



# Challenges to link biodiversity concerns with water management decision making in the Kura-Aras river basin

Вызовы для улучшения связи между биоразнообразием и принятием управленческих решений по воде в бассейне реки Кура Арас



Empowered lives.  
Resilient nations.

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International Demonstration Project Coordinator

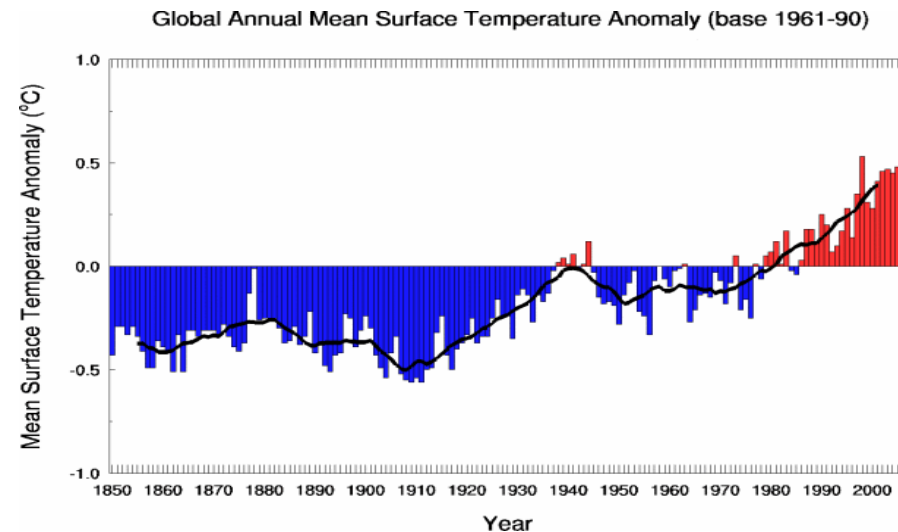
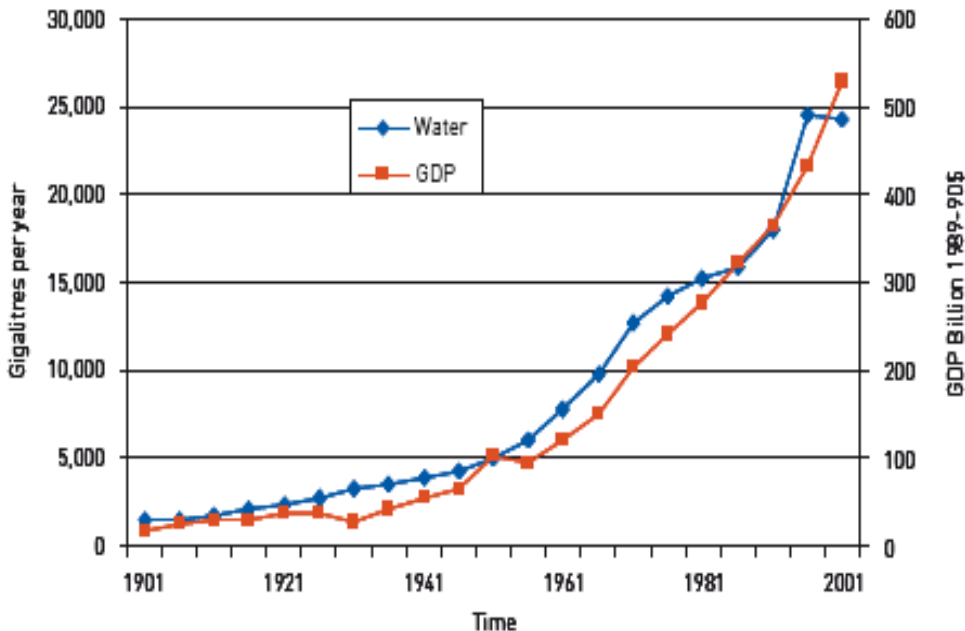
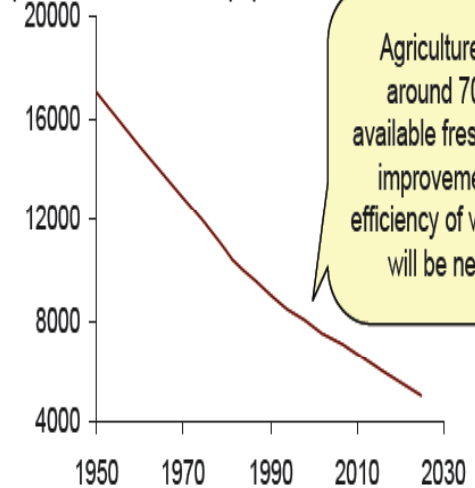


# The facts – humans & water

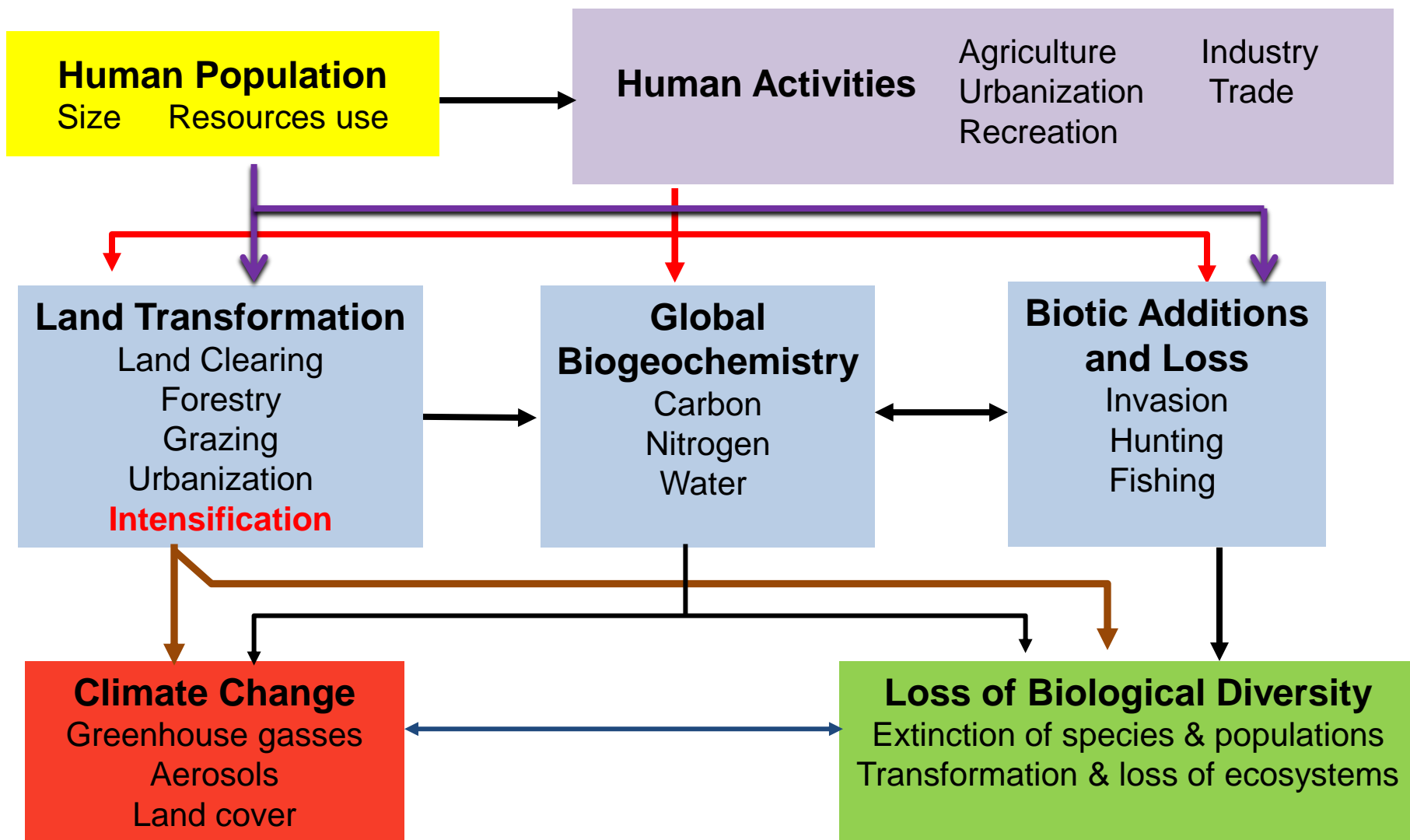


- World population doubled between 1960 – 2000:
  - Water use doubled, installed hydropower doubled, global economy increased six-fold
- Availability of freshwater is decreasing
- 50% wetlands “developed” for agriculture in 20<sup>th</sup> century
- Increase in GDP = increase in *per capita* consumption
- Climate change

Actual and projected freshwater availability, cubic metres per head of total world population<sup>1</sup>



# Interrelationships

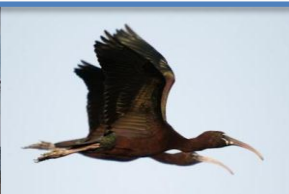




# The facts - biodiversity

## General developments

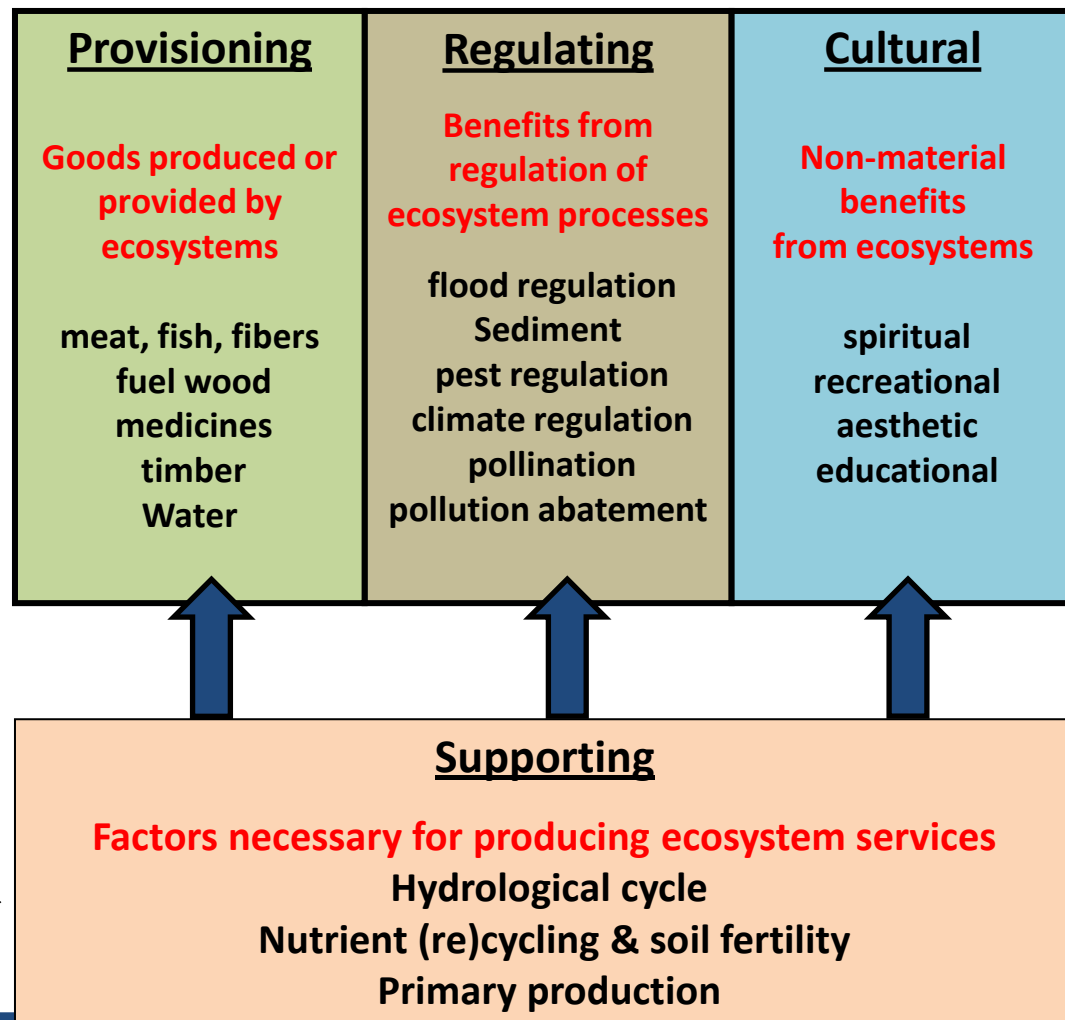
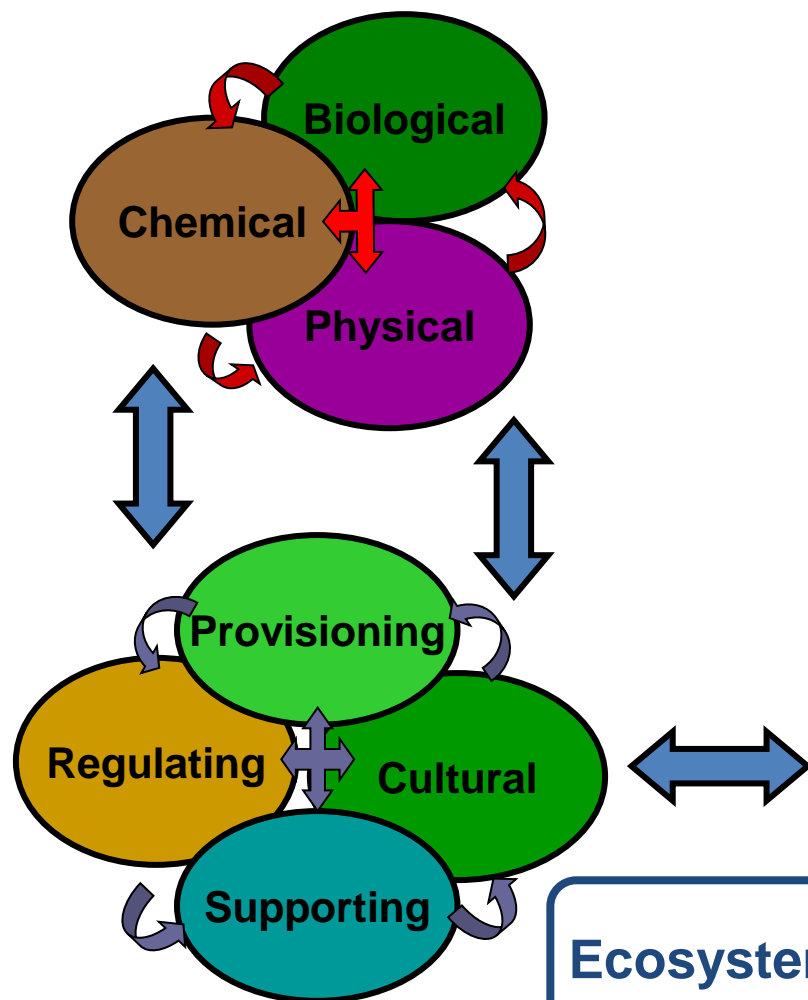
- The **degradation and loss of wetlands** is more rapid than that of other ecosystems.
  - Less fish, and less fish species (30% threatened)
  - Increasingly flora & fauna species threatened/extinct (24% of all mammals, 12% of all birds)
- Primary **direct drivers** of degradation and loss
  - infrastructure development, land conversion, water withdrawal, eutrophication & pollution, overharvesting & overexploitation, introduction of invasive species
- Primary **indirect drivers** of degradation and loss of wetlands:
  - population growth, economic development, sector-oriented policies and decision making,
- **BUT**
- Nature **DOES** deliver a wide range of valuable services



# The facts – Nature's value



## Ecosystem Components and Processes

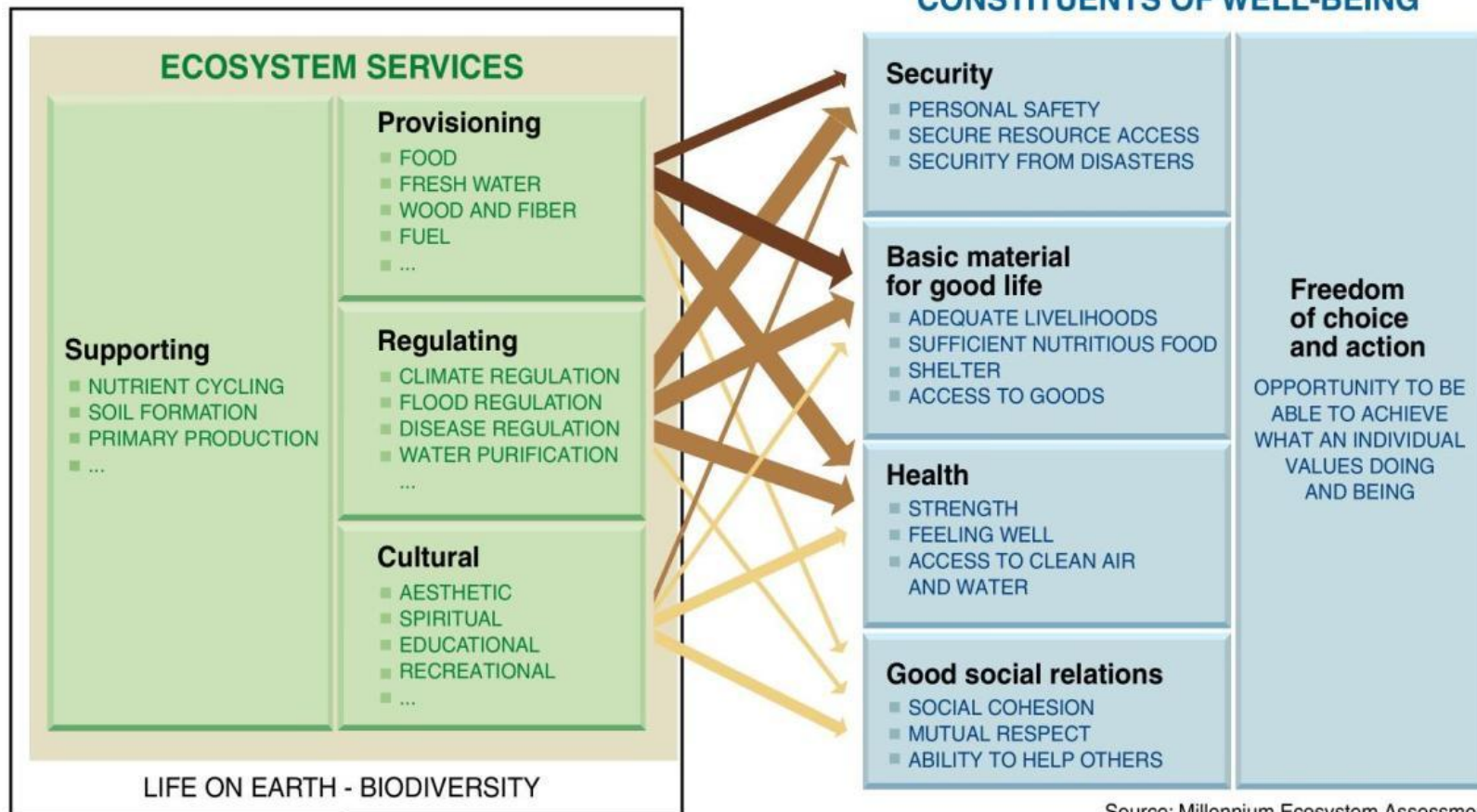


## Ecosystem Services

# Nature's benefits for humans



Empowered lives.  
Resilient nations.



Source: Millennium Ecosystem Assessment

**ARROW'S COLOR**  
Potential for mediation by socioeconomic factors

- Low
- Medium
- High

**ARROW'S WIDTH**  
Intensity of linkages between ecosystem services and human well-being

- Weak
- Medium
- Strong

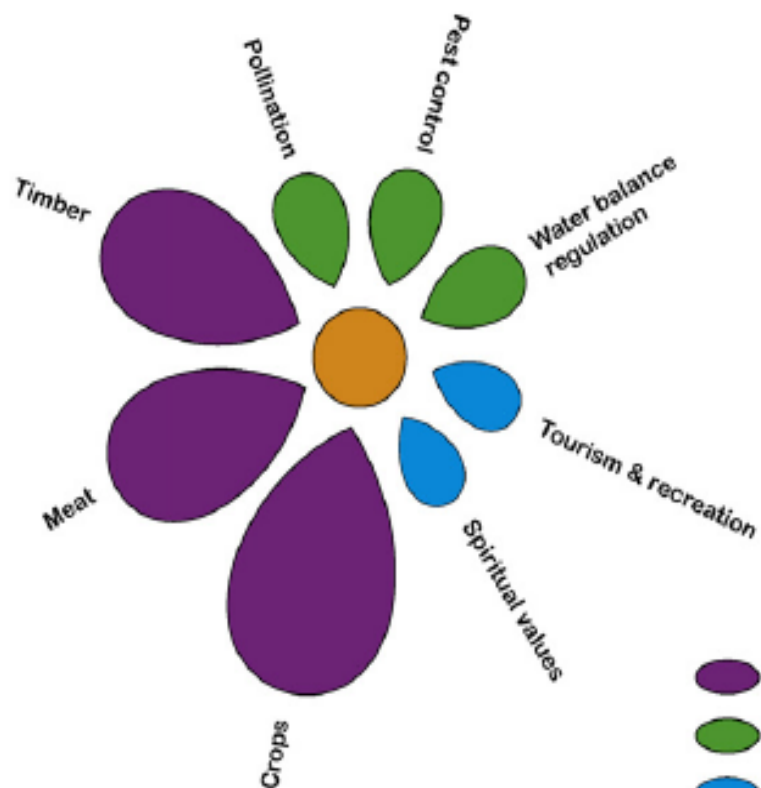


# Changed benefits






Impact of agriculture / water regulation on ecosystem services:  
shift from regulating services (generally unvalued and not traded) to provisioning services (valued and traded)

AGRICULTURAL ECOSYSTEM



'NATURAL' ECOSYSTEM



-  Regulating ecosystem services
-  Provisioning ecosystem services
-  Cultural ecosystem services



# The message

from the Millennium Ecosystem assessment

- Humans have made **unprecedented changes** to ecosystems in recent decades **to meet growing demands** for food, fresh water, fiber, and energy
- These changes have helped to **improve the lives of billions**, but at the same time they **weakened nature's ability** to deliver other key services such as purification of air and water, protection from disasters, and the provision of medicines
- The **pressures** on ecosystems **will increase** globally in coming decades unless human attitudes and actions change



# the figures



## Danube delta wetlands

Value provided by restored habitat for nitrogen and phosphorous absorption and cycling  
**~\$112.5 million** and **~\$18.2 million**  
 respectively / year (Kettunen & ten Brink, 2006)

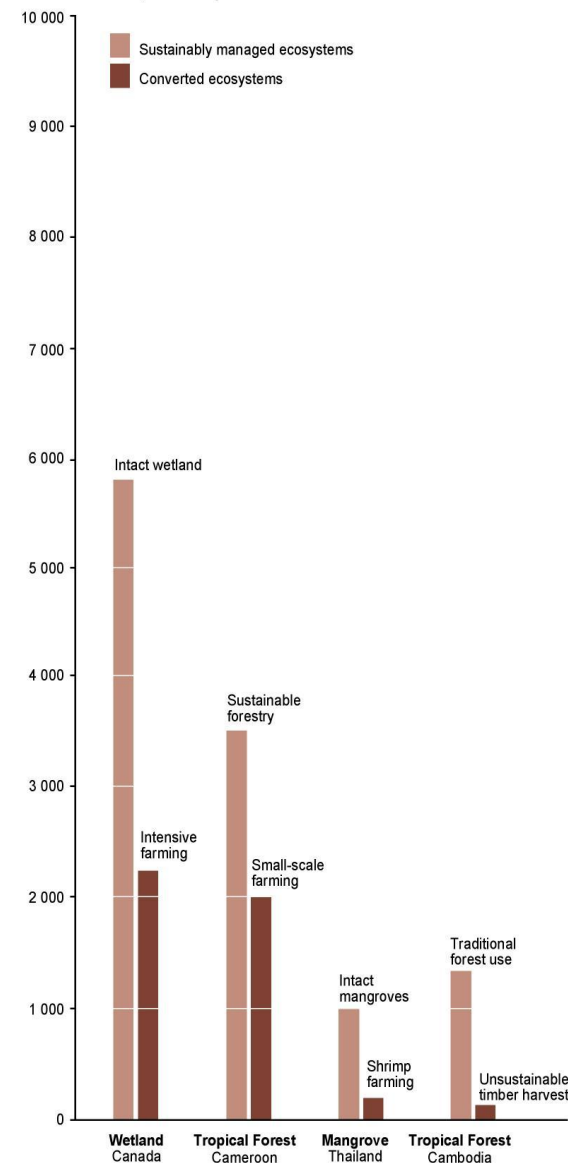
## England and Wales

Total value of inland fisheries  
**4,854 million EUR**  
 (Murray, M. & Simcox, H. 2003)

## Global

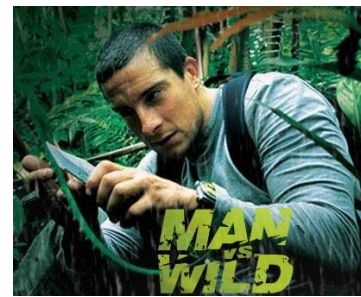
Value of ecosystem services to human welfare (Constanza et al., 2007)  
**\$ 42 trillion / year** (2004 \$US)

Net Present Value, in dollars per hectare



# Man vs. Wild

## in the Kura Aras river basin



### MAN

- Land conversion: agriculture, forest logging, dikes
- Extensive use of nature: overgrazing, water intake (irrigation, communal), hunting, fishing
- Dams: fish migration, reduced flooding
- Hydropower: off-stream
- Pollution: communal, lack of treatment
- Climate change

### WILD

- Natural habitats: destruction, degradation & fragmentation:
  - Forest – logging
  - Steppe – Agriculture
  - Floodplain – dikes
- Flora & fauna species: threatened species, decreased populations

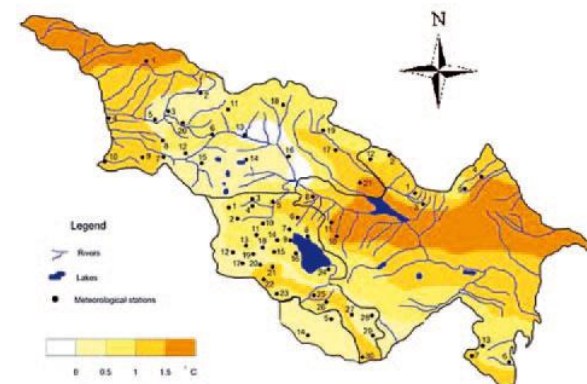


# The future

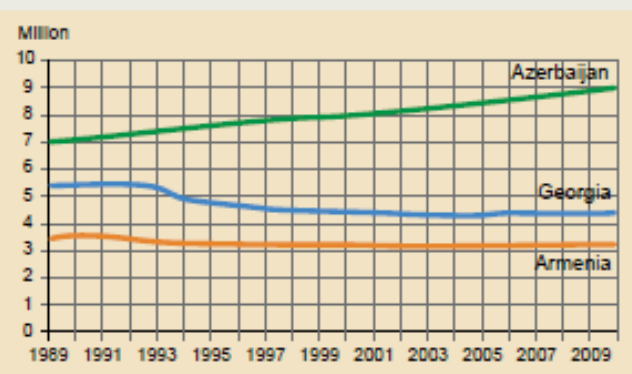


- Population: growth, increase urbanization
- Agriculture: increase – restore fields, intensify production
- GDP: increase
- Water use: increase – irrigation, communal, hydropower
- Climate change: increase T, decrease P
- Many **SECTORAL** economic development plans
  - more water for agriculture
  - more hydropower (energy needs, revenue from export)

## Temperature

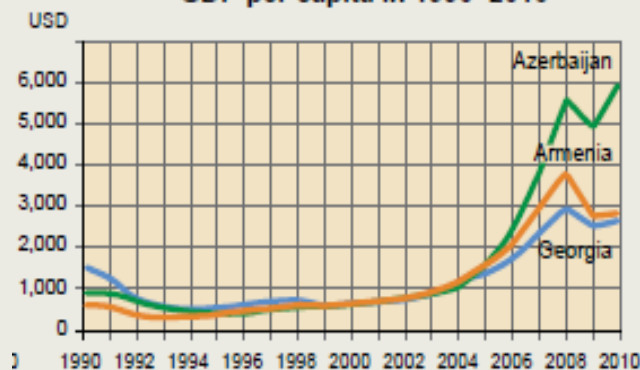


Population dynamics in 1989–2010



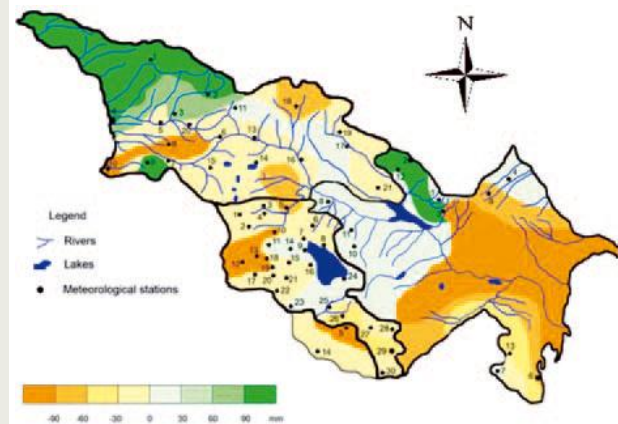
Sources: Statistical Year Books of Armenia, Azerbaijan and Georgia, 2010; World Bank statistics.

GDP per capita in 1990–2010



Source: UN statistics.

## Precipitation



# The developments



10/03/11 Overseas Private Investment Corporation (OPIC) approved **\$58 million** in financing for the construction of a 46-MW **hydropower** plant in Georgia ([www.opic.gov](http://www.opic.gov))

The government of Azerbaijan signed with IFAD agreement for **\$19.35 million** to finance the Integrated Agricultural Development project, for financing improving farmers' revenues and providing product security of the country. The total sum of the project is **\$103.8 million** ([www.vestnikkavkaz.net](http://www.vestnikkavkaz.net))

15/09/11 Norwegian "Norsk Energy" will implement the 3-year project of developing **hydropower** in Armenia "Armenia gives priority to small-scale hydropower plants (<10 MW). Armenia aims to build 265 MW of small-scale hydropower by 2025, which is a very ambitious goal" ([www.energi.no](http://www.energi.no); [www.news.am](http://www.news.am))

14/10/11 **Five million** euro Georgia Renewable Energy Fund for the development of small **hydropower** plants. ([www.koreatimes.co.kr](http://www.koreatimes.co.kr))

22/02/12 PM: Armenian government to prioritize **agricultural development** for next 5 years "... also the improvement of life conditions in Armenian villages," ([www.grantthornton.am](http://www.grantthornton.am))

Azerbaijan's long-term economic development strategy for 2011-2025 envisages to increase the area of **agricultural** land per capita from about 3 hectares in 2009 to about 10 hectares in 2025 ([www.blackseagrains.net](http://www.blackseagrains.net))

# The consequences



## Expectations from global trends

- Incidence of vector-borne and waterborne diseases may increase
- business as usual => within two decades demand for freshwater may rise +40%
- By 2025 – more people will live in water-stressed conditions
- Climate Change: river flow to decrease, precipitation to decrease, evaporation to increase

## Nature in the KURA ARAS river basin

- Continued: Habitat destruction, degradation, fragmentation
  - Wetlands, steppe, mountain ecosystems
- More flora & fauna species threatened, some may become extinct

**=> CONFLICT**



# Questions



- How will the Kura Aras basin cope with an increase in population and GDP – urbanization, wealth, water consumption ?
- Is there a way to address the additional energy, water and food demand, while not degrading the Kura Aras ecosystems even further?
- How to urge decision makers to see the 'bigger picture' and put nature / biodiversity / ecosystems into the center of solutions to transboundary water management
- Can the value of biodiversity / ecosystems / nature be internalized in markets, policies and decision making? How, what is needed?
- How to incorporate transboundary responsibility?



# The Discussion



## WHAT CAN WE DO?

- Towards **wise use** of the environment : Acknowledge biodiversity / ecosystems / species – complexity, heterogeneity, (economic) values
- Manage resilience, “no regret”
- Pluralistic approach in land & water management – in disciplines and methodologies
- Solid and extensive evidence & knowledge base

## AN HONEST APPROACH – ACKNOWLEDGE NATURE

## ALTERNATIVES ?

- Water harvesting, water saving & recycling – communal supply, irrigation, industry
- Use nature’s regulating functions: pollution treatment in natural & artificial wetlands (nutrient reduction, flood risk reduction)
- Protected Areas
- River Restoration

## LIMITATIONS & NEEDS

- Information & Knowledge
- Institutions
- Policies
- Legislation & Enforcement

**How???**

**Provide, protect, share, value**

**IDEAS?**

**OPINIONS!!**



стараясь не  
замечать кризис  
водных  
ресурсов

не беспокоить !

!! WATER !!

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... in name of Nature

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