International Institute for Applied Systems Analysis
IIASA www.iiasa.ac.at

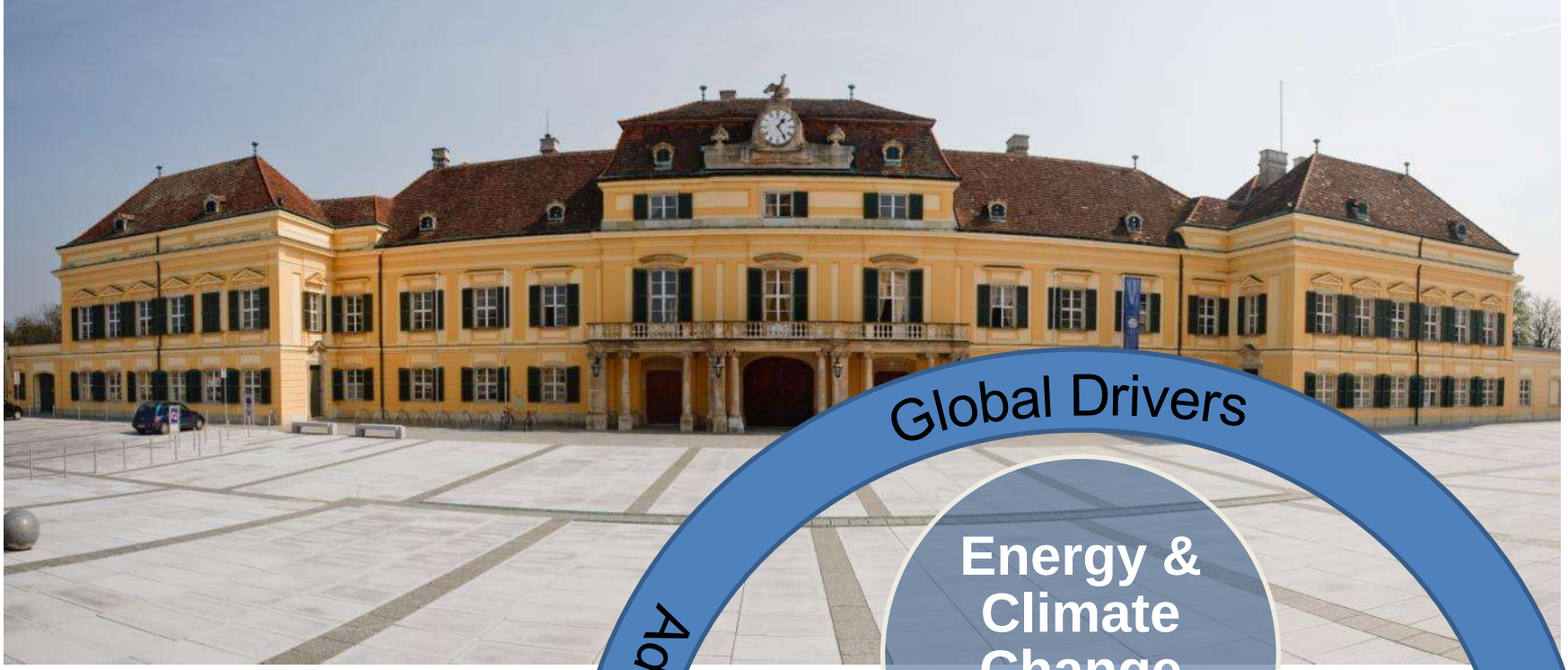
science for global insight

water futures and solutions

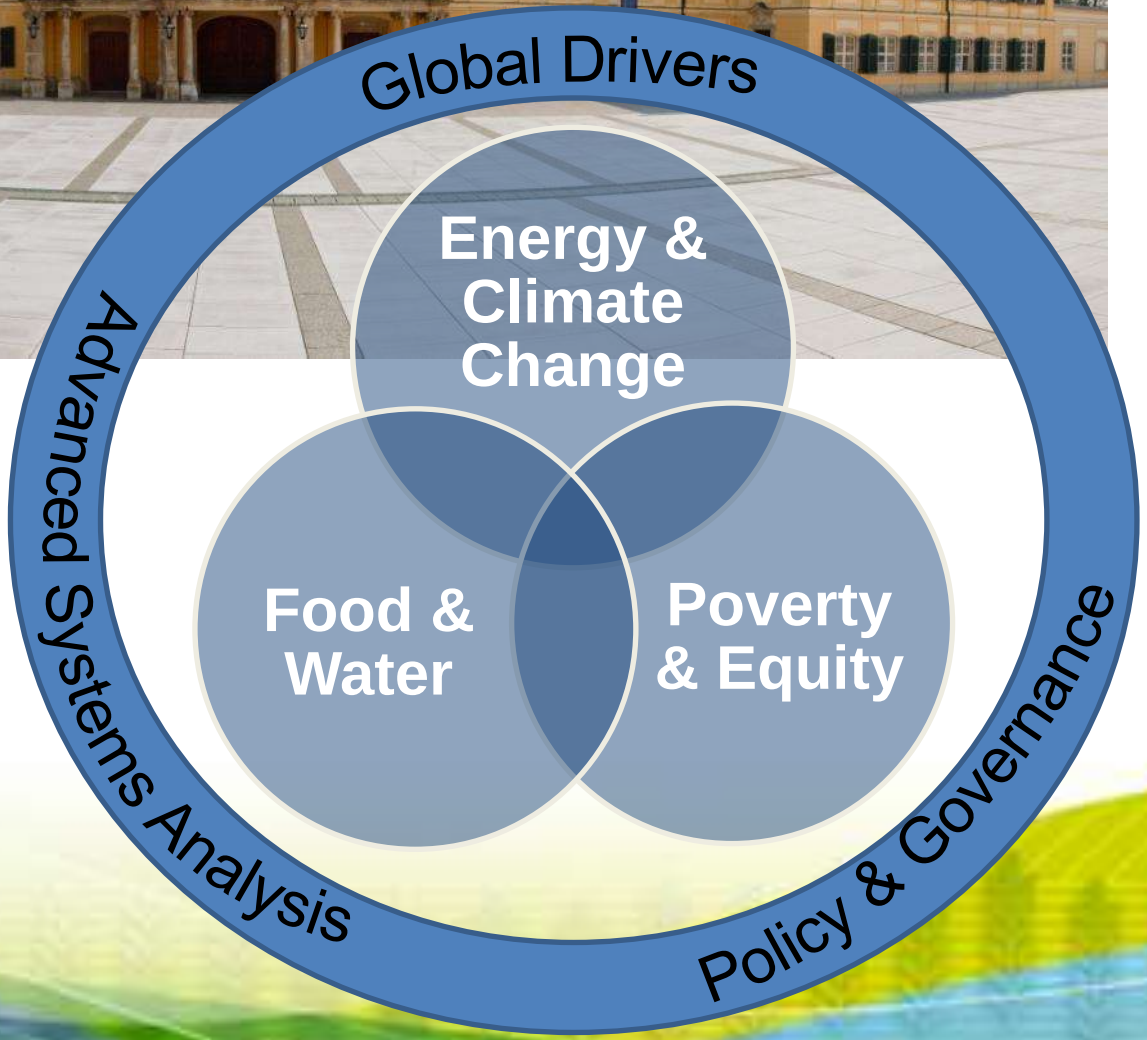
Austrian Red Cross Nexus: Water-Energy-Food

Robert Burtscher, Stakeholder Engagement and Liaison

Vienna, 20.12.2017

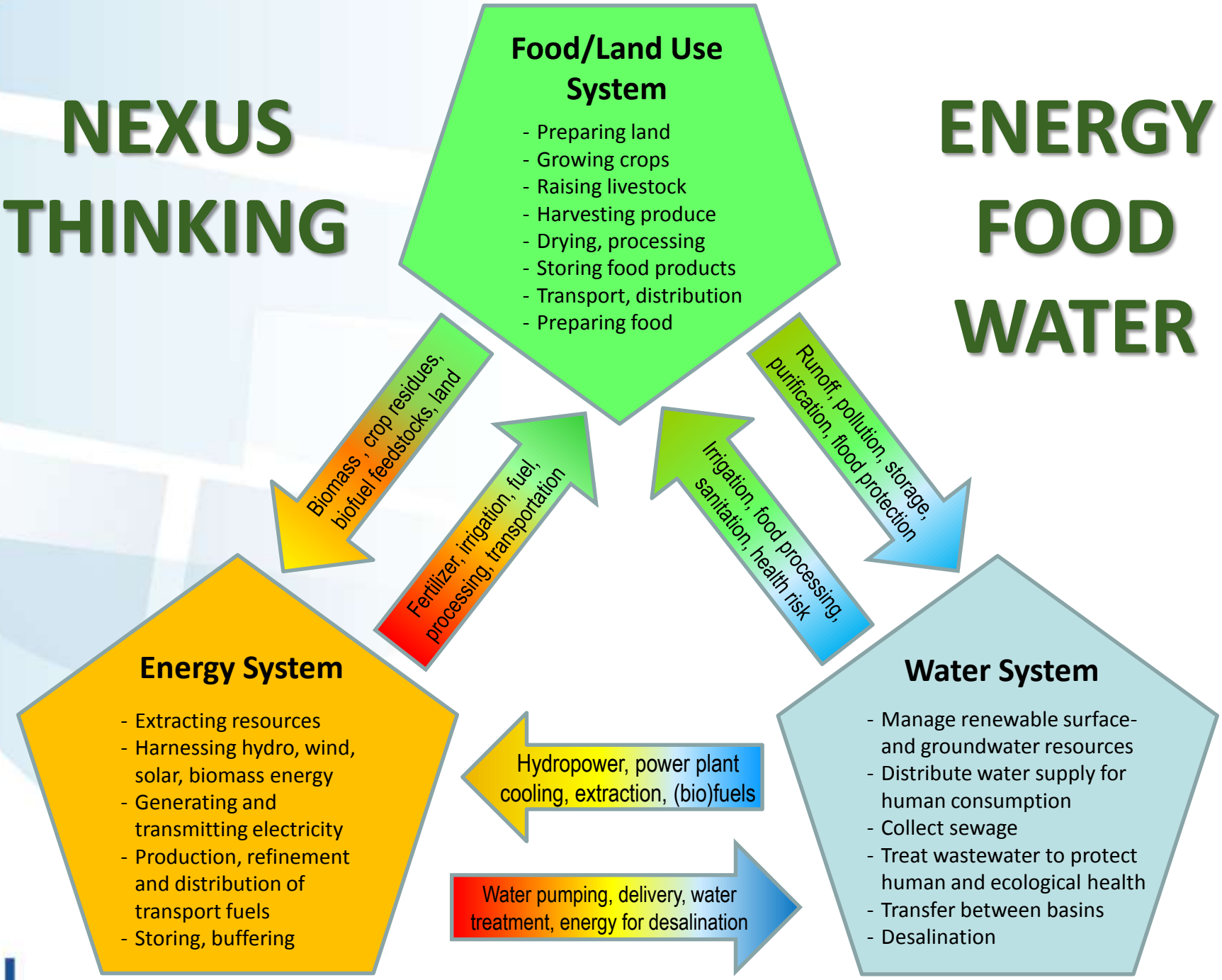


IIASA - RESEARCH FOR A CHANGING WORLD

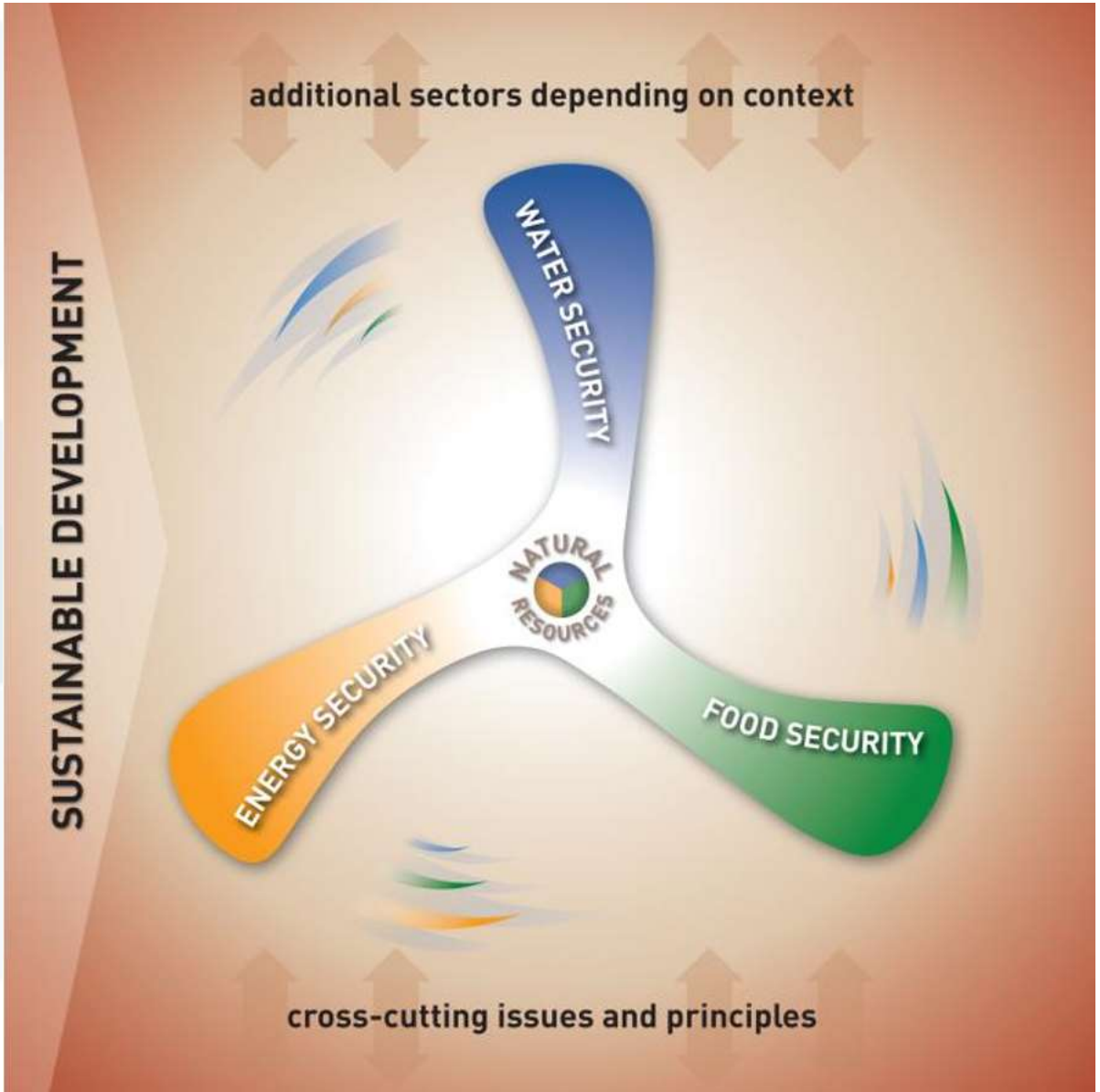


NEXUS THINKING

ENERGY FOOD WATER



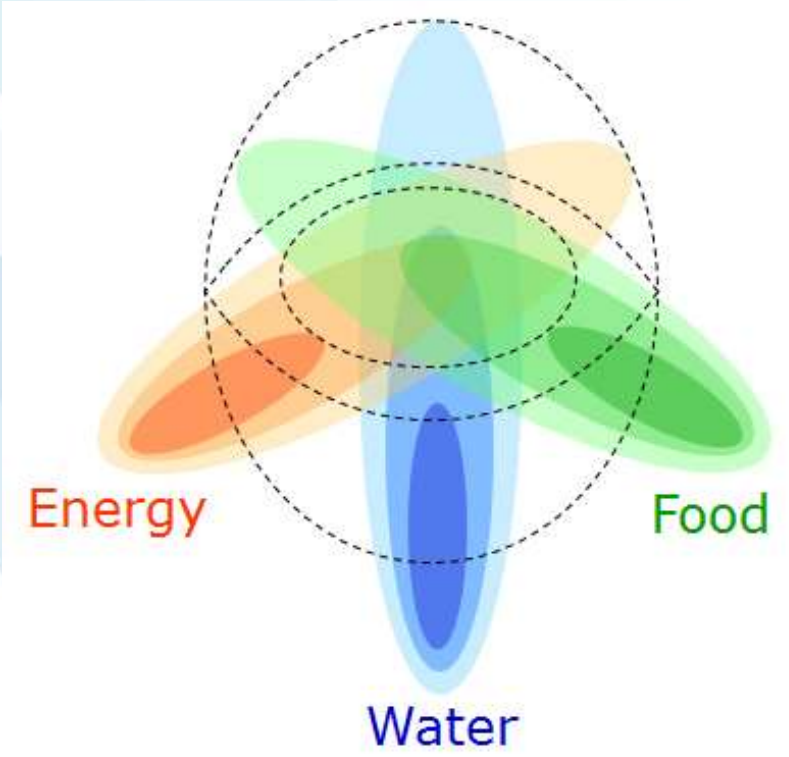
ADC: NEXUS Scheme

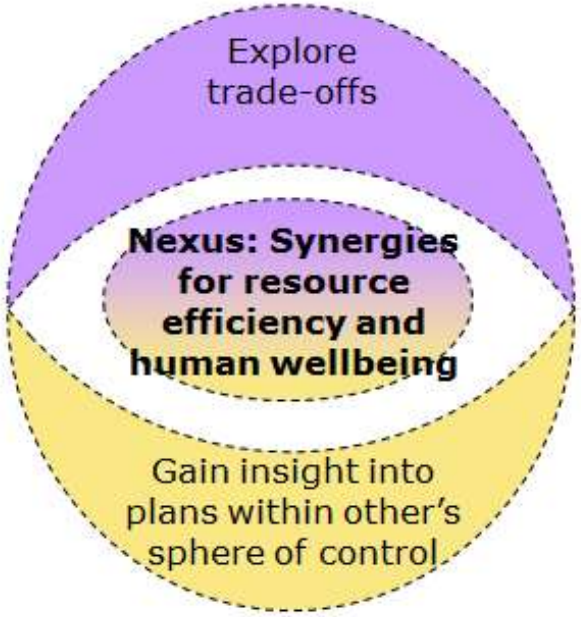


Systemic interrelations between the nexus components…

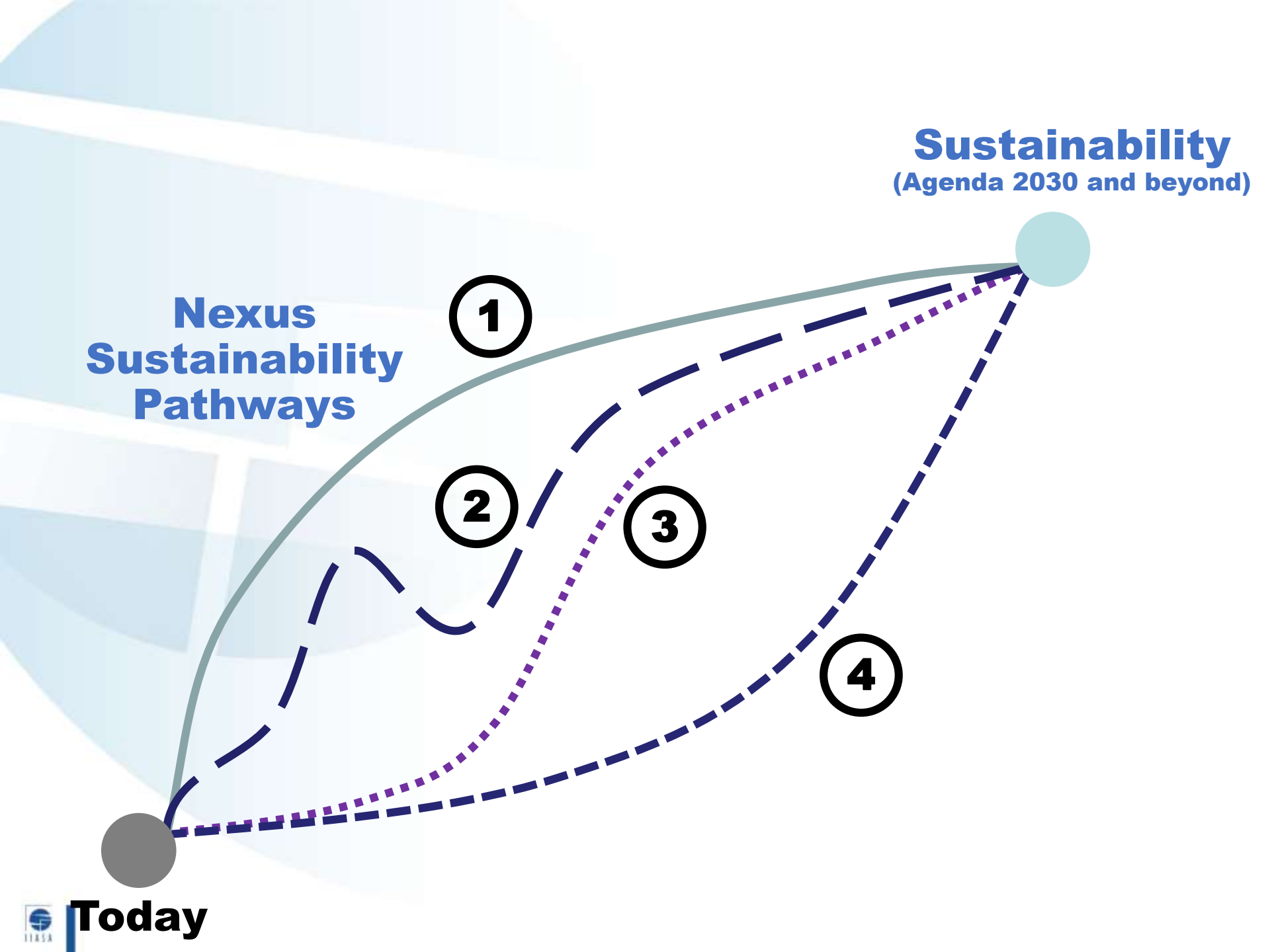
Depending on scope of action and on local context:

- highly systemic (core of nexus)
- Sector-controlled and sector-driven actions (exploring trade-offs)



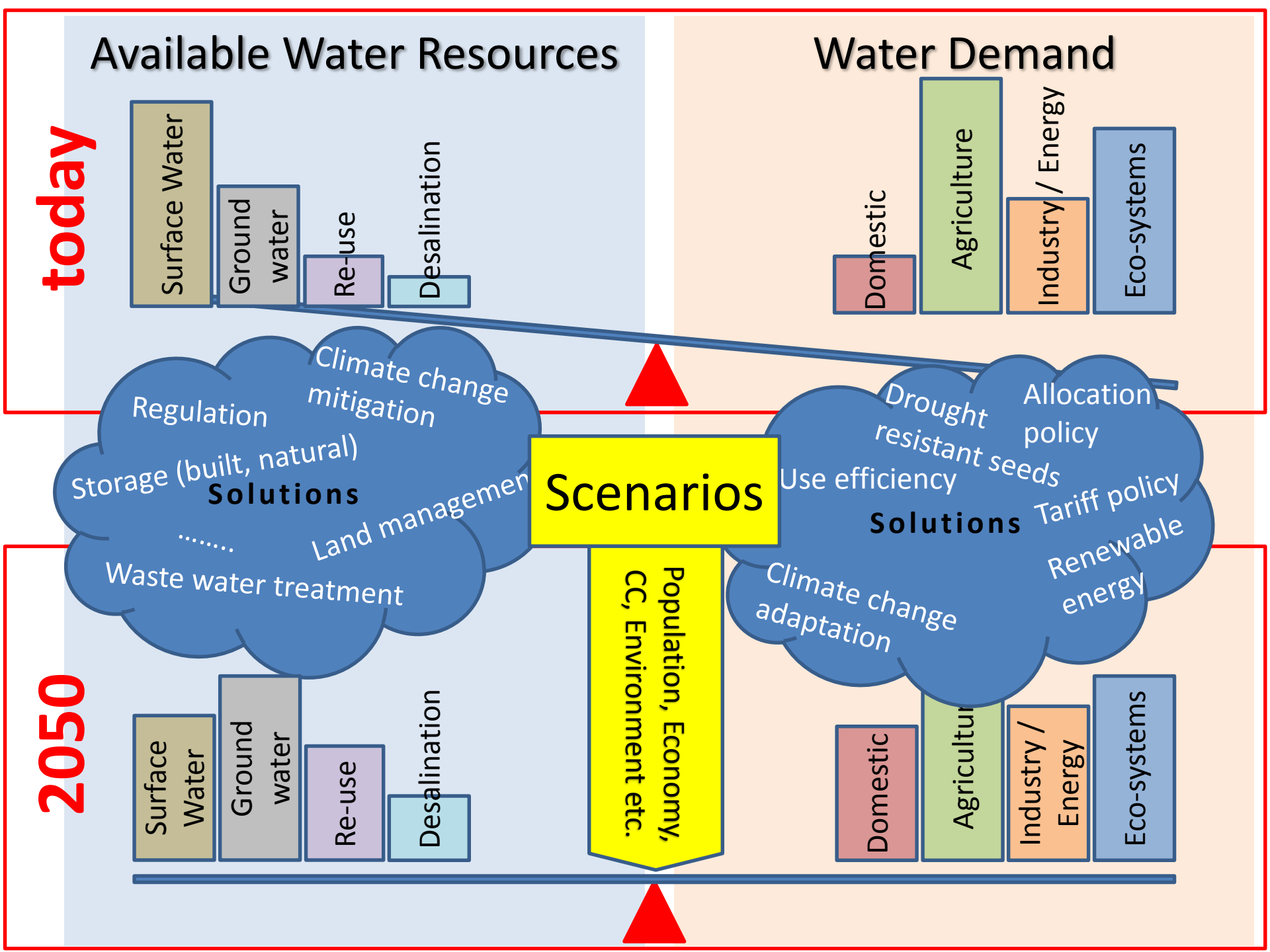


IIASA 2013, ADA annual meeting (adapted)

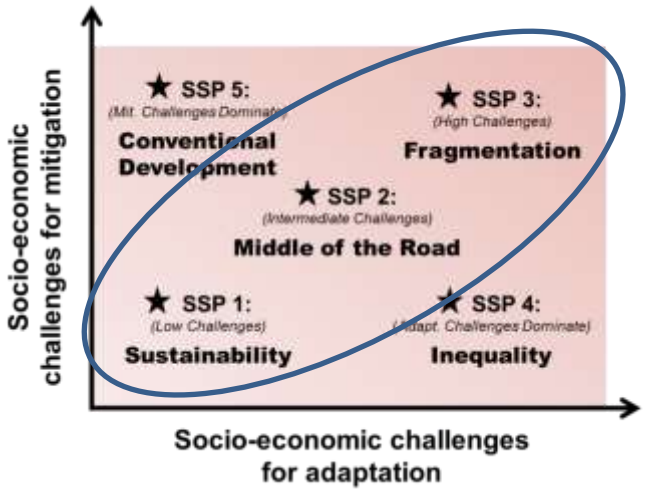

Sustainability
(Agenda 2030 and beyond)
Nexus
Sustainability
Pathways
1
2
3
4
Today

Water Futures and Solutions (WFaS) Initiative

Towards Innovative Solutions through Integrative Water Futures Analysis


Available Water Resources
Water Demand
today
Surface Water
Ground water
Re-use
Desalination
Domestic
Agriculture
Industry / Energy
Eco-systems
Climate change mitigation
Regulation
Storage (built, natural)
Solutions
.....
Land management
Waste water treatment
Scenarios
Drought resistant seeds
Allocation policy
Use efficiency
Solutions
Tariff policy
Renewable energy
Climate change adaptation
Population, Economy, CC, Environment etc.
2050
Surface Water
Ground water
Re-use
Desalination
Domestic
Agriculture
Industry / Energy
Eco-systems

Water Futures: Scenarios & Quantitative Assumptions



SSP1: The world is moving toward sustainability

SSP characteristics

- Improved resource use efficiency
- More stringent environmental regulations
- Rapid technological change is directed toward environmentally friendly processes
- Management of global commons improves.

Implications for Manufacturing Water Use:

- Manufacturing industries with efficient water use and low environmental impacts are favored.
- Enhanced treatment, reuse of water, and water-saving technologies;
- Widespread application of water-saving technologies in industry

Table 3 Qualitative technological changes on water use intensities in the domestic and industry sectors according to HE-regions.

			L		M		H		M	
		socio-economic capacity	poor		rich		Rich		Poor	
		hydro-climatic complexity	low		low		high		high	
			HE-1		HE-2		HE-3		HE-4	
	SSP1	Sustainability Quest (SSP dominant)	HL	B	HM	B	HH	A	HM	B
M	SSP2	Business as Usual (SSP as HE)	ML	D	MM	C	MH	B	MM	C
L	SSP3	Fragmentation (HE dominant)	LL	E	LM	D	LH	C	LM	D

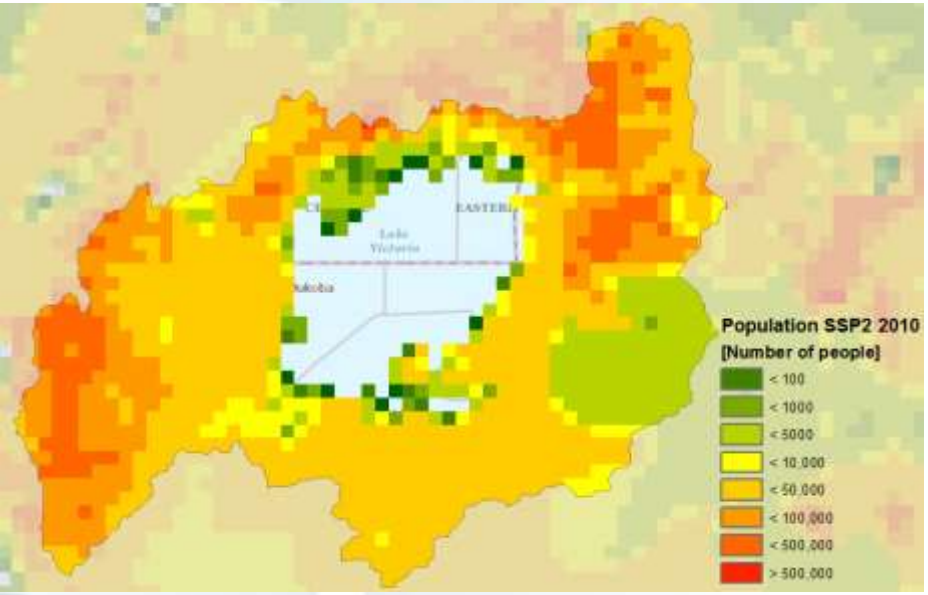
Table 4 Applied annual efficiency change rates as derived for different classes.

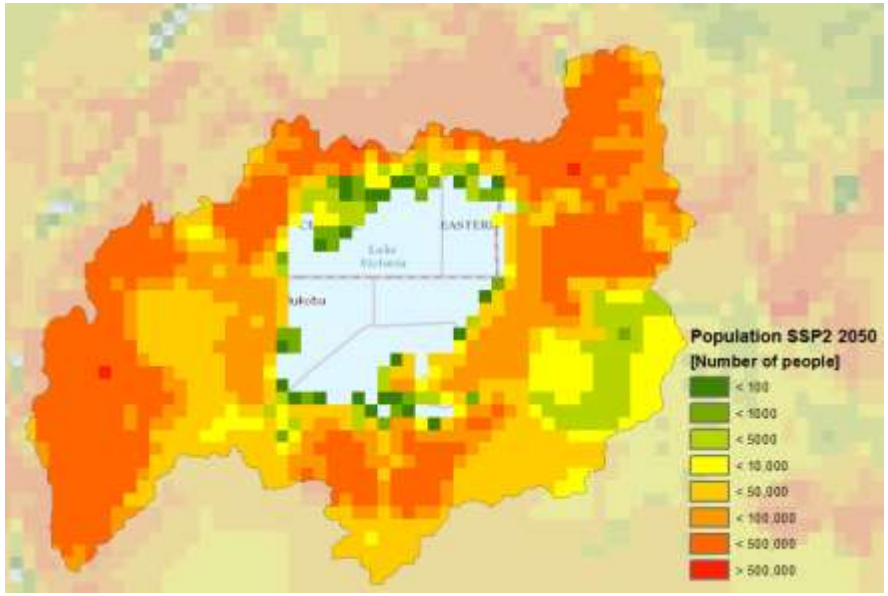
A	B	C	D	E
1.2%	1.1%	1%	0.6%	0.3%

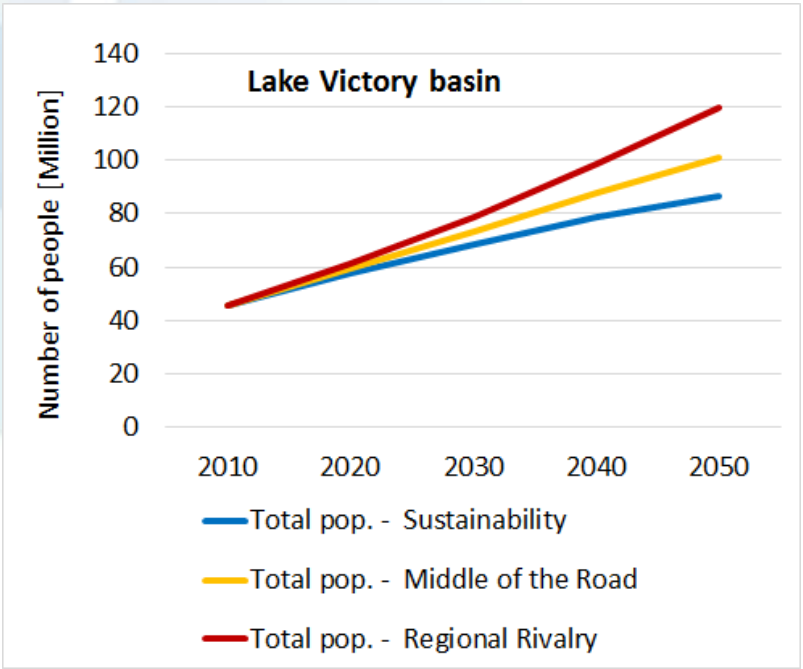
highest lowest

water futures and solutions

Socio-economic change -Population







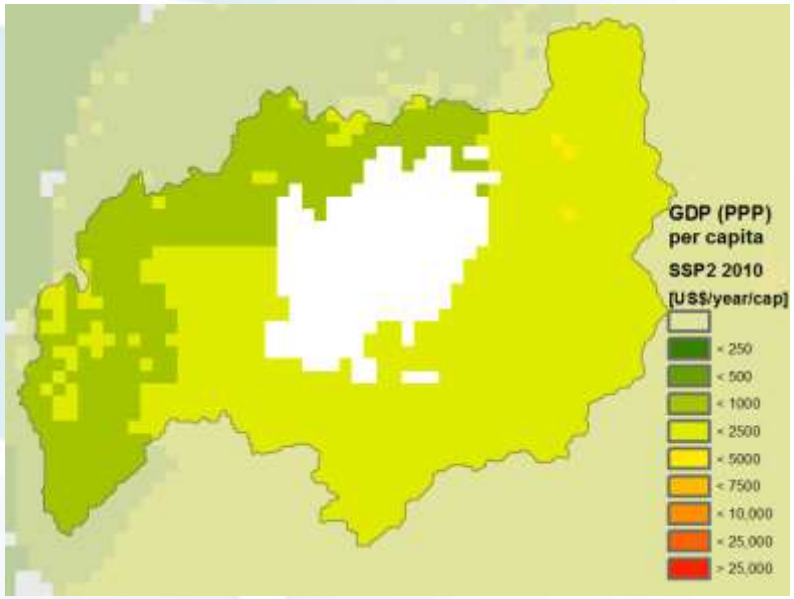
Lake Victoria basin

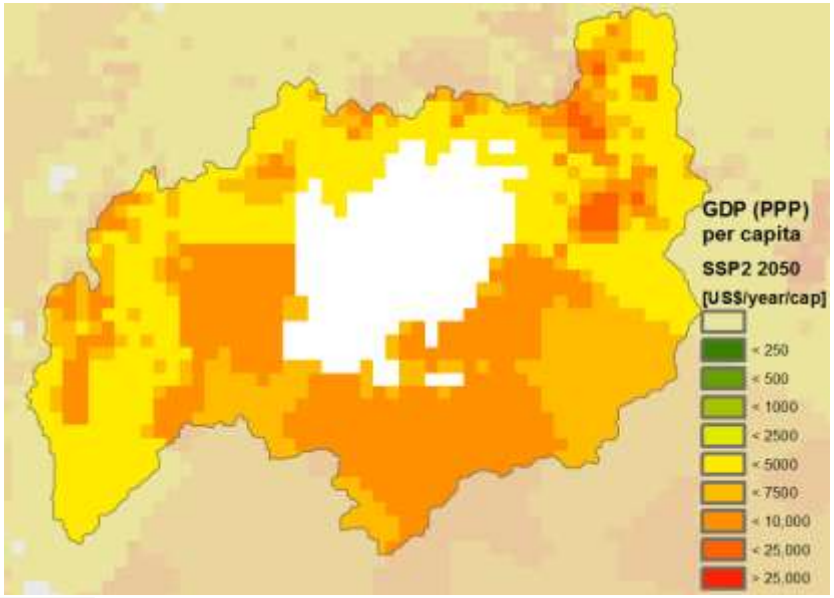
From 46 Mio. people in 2010 to 87 – 120 Mio. people in 2050 (+ 90% - 260% depending on scenario)

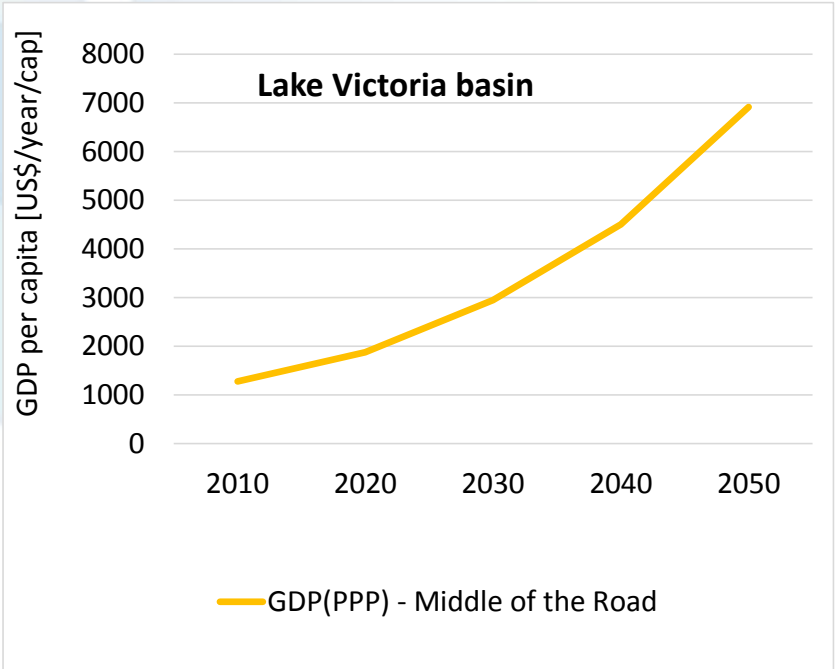
LVBC Strategy 2016 - 2021:

From 44,9 m people in 2015 to 59.5 m people in 2025

Socio-economic change - GDP







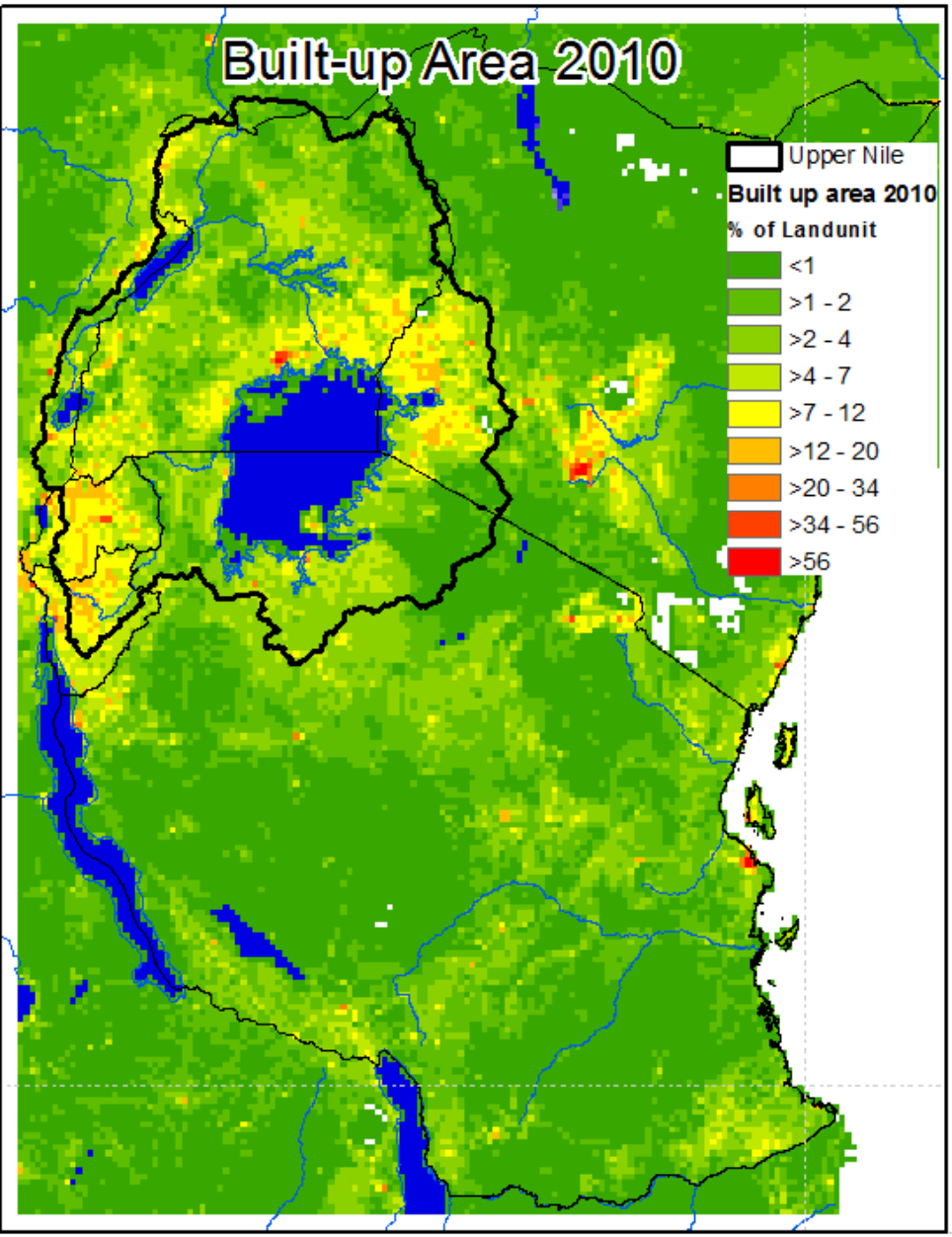
Middle of the Road scenario:

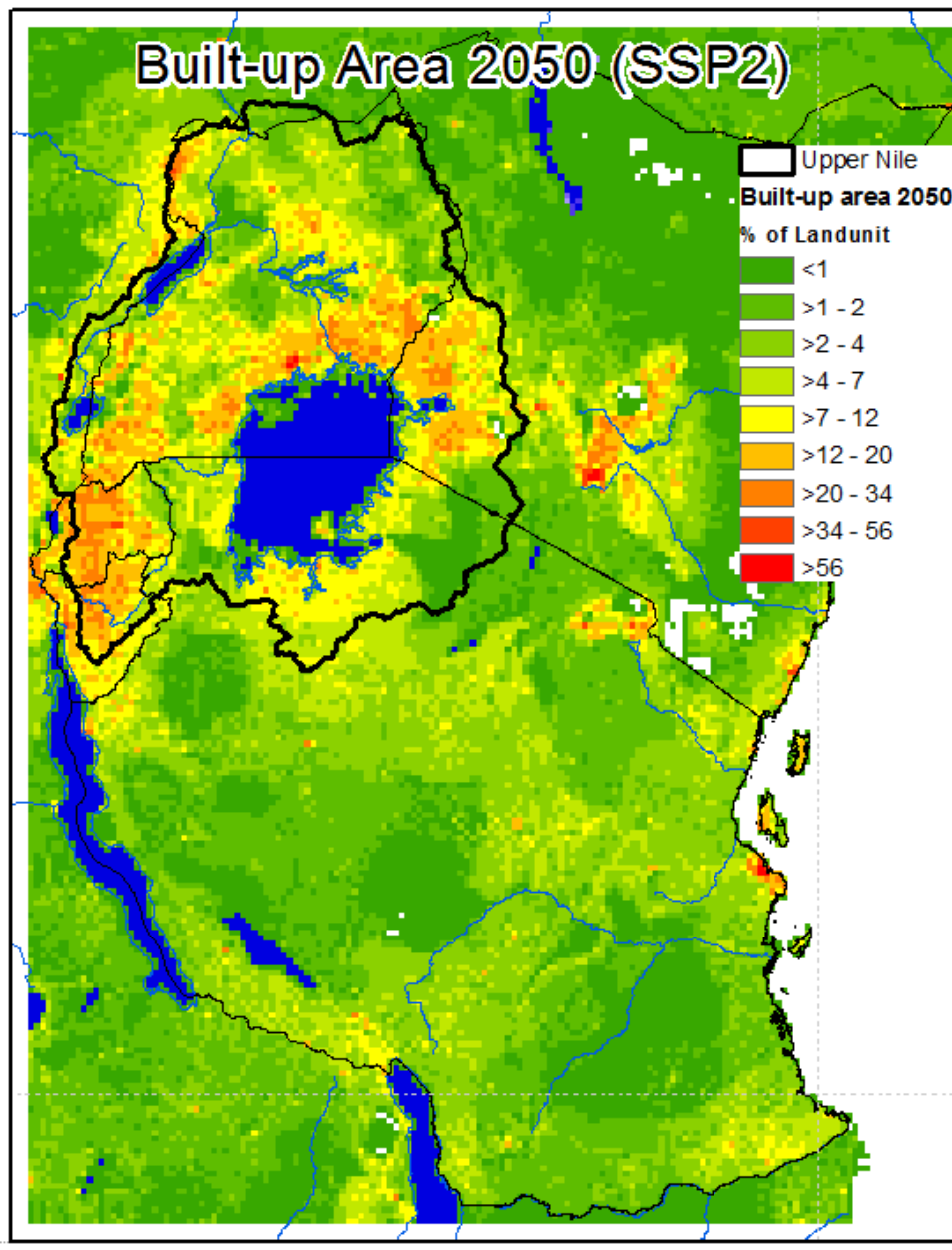
From 1,275 US$/year/cap in 2010 to 6,900 US$/year/cap in 2050 (+550%!)

EAC Vision 2050:

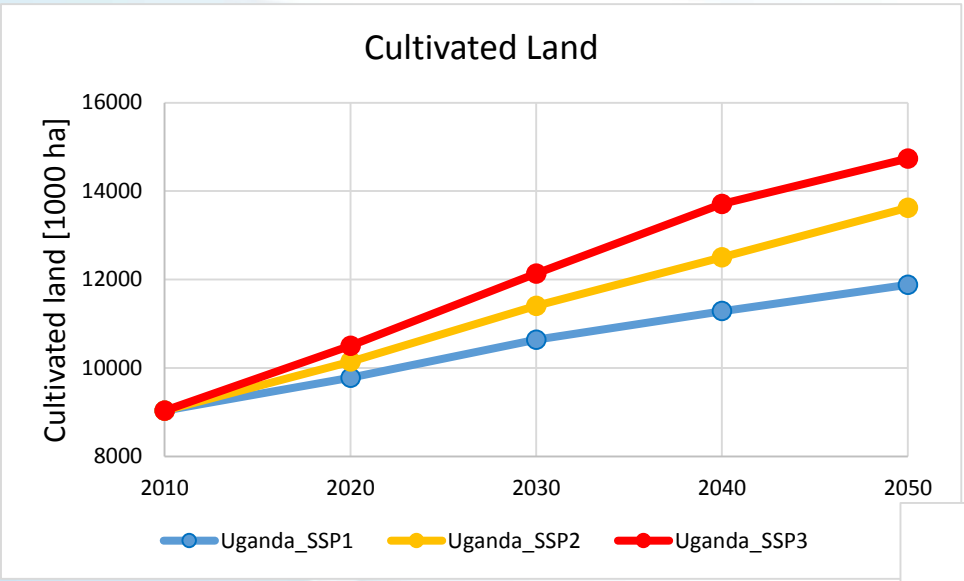
From 1,014 US$/year/cap in 2014 to 10,000 US$/year/cap in 2050

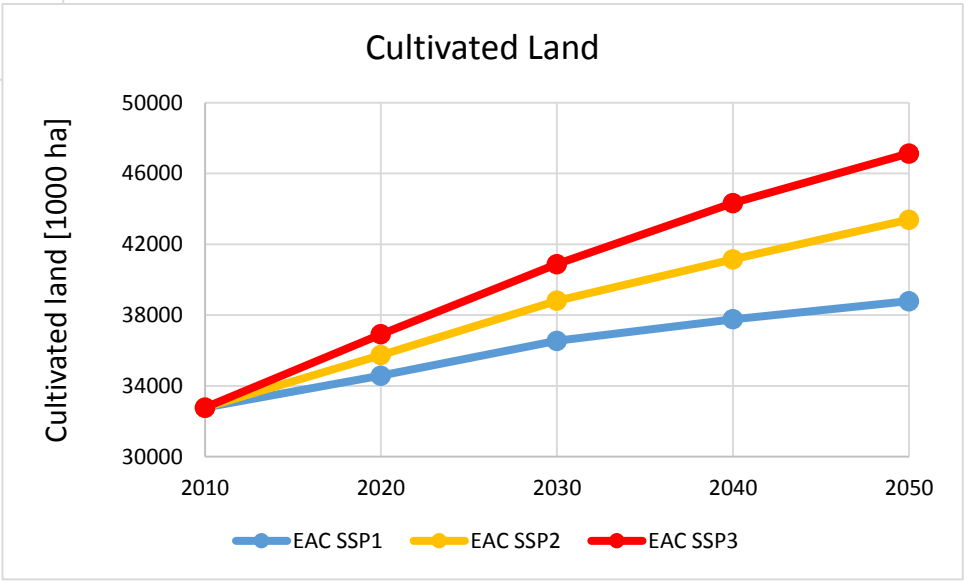
Change in built-up area in EAC





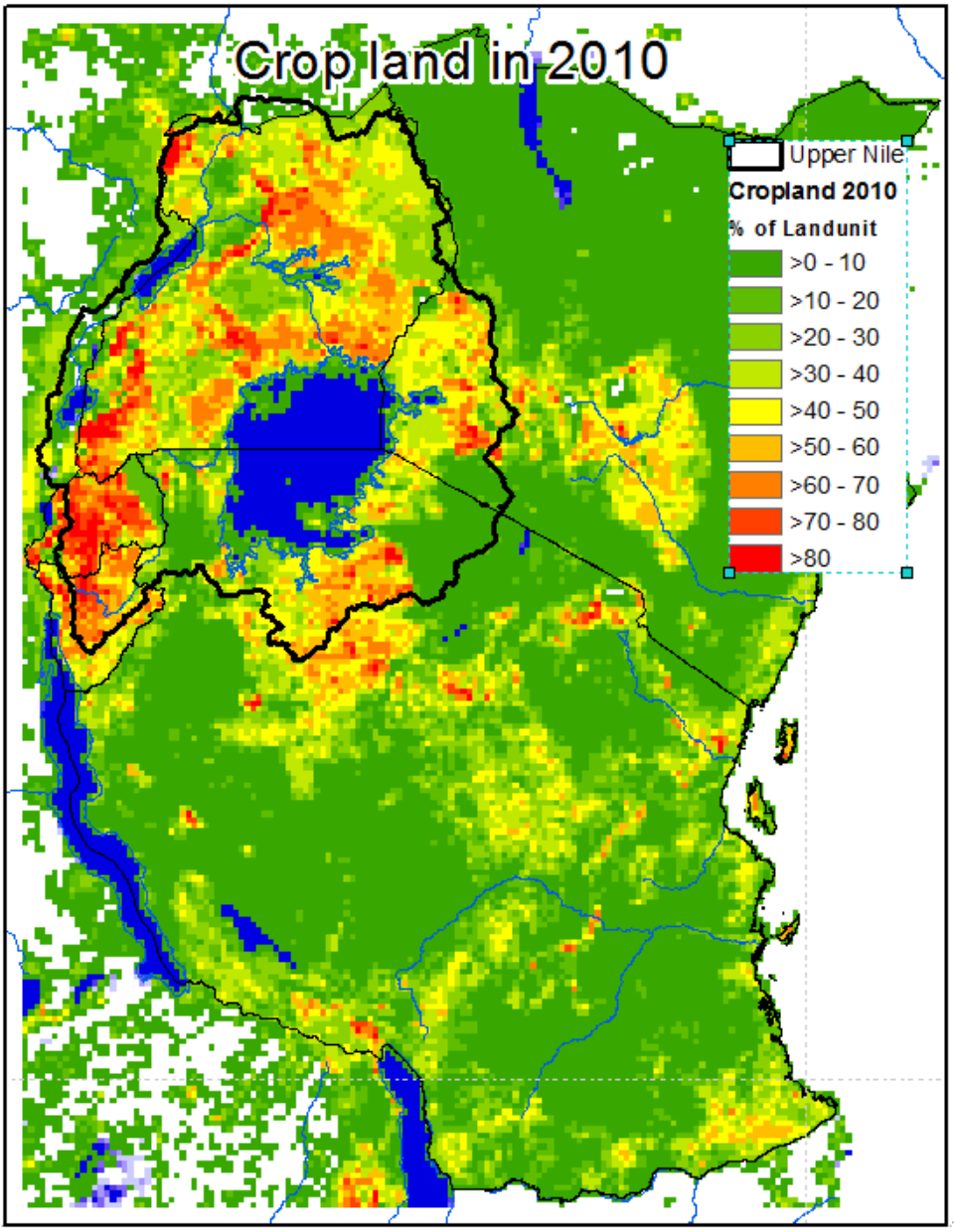
Change in cultivated land Uganda & EAC

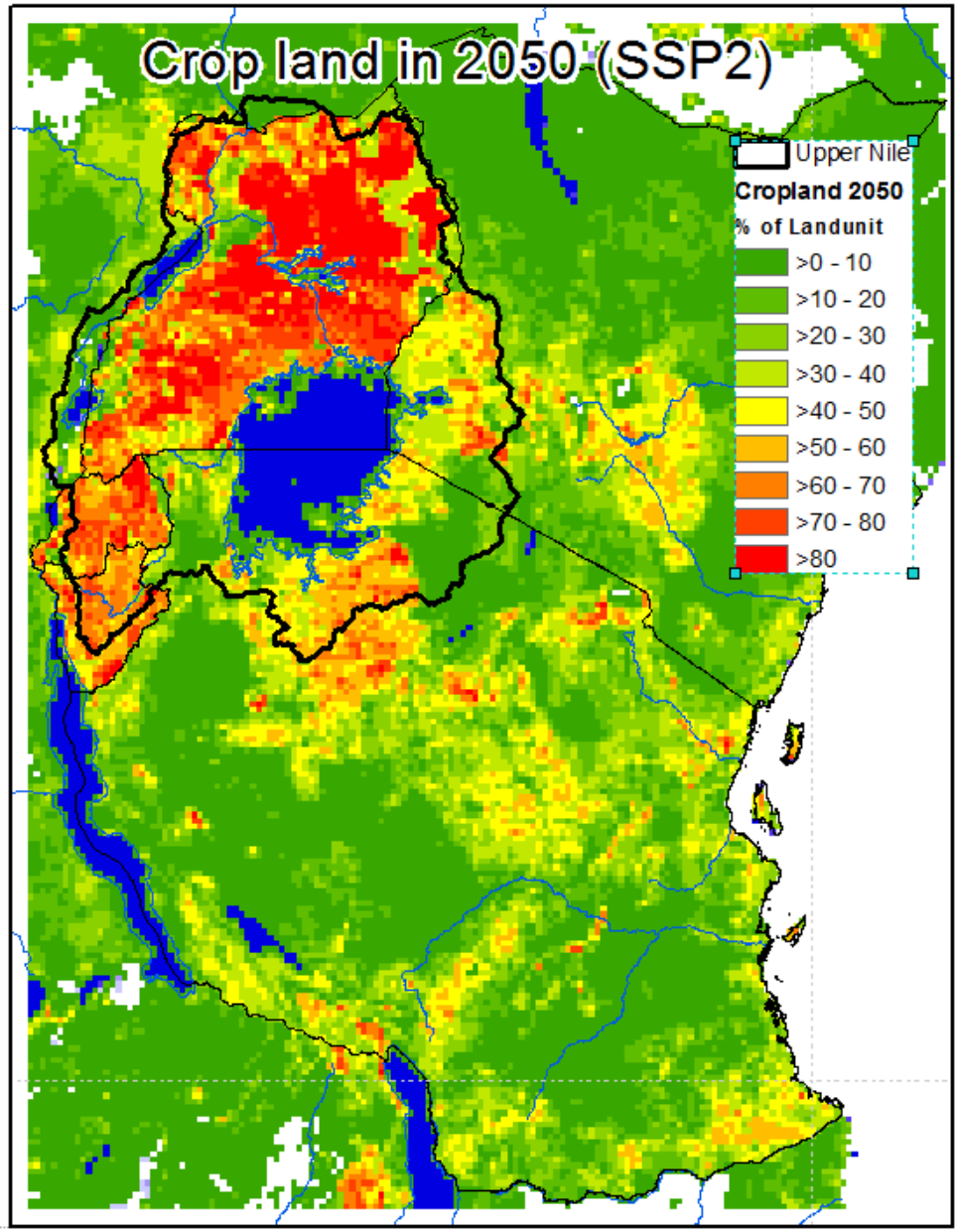




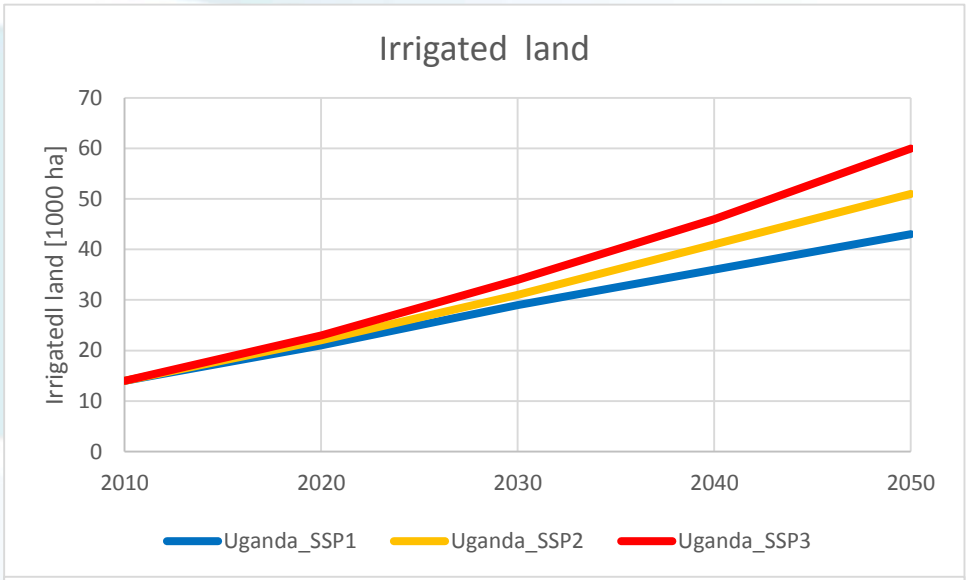
- Cultivate land will increase by 30-60% till 2050 for Uganda
- Cultivate land will increase by 20-40% till 2050 for EAC

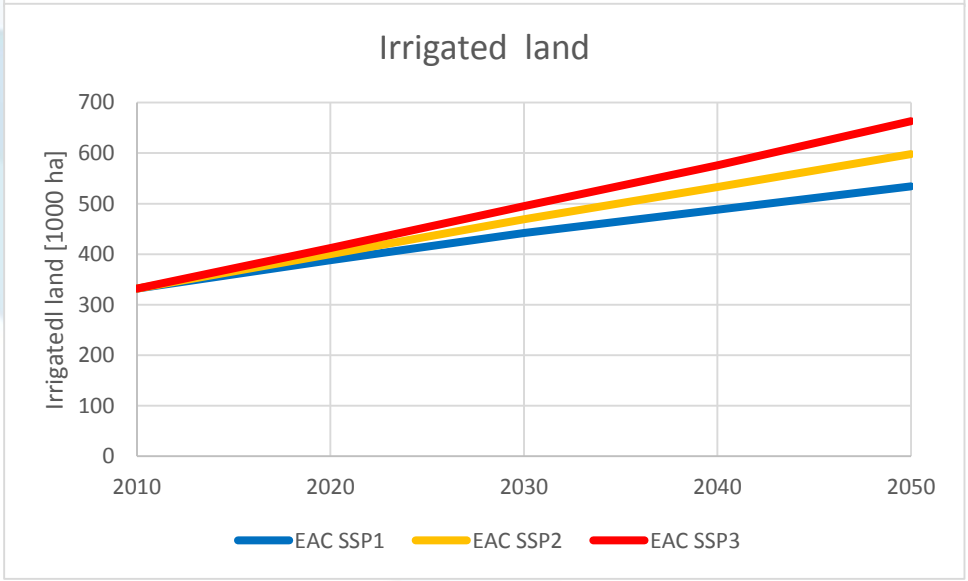
Change cultivated land area in EAC





Change in irrigated land





Target based on different strategy documents:

Uganda Vision 2040 / National WR Strategy:

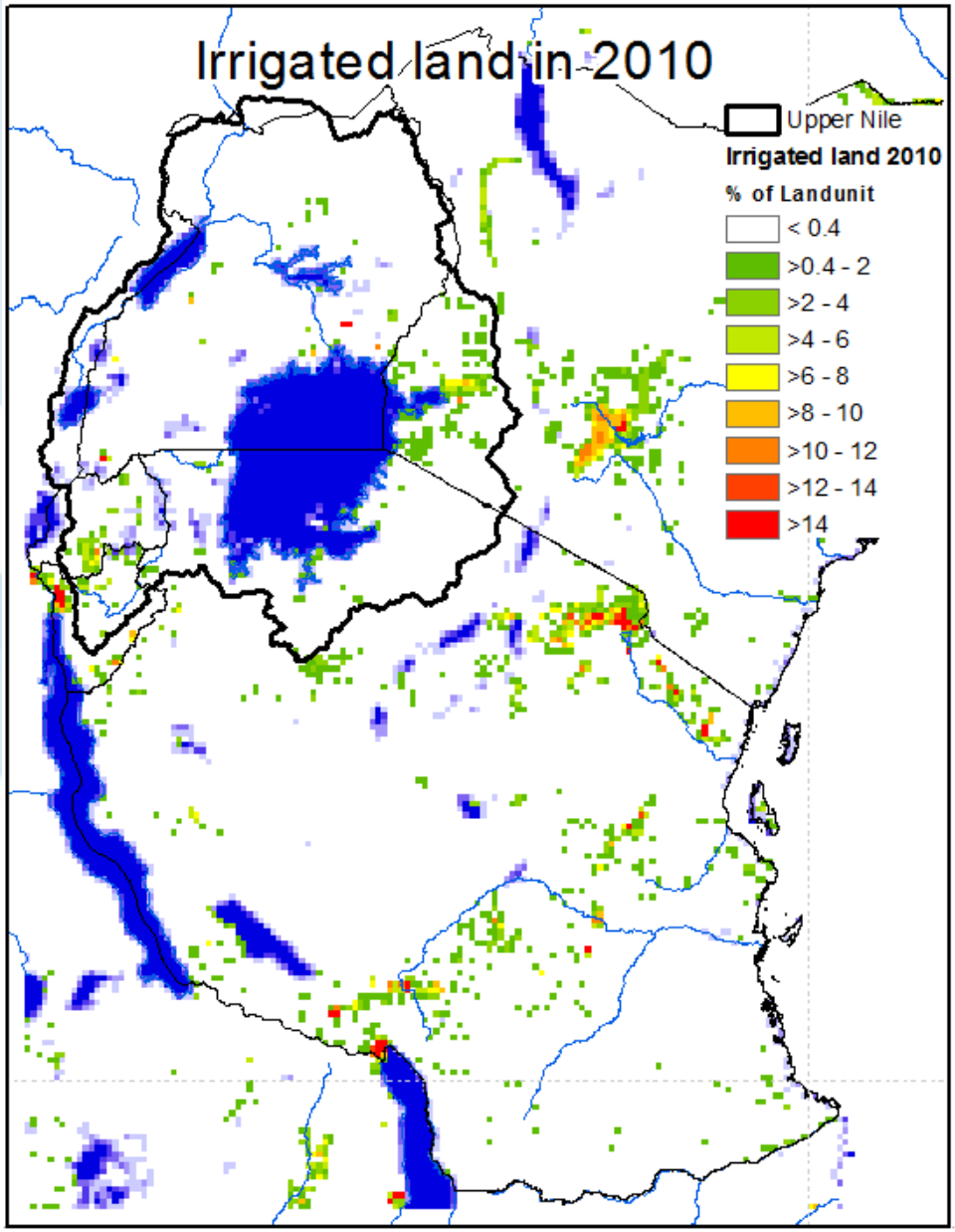
- more than 10 fold (>600.000 ha wetland und upland irrigation combined)

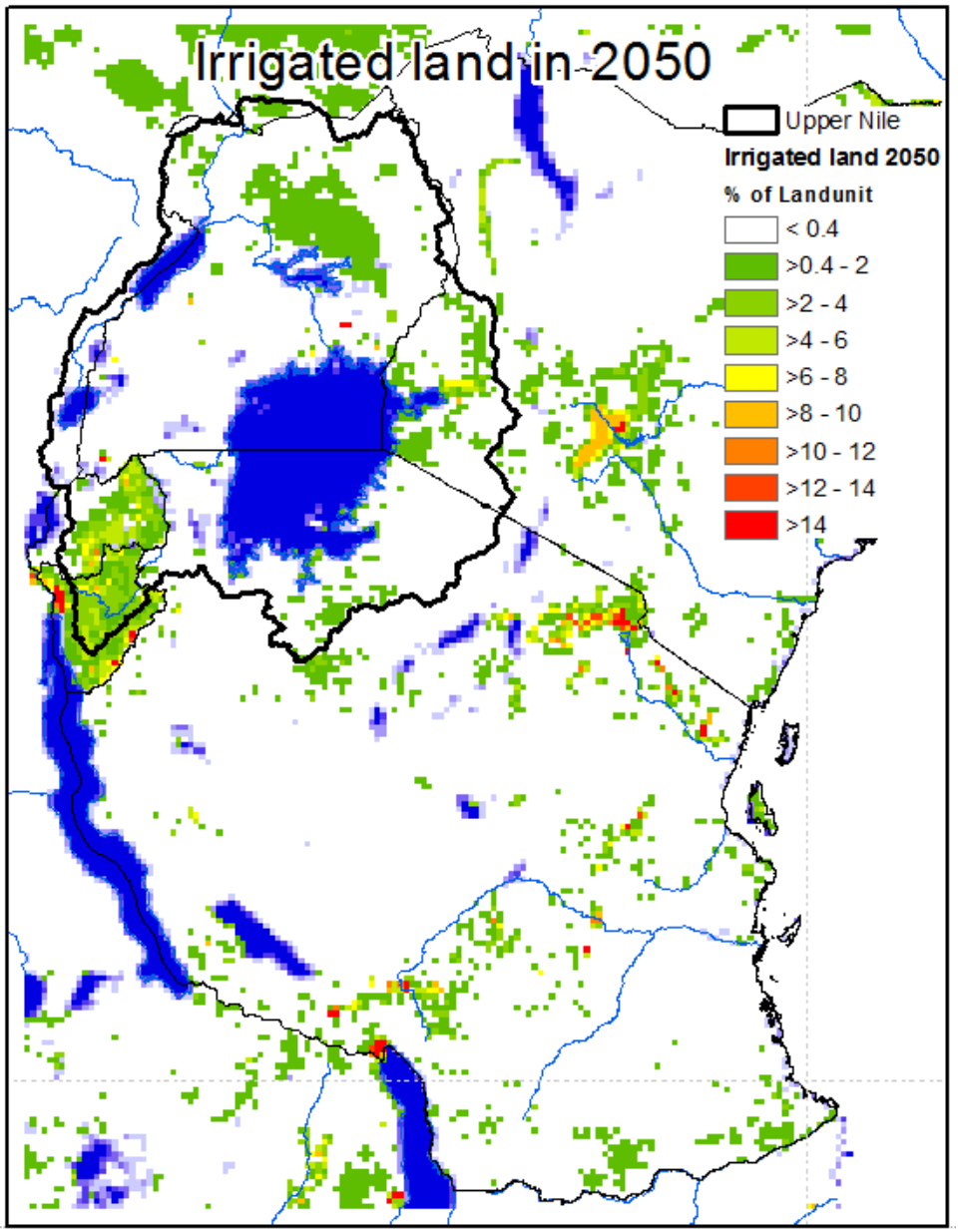
AMCOW Pan-African M&E System:

- Increase the size of irrigated areas by 100% from 2000 to 2025.
- Increase water productivity from irrigation and rainfed agriculture by 60% from 2000 to 2025

- Irrigated land will increase by 300-430% till 2050 for Uganda
- Irrigated land will increase by 60-200% till 2050 for EAC

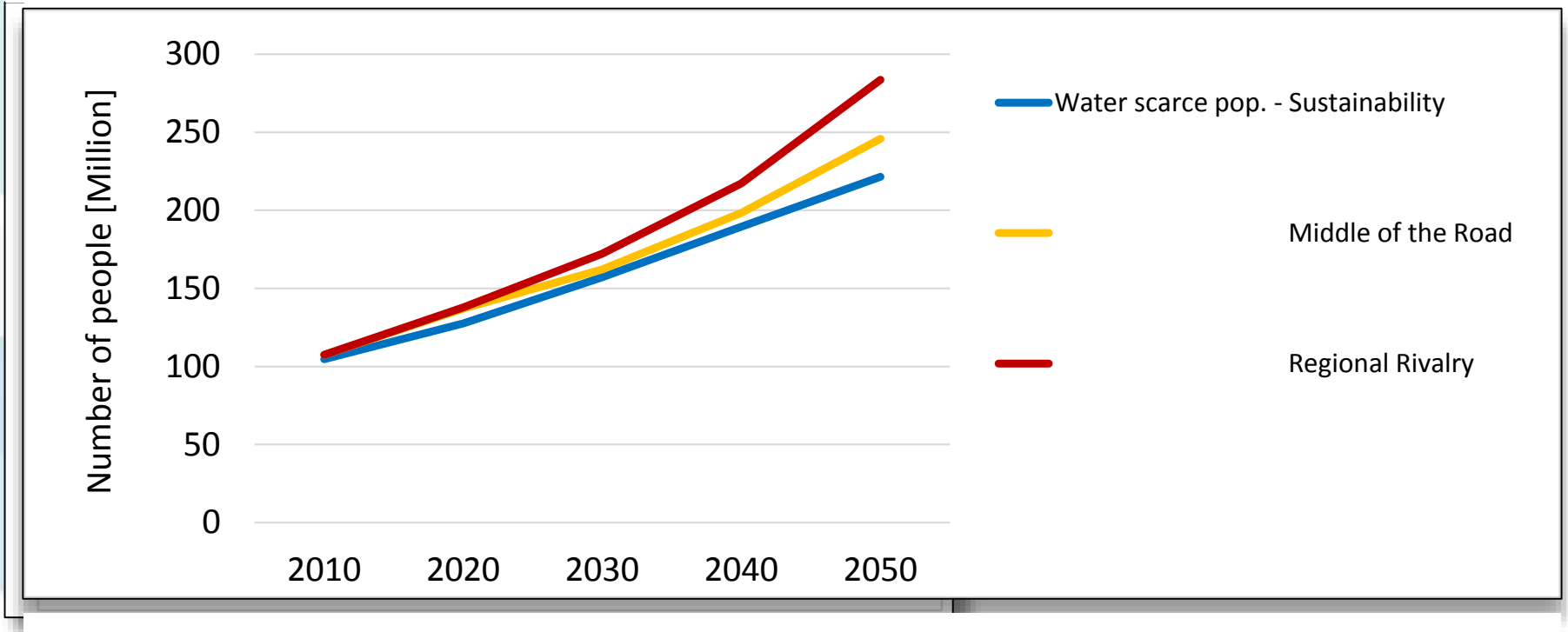
Change irrigated land area in EAC





Potential population exposed to severe water scarcity

Africa



Change:

2010: 11% of total population or 105 -108 m people

2050: 12% or 220 - 280 m people

Nexus game:

- opportunity for practicing water management policies
- players take on the roles of policy makers in two countries that have access to the same river
- match the increasing water demand with limited supply/resource
- practicing conflict resolution and cooperation

Benefits:

NEXUS GAME

Learn how to balance increasing water demand and solve water-supply conflicts between different sectors and countries

Discover and exploit the potential of innovative technologies for increasing energy and water use efficiency

Experience challenges connected with transitions in complex systems where multiple stakeholders' interests collide

Practice collaboration among various organizations and groups of interest whose individual and collective goals differ

NEXUS GAME

Technical details

3 - 4 hours

8 - 24 players

3 tables

http://nexus.games4sustainability.org/

From science to policy and practice

What for do we model hydrological processes and relating them to socio-economic developments and the environment?

- Building evidence base for solid policy, sustainable water management and investment decisions.
- Understanding synergies and trade-offs between sectors (users) and riparian countries.
- “water proofing” future development pathways and future solution options

Interested to engage?

Contact: wfas.info@iiasa.ac.at or burtscher@iiasa.ac.at

http://www.iiasa.ac.at/water

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