Water Accounting

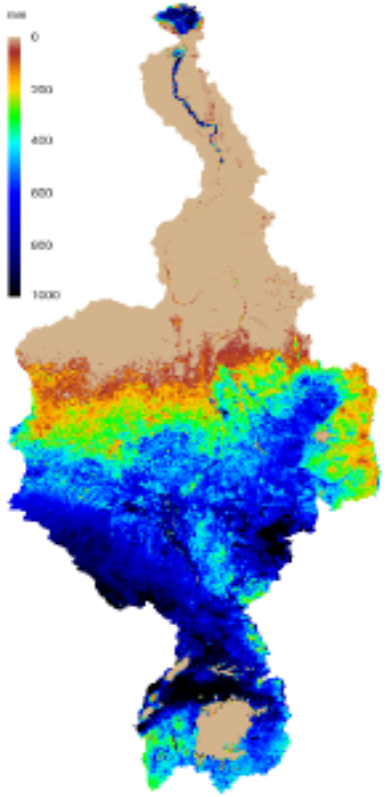
Chris Perry

Delft, 2009

Why can't my left hand give my right hand money?
Wittgenstein

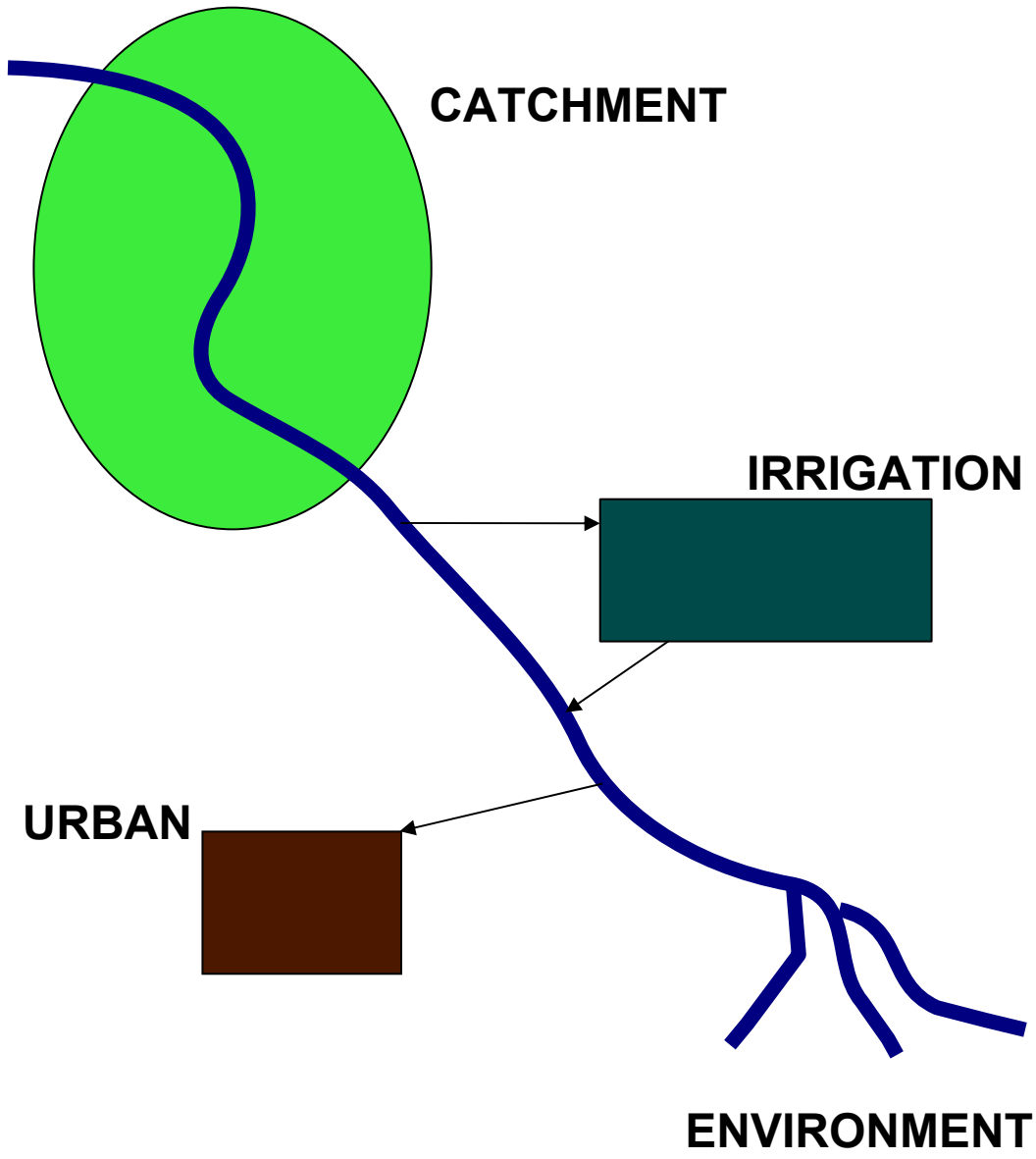
Not a new topic...

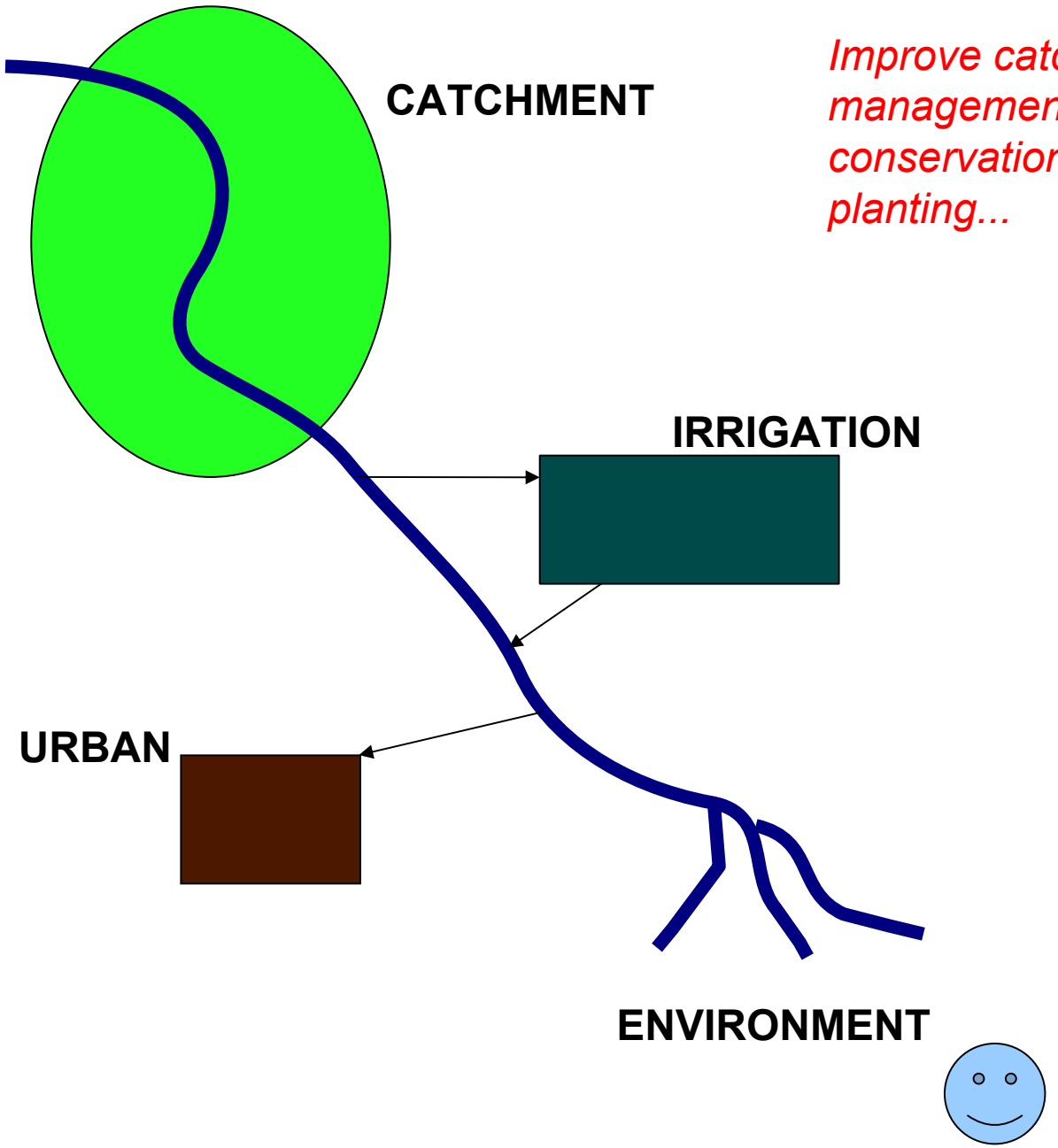
Not a new topic... but there are new data...



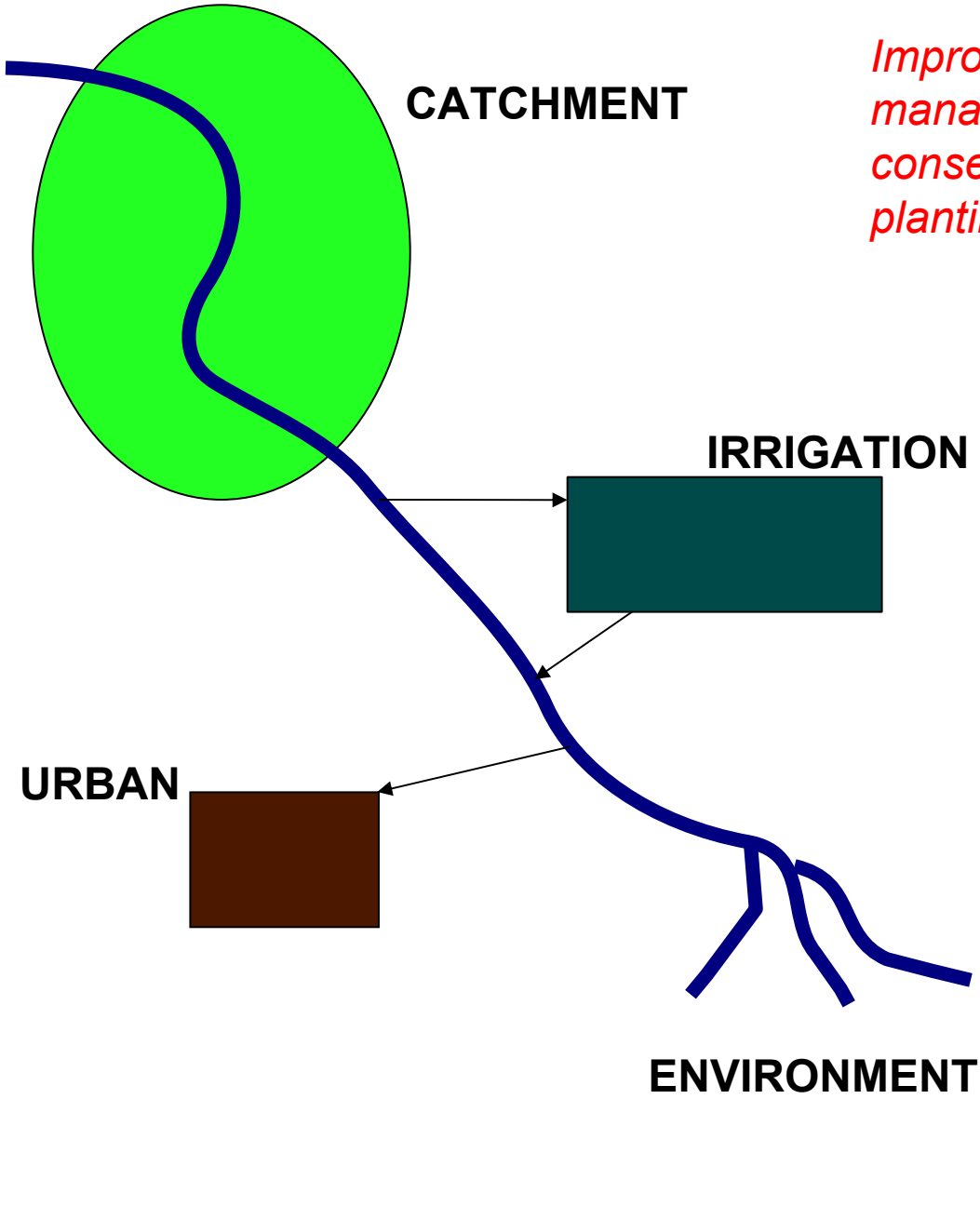
Why water accounting?

- Making best use data means clear communications between sectors
- Consider a simple basin
  - Degraded catchment
  - Wasteful irrigation
  - No proper sanitation
  - No water for the environment...


CATCHMENT
IRRIGATION
URBAN
ENVIRONMENT

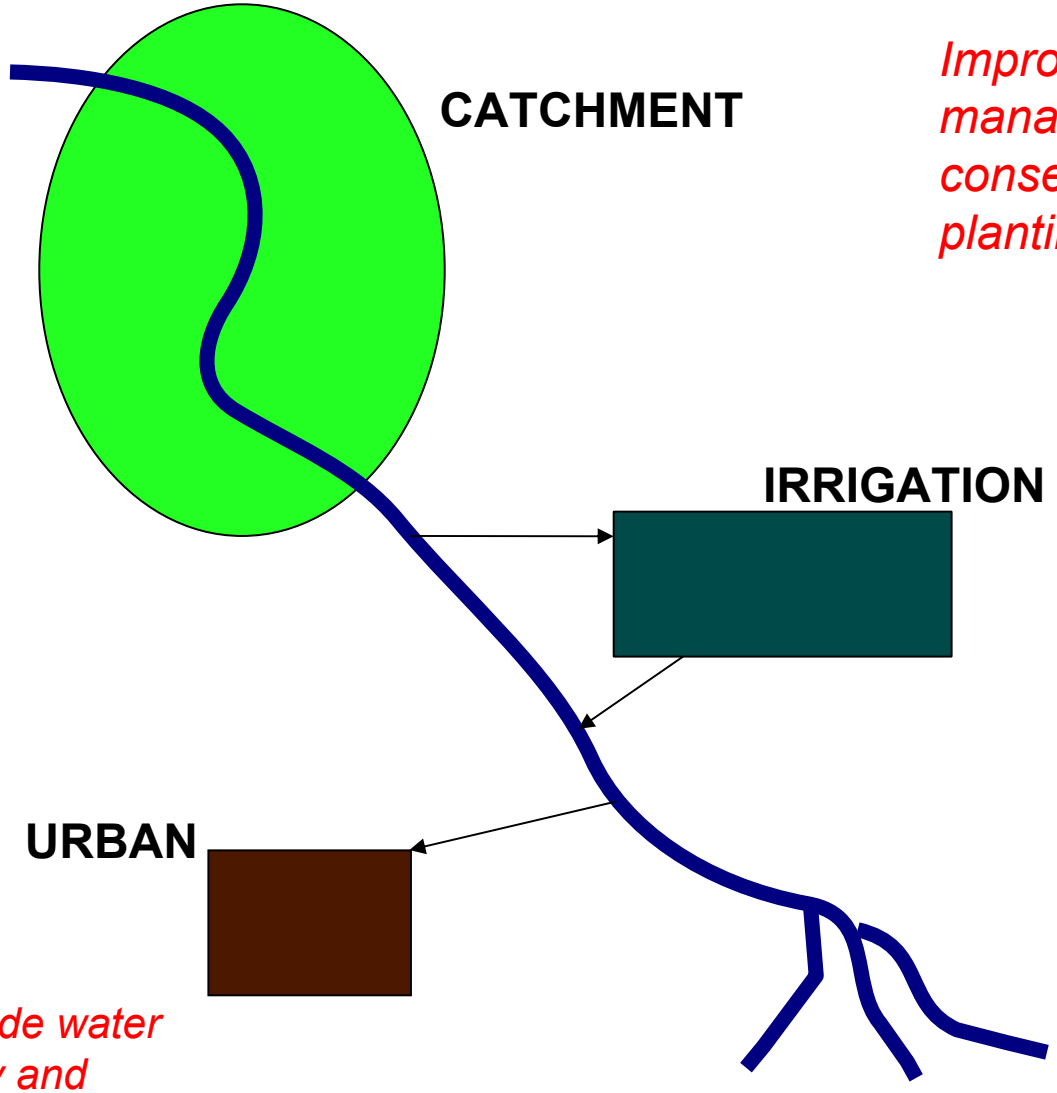


Improve catchment management... Soil conservation, tree planting...



Improve catchment management... Soil conservation, tree planting...

Increase irrigation efficiency...



Improve catchment management... Soil conservation, tree planting...

Increase irrigation efficiency...

Upgrade water supply and sanitation...

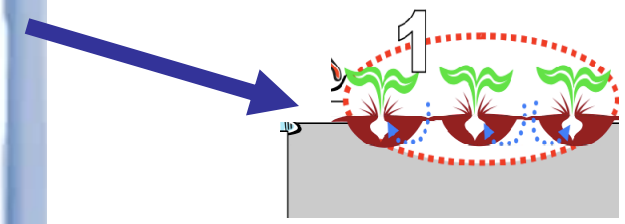
Let's examine one of these uses...

Irrigation

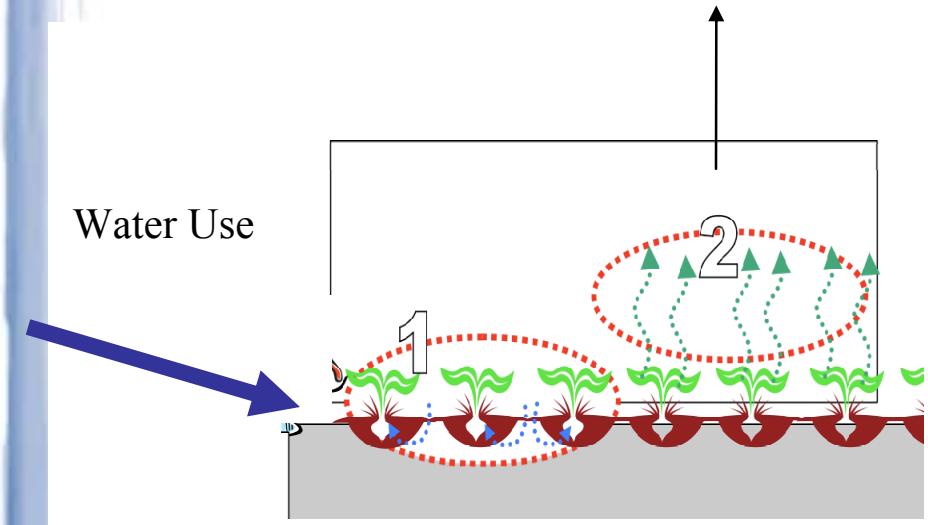
Water Use

Transpiration

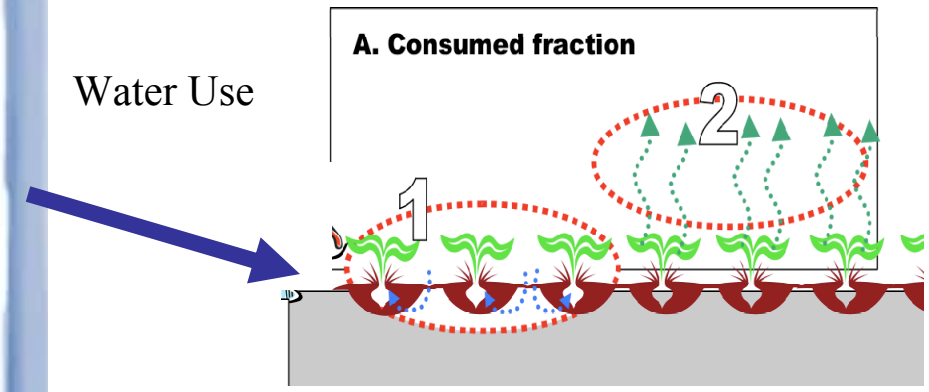
Water Use



Evaporation

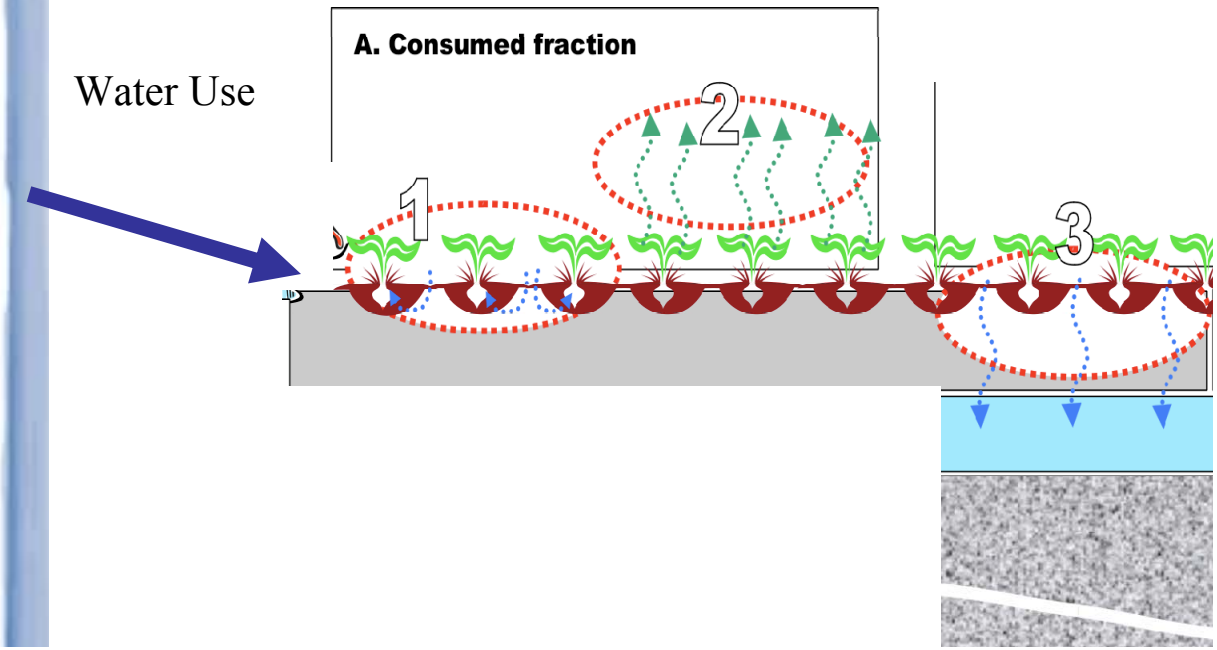


Water Use



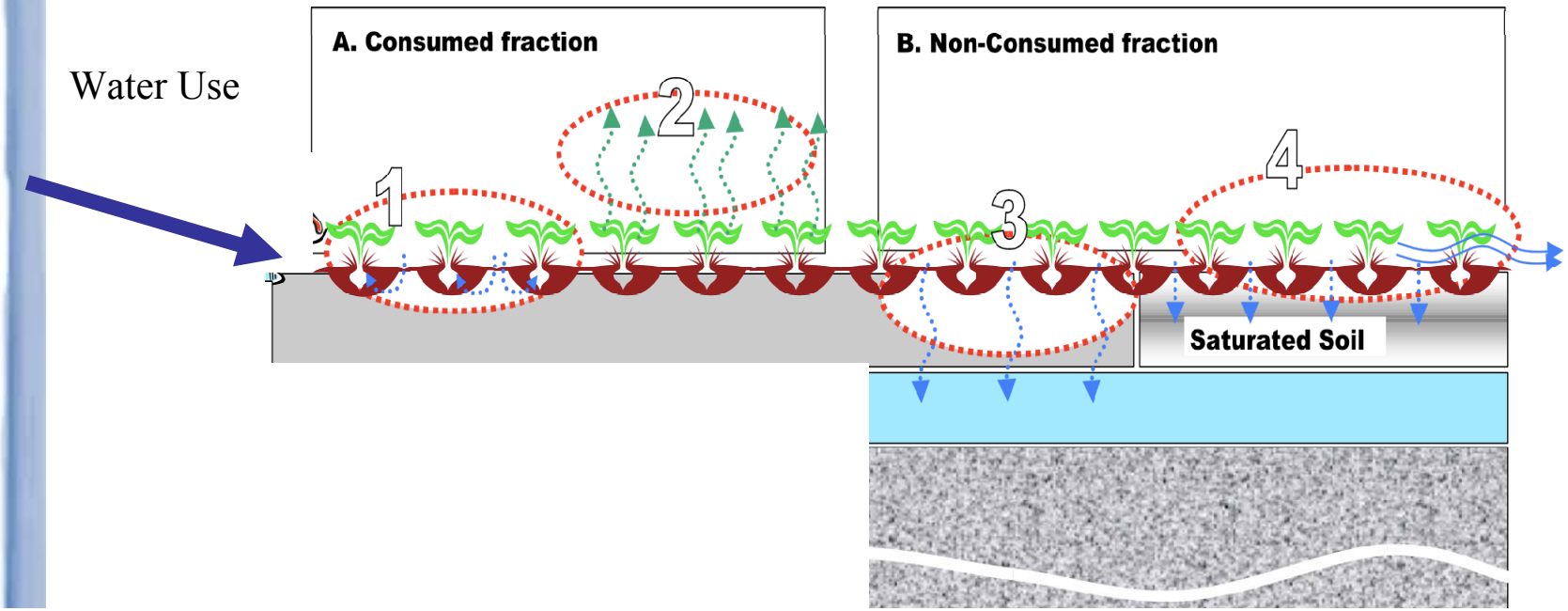
Consumed Fraction =
Transpiration
\+ Evaporation

Water Use



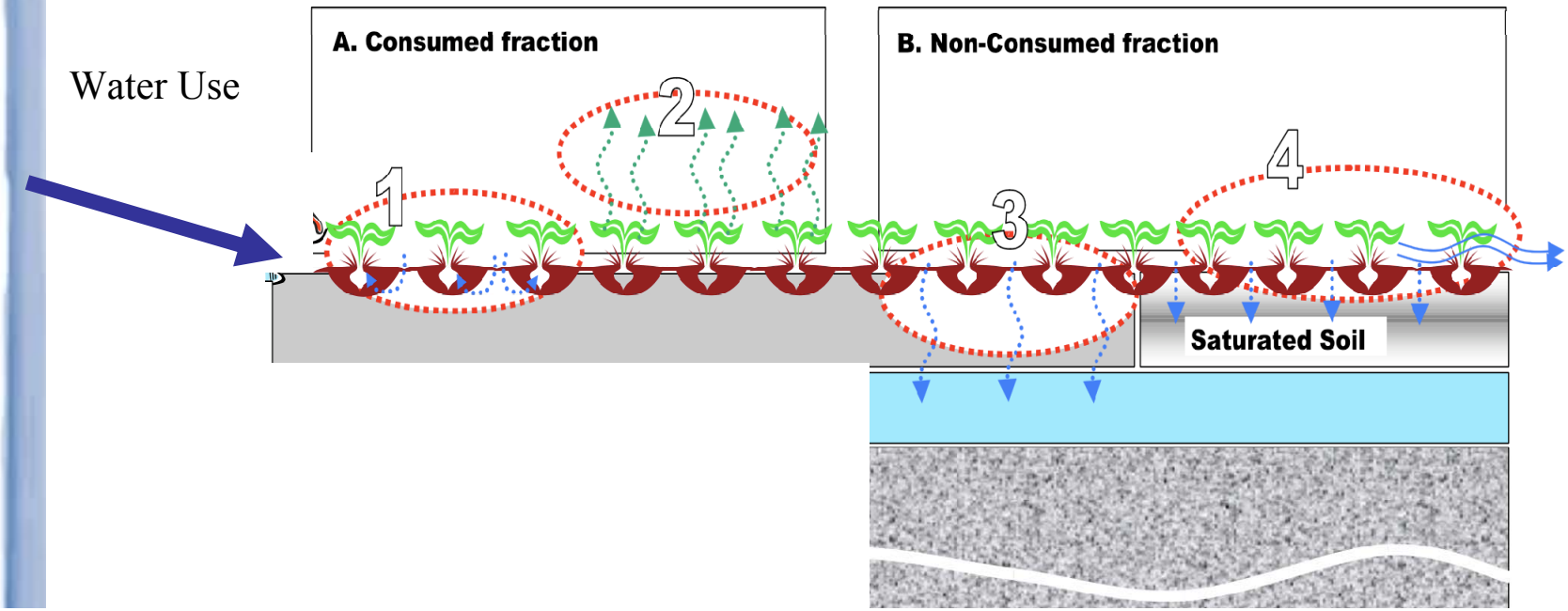
Infiltration and percolation

Water Use



Runoff

Water Use



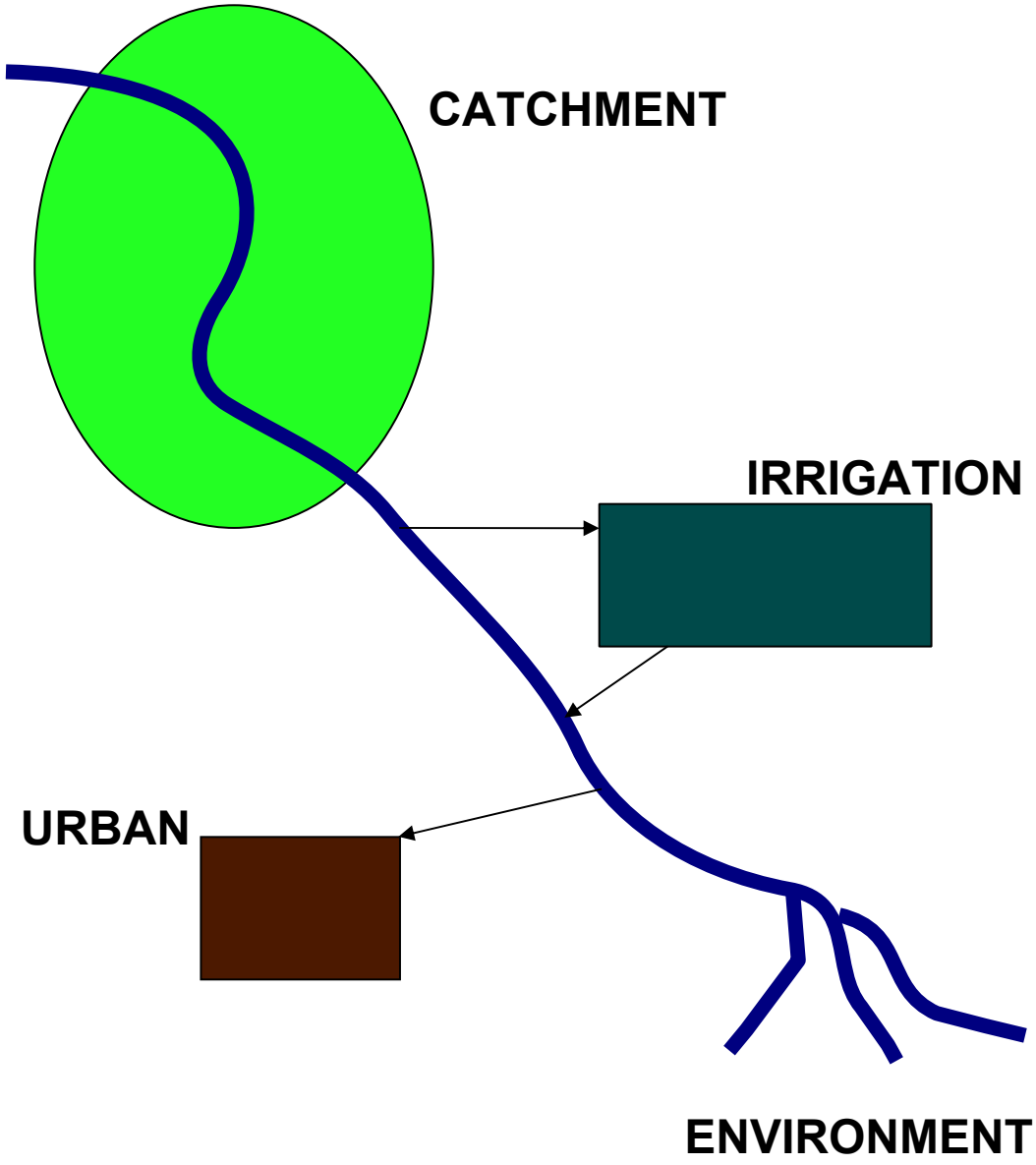
Non-Consumed Fraction =
Infiltration
\+ Runoff

“Fractions” Terminology for Water Accounting

- Water Use
  - Consumed Fraction
    - Beneficial Consumption
    - Non-beneficial Consumption
  - Non-Consumed Fraction
    - Recoverable flows
    - Non-recoverable flows

Revisiting the basin...

- “Improved” catchment management
- “Increased” irrigation efficiency
- “Upgraded” water supply and sanitation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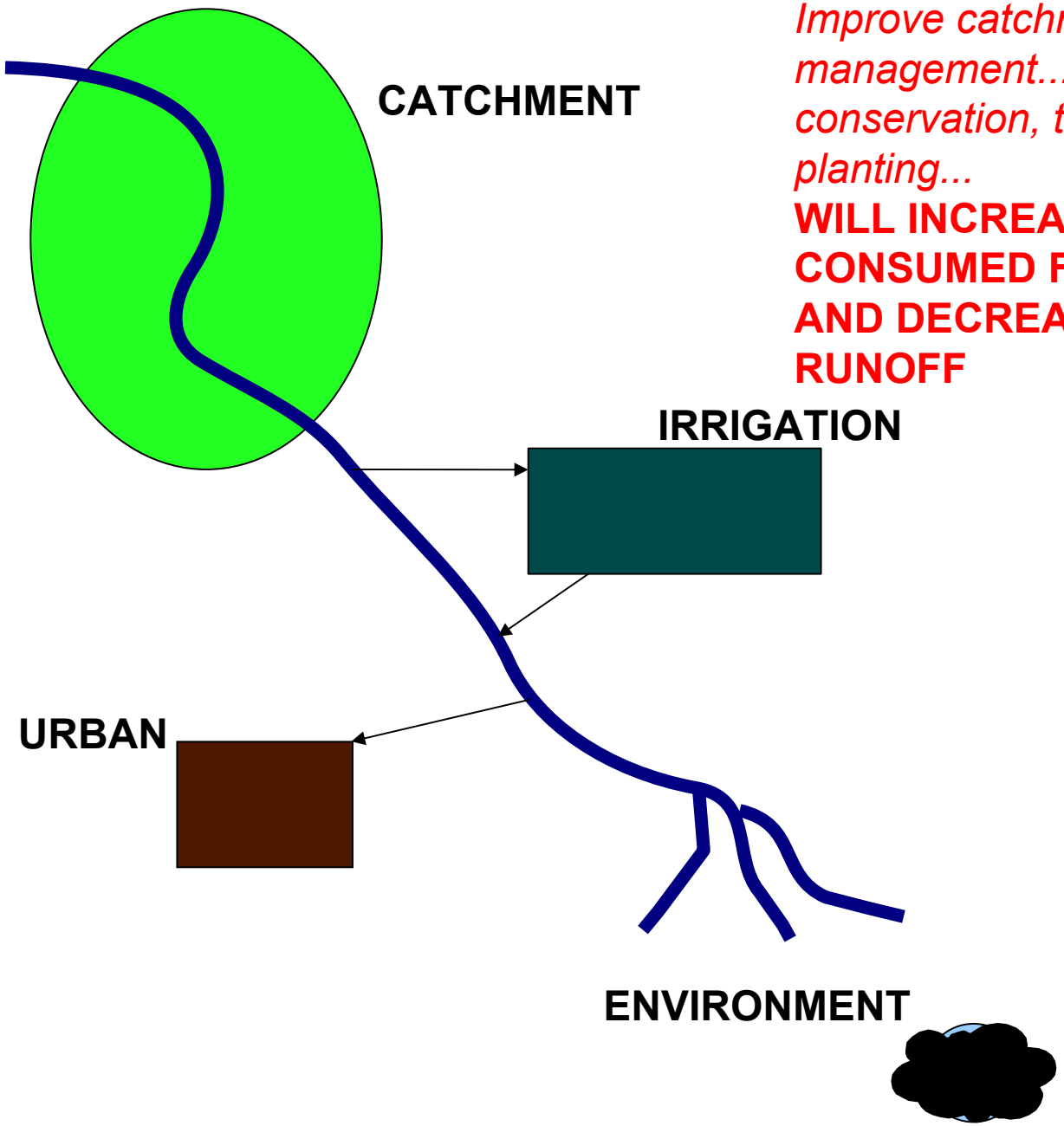
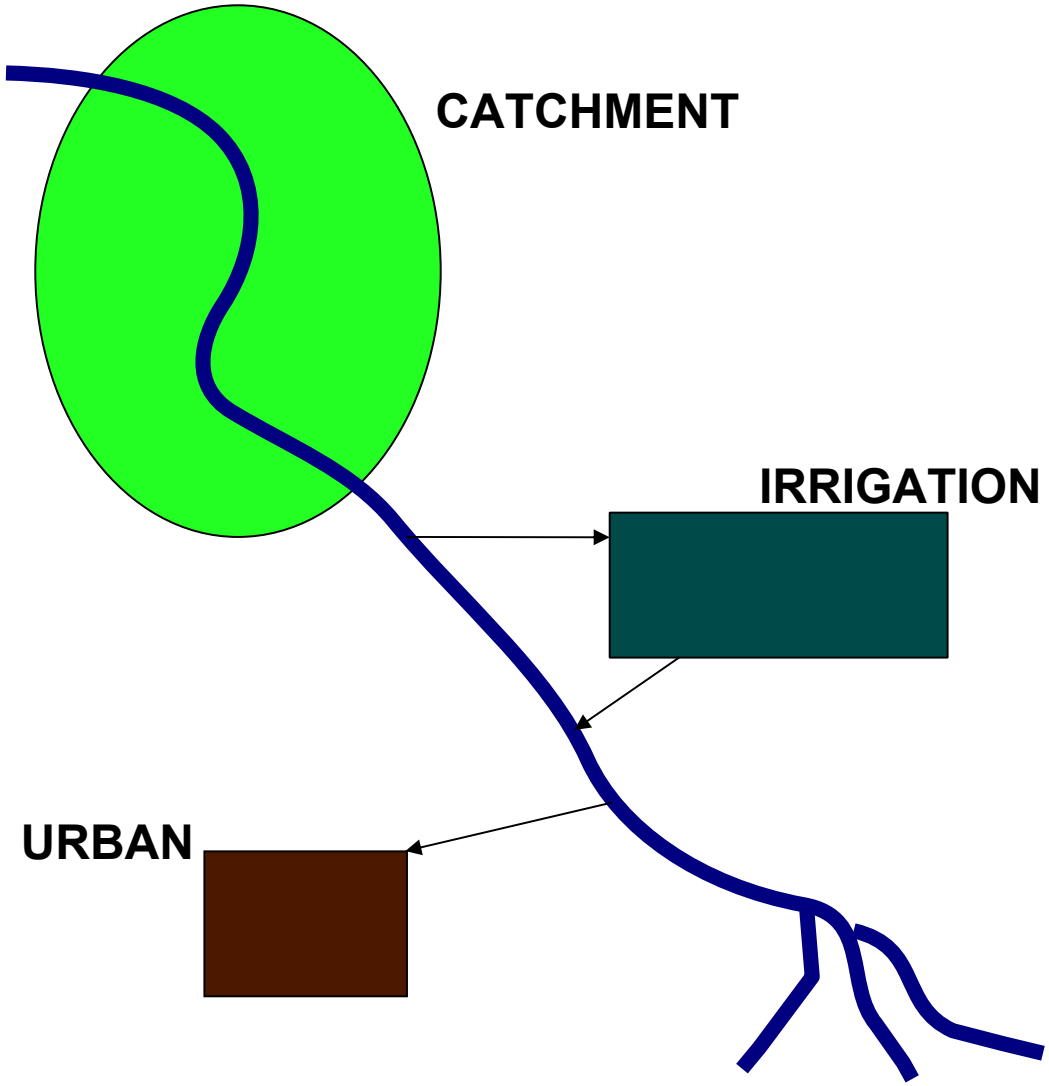
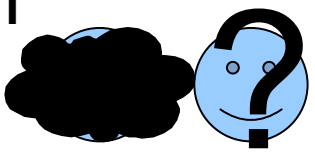


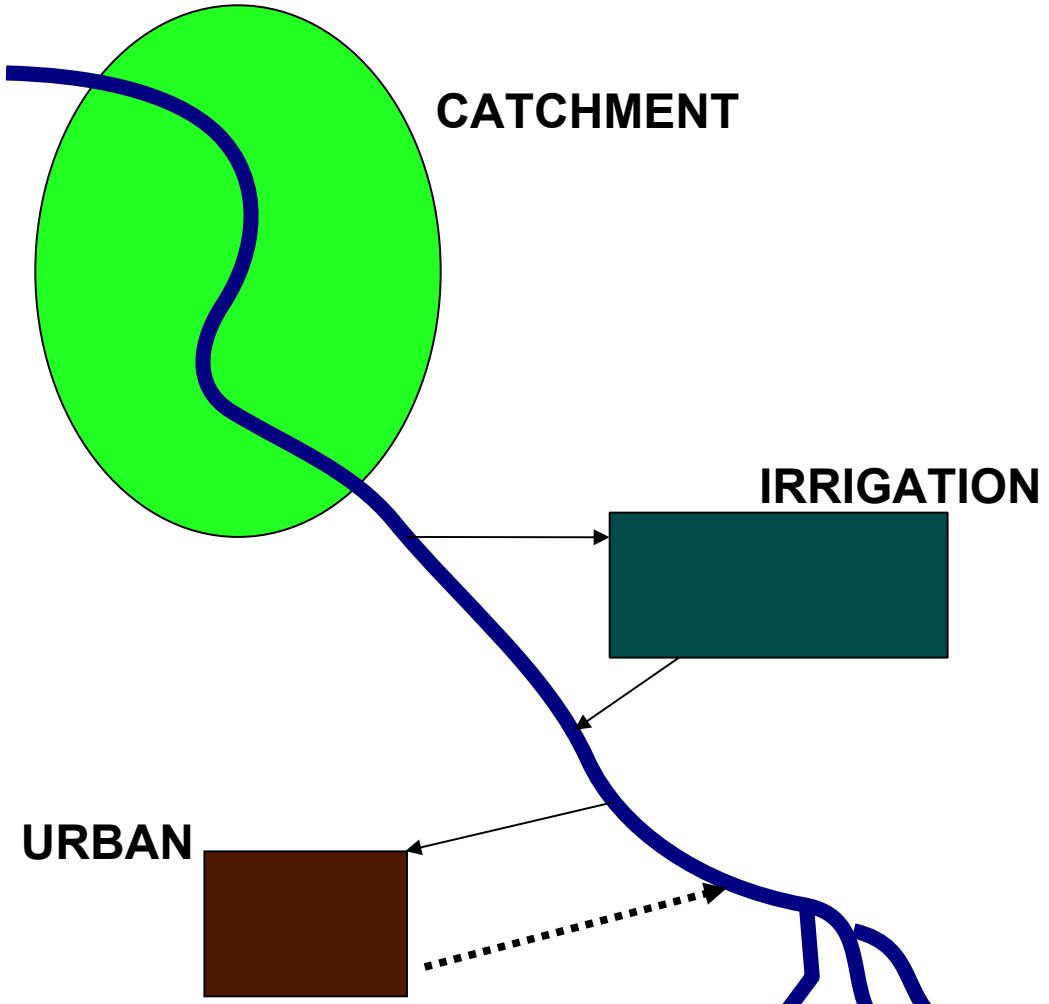
Improve catchment management... Soil conservation, tree planting...

WILL INCREASE CONSUMED FRACTION AND DECREASE RUNOFF



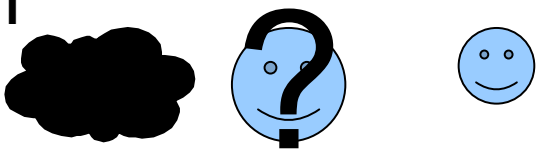
Increase irrigation efficiency...
MAY INCREASE CONSUMED FRACTION AND REDUCE RETURN FLOWS





Upgrade water supply and sanitation...

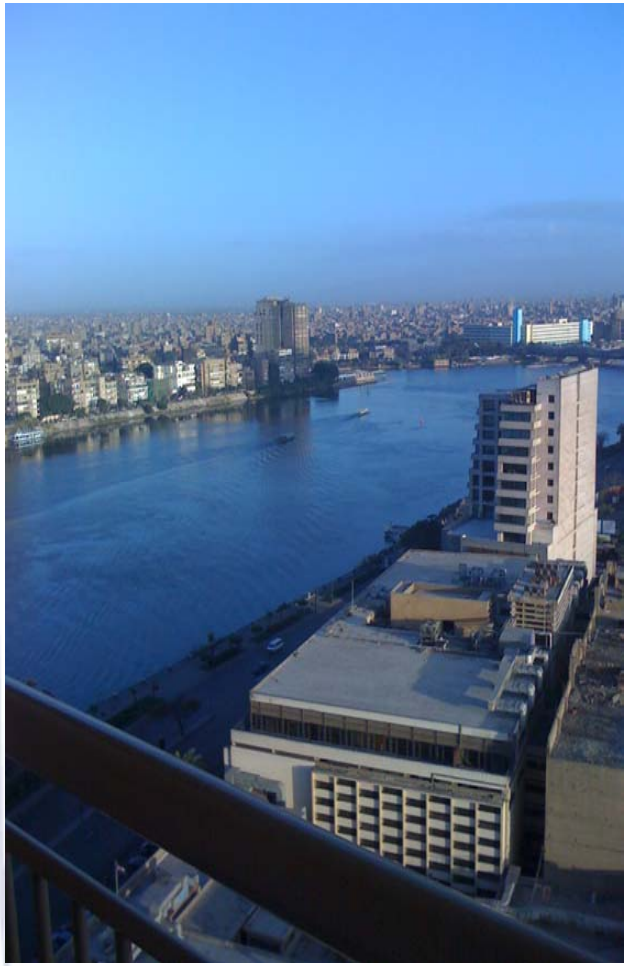
WILL INCREASE QUANTITY AND QUALITY OF RETURN FLOWS



THIS WAS ONE SCENARIO.

THERE ARE MANY...

LOCATION, LOCATION, LOCATION...



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Terminology for Water Accounting

- In a *basin*, the CONSUMED FRACTION may be 70% of water available
- Remote sensing can estimate the consumed fraction, spatially and temporally
- “Beneficial” is not an objective term

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Willardson, Frederiksen and Allen, 1995