Economical and societal value of water and its management

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GLASS/GEWEX workshop on Including Water management in Large Scale Models
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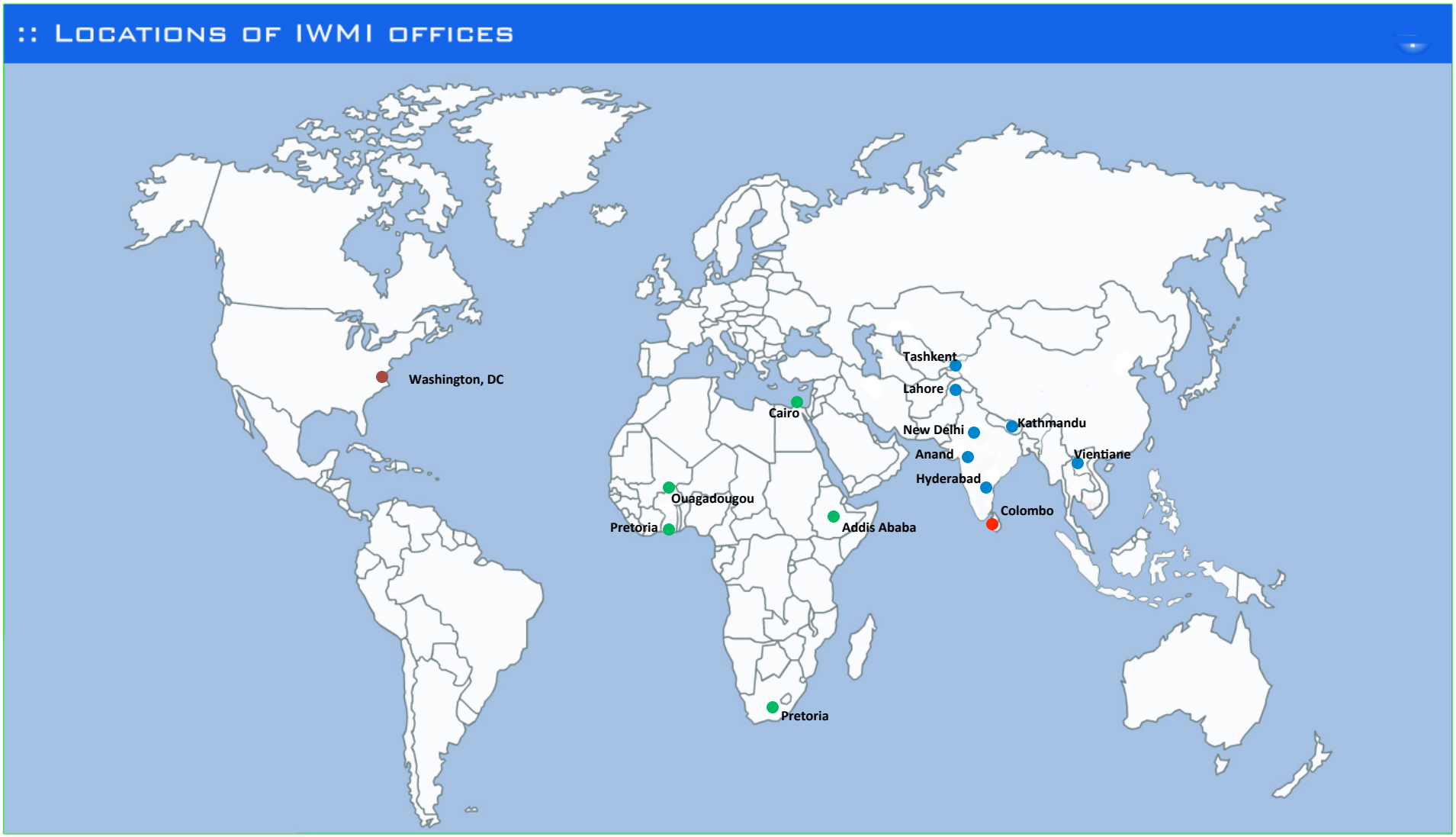
IWMI's mission

To provide evidence-based solutions to sustainably manage water and land resources for food security, people's livelihoods and the environment

IWMI's vision

A water-secure world

Where we work:



We are…

- **A think tank** driving innovative research and generating ideas for solutions.
- **A provider** of science based products and tools.
- **A facilitator** of learning, strengthening capacity and achieving uptake of research findings.

Consultative Group on International Agricultural Research (CGIAR)

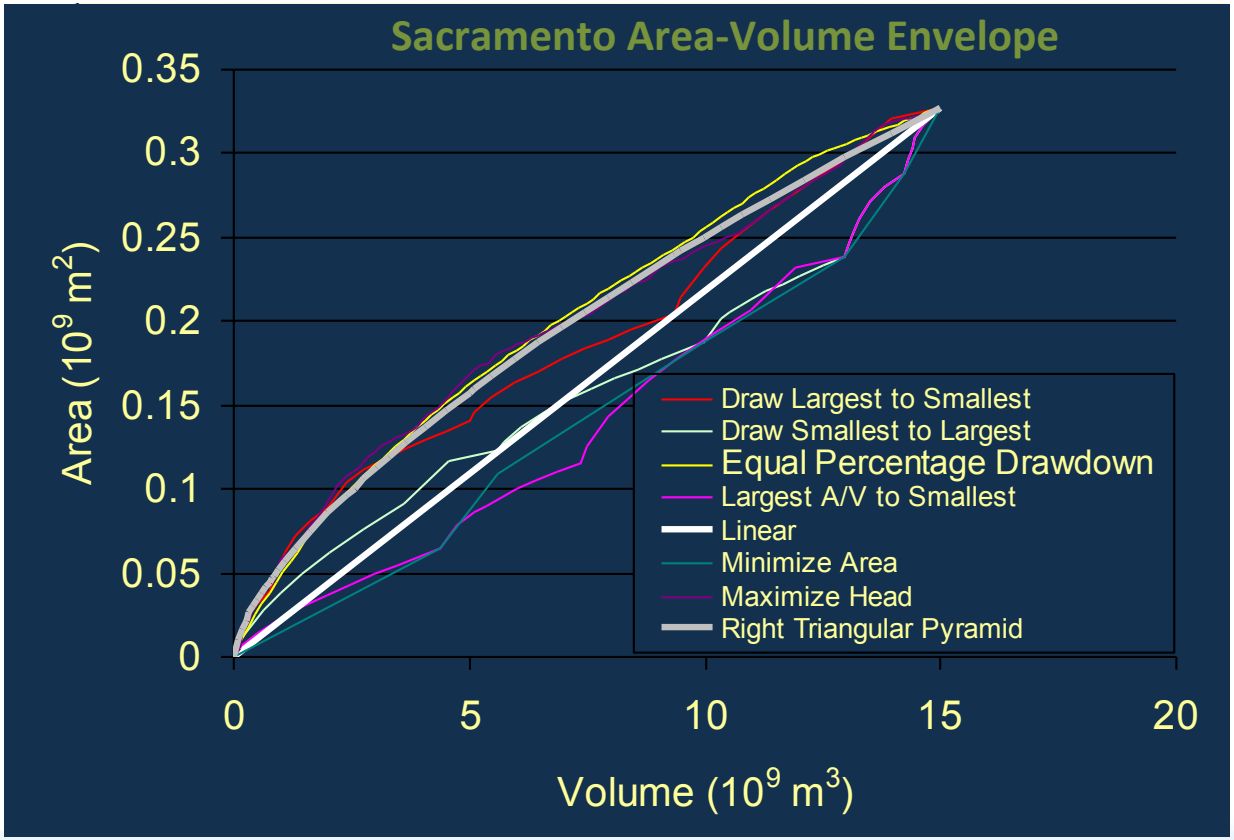
A world free of poverty, hunger and environmental degradation

What is Water Valuation?

- *"Water valuation is about assessing the worth of water to different stakeholders under a set of specific circumstances"* (WBCSD, 2012).

Why Water Valuation?

- Why do we model?
- Why do we need to include water management?
  - Hint: Only 12% of the world's large rivers flow freely from source to sea (WWF)



Why Water Valuation?

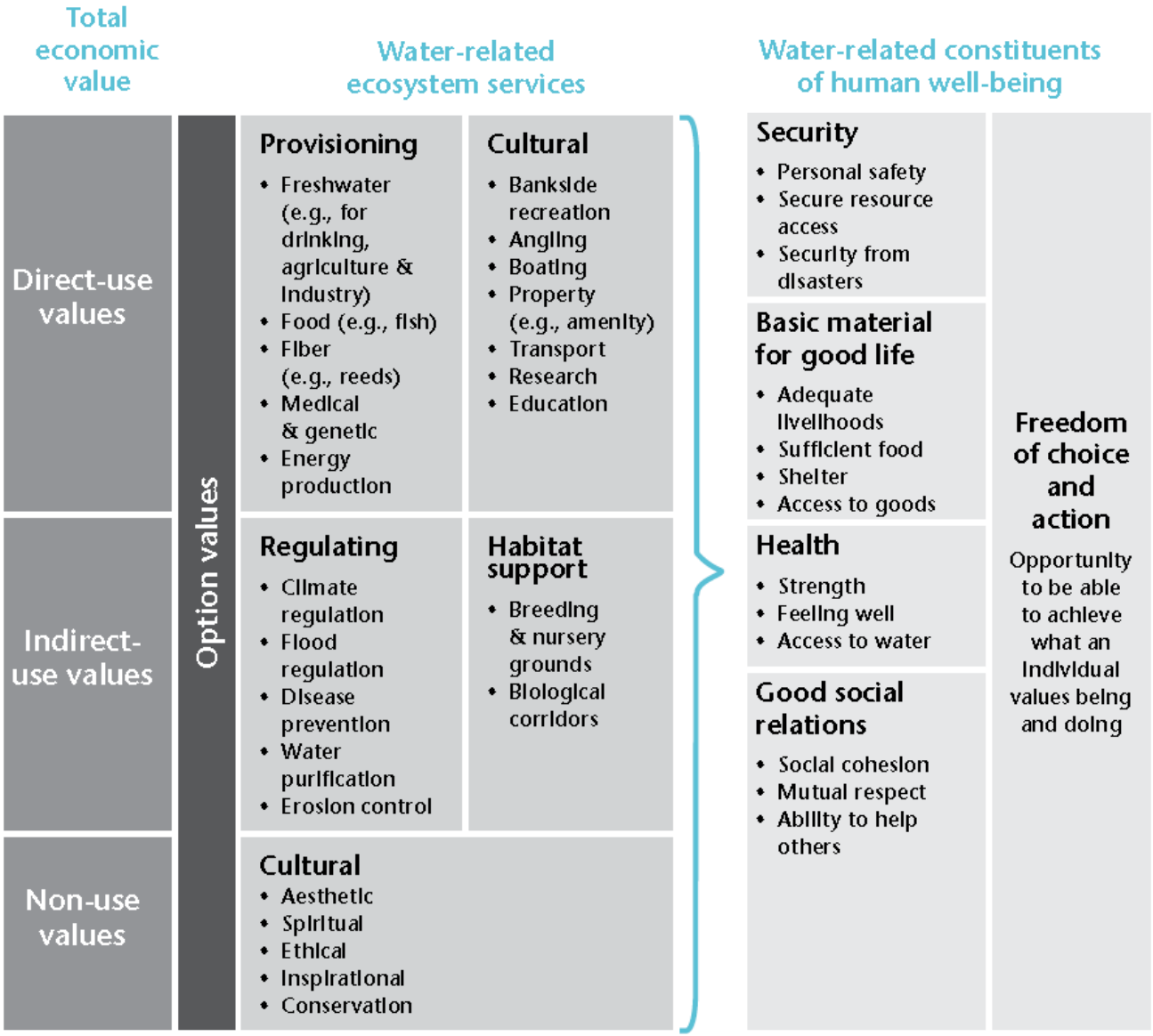
- Water management is for meeting demands
- Water valuation defines those demands and associated priorities
- Water valuation leads to sustainability efficiency
- Regulations and conventions
  - Water Framework Directive (full cost recovery)
  - Blueprint to Safeguard Europe's Water, 2012
  - Dublin Statement, 1992
  - Convention on Biological Diversity, 1992
  - Banking sector's Natural Capital Declaration, 2012

Why Not Water Valuation

- Water has only fairly recently become a scarce economic good (at large scales).
- Complex and difficult
- Scope too large and varied
- Context Specific: No fit-for-all approaches
- Complex terminology
- Different stakeholder perspectives/priorities
- Ethical issues

Frameworks

Figure 8 Water-related ecosystem services and links with total economic value and well-being



Source: WBCSD, 2012

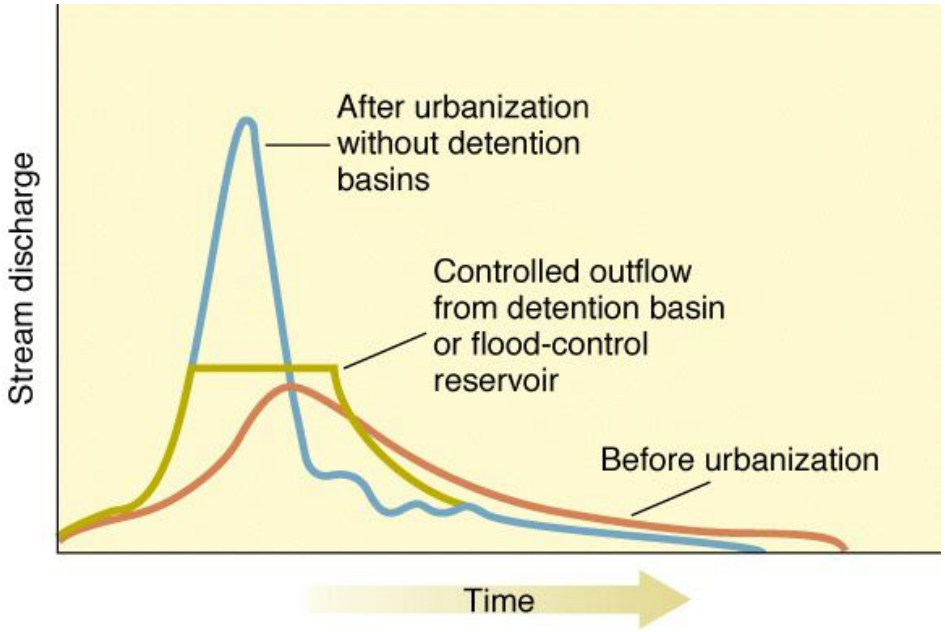
Methods

- Market Price (direct or indirect)
- Production Input (avoided damage, substitutes)
- Revealed Preferences
  - Hedonic Pricing
  - Travel Cost
  - Multi-site Recreation demands
- Stated Preferences
  - Contingent Valuation (willingness to pay)
  - Choice modeling
- Benefits Transfer

Source: Canadian Council of Ministers of the Environment, 2010

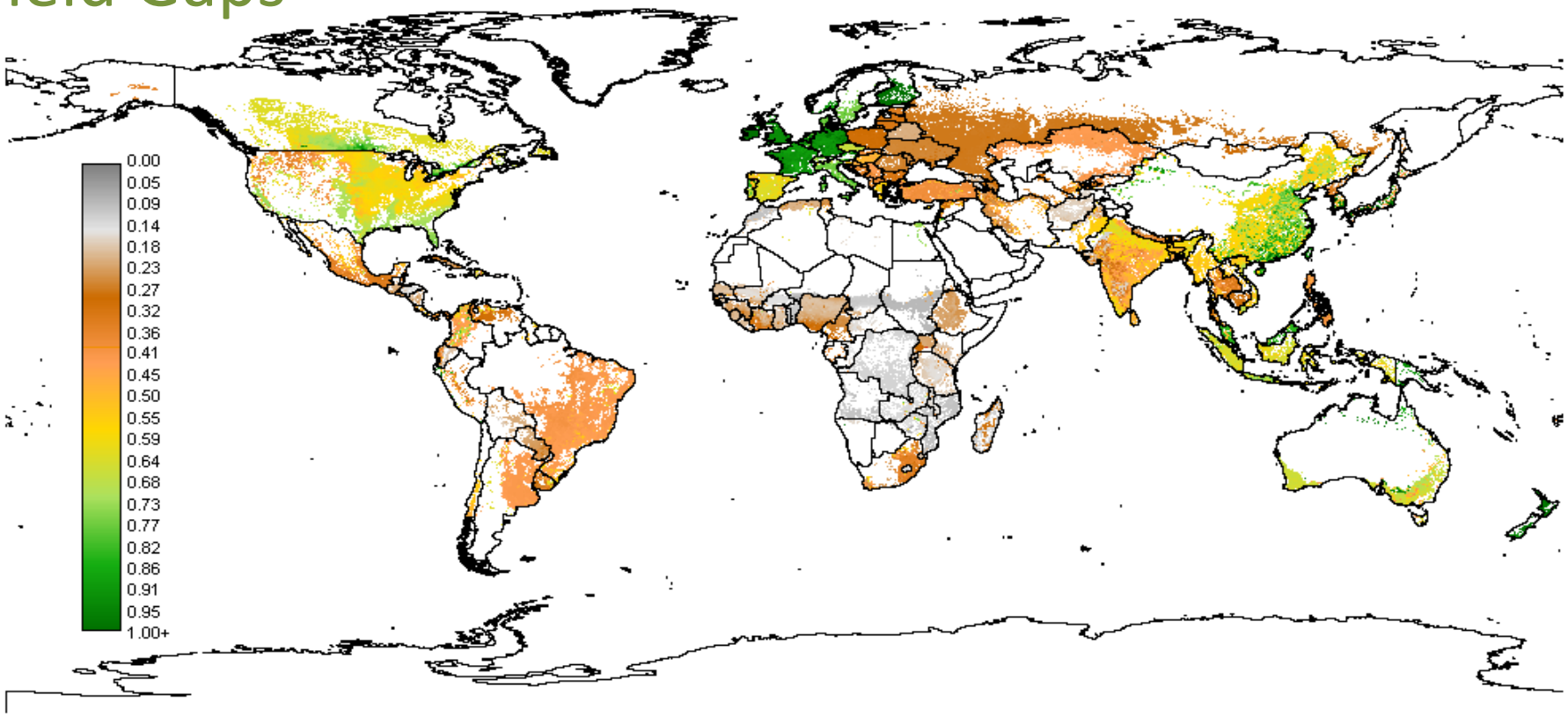
Methods: Market Price

- Opportunity costs
- Cost of alternatives
- Mitigation Costs
- Shadow Project
- Cost of illness
- Subsidy cost



Methods: Production Input Method

Yield Gaps

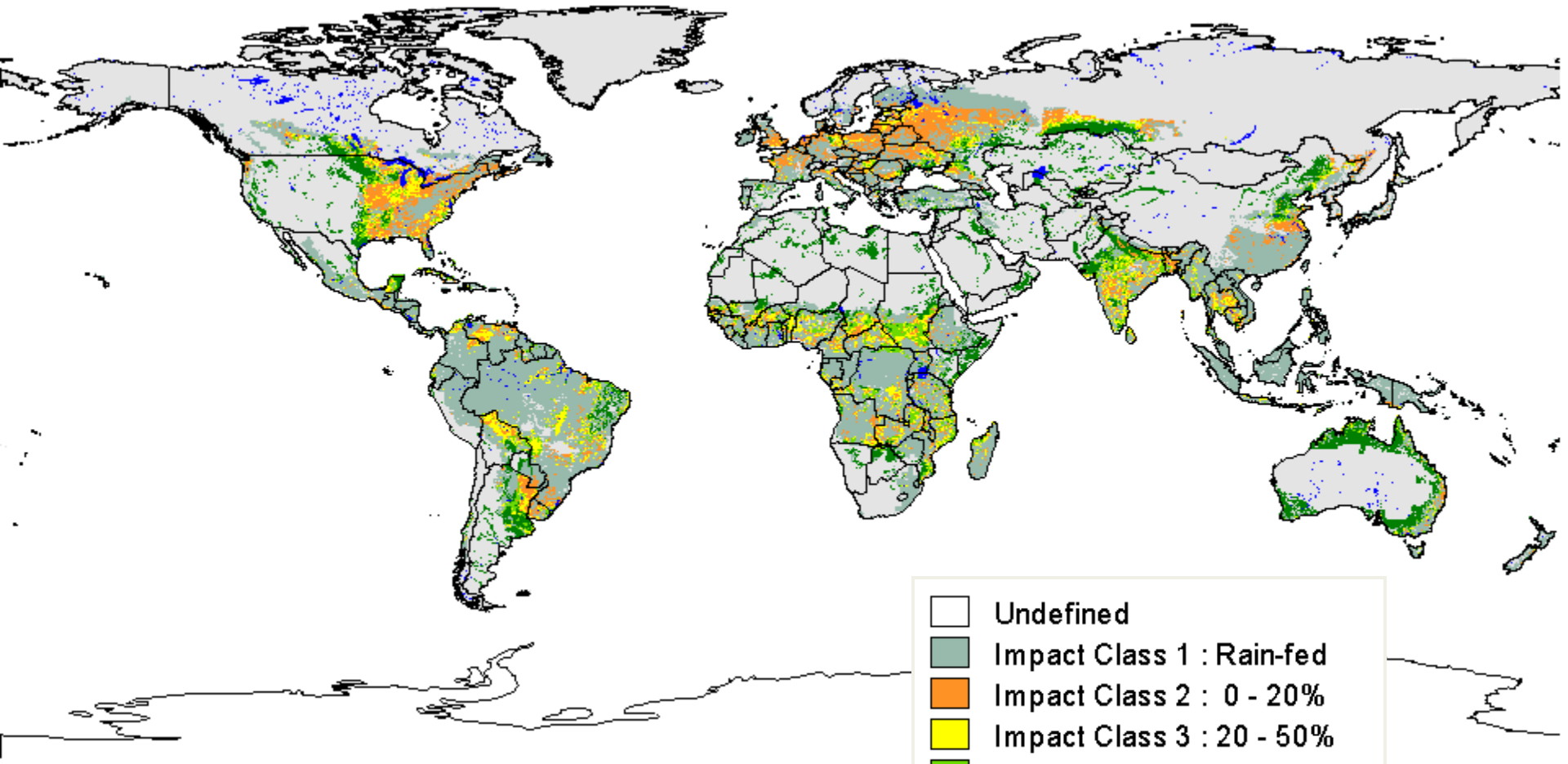


Yield gap ratios comparing actual crop production of year 2000 with potentials achievable in current cultivated land with advanced farming. *Source: GAEZ2012.*

Methods: Production Input Method

Where Irrigation Matters

AEZ irrigation impact classes

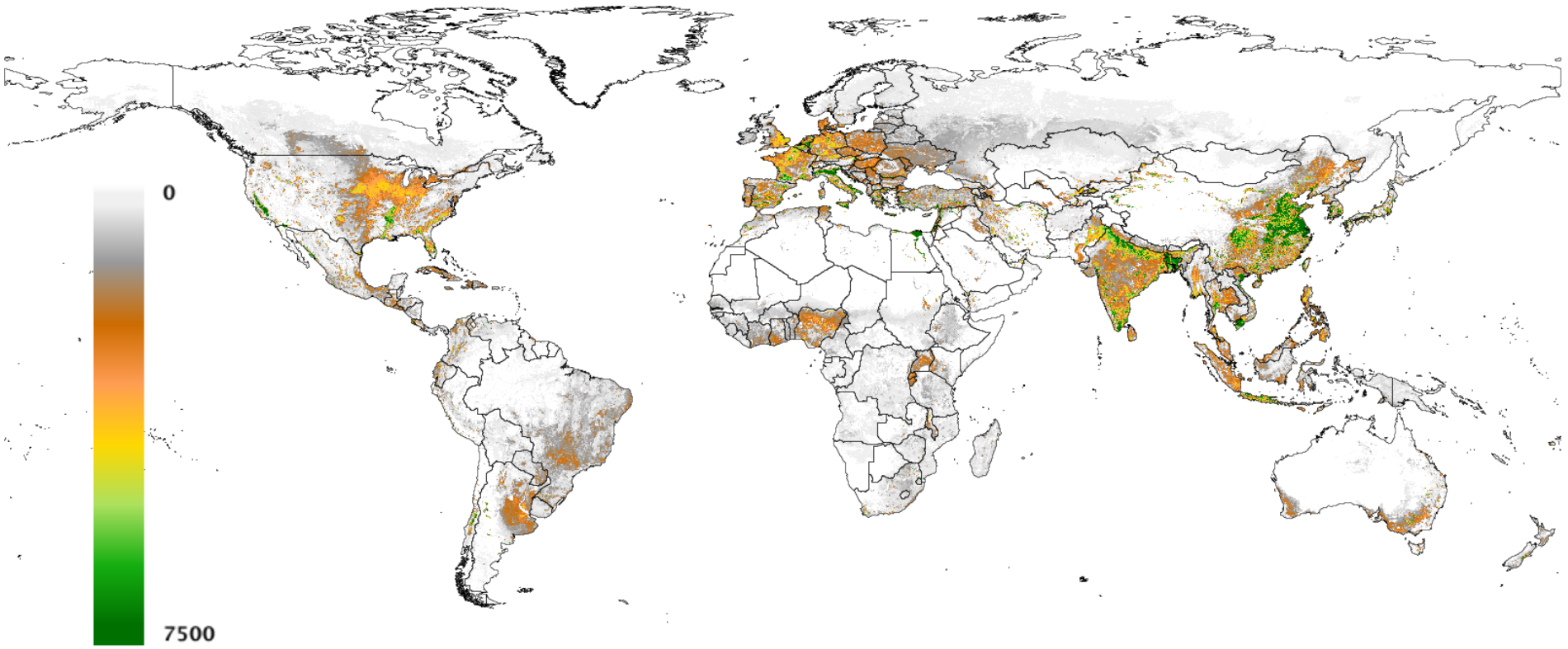


Source: GAEZ Portal, FAO&IIASA

Methods: Production Input Method

Total crop production value

(GK$ by 5 min latitude/longitude grid cell)



Source: GAEZ Portal, FAO&IIASA

Methods: Revealed Preferences

- Hedonic Pricing

- Travel Cost
- Multi-site Recreation demands
  - Where do individuals go more often based on perceived quality and quantity of natural resources

Source: Canadian Council of Ministers of the Environment, 2010

Methods: Stated Preferences

- Contingent Valuation – Surveys
- Choice modeling
  - Several choices with different options and prices

Conclusions

- Water valuation improves resource planning, efficient and sustainable use.
- Helps develop and understand impacts of scenarios
- Market Price and Production Input Methods Suitable for large-scale modeling now
  - However, they are only proxies for true value
  - Other methods can help get closer to true value, but are highly context specific and difficult to implement on large scales
  - Benefits transfer methods could help.
- New databases are needed

Source: Canadian Council of Ministers of the Environment, 2010

Information Requirements

- Trends in water uses at basin/sub-basin scale
  (locations and times of use, quality required, technology used, developments over time)
- Policy/Institutional/Legal mapping
  (which **organizations** are responsible for which decisions, monitoring, enforcement, impacts of change)
- Options Analysis and Database
  (benefits, costs, impacts, synergies, tradeoffs)
- Priorities/Values Mapping
  (what are the priority options for **stakeholders** in the regions)