Water Security and Conflict
An African Perspective

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Water Security and Conflict

- **Water Security for What?**
- **Water Security for Whom?**
- **Water Security Where?**
- **Water Security When?**
- **Water Security How?**
- **How much Risk ?**
- **Is Africa's high renewable water dependency a risk or opportunity peace and regional cooperation?**
- **What tools and capacities are needed for better water security?**

These questions lead to conflicts

Let's take a brief look at each of these from an African Perspective

Water for Food vs. Environment

UGANDA
Conflict between Food and Environment

WETLANDS BEING USED FOR RICE CULTIVATION

Water for Economic Growth vs. Environment

UGANDA Conflict between Jobs and Environment

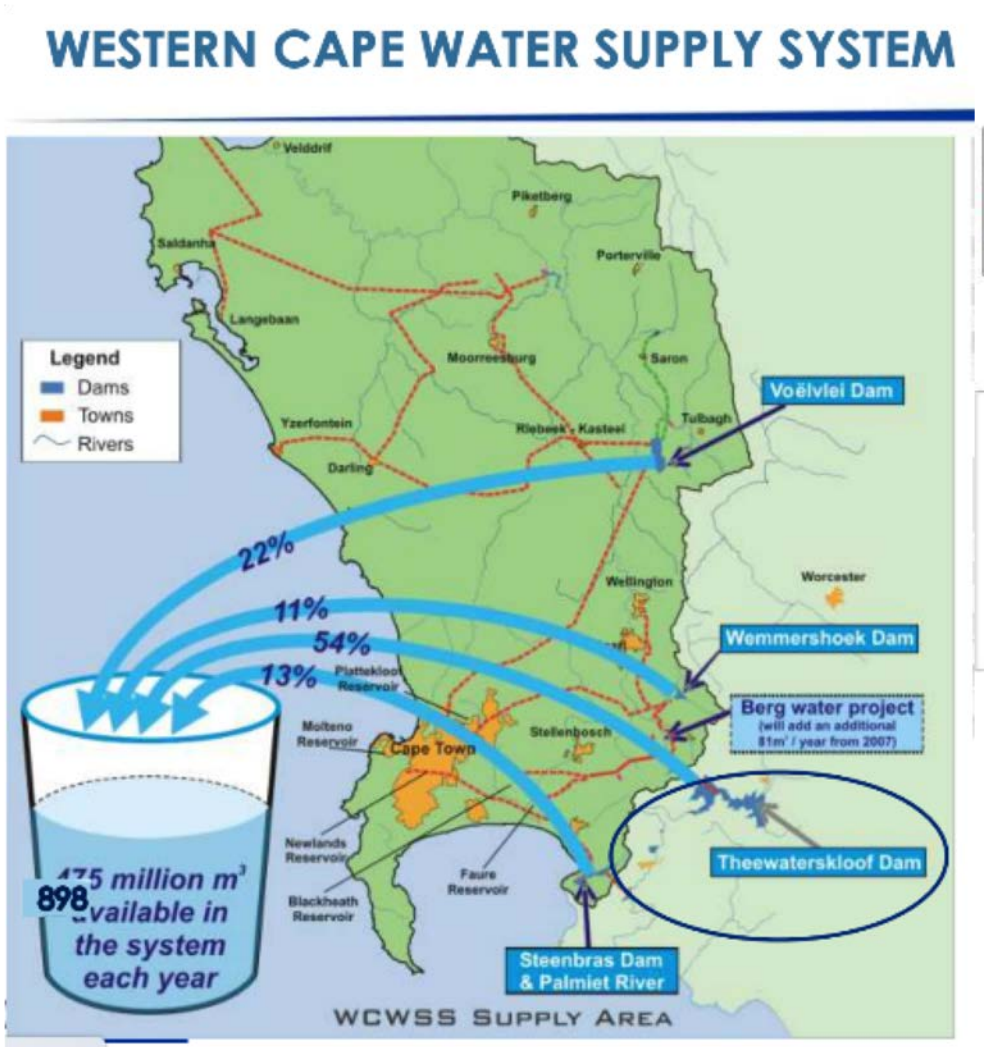
Uganda: Govt' allows investors to set up factories in wetlands but orders local communities to vacate

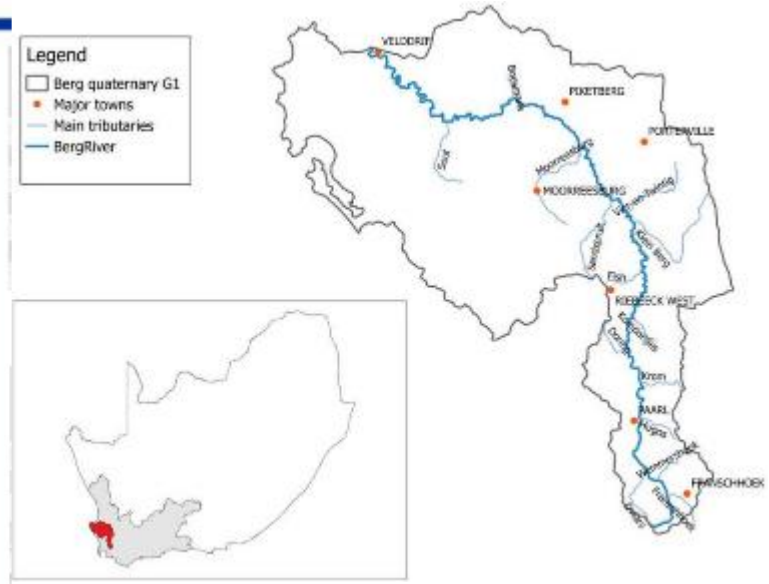
Read more

KAMPALA, Uganda — Rapidly disappearing wetlands are at the center of a controversial plan in Uganda to expand job opportunities — especially for young workers — by building a series of industrial parks.

Water for People vs. Environment

Cape Town Water supply vs. WQ in Berg River





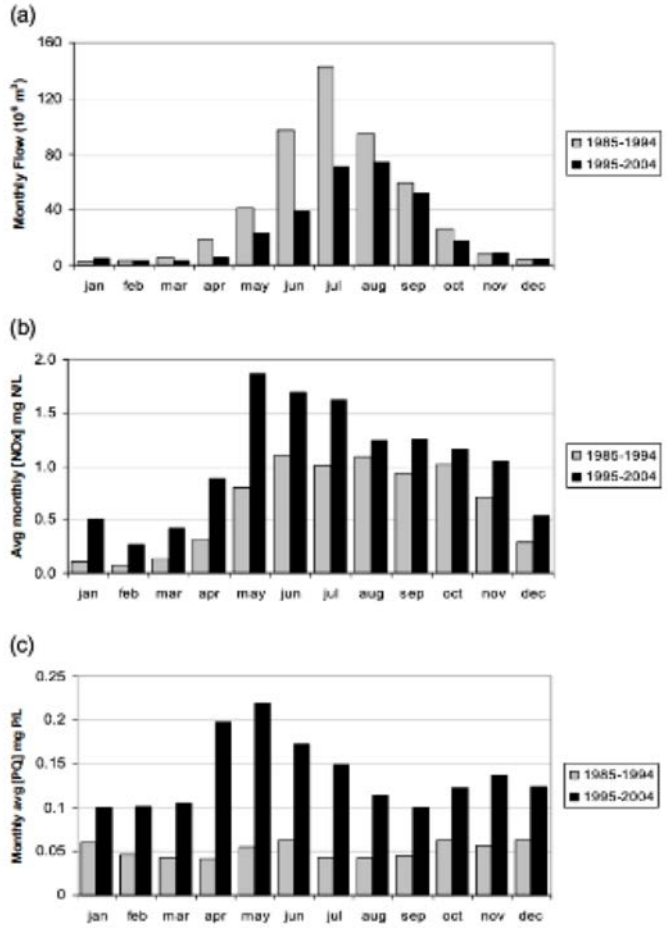
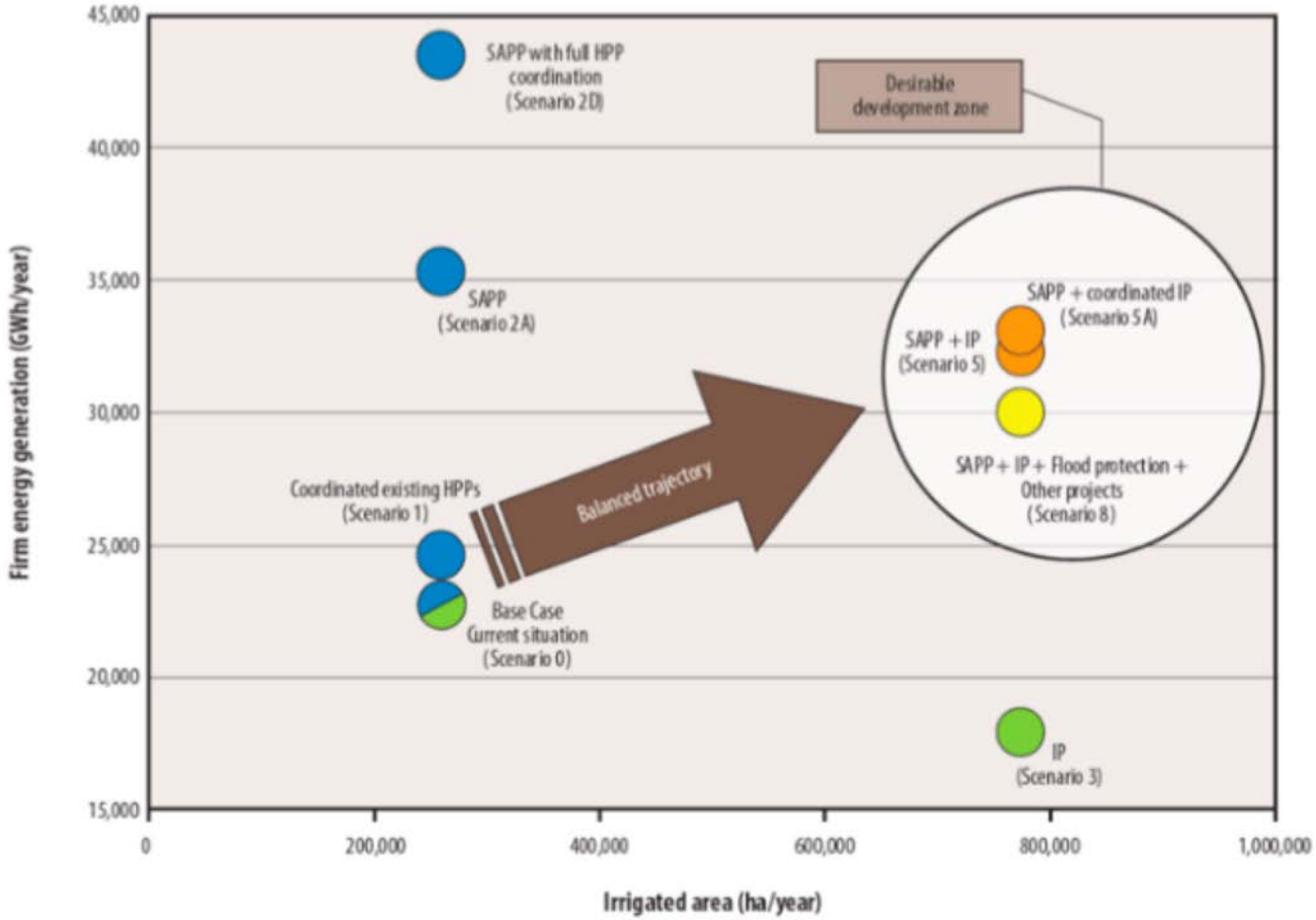


Figure 4
Comparative river flow, $[NO_3^- + NO_2^-]$ and $[PO_4^{3-}]$ monthly averaged data for the periods 1985-1994 and 1995-2004, at monitoring station B3

Water for Food vs. Clean Energy

Irrigation vs. Hydropower in Zambezi River

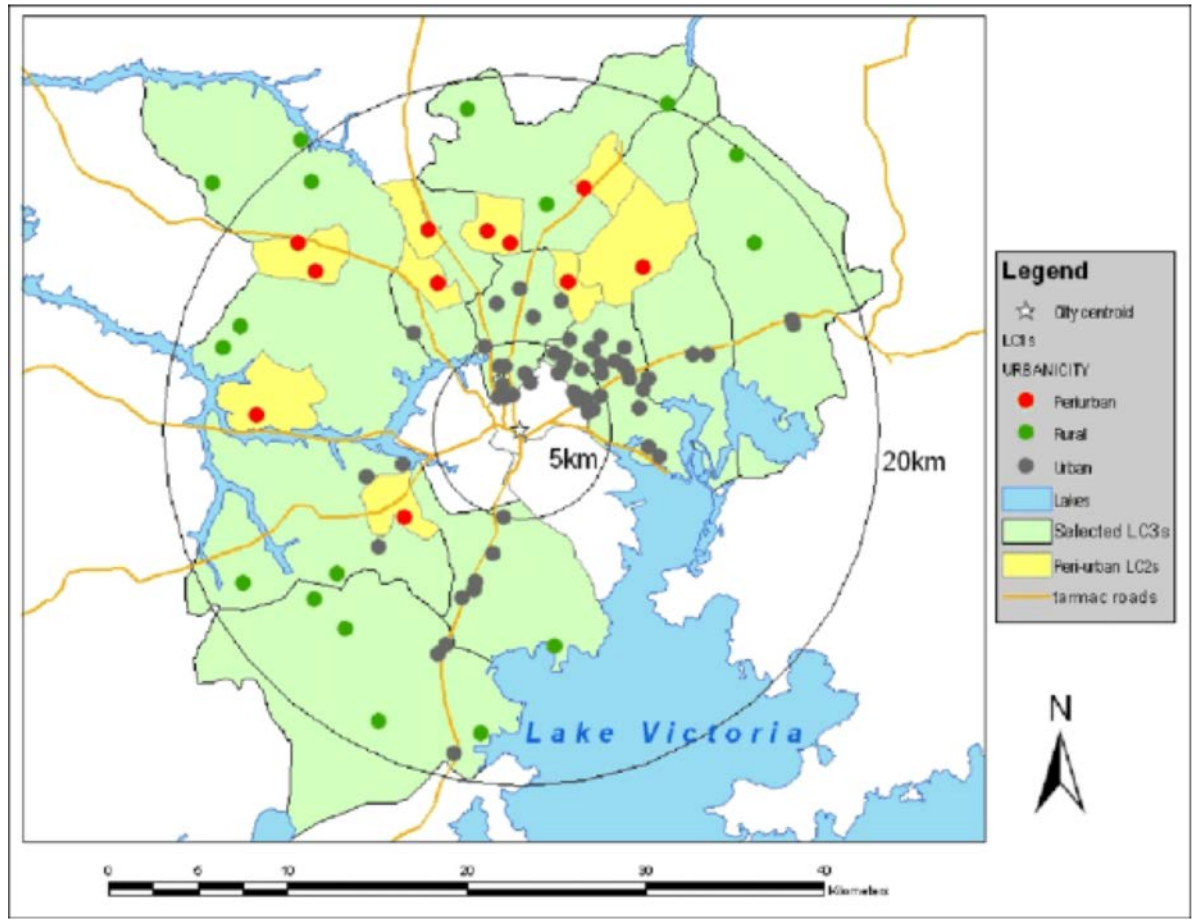
Figure 3.1. Potential for energy generation and irrigation by development scenario



SAPP = Southern Africa Power Pool ; IP = Identified Irrigation Projects.

URBAN vs. RURAL

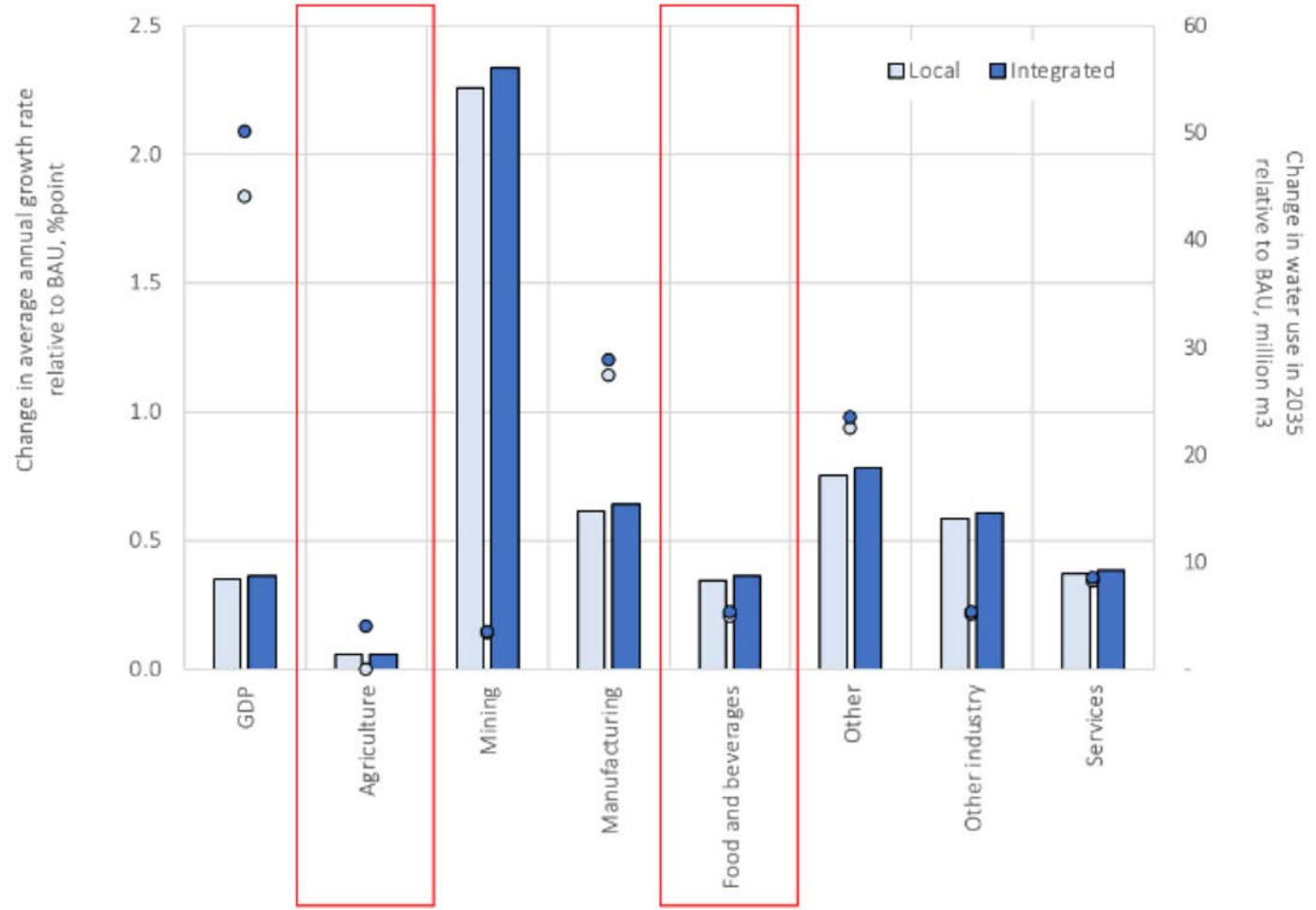
Greater Kampala
Conflicts over Priorities, Budgets, Governance, & Power



Water Security Interventions
Bore Holes
Drainage Improvement
WETLAND Restoration
Fecal Sludge Removal
Industrial Pre-Treat

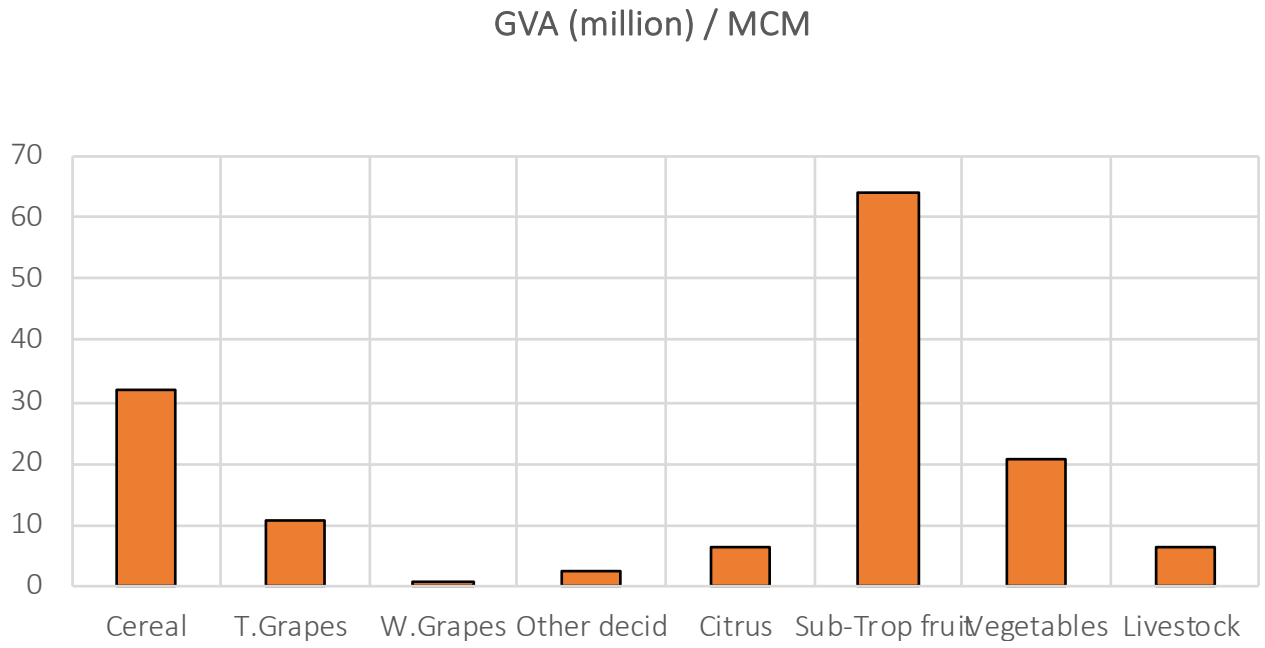
Water for Agriculture vs. Industry vs. Municipal

Marginal Value Water to Sectoral Growth in Western Cape Province South Africa



CONFLICT AMONG CROPS

Western Cape South Africa



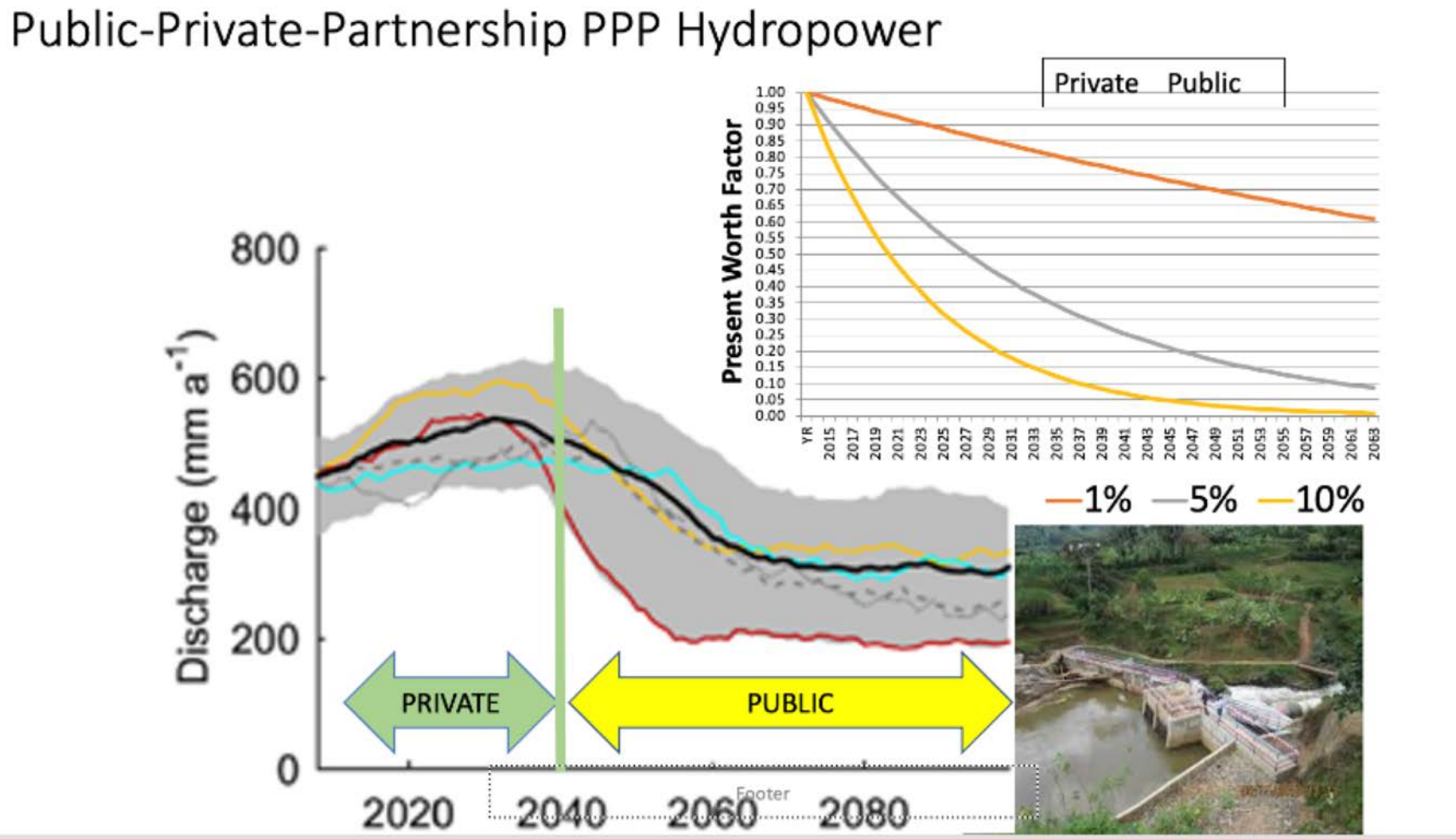
Agriculture		Processed Food	
Cereals	2.34	Meat	2.20
Table grapes	2.27	Fish	2.21
Wine grapes	3.11	Fruit and vegetables	2.44
Deciduous fruits	2.75	Dairy	2.52
Citrus fruits	2.64	Grain	2.46
Sub-tropical fruits	2.30	Baking	2.55
Vegetables	2.42	Animal feed	2.48
Livestock	2.36	Other food	2.34
Other agriculture	2.01	Beverages and tobacco	2.36

Direct Value Added

Value Added Multiplier

PUBLIC vs. PRIVATE vs. PPP

Cost of Capital vs Social Rate of Discount



Nation Vs Nations
Public vs. Private

Table III. Vulnerability of BCUs and population, present and future hazards

	Present hazard level			*Future hazard level*			
	High	*Medium*	*Low*	*High*	*Medium*	*Low*	*Total BCUs*
Vulnerability level (no. of BCUs)							
High	**41**	199	146	**94**	174	118	386
Medium	9	113	51	46	93	34	173
Low	15	111	50	35	93	48	176
Total BCUs	65	423	247	175	360	200	735
							Total population (in millions)
Vulnerability level (% of population)							
High	**0.27**	7.78	7.99	**2.05**	6.77	7.23	441
Medium	0.38	8.51	6.29	1.92	7.75	5.51	417
Low	2.37	31.55	34.86	4.25	47.07	17.46	1890
Total population (in millions)	83	1315	1350	226	1693	8309	2748

Bold entries are the highest risk categories.

WGS 1984 Geographic Coordinate System

International River Basins of Africa

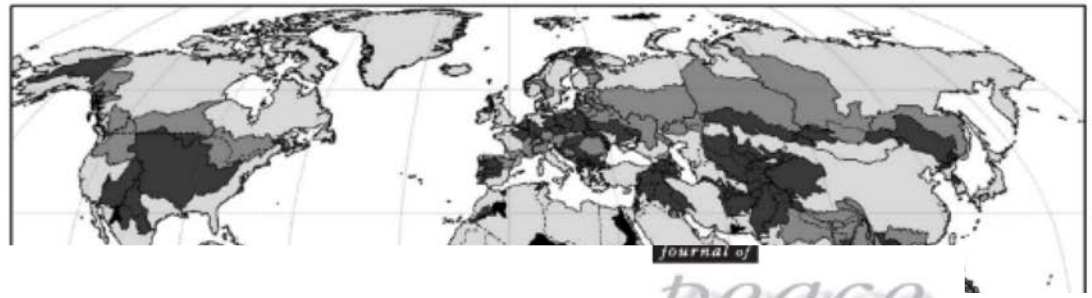


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Table III. Vulnerability of

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Climate change and the institutional resilience of international river basins

journal of peace RESEARCH

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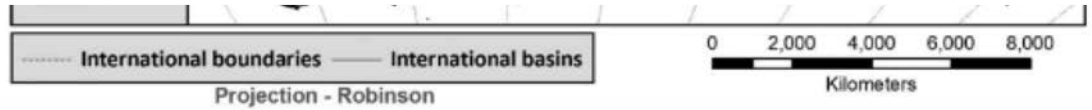


Figure 3. Global distribution of basin-country units in present and future hazard classes.

Water and Development in the Zambezi Basin under Climate Risk

CONFLICTS OVER

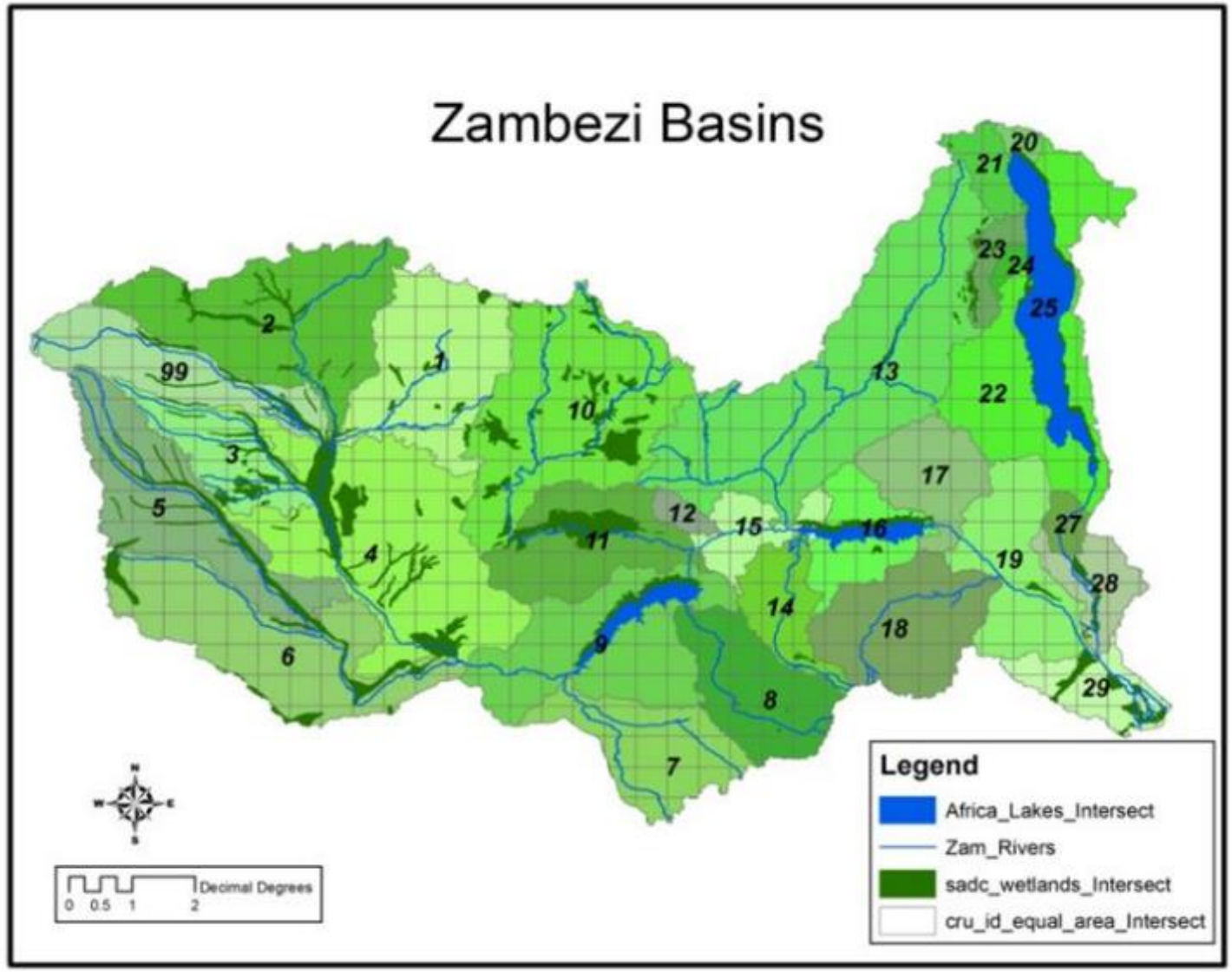
Present versus Future Costs and Benefits

Levels of Risk

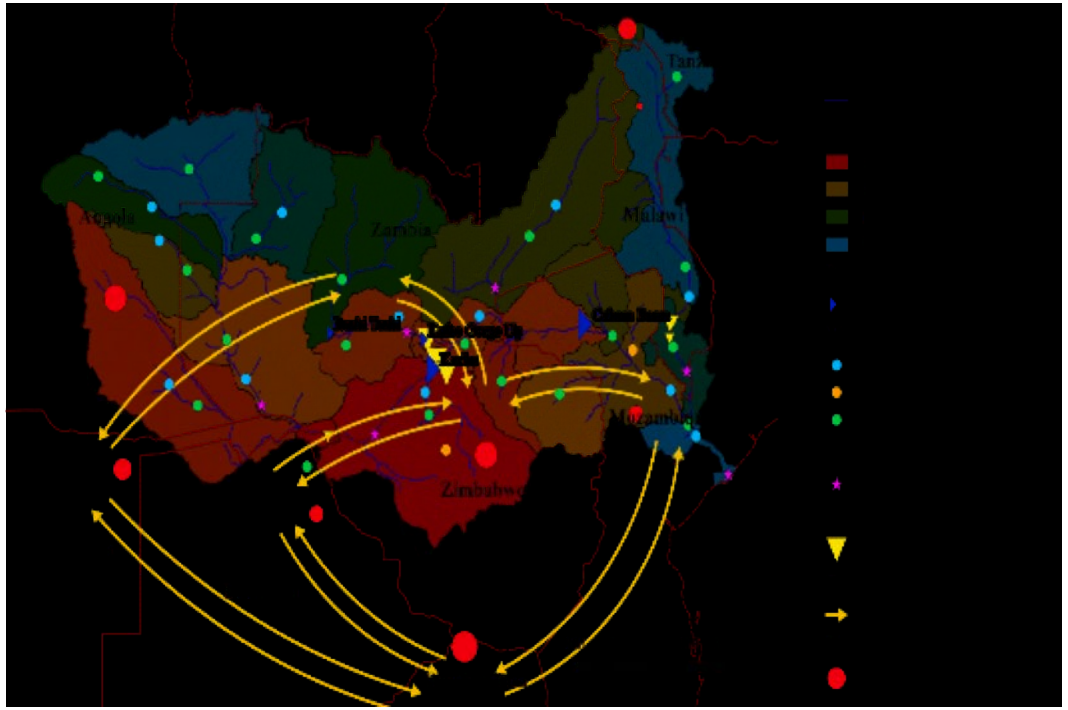
Resilience

Regional Cooperation

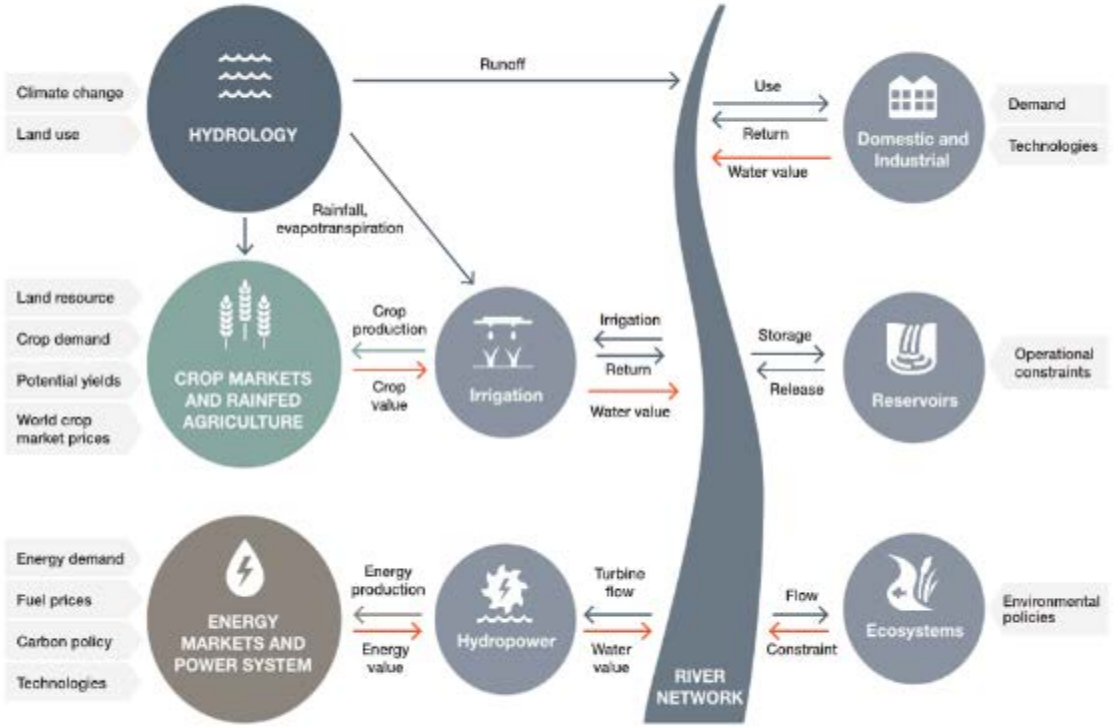

Luanda
Mbuji-Mayi
TANZANIA
Zanzibar
Dar es Salaam
Lubumbashi
MALAWI
Lilongwe
ANGOLA
Kitwe
Lubango
ZAMBIA
Lusaka
Cidade de Nacala
Blantyre
Namibe
MOZAMBIQUE
Harare
ZIMBABWE
Beira
Mozambique Channel
Windhoek
BOTSWANA
KALAHARI DESERT
Walvis Bay
NAMIBIA
Gaborone
Pretoria
Maputo
Johannesburg
Mbabane
SWAZILAND
SOUTH AFRICA
Maseru
LESOTHO
Durban
Cape Town
Port Elizabeth


Zambezi Basins
Legend
Africa_Lakes_Intersect
Zam_Rivers
sadc_wetlands_Intersect
cru_id_equal_area_Intersect
Decimal Degrees
0 0.5 1 2

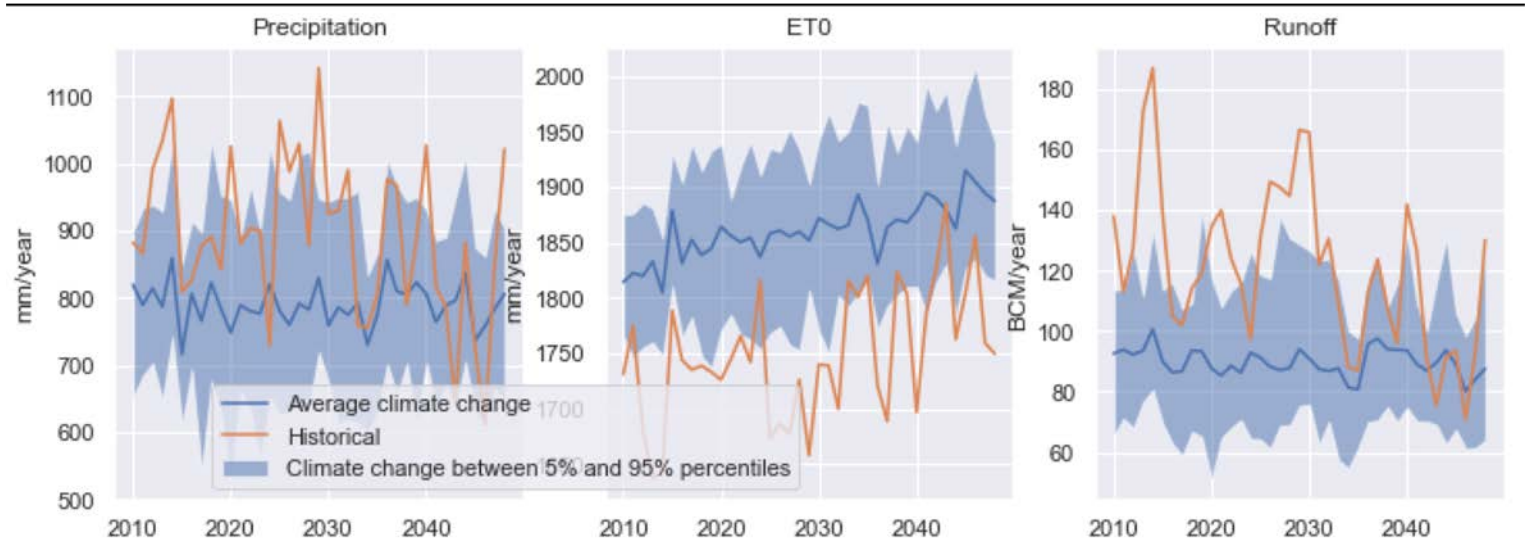
# of The Zambezi River Basin under Climate Uncertainty



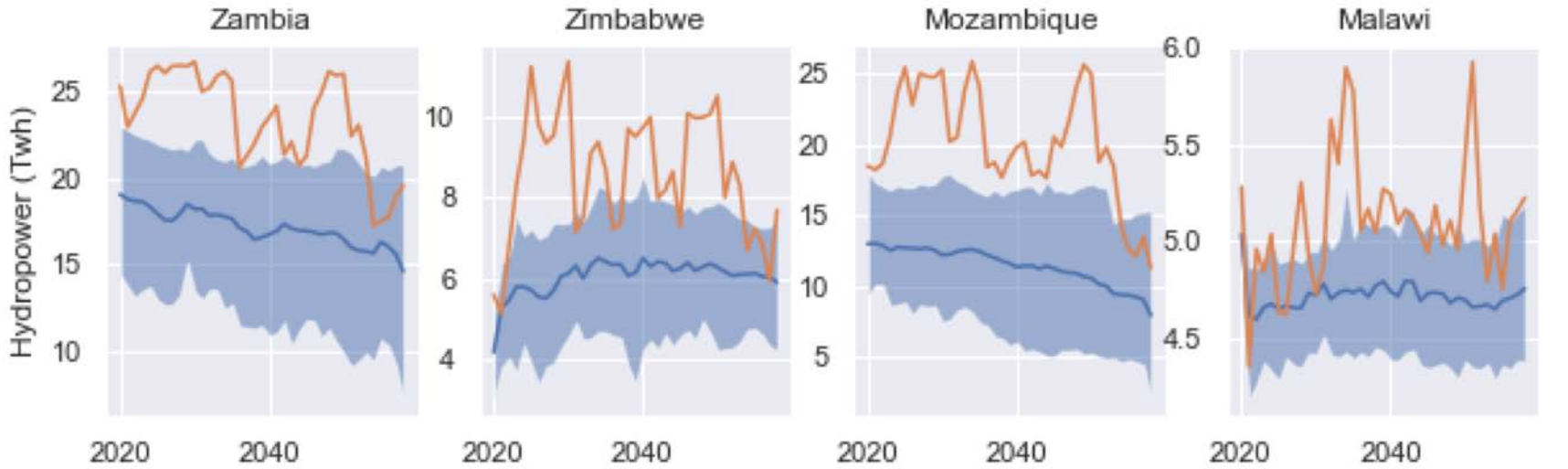
HYDROECONOMIC OPTIMIZATION MODEL OF THE WATER, AGRICULTURE AND POWER SYSTEMS



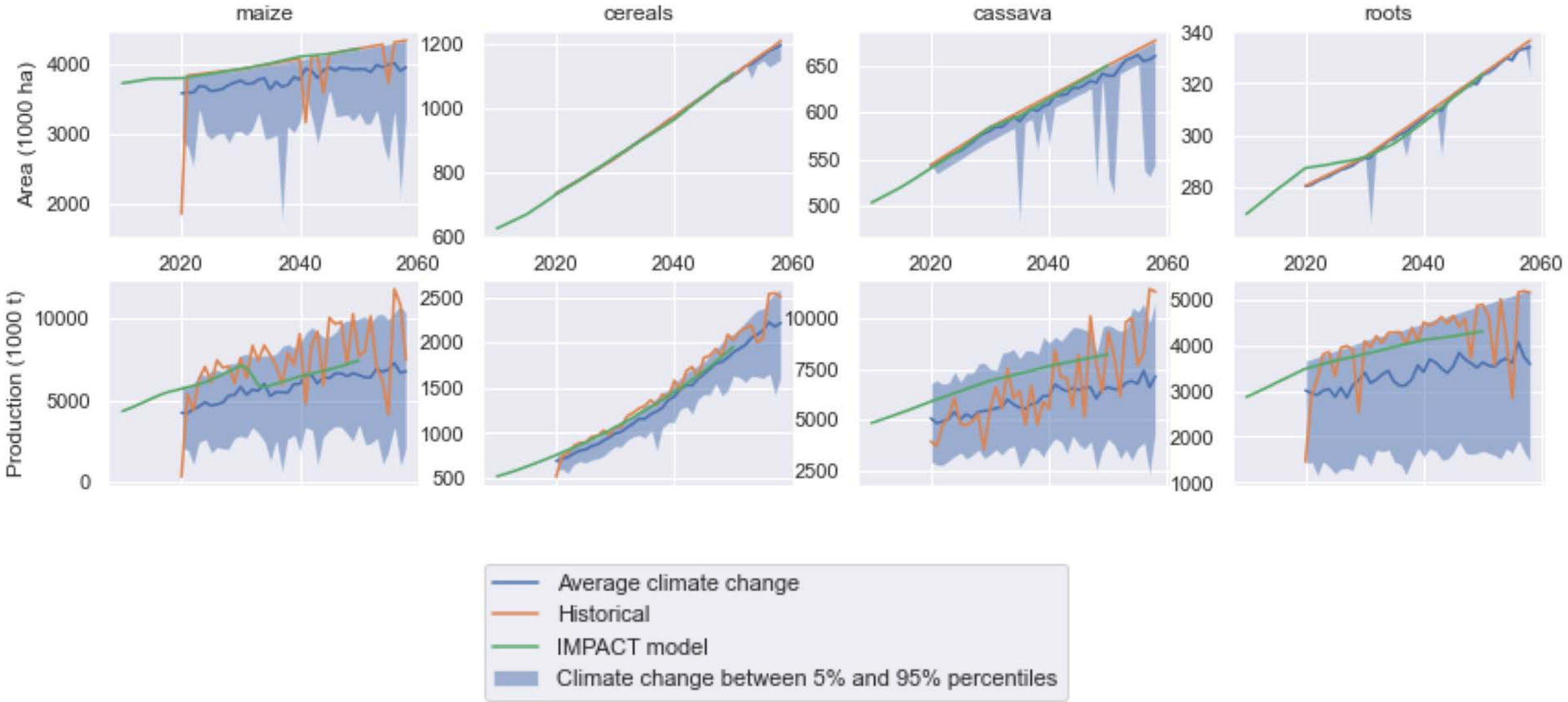
MIT-JP HFD PROJECTIONS OF HYDRO-CLIMATOLOGY IN ZAMBEZI BASIN



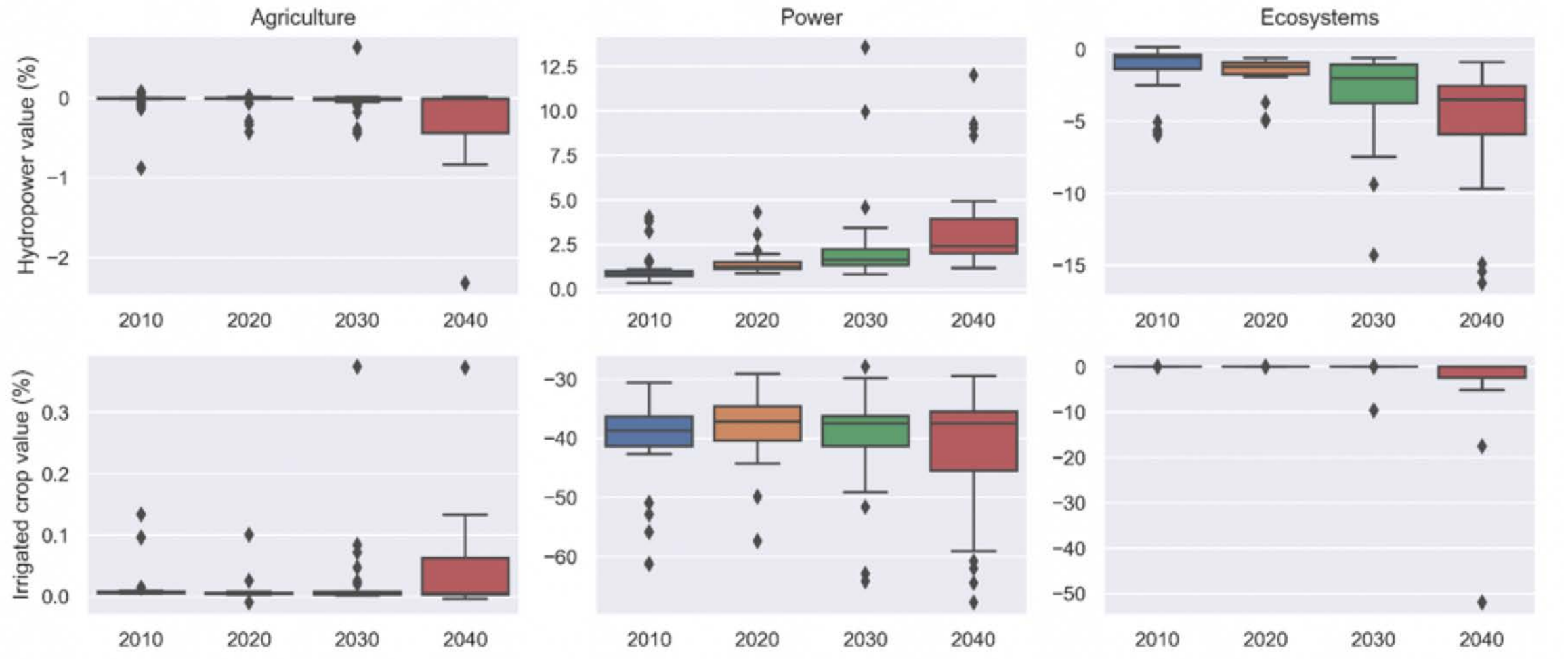
Hydropower Production Under PF Scenario



Rainfed and Irrigated Crop Area and Production Under PF Scenario



Trade-off between Energy vs. Agriculture under Alternative Water Allocation Policies



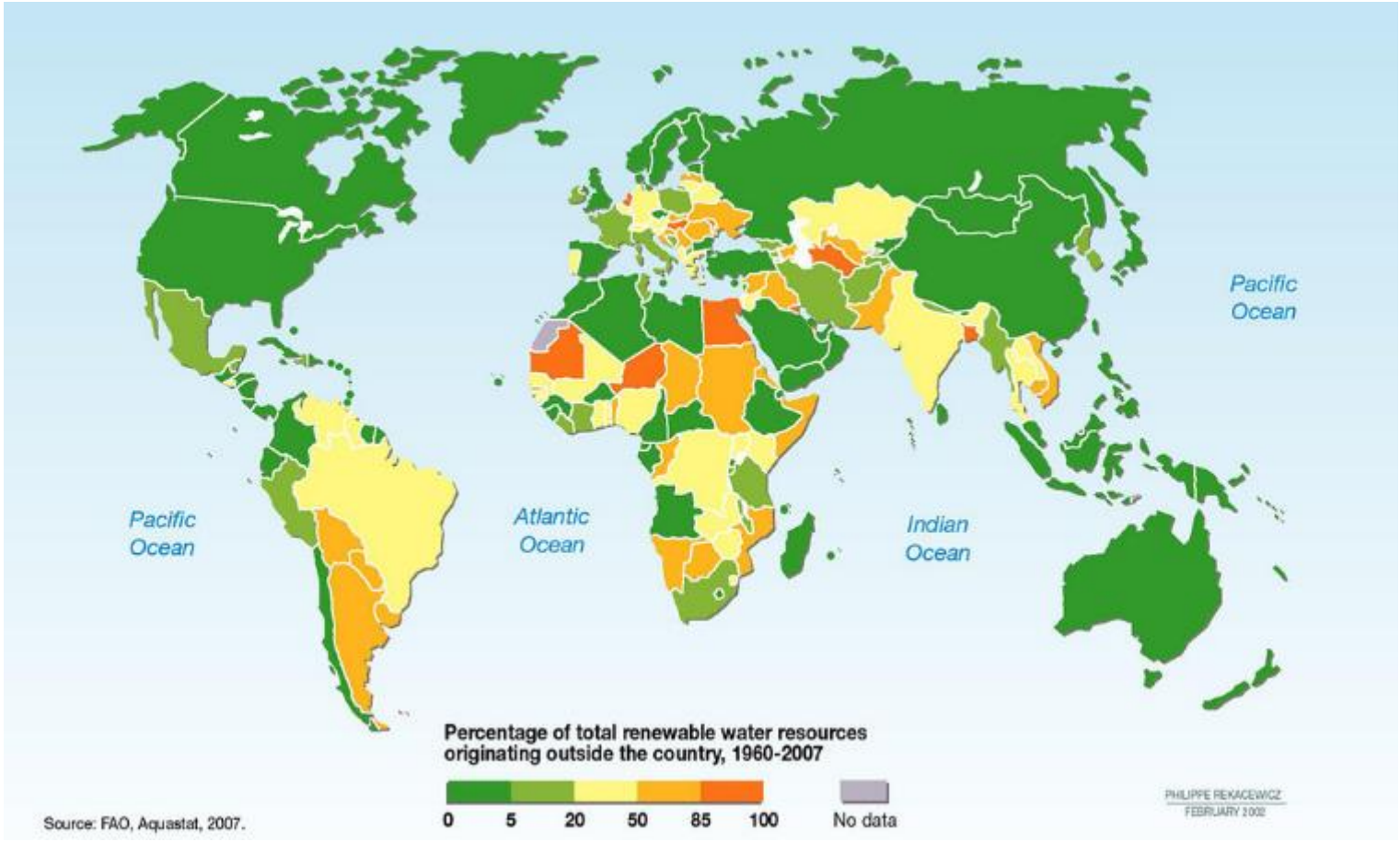
Trade-offs between hydropower, irrigation and ecosystems. Each column represents a different sector being prioritized in the objective function (Agriculture, Power, Ecosystems), and the indicators show the difference with the economically optimal solution.

Value of Regional Cooperation

Table 13-6. Climate Change Impact on the Unconstrained Development VS High Environmental Protection Scenarios

	HYDRO GEN (TWH/YEAR)		FIRM POWER 90TH (TWH/YEAR)		CALORIES (10^12)	
Scenario	**HIST**	**DRY**	**HIST**	**DRY**	**HIST**	**DRY**
Independent						
Baseline (No Constraints)	39.87	11.81	22.0	8.7	3,983	3,391
Ambitious Environment and Delta/Flood	33.17	13.91	20.8	9.6	3,836	3,301
Cooperative						
Baseline (No Constraints)	46.8	33.0	46.9	33.0	3,557	4,534
Ambitious Environment and Delta/Flood	46.2	14.0	46.4	12.0	3,709	4,635

Many countries in Africa are dependent on each other for renewable water



High water dependency: A water security risk or an opportunity for regional cooperation for water security

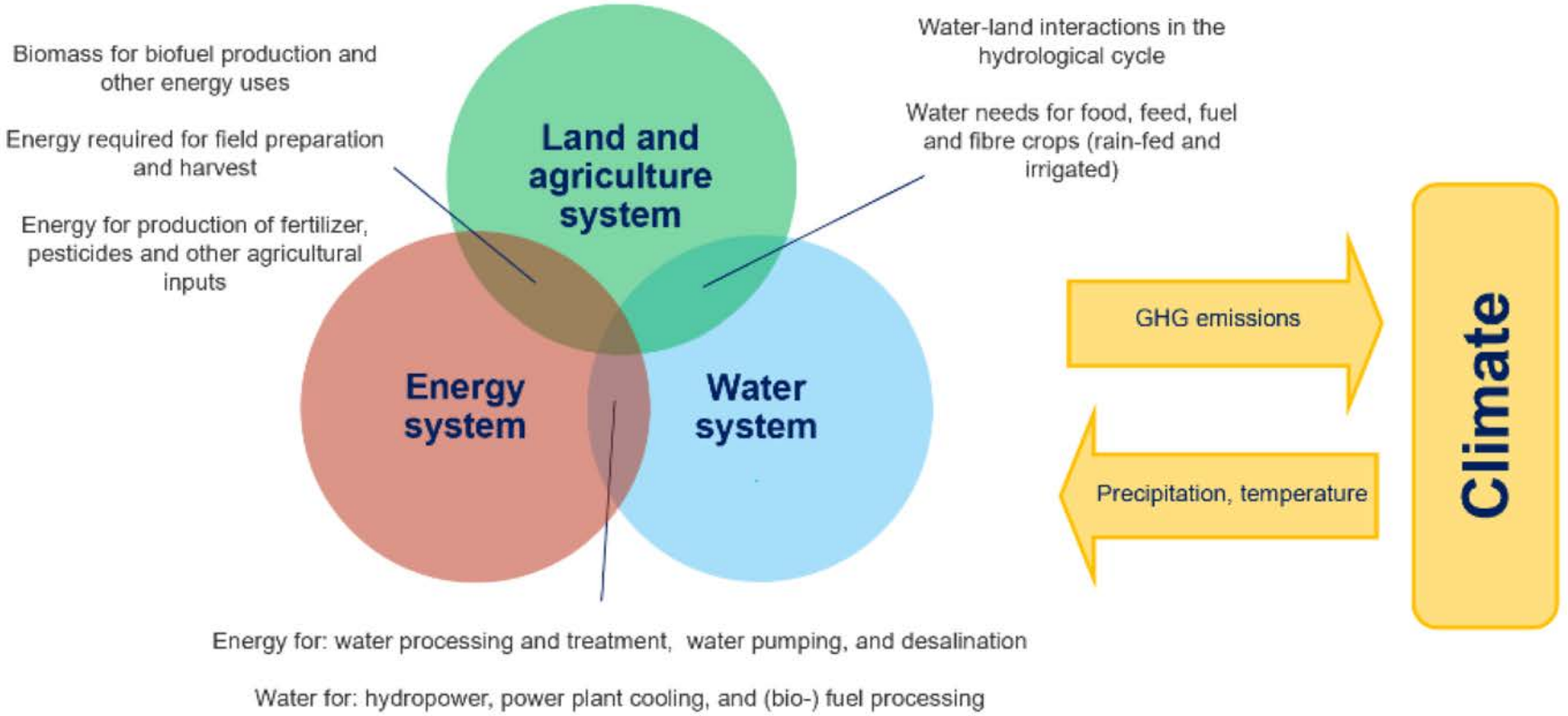
United Nations | Department of Economic and Social Affairs

UNDP

United Nations Economic Commission for Africa

The Climate, Land, Energy and Water systems (CLEWs) approach in Africa

Conceptual CLEWs diagram



Pilots:

- Cameroon
- Ethiopia
- Namibia

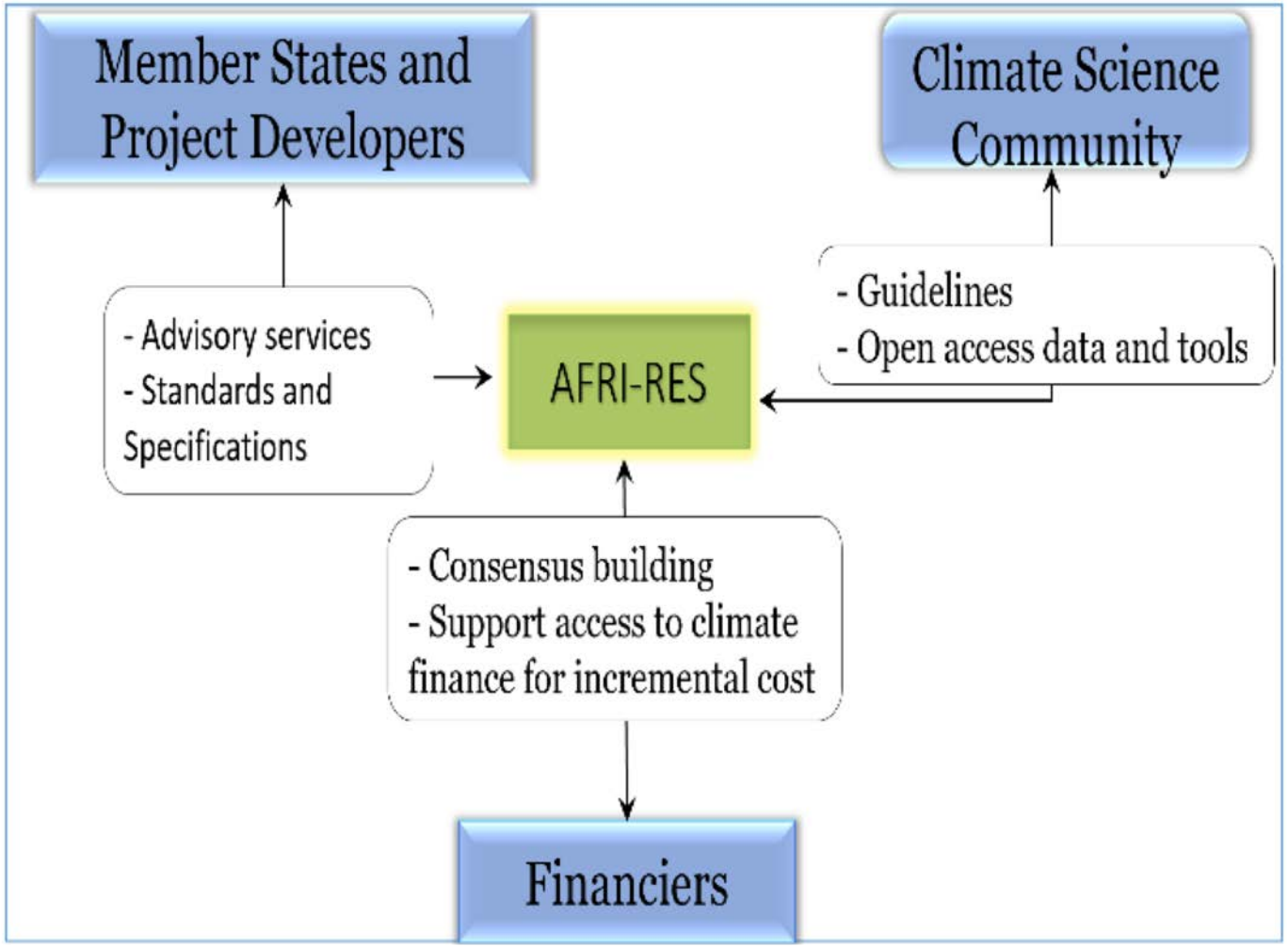
Tools and capacities for policy coherence and integrated climate, land, energy and water systems approaches critical for water security in Africa

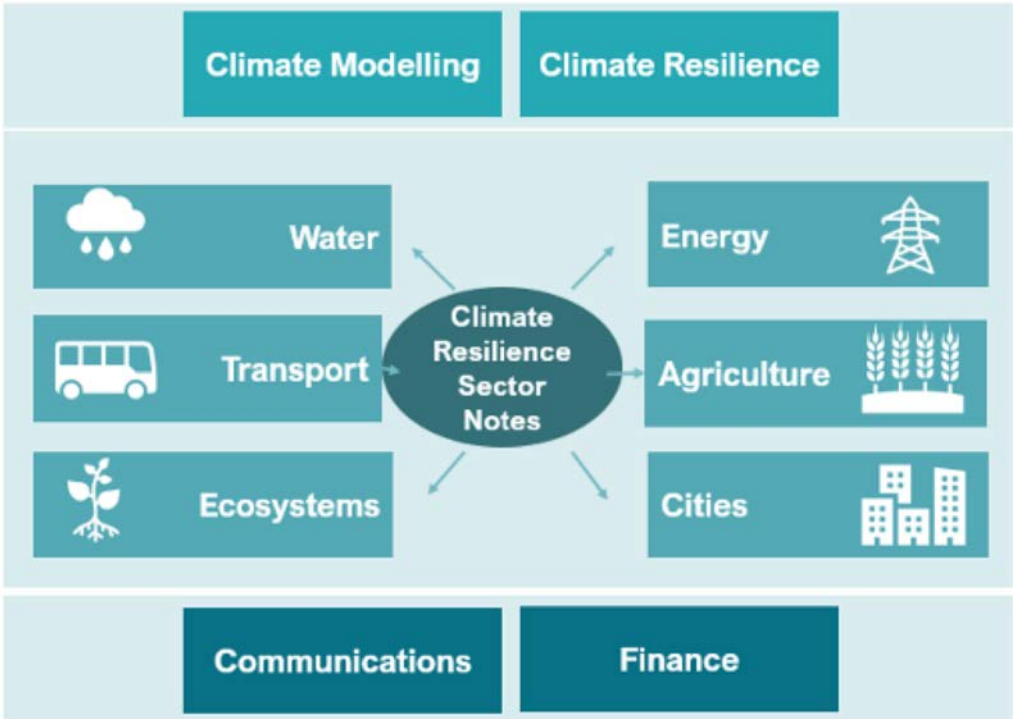
CONFLICTS IN DEVELOPING CLIMATE RESILIENT WATER INFRASTRUCTURE

- Value Proposition: AFRICA MUST HARNESS THE CLIMATE RESILENCE DIVIDEND !!!!
- Who should pay for additional Climate Change Induced Resilient Cost of Design?
- DEVELOPMENT FUNDERS ARE REQUIRING CLIMATE RESILIENT INVESTMENT PROJECTS BUT NOT PROVIDING THE MARGINAL COST FROM CLIMATE CHANGE
- Africa **CANNOT** afford to **NOT** develop Climate Resilient Infrastructure and bearing the burden of GHG climate change they did not emit.
- There is a conflict over who does “RESILIENCE ANALYSES” and who pays for the RESILIENCE
- There is mistrust when being forced to take bigger loans for funders based on there Analysis.
- UNECA and World Bank have initial **AFRI-RES** – The African Climate Resilience Investment Facility
  - To bring awareness and training in tools for resilient design is key sector for African practitioners
  - Moving toward Standards and Certification for Climate Resilience and shared knowledge, data and tools

Africa Climate Resilient Investment Facility

AFRI-RES





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IEc

Guidance Note:
Climate-Resilient Investment in Sub-Saharan Africa's Water Systems
Draft

21 October 2022

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Thank You

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The Africa Climate Resilient Investment Facility

Call for Applications and Nominations

IDEP | ECA