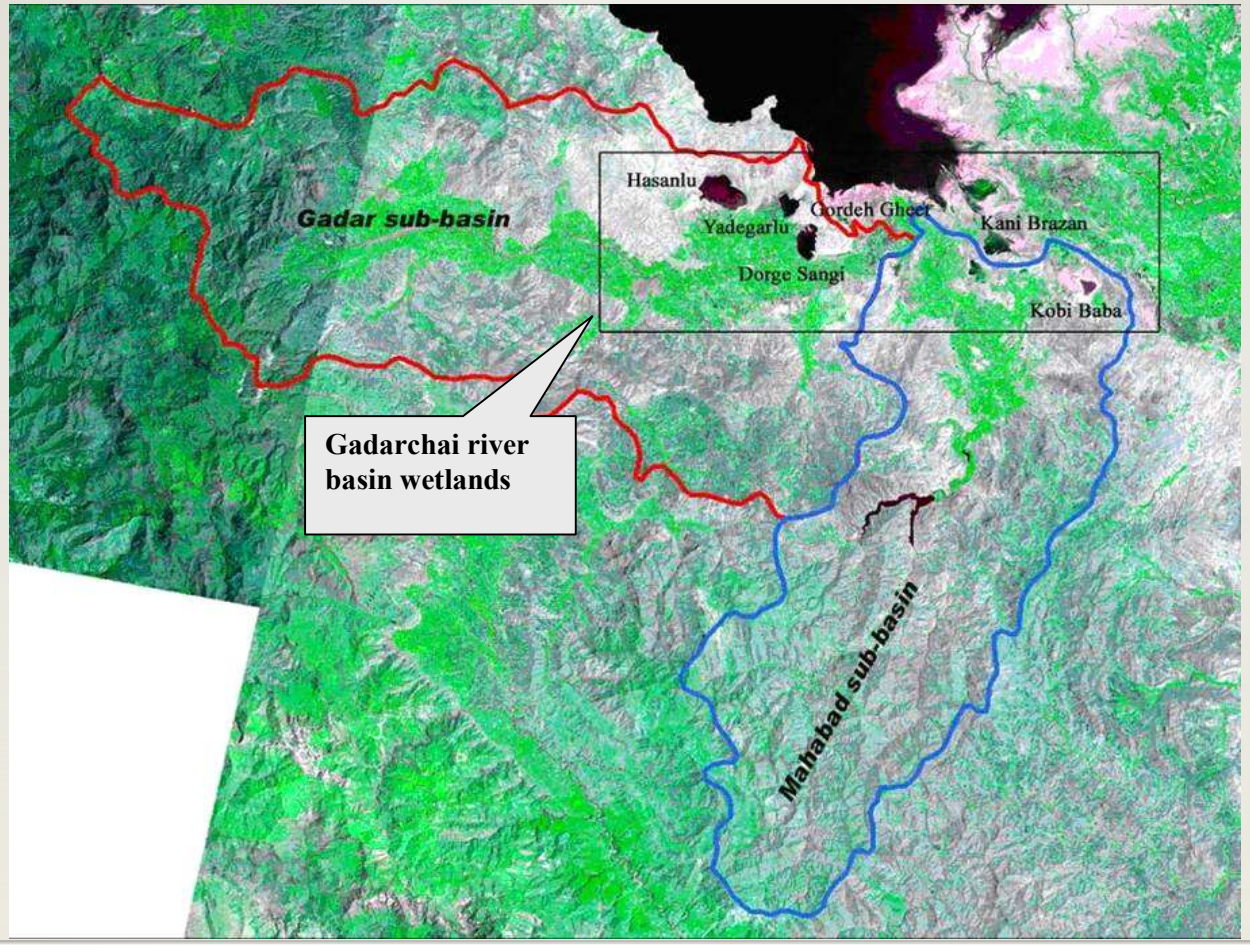
Losses from the system (calculated from satellite images)



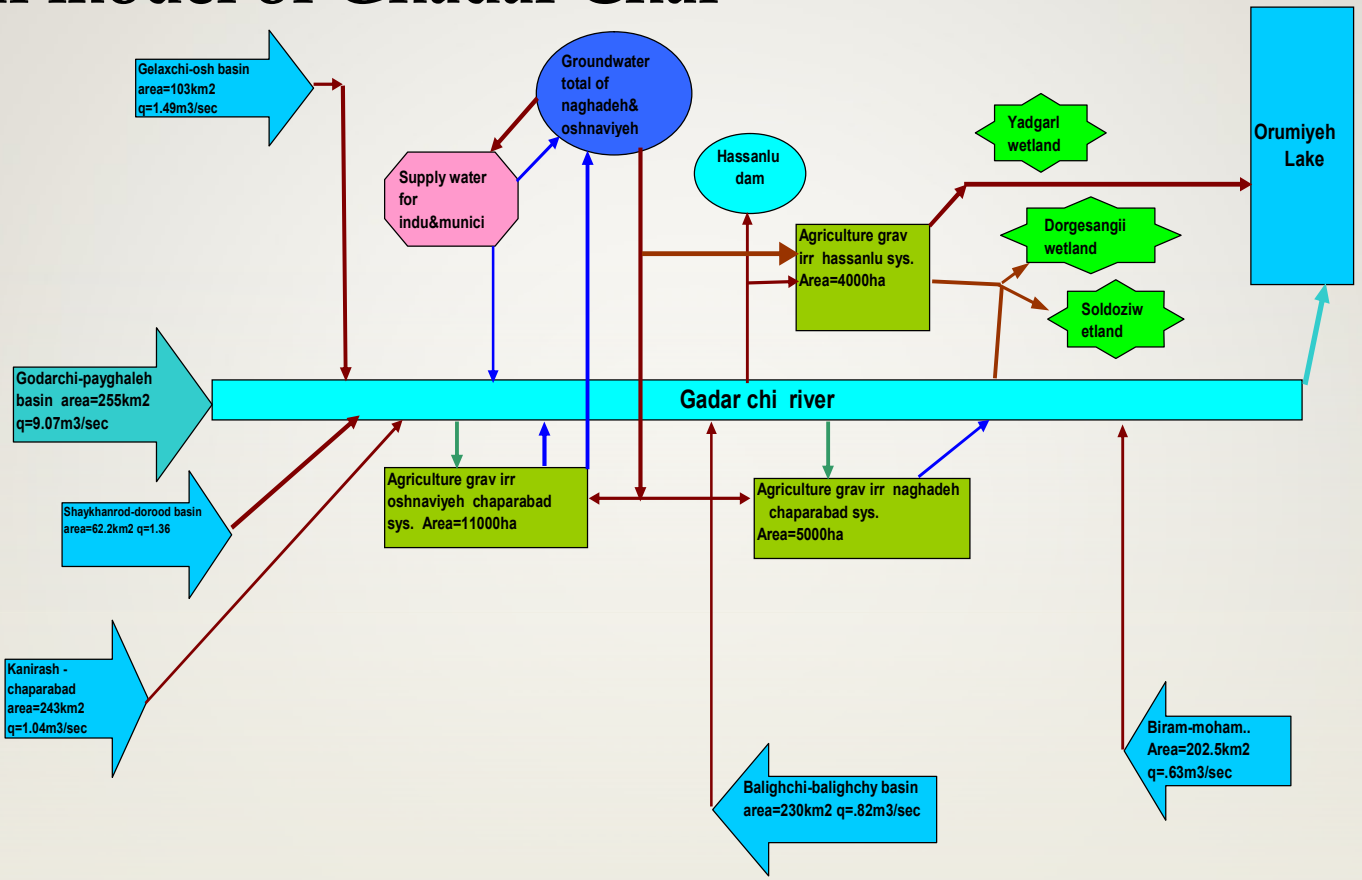
actual evapotranspiration 1993-94

actual evapotranspiration 1999-2000

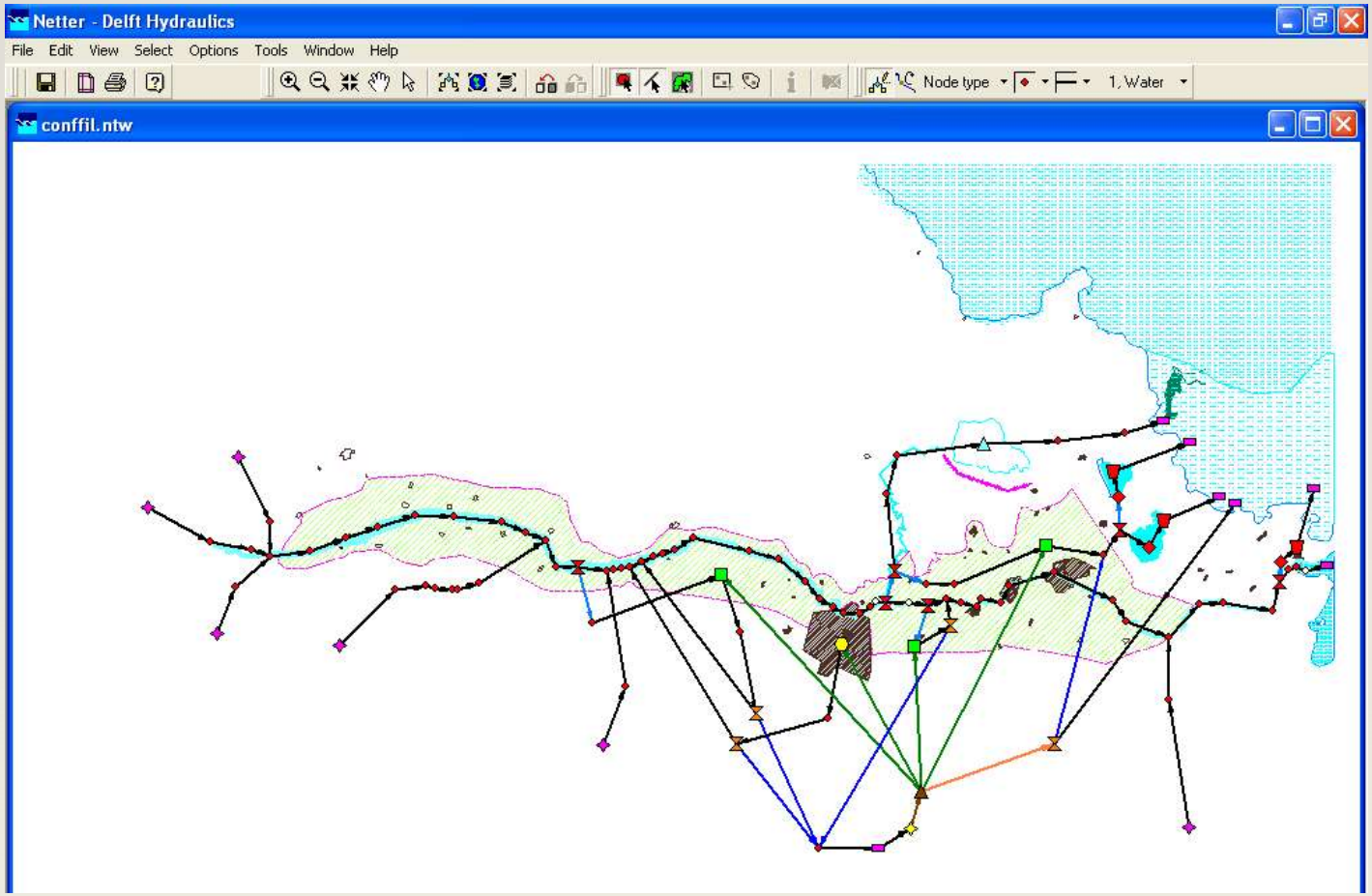
Modelled sub-watershed: Gadar Chai



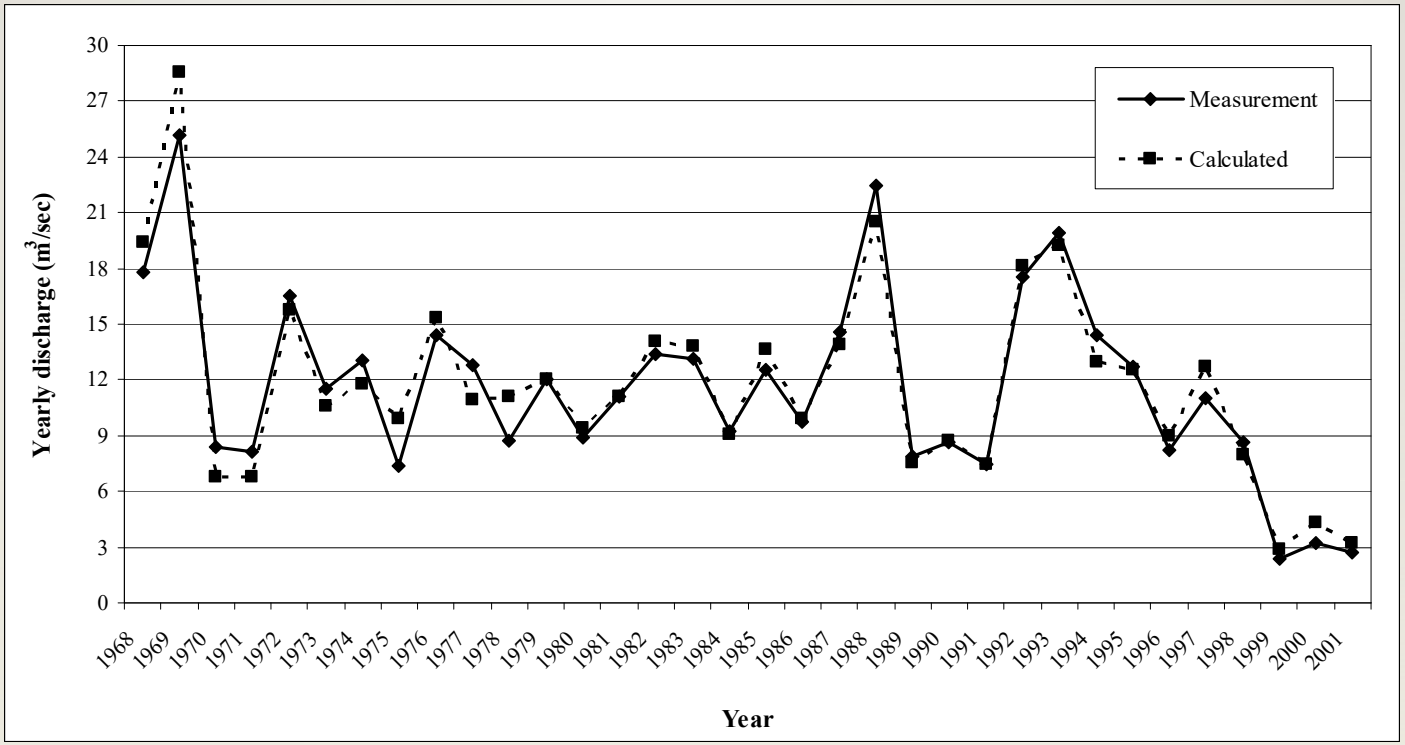
Conceptual model of Ghadar Chai



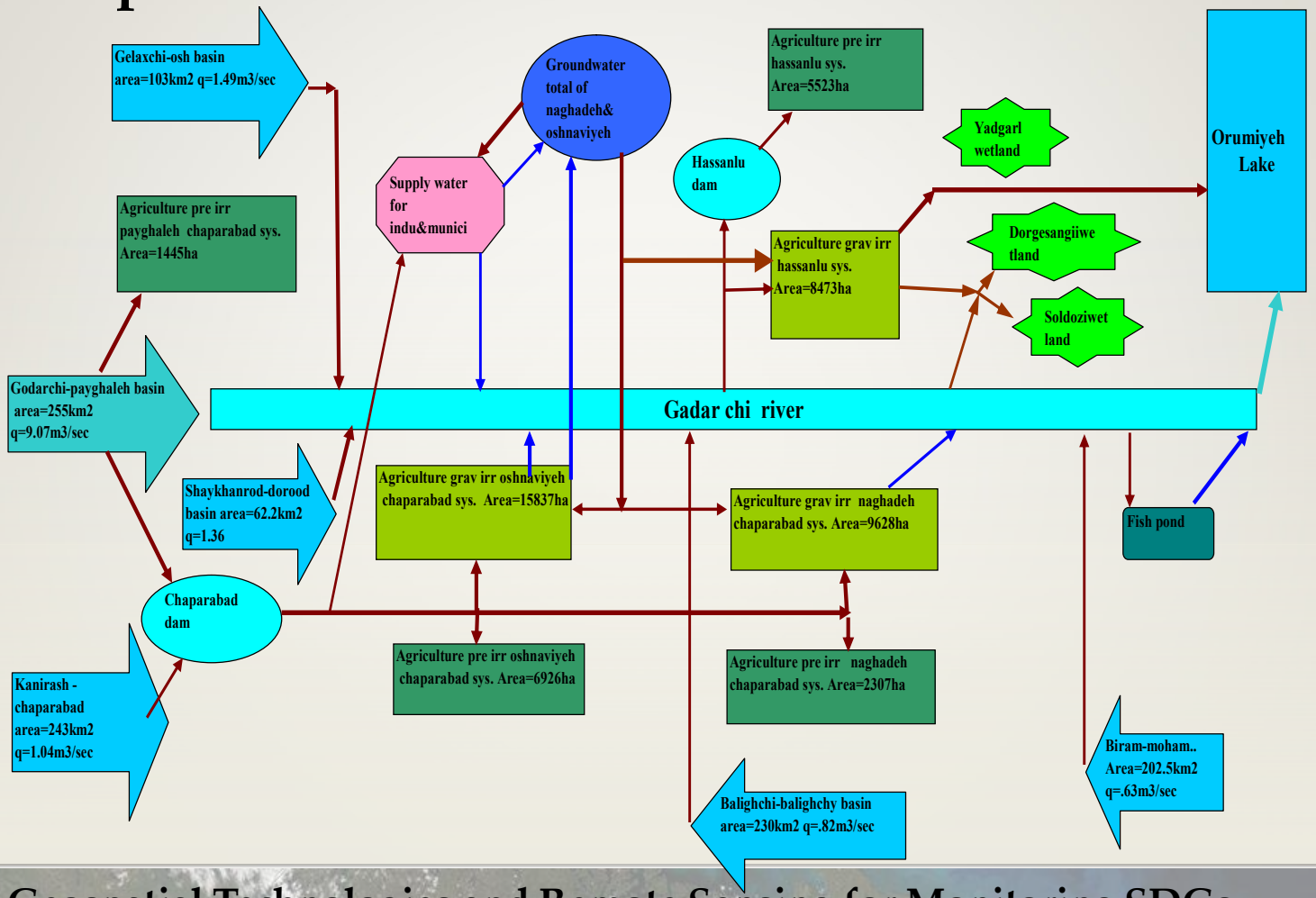
Water network in Ribasim



Long-term calibration of flow



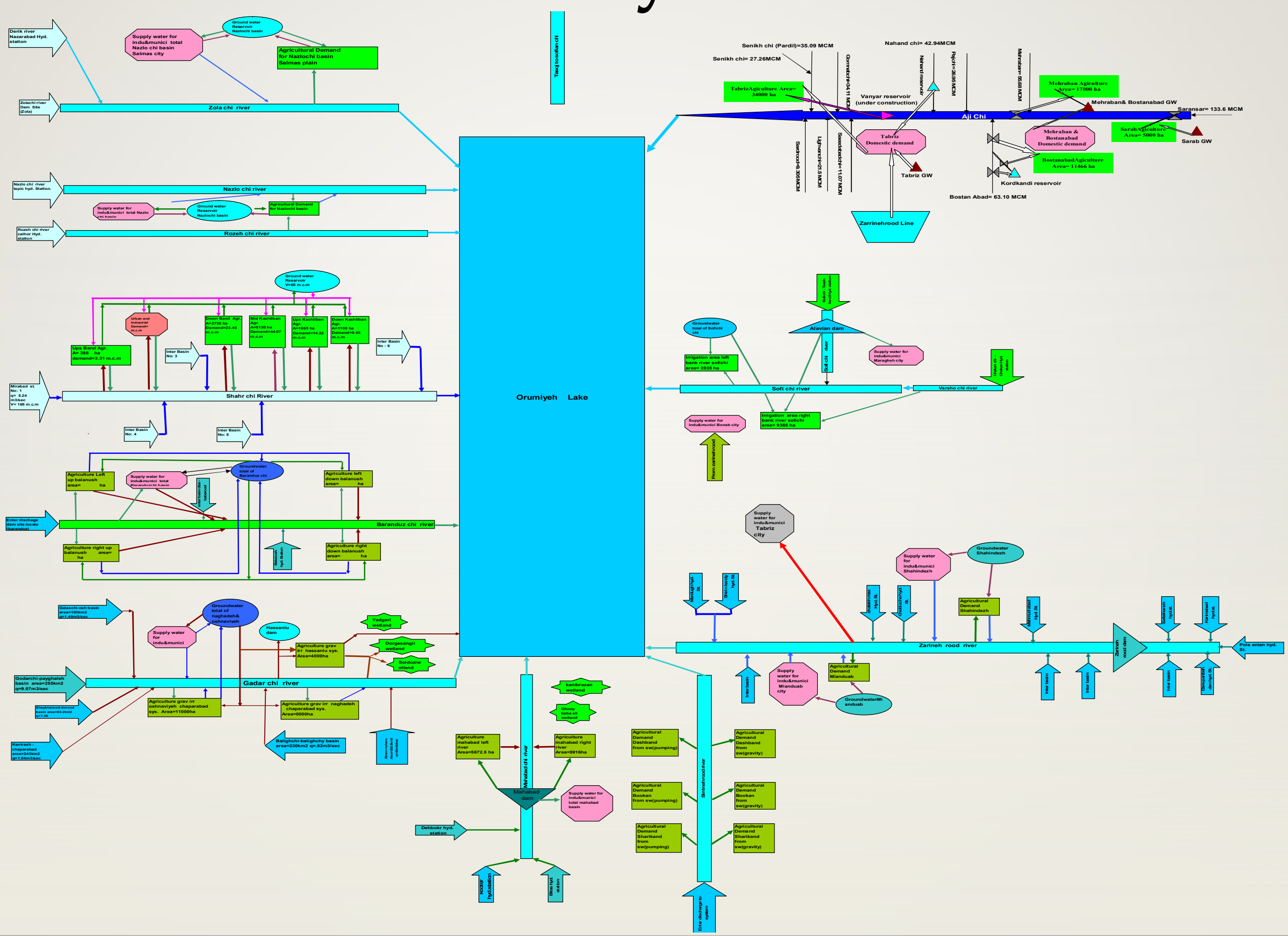
Future developments



Scenarios

- Agriculture without efficiency increase
  - Priority 1: domestic and industrial supply
  - Priority 2: agriculture and fishponds with present efficiency
  - Priority 3: wetlands with present demand + streamflow
- Agriculture with efficiency increase
  - P1: domestic and industrial supply
  - P2: agriculture and fishponds with increased efficiency
  - P3: wetlands with increased demand + streamflow
- Environment without efficiency increase
  - P1: domestic and industrial supply
  - P2: wetlands with present demand + streamflow
  - P3: agriculture and fishponds with present efficiency
- Environment with efficiency increase
  - P1: domestic and industrial supply
  - P2: wetlands with increased demand + streamflow
  - P3: agriculture and fishponds with increased efficiency

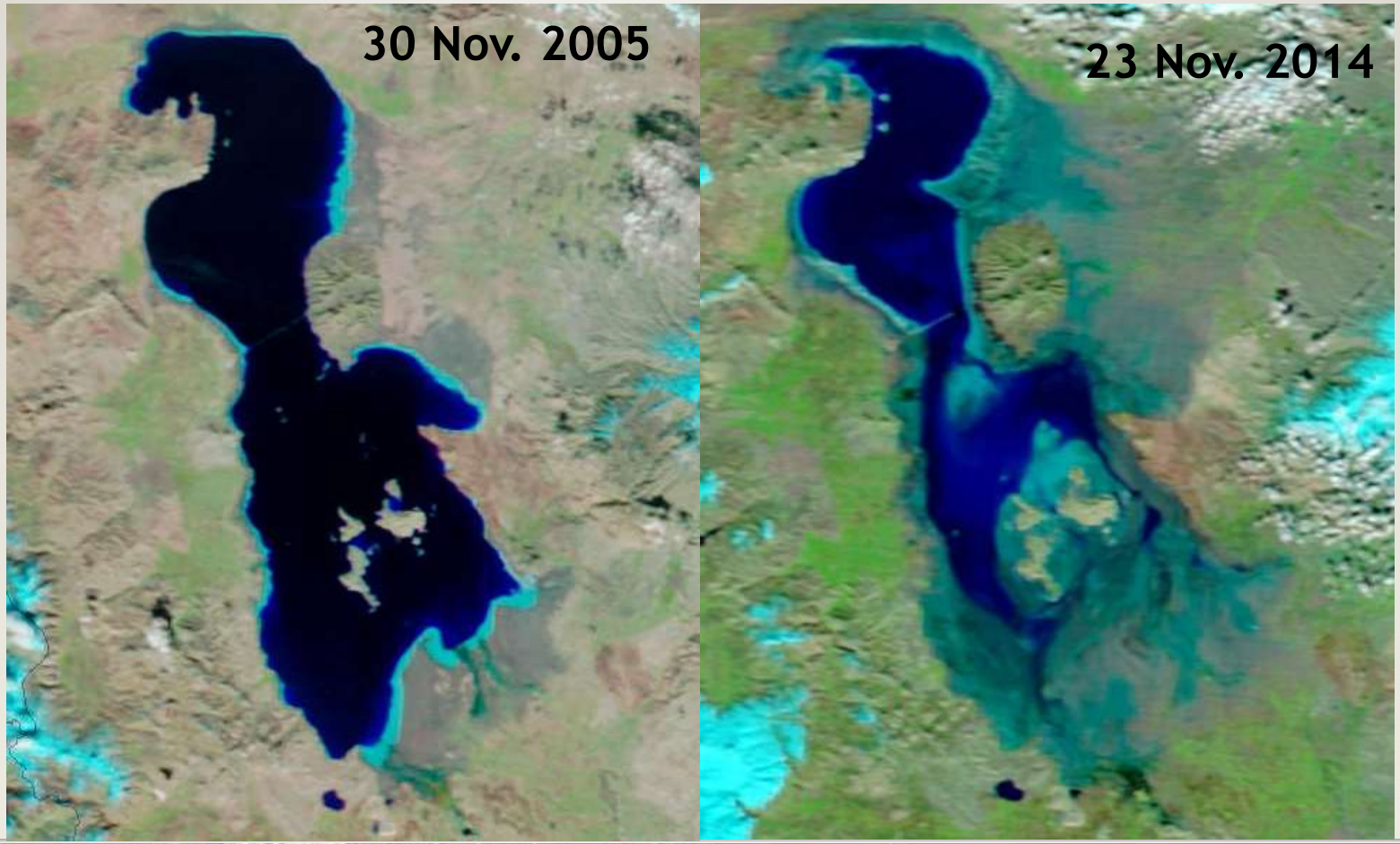
Conceptual model of the Uromiyeh Basin



Major conclusions of the project

- The recent water use is already more than the environmentally tolerable.
- Further development without efficiency improvement is killing Lake Uromiyeh.
- Even the planned efficiency improvement is not enough for balancing the population pressure (increasing agricultural production) and the need for energy production.

Not a success story...



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