Water and Change

A personal account of nearly 40 years in WATER

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The Water CHANNEL

Involvement in 3 WATER issues

- Rural Water Supply: 1973- 2000
- Water and Climate: 2001 - 2012
- Water and Peace: beyond 2012……..

1. Rural Water Supply

Malawi Gravity Fed Water Supply Systems

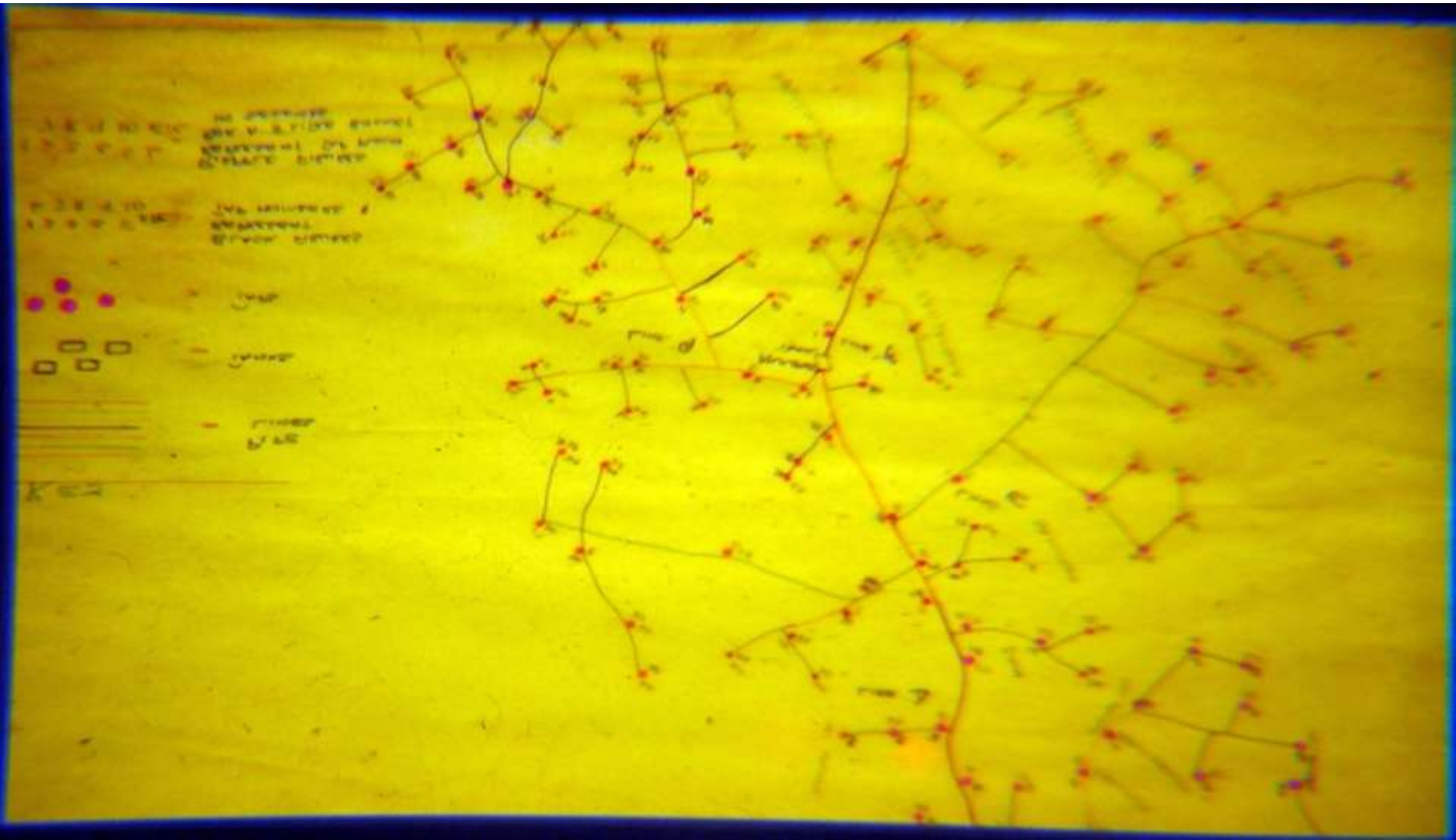
- Malawi landlocked country in South East Africa
- Started 1968 with small pilot by Reverent Lindesay Robertson
- My involvement: April 1976 till Sept 1983.
- Worked on: designs, constructions, training, setting up O&M and performance monitoring, socio economic and health impact studies, development of slow sand filtration

Principles

- All project activity (including planning, mobilization of resources, construction, maintenance, and repair) is firmly based on full participation of users, their communities, and leaders.
- All taps are public. No private connections.
- The systems serve 27 liters per person per day.
- The systems were designed for a population growth over 30 years.
- Government provides technical support
- Donors provide finance for materials and staff salaries.
- The systems should perform for 100 years.

Local Leaders and Staff

Typical design



All unskilled labour by unpaid self help

….. use of Asbestos Cement transmission pipes for main lines

The tap makes us like people in towns…..

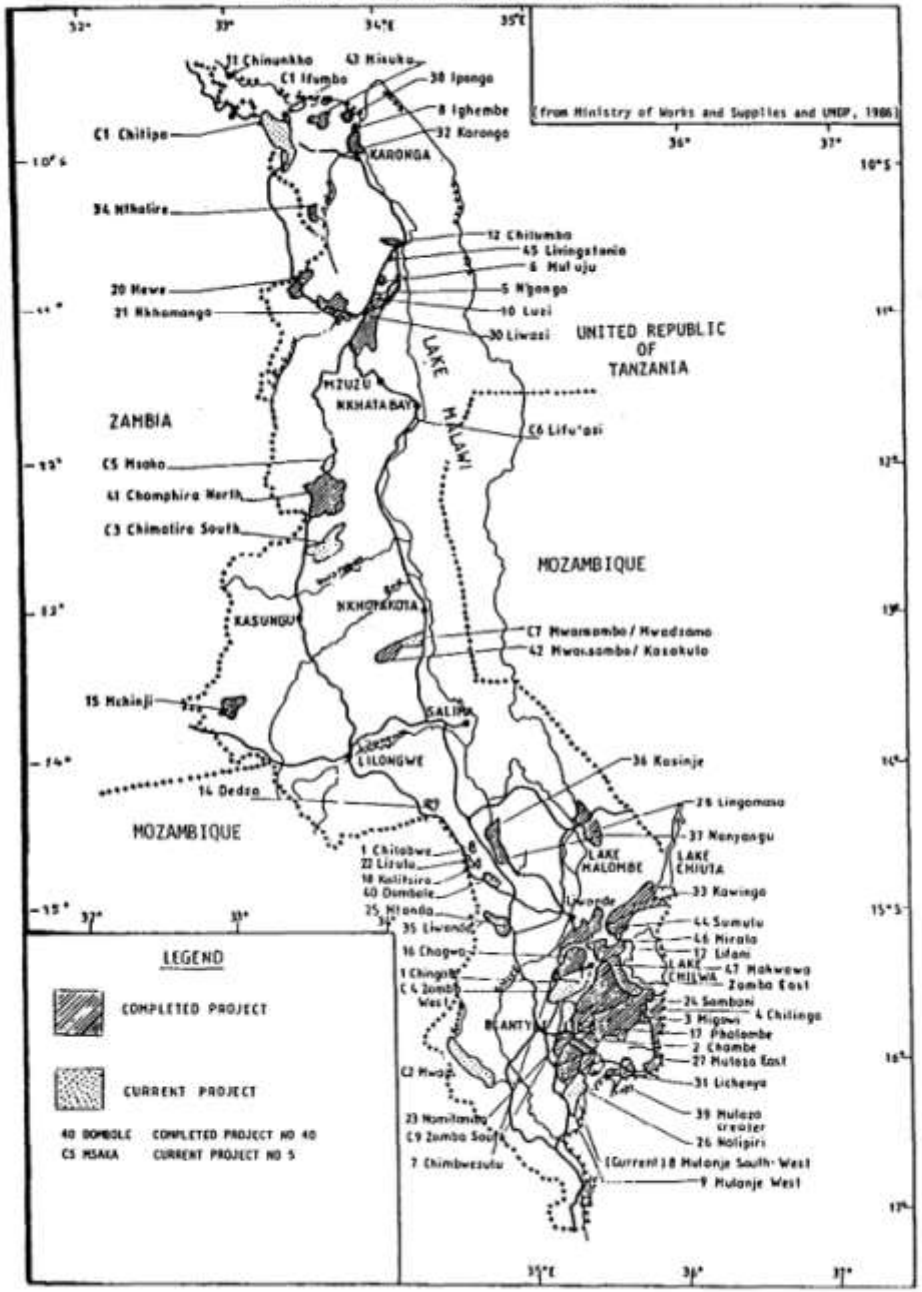
Household hygiene was promoted

Research and development: filtration…

Coverage

- From 1969 to 1985 over 1 million rural people were served through 47 piped water systems

Figure 2. Malawi - rural piped-water projects



Status of Gravity Fed Systems anno 2012

After more than 40 years:

…high service levels continue
….with gradual changes in principles

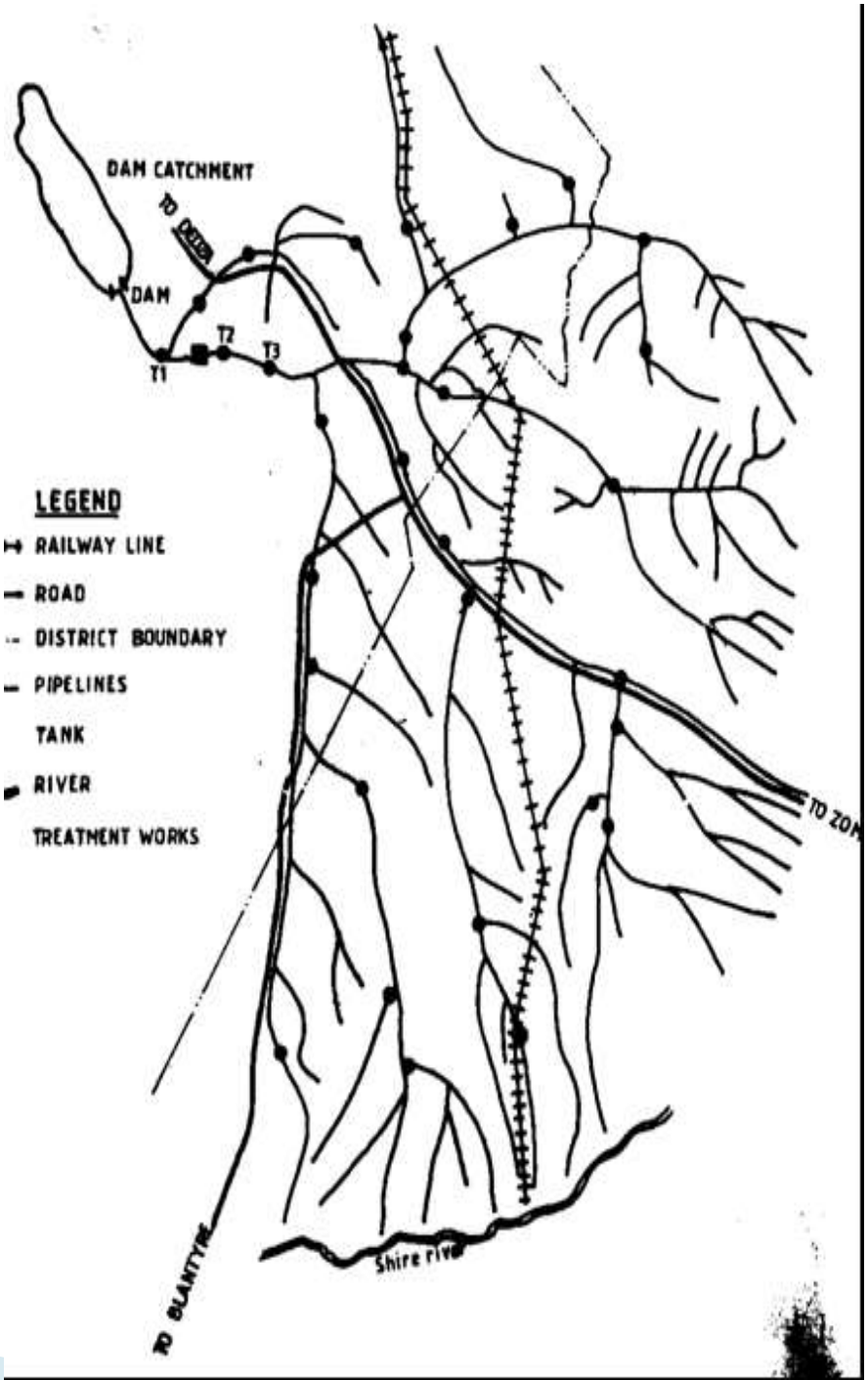
- Governance:
  - Instead of community level O/M now legal entities
  - No more central Government support; design archive lost
- Tariffs from private connections
- No more AC pipes
- Intermittant transfers through external partners: to adapt governance systems, rehabilitation….


CHAGWA WATER SUPPLY COOPERATIVE SOCIETY.
P.o.Box 97
Machinga.
Madzi ndi moyo. Lipilani madzi anu kuti asakudulireni.
WaterAid
PDI
Kutenga mbali pa chitukuko.
Machinga District Council.

Mpira Balaka

The Mpira Balaka Gravity Fed Rural Piped Water Supply was constructed from 1987 to 1992 from the Mpira Reservoir and Dam.

It serves more than 300,000 people.



Mpira Balaka

Since 2006 Mpira Water Trust a registered Water Board.

Material Assets remain with Malawi Government.

Reflection on FIETS criteria

- FIETS stands for areas under SD e.g. Financial, Institutional, Environment, Technology and Society
- Gravity systems were to reduce morbidity and mortality. This is not included in FIETS!
- Gravity systems qualified according to USAID and WB/UNDP as excellent at the time on Financial, Institutional, Technical, Environment and Social criteria.
- The use of asbestos should have scored negative. Meantime AC has been replaced.

Conclusion

- Due to population increase and population densities together with changes in governance and financing concepts the principles on design (for only public use), governance and payments of tariffs have been adjusted.

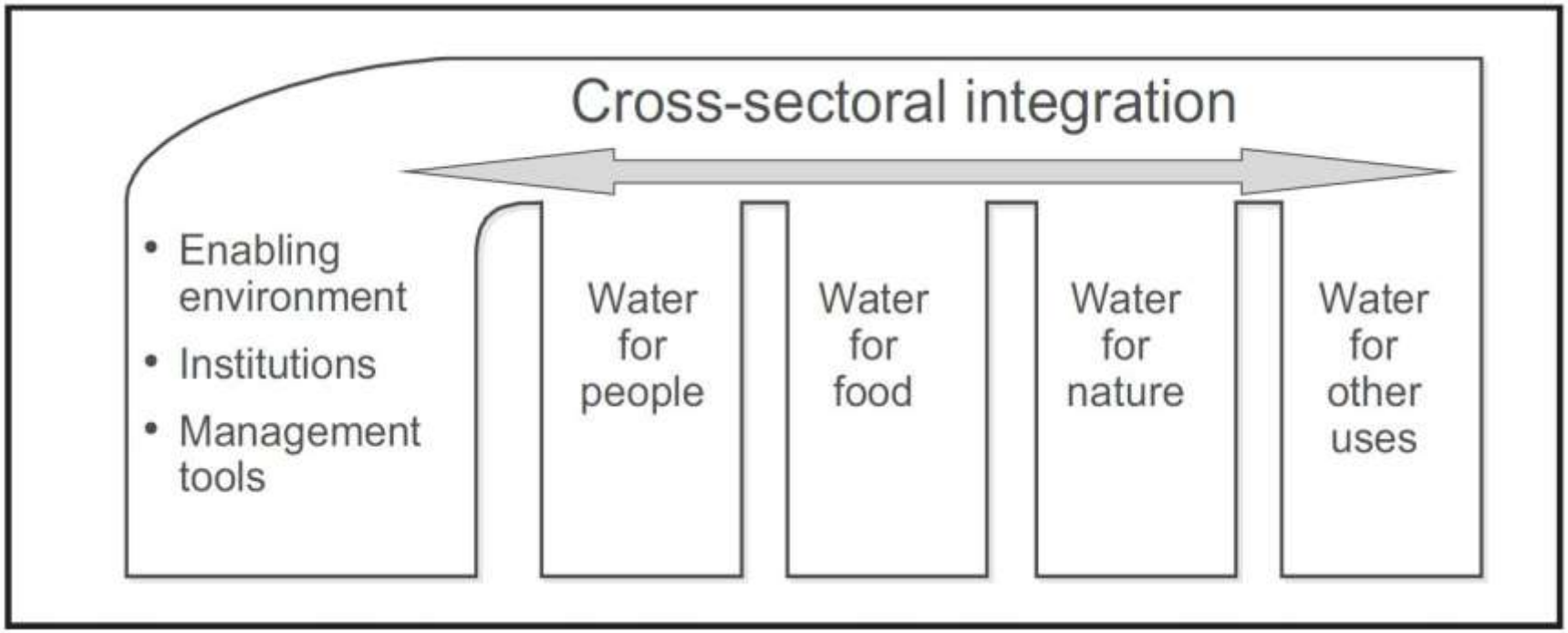
- These changes have been accommodated.
- The Gravity Fed Systems have proven to be very sustainable.

A couple of reflections on Rural Drinking Water

- Seventies:
  - LSH: Relation Water and Health. Still stands.
  - WHO: Health for All by 2000. Very important.
  - Mar del Plata 1978: 1980 – 1990 Drinking Water Supply Decade by WB, WHO and UNICEF. Very important.
- Eighties:
  - Many programmes and abundant funding
  - Standardization of designs, VLOM, O&M at village level.
  - Plastics for pipes and pumps replacing asbestos and steel
- Nineties:
  - concerns over cost recovery and governance. Major institutional change
- 2012:
  - MDG for water have been achieved! Really????
  - Explosion in technological innovation in handpumps, household treatment and actors. A blessing or a curse?
  - Internet enabling links between users and outside world.

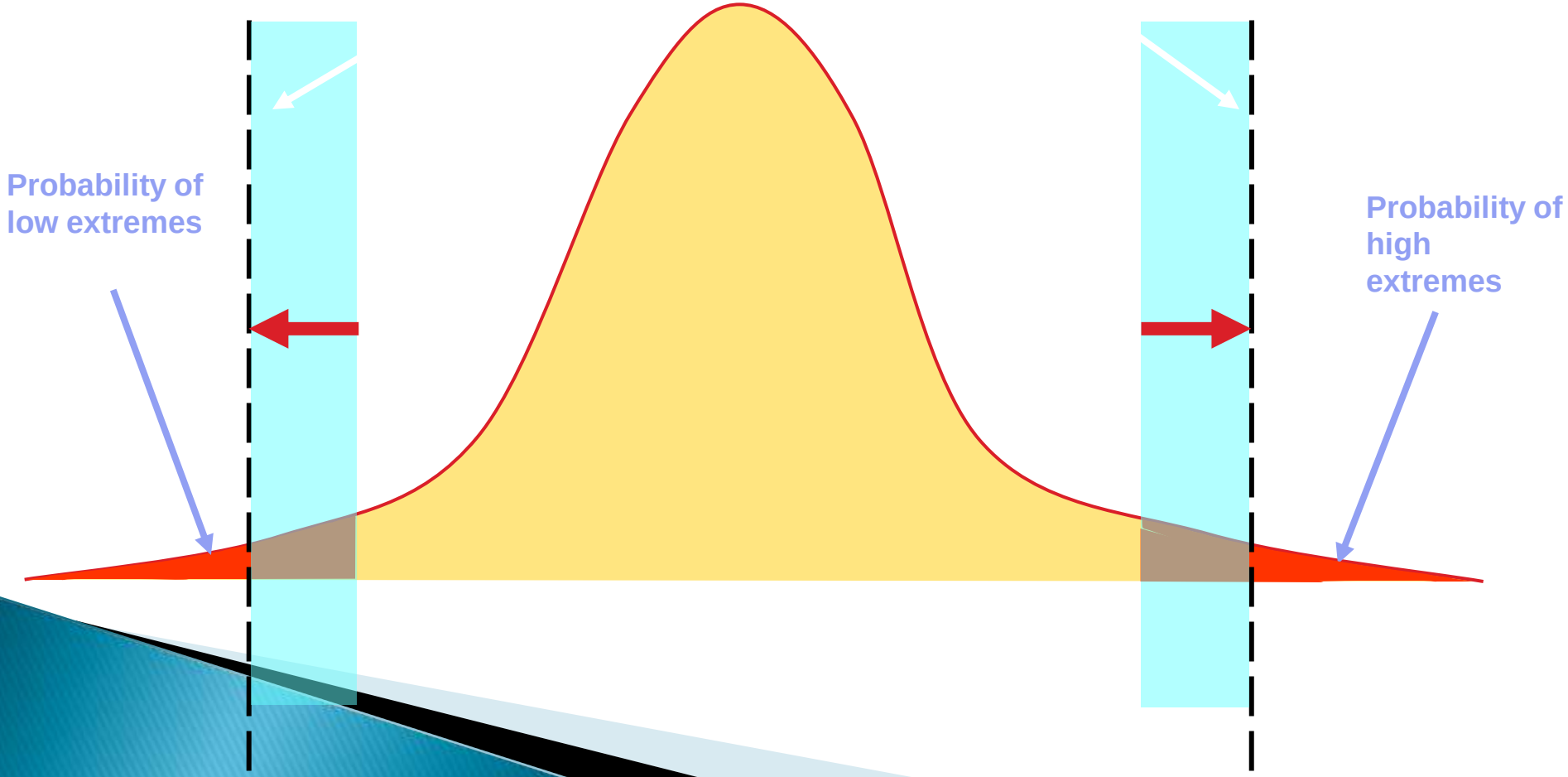
Integrated Water Resources Management: water allocation under scarcity

1995: Prof Malin Falkenmark in Barbedos
1996: Creation of Global Water Partnership
2002: Johannesburg: Target for IWRM plans



Concept of water security for water use sectors

"sustainable access, on a watershed basis, to adequate quantities of water of acceptable quality, to ensure human and ecosystem health as well as sustainable defense against water threats.



IWRM

- Technological concept
- Can substantially enhance water security.

Climate change impacts on Water

with thanks to many colleagues

2001 IPCC Third Assessment Report: Climate change will affect the hydrological cycle

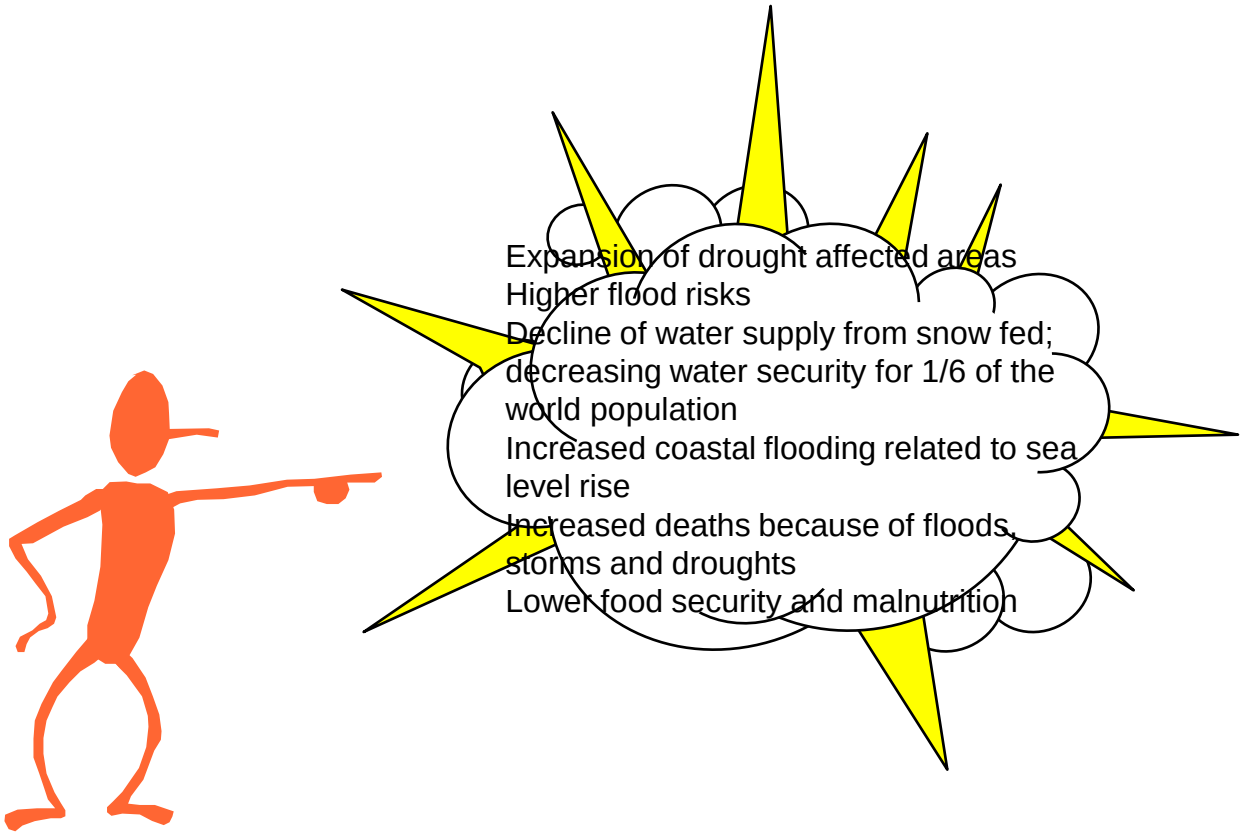
Noah's times

- For behold, I will bring a flood of waters upon the earth ….
- Make yourself an ark of gopher wood; make rooms in the ark and cover it inside ….The length of the ark three hundred cubits, its breadth fifty cubits and its height thirty cubits.

Ark of Noah

- Noah got strict instructions
- 300 cubits length, 50 cubits width and 30 cubits height
- 1 cubit is 50 cm.

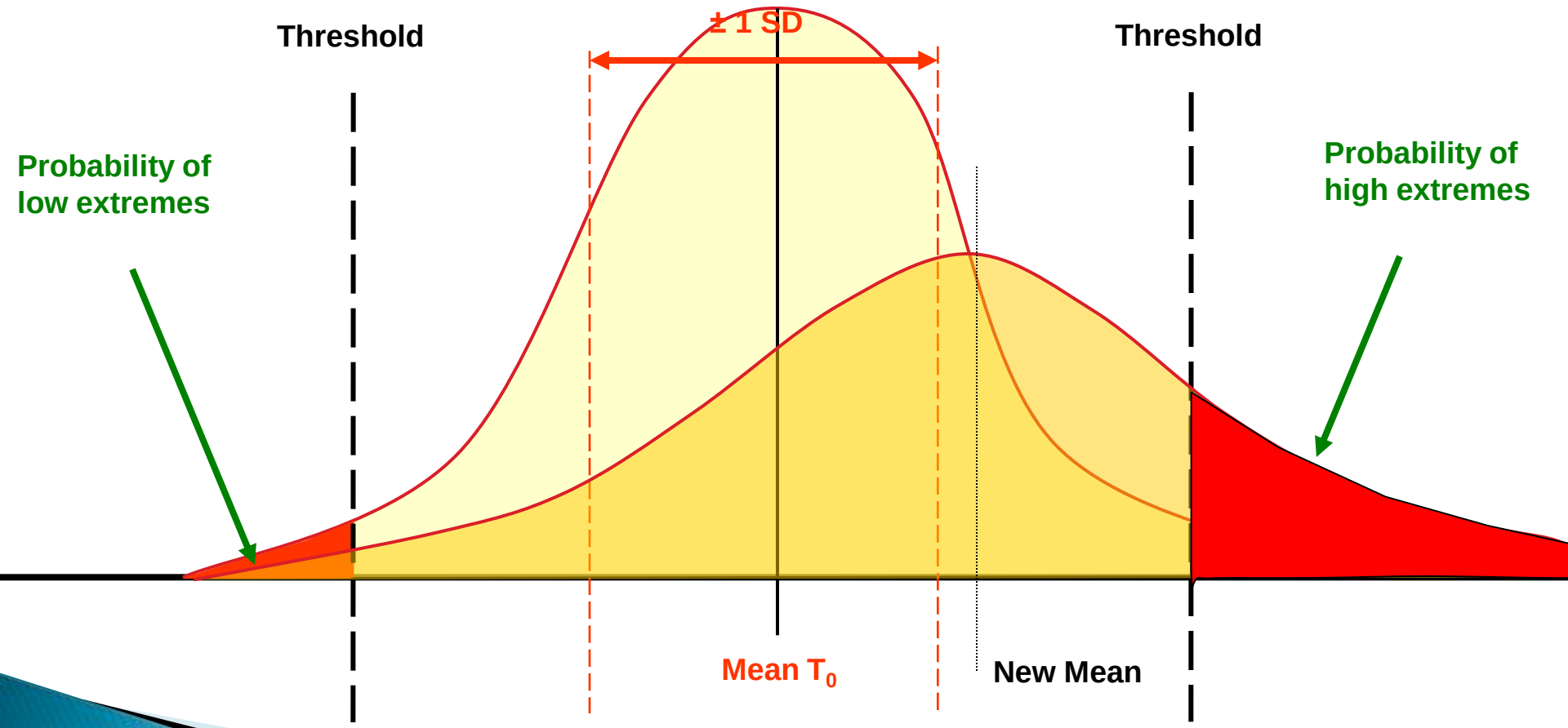
IPCC 2007: Climate change is irrevocable



IPCC

Water Manager

An increase in mean and variance of run off imply a nonlinear increase in the probability of extremes, which requires to adjust design criteria

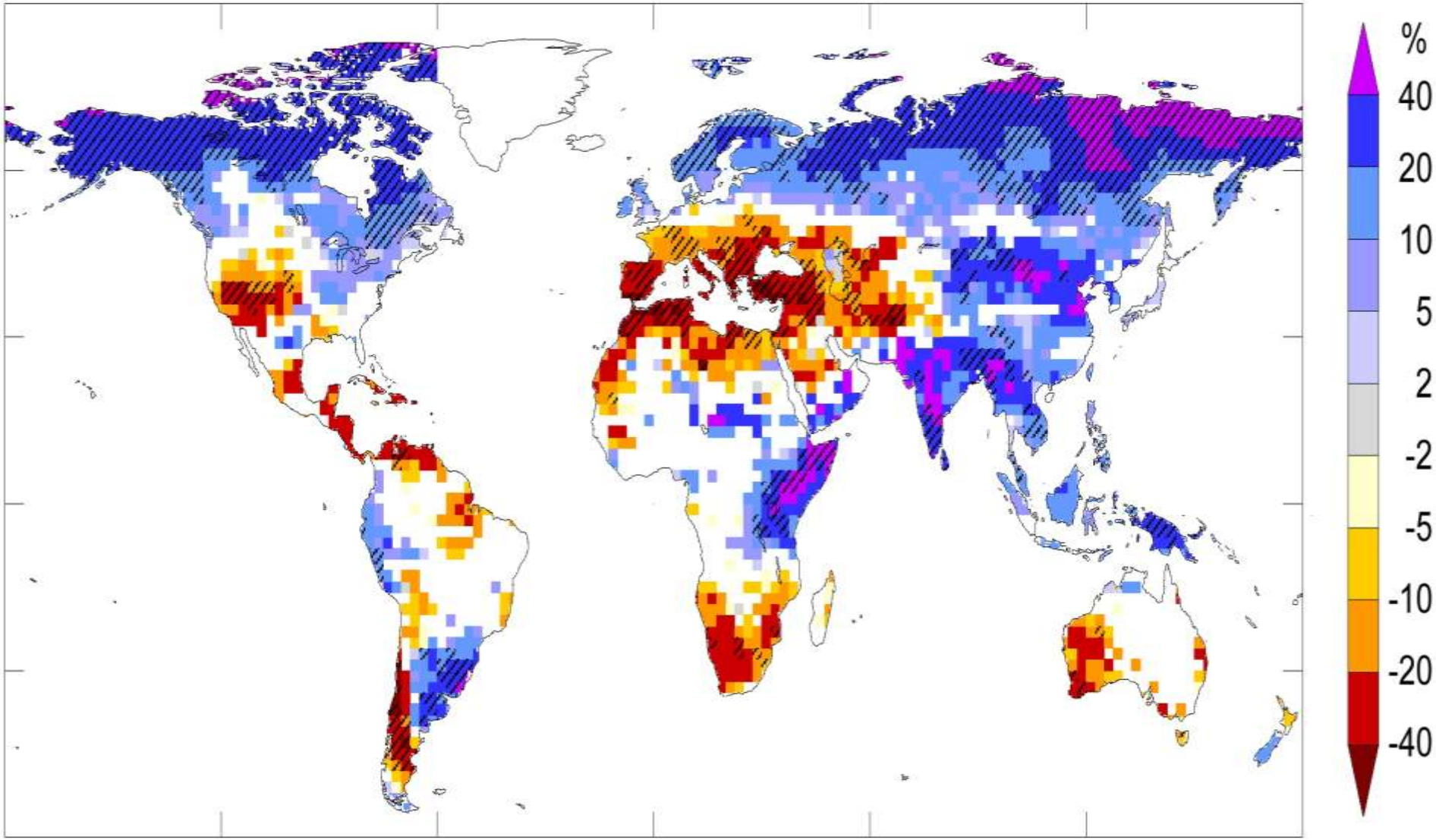


Standard communication between climatologist/ hydrologist and water manager on Climate Change

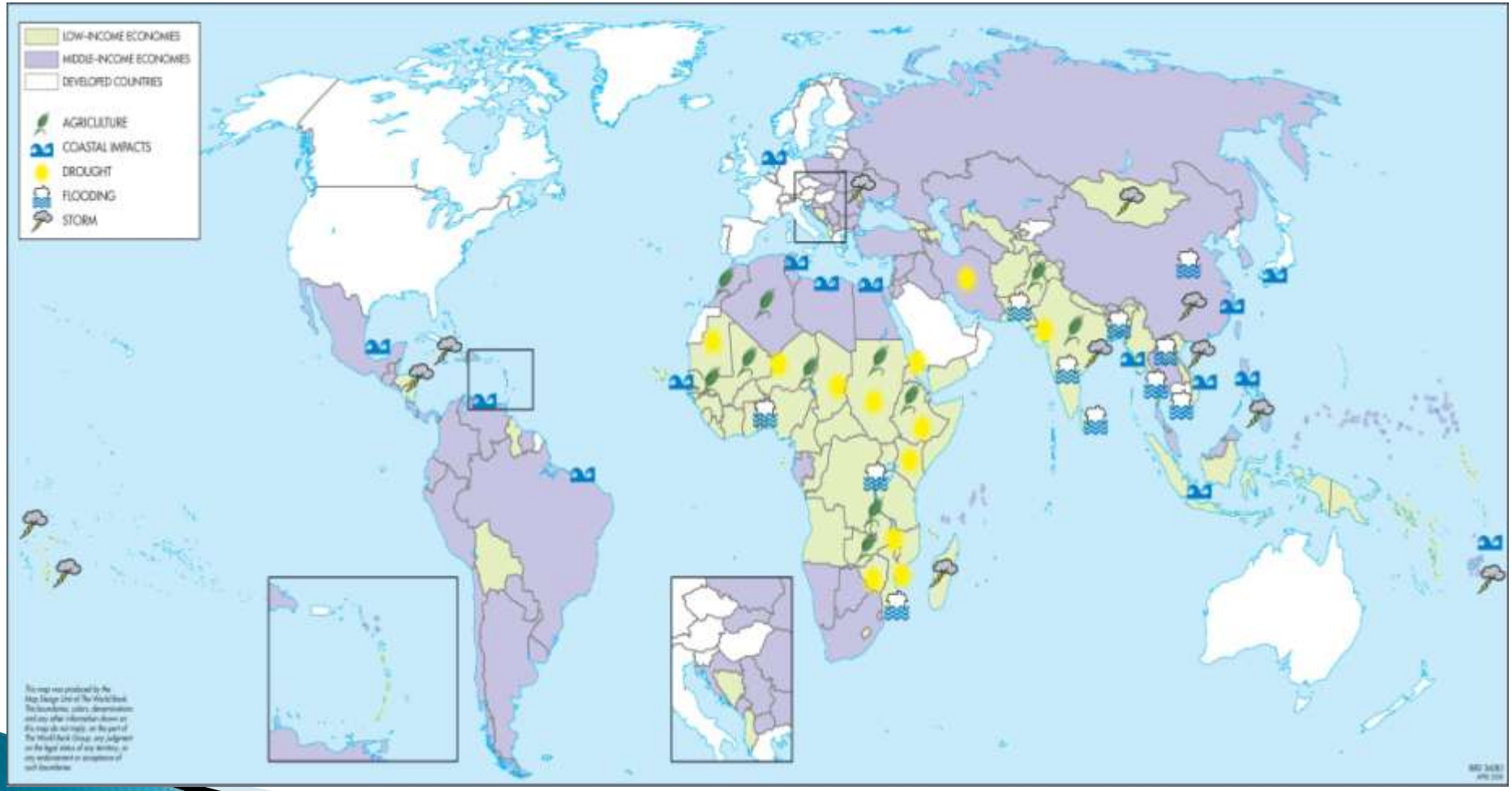
Climatologist/Hydrologist

Water manager

Change in average runoff

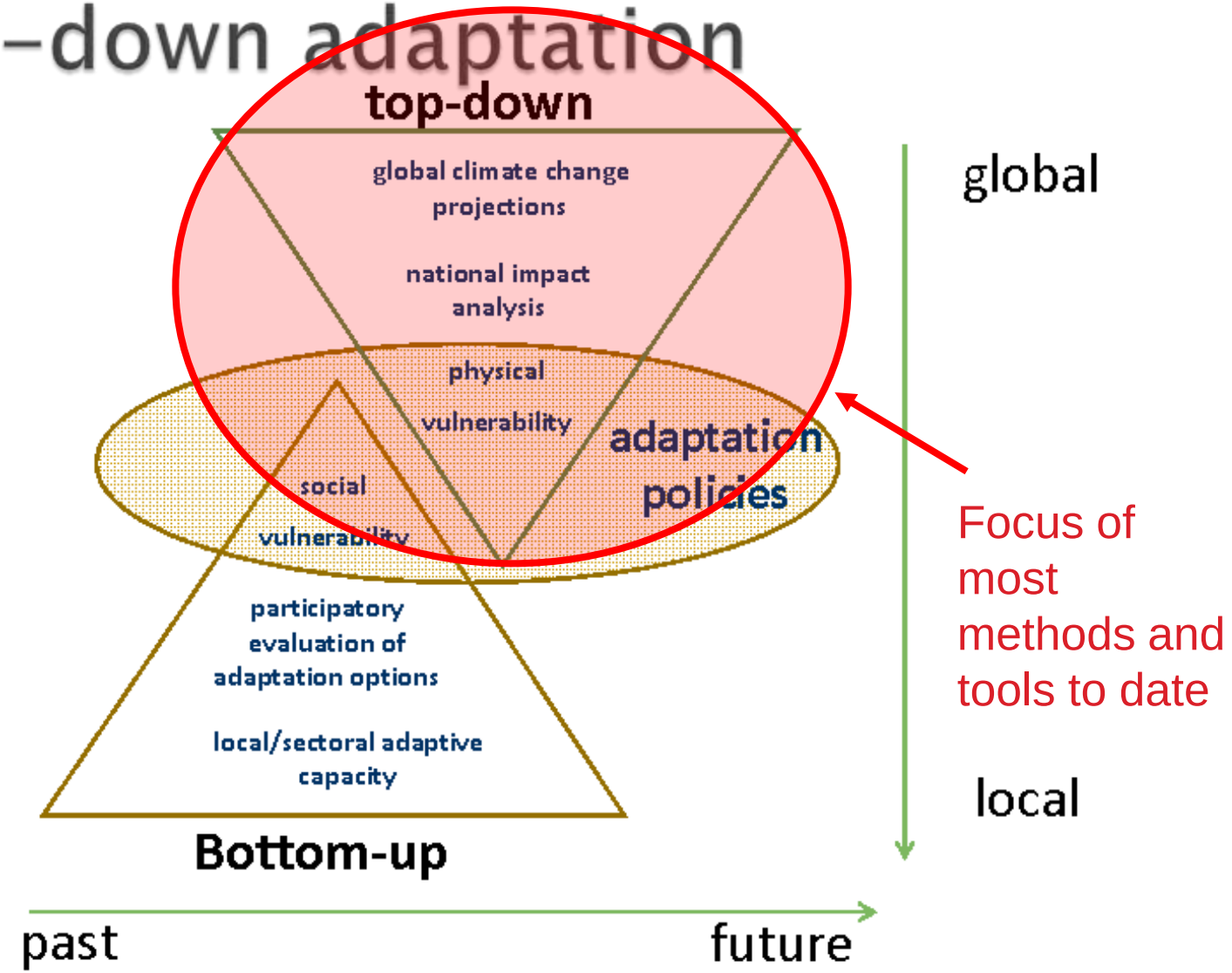


Climate risks are higher for poor countries (WB)



Source: World Bank staff.

Risk management: Bottom-up and Top-down adaptation

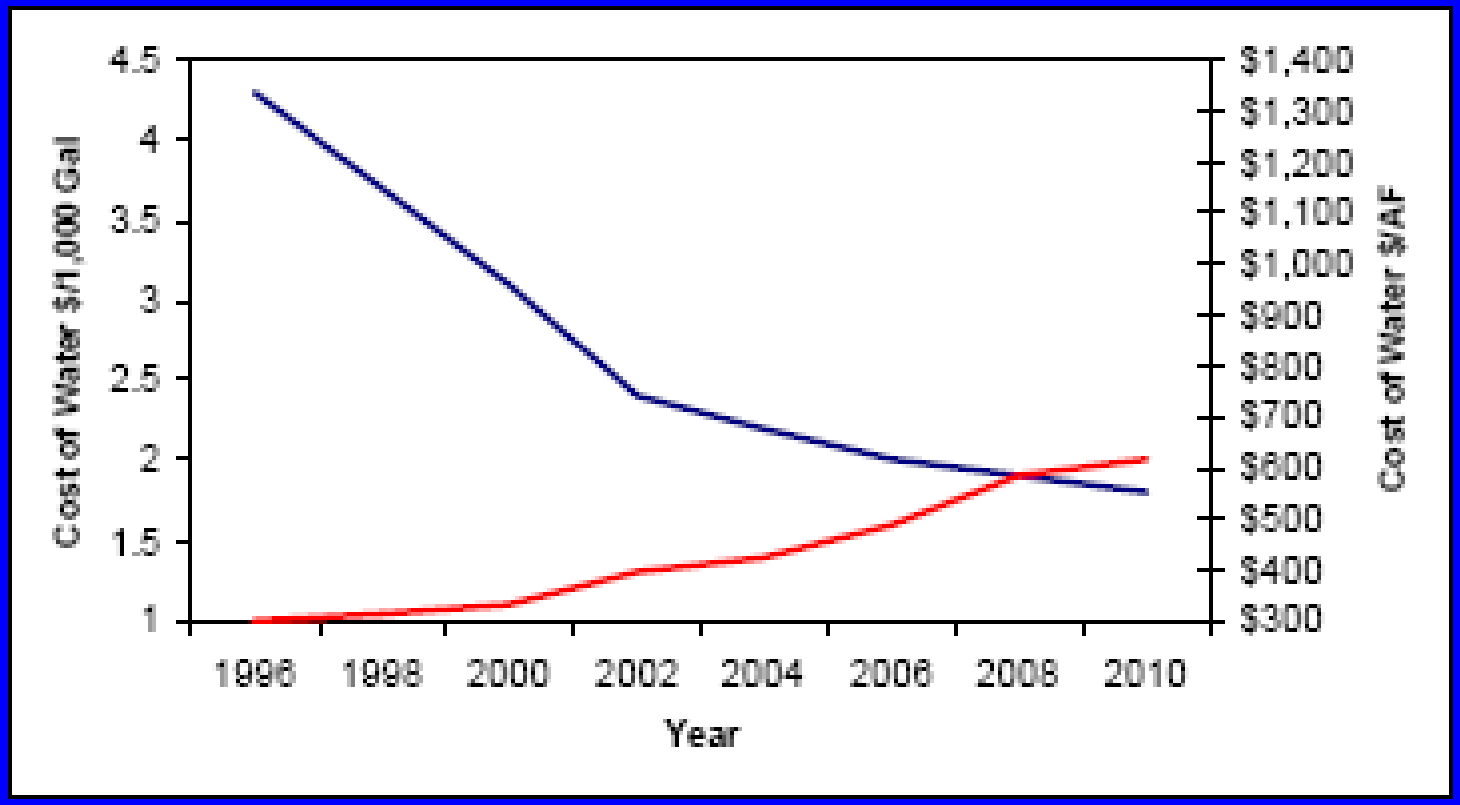


Source: Dessai and Hulme, 2003

SUPPLY-SIDE		DEMAND-SIDE	
Option	**Comments**	**Option**	**Comments**
MUNICIPAL WATER SUPPLY			
• Increase reservoir capacity	Expensive; potential environmental impacts	• Incentives to use less (e.g. through pricing)	Possibly limited opportunity; needs institutional framework
• Extract more from rivers or groundwater	Potential environmental impacts	• Legally enforceable water use standards (e.g. for appliances)	Potential political impact; usually cost-inefficient
• Alter system operating rules	Possibly limited opportunity	• Increase use of grey water	Potentially expensive
• Inter-basin transfers	Expensive; potential environmental impacts	• Reduce leakage	Potentially exoensive to reduce to very low levels especially in old systems
• Desalinisation	Expensive (high energy use)	• Development of non-water-based sanitation systems	Possibly too technically advanced for wide application
		• Seasonal forecasting	Increasingly feasible
INDUSTRAL AND POWER STATION COOLING			
• Increase source capacity	Expensive	• Increased water-use efficiency and water recycling	Possibly expensive to upgrade
• Use of low-grade water	Increasingly used		
HYDROPOWER GENERATION			
• Increase reservoir capacity	Expensive; potential environmental impacts; may not be feasible	• Increasing efficiency of turbines; encourage energy efficiency	Possibly expensive to upgrade
NAVIGATION			
• Build weirs and locks	Expensive; potential environmental impacts	• Alter ship size and frequency	Smaller ships, more trips;increased emissions and costs
POLLUTION CONTROL			
• Enhance treatment works	Potentially expensive	• Reduce volume of effluents to treat (e.g. charging discharges)	Requires management of diffuse sources of pollution
		• Catchment management to reduce polluting runoff	Requires buy-in from farmers, e.g. incentives
FLOOD MANAGEMENT			
• Increase flood protection (levees, reservoirs)	Expensive; potential environmental impacts	• Improved flood warning and dissemination	Technical limitations in flashflood areas and unknown effectiveness
• Catchment source control to reduce peak discharges	More effective for small than large floods	• Curb floodplain development	Potential major socio-political problems
IRRIGATION			
• Increase irrigation source capacity	Expensive; potential environmental impacts	• Increase irrigation-use efficiency	By technology or increasing prices
		• Increase drought-tolerant varieties	Genetic engineering is controversial
		• Change crop patterns	Change to crops which need less or no irrigation

Example of “no regret” – Kitui Sand dams

Membrane Desalination Becoming the Technology of Choice



For more Info see:

http://www.brazos.org

Climate change one of several pressures on water resources

Pressures on the resource: External drivers

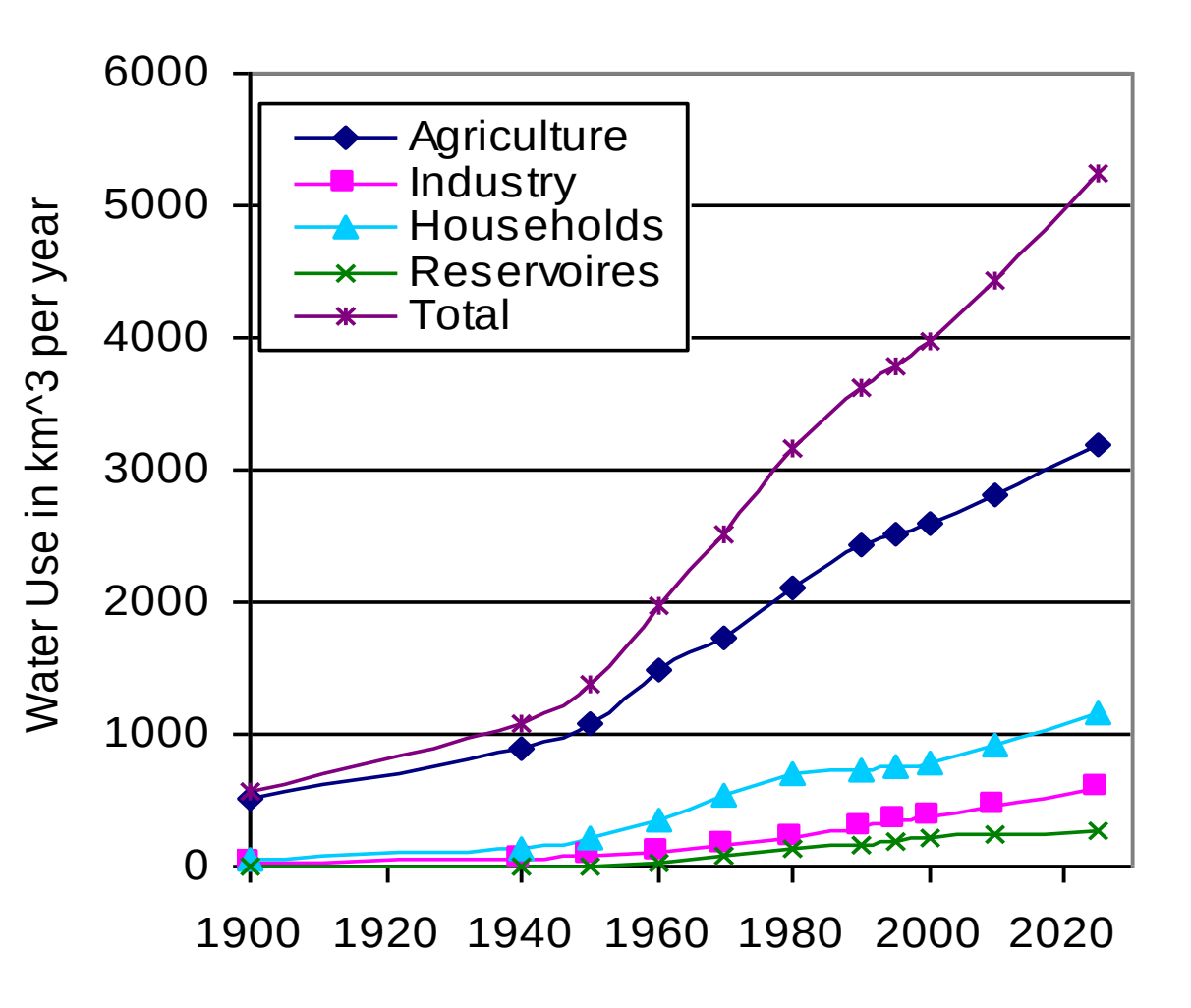
- Demographic
  - Population growth
  - Migration and urbanisation
- Economic
  - Globalization
  - Rising cost of food and energy
  - Trade and “virtual water”
- Social
  - Poverty
  - Education
  - Culture and values
  - Lifestyles and consumption patterns

United Nations Educational, Scientific and Cultural Organization

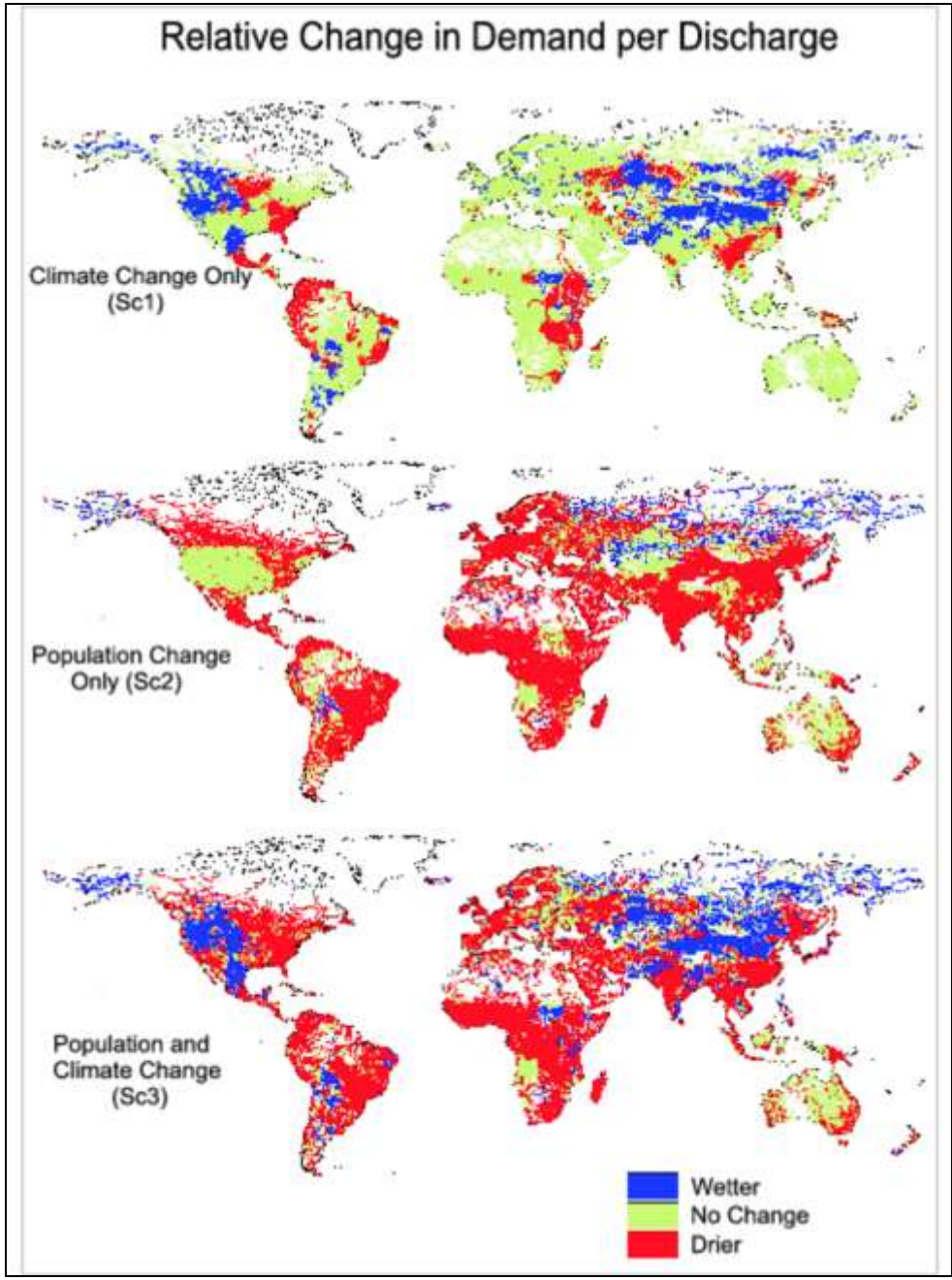
World Water Assessment Programme

UN WATER

Meeting growing global water demands



- 80% of future stress from **population** & **development**,
- **Climate change additional**!



UNH

Vörösmarty et al. 2000

Climate change adaptation and water management

- Coping with climate change is coping with non stationarity and uncertainty in water resources availability as well as in water use demands.

- Adfaptation to climate change opened the Water Box or water management to politics and society. Risk management and risk control measures are socio political decisions.

- Water management Adaptation goes through a societal decision making process deciding on which options are preferable: The options include preparatory measures (early warning), protective measures (storage, dams) , preventive measures (building with nature, demand management), risk spreading and insurance, and last evacuation.for adaptation and the trade offs between the options at the appropriate level, local (urban), national, regional (transboundary) and global level.

- Questions:
  - Should risk management be given more attention in the IWRM process?

  Should risk management and change be given more specific attention in the FIETS criteria?

Or, can systems be adjusted when required as in Malawi.

1.

.....new developments

UPEACE Campus, Costa Rica

PEACE PALACE The Hague

WATER and PEACE

- Increasing water stress
- Water allocations for people, food, energy and navigation leading to potential conflict
- Water conflicts
- Conflict resolution requires:
  - Data and information
  - Assessments
  - Negotiations
  - Regulations and compliance

- UPEACE Centre The Hague and the Water Diplomacy Initiative

- Water and Peace: a topic for WWF-7?

Water Allocations under Green Growth

Stockholm August 28 and November

New Water Allocation Mechanisms under Green Growth

ICOMOS, Water and Heritage,

International Conference during the festivities celebrating the 400 years anniversary of the Amsterdam canals systems.

A topic for WWF7?

WATER is essential for life. This is a constant.

Working in WATER is fully fullfilling many professional lives since time immemorial.

Over my lifetime in WATER, water policies and priorities have moved on considerably, from a health and social agenda through a belief in water management under stationarity to now addressing water and risks.

The basic interest of local people in having access to adequate and safe water for people, food, energy, navigation and ecosystems is there to stay.

For decades to come there is lots to do in WATER. I wish all of you a great time in WATER serving to the best of your knowledge and ability local needs with efficient, effective and sustainable support.

THANK YOU

Water and Change

Henk van Schaik

Thanks for attending the webinar.
A recording will be available soon on
www.TheWaterChannel.tv/webinars

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