



2018年(第27回) ブループラネット賞  
受賞者記念講演会

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2018 Blue Planet Prize  
Commemorative Lectures

マリン・ファルケンマーク教授

講演スライド集

「水」—生物圏をめぐる血潮

東京講演

Prof. Malin Falkenmark

Slides for the Lecture

Water - Bloodstream of the biosphere

Tokyo



**Blue Planet Prize 2018**  
**M Falkenmark Lecture 1**



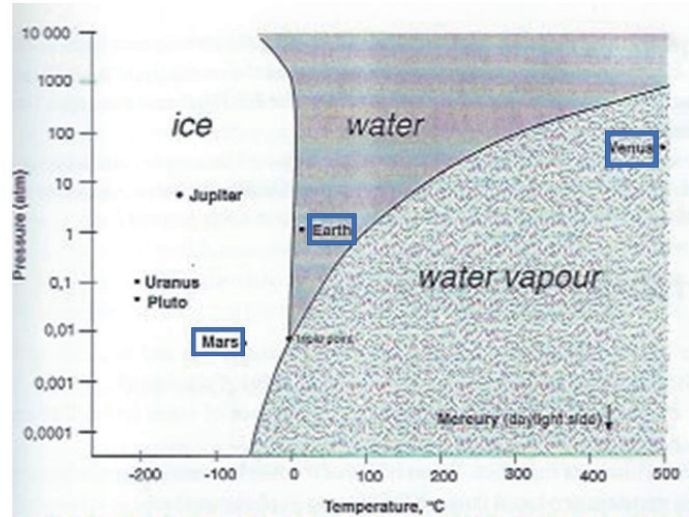
## **Water – bloodstream of the biosphere**

**Water and the life support system**

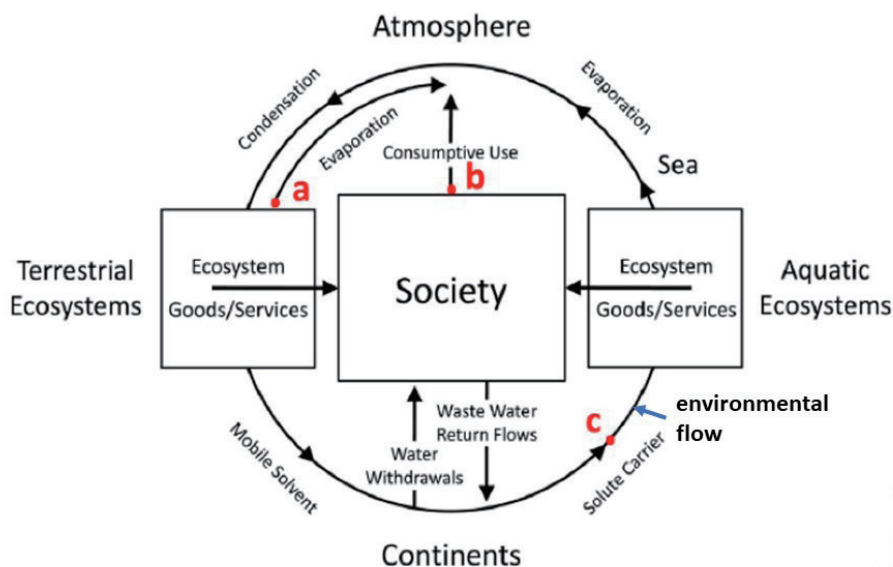
## Water and life-support system

Planet Earth the only planet in the solar system where water can exist as both  
-ice -liquid -vapour.

Mars too cold  
Venus too hot



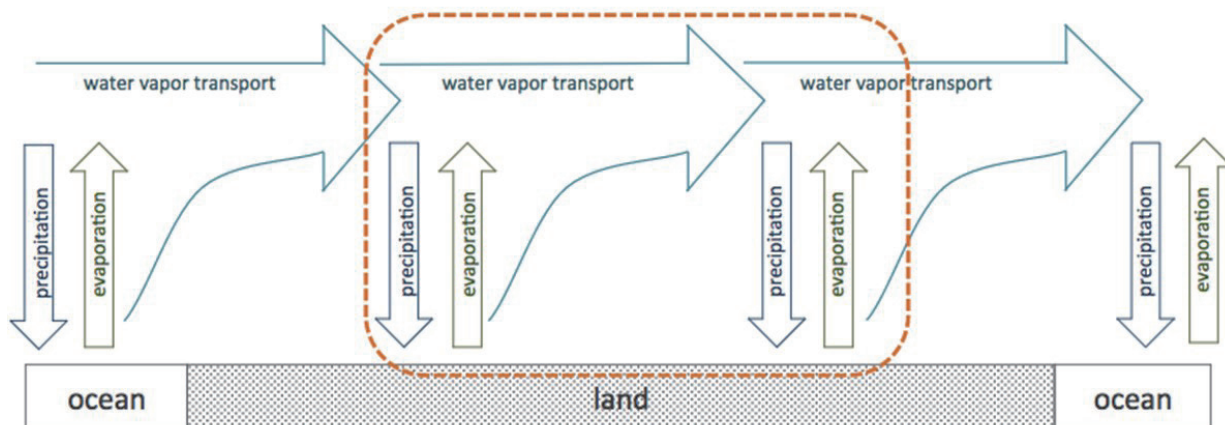
## Water cycle makes life possible on this Planet



*Securing environmental flow puts limits to consumptive water use*

*Planetary Water Boundary*

## Global water circulation

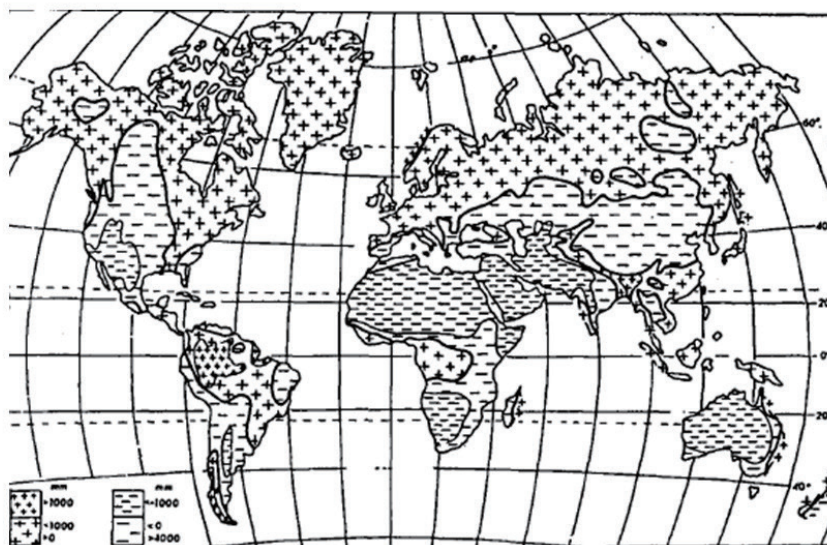


land use change → evaporation → aerial vapor flow → downwind rainfall

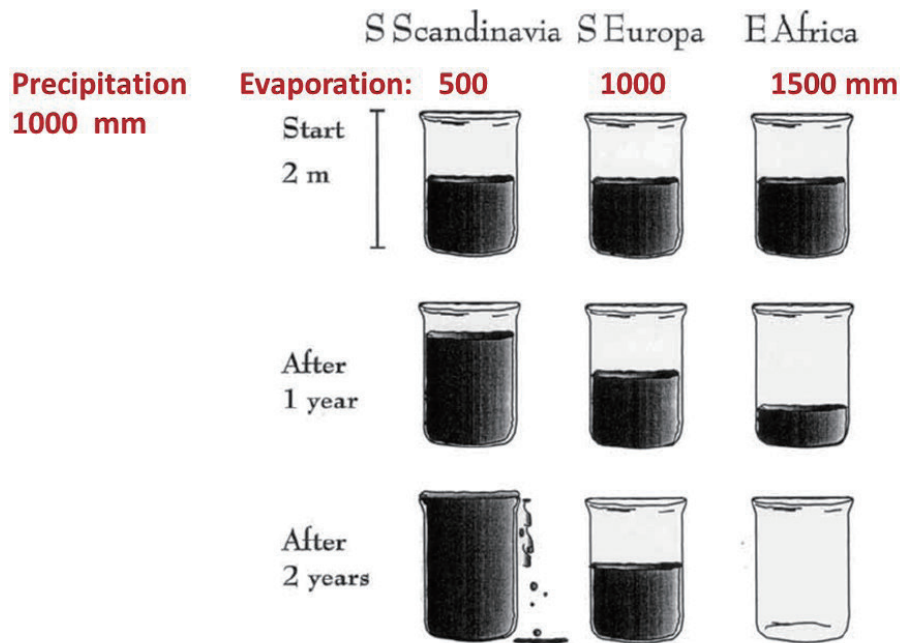
Source: Patrick Keys

## Large hydroclimatic differences

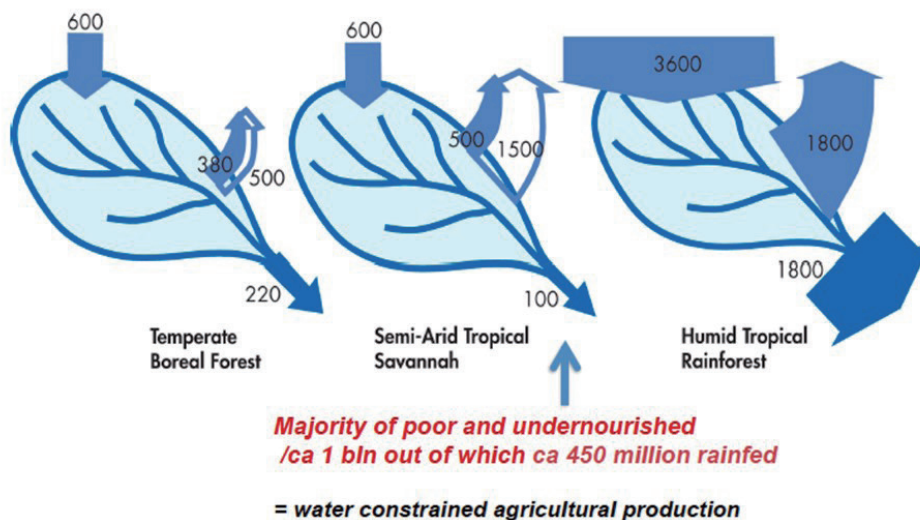
precipitation  
minus  
evaporative demand



## Difference humid vs arid hydroclimate

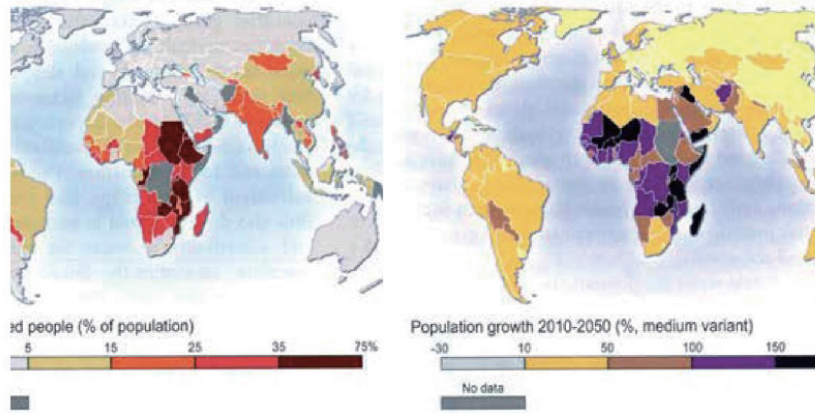


## Hydroclimate differences reflected in human life support system





# Africa suffering from major development failure

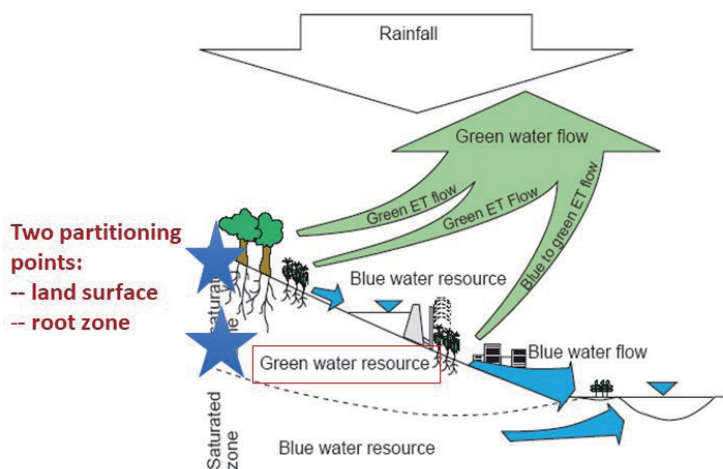


**UNDERNUTRITION**

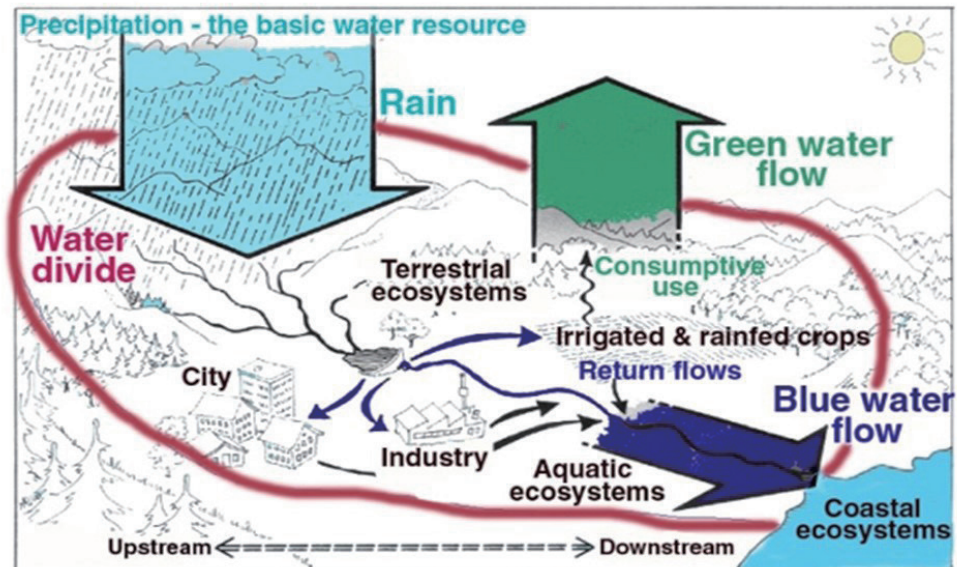
**POPULATION GROWTH**

**Strong motivation for UN Sustainable Development Agenda**

## Rainwater partitioning into green and blue water



## River basin water partitioning

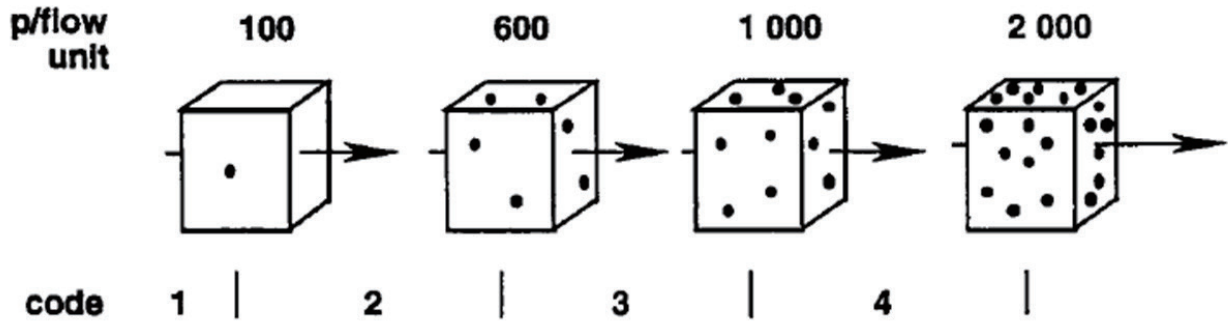


**Blue water scarcity**



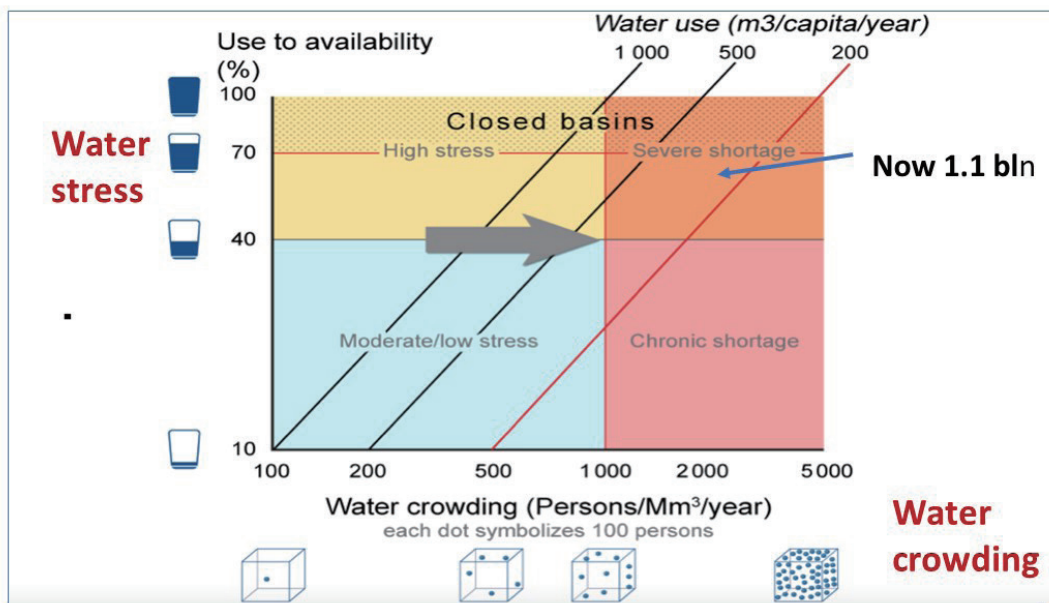
# Water crowding

how many people share each flow unit?



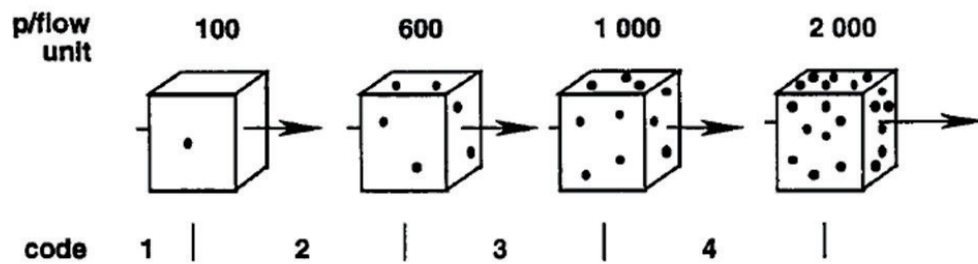
**"Falkenmark indicator"**

# Blue water scarcity components



## Water pollution

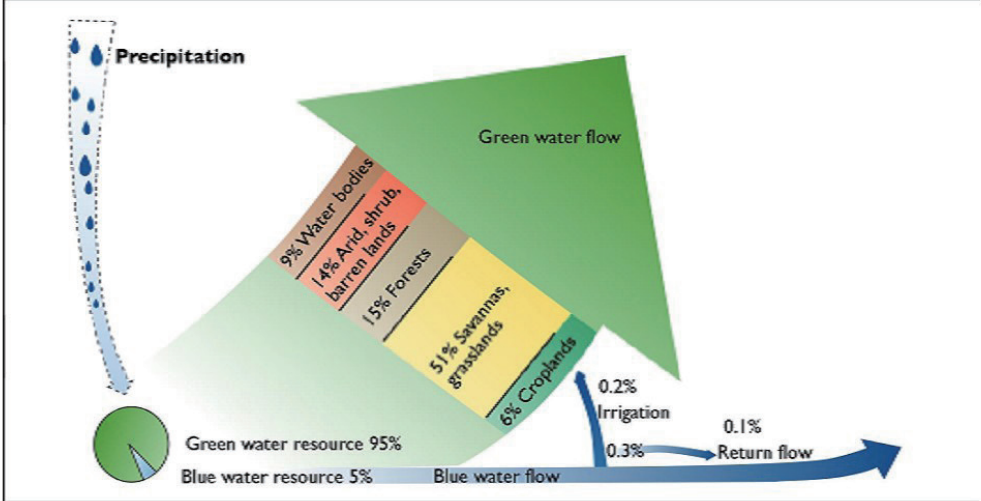
- Number of people polluting each flow unit



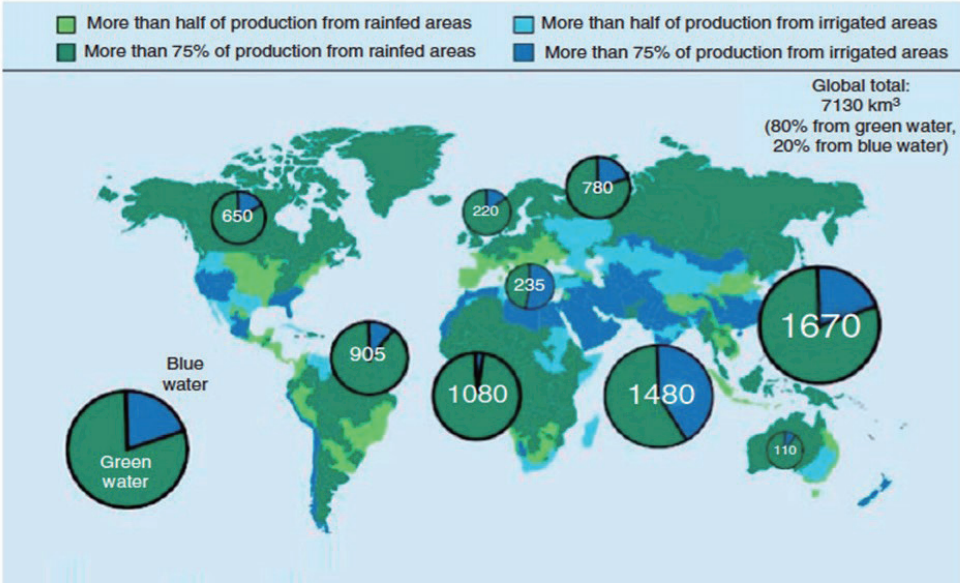
**Green water** — core water resource in  
dryland agriculture

# Kenya's water balance

most water is green!

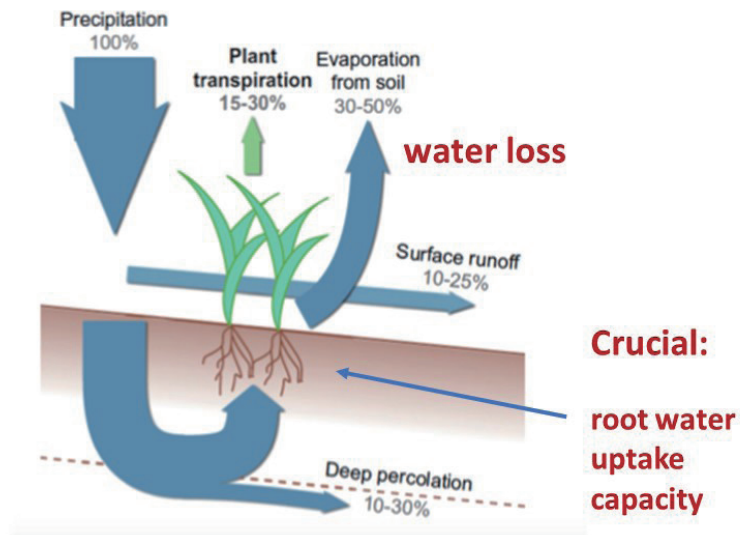


# Water used in global food production



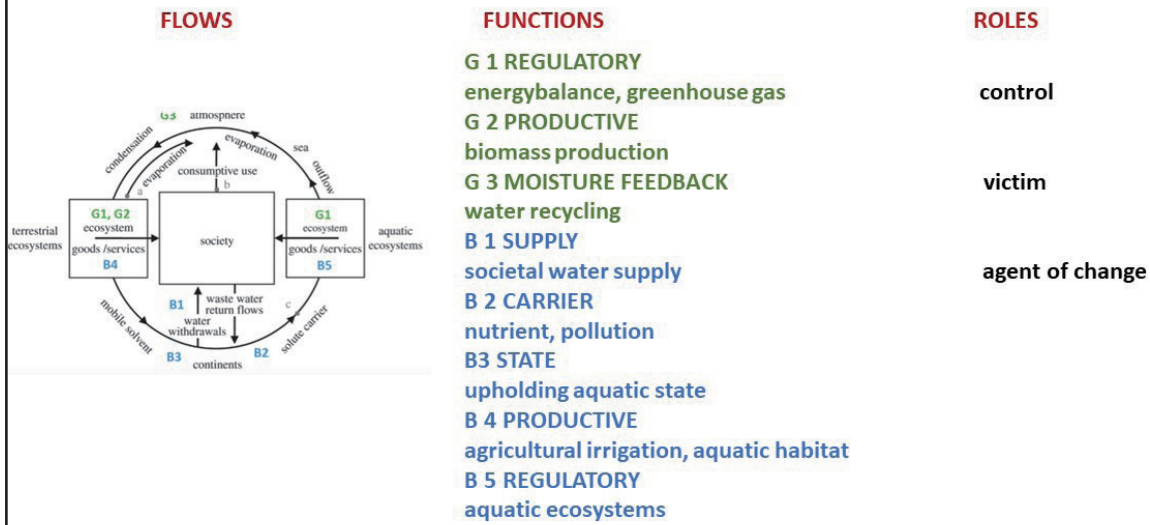
## Dryland agriculture

huge agricultural water losses to overcome

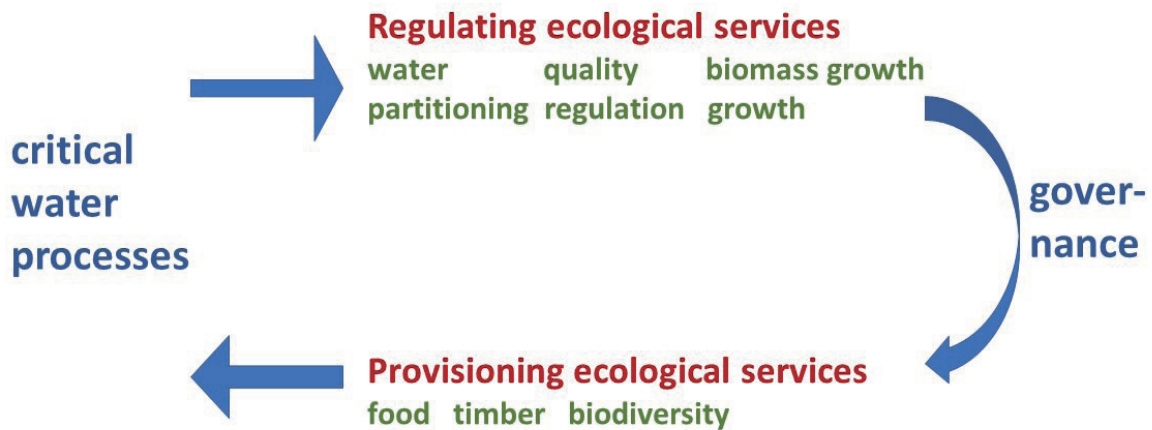


- **Global outlook on the life support system**

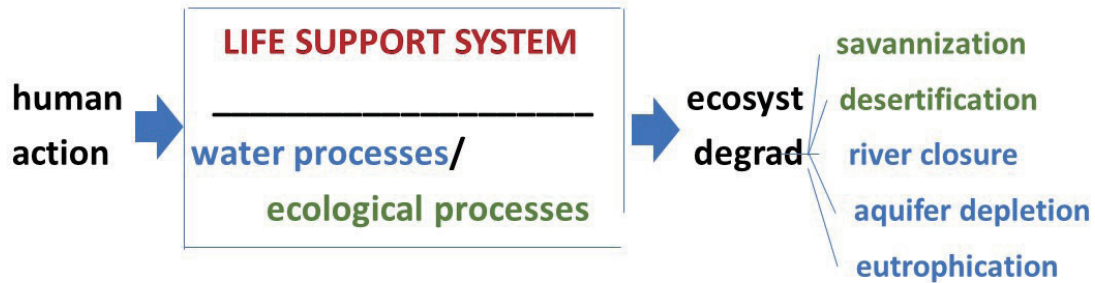
# Water – interacting processes in the life support system



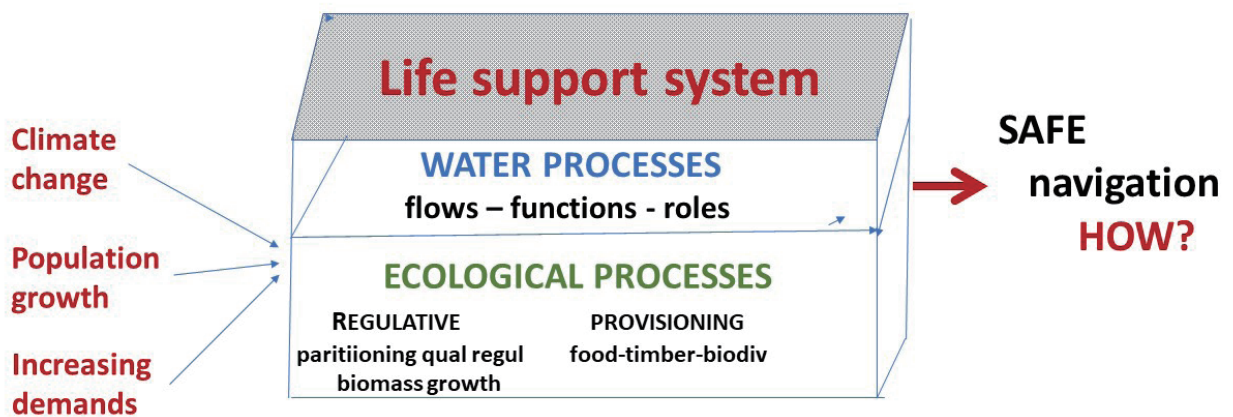
## Water interaction with ecological processes



## Past degradation of ecosystems



## Question for next generation





Thank you!!!



Blue  
Planet  
Prize