EFlows in transboundary settings: Negotiating objectives for river and estuarine ecosystem status (Development Space)

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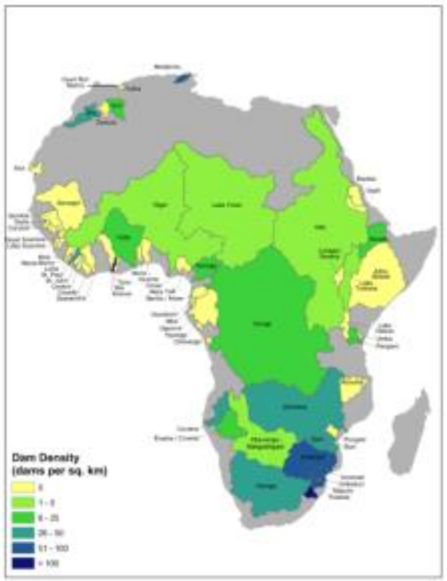
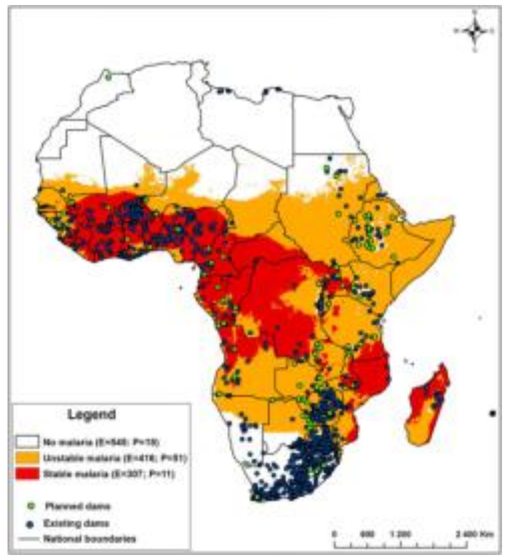
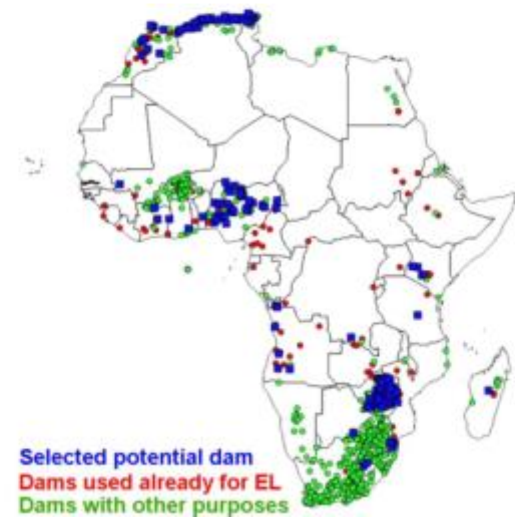
UNEP workshop: Mainstreaming Environmental Flows
into Integrated Water Resources Management.
Cape Town November 2019

water matters

Water Security
quantity, quality, reliability, availability

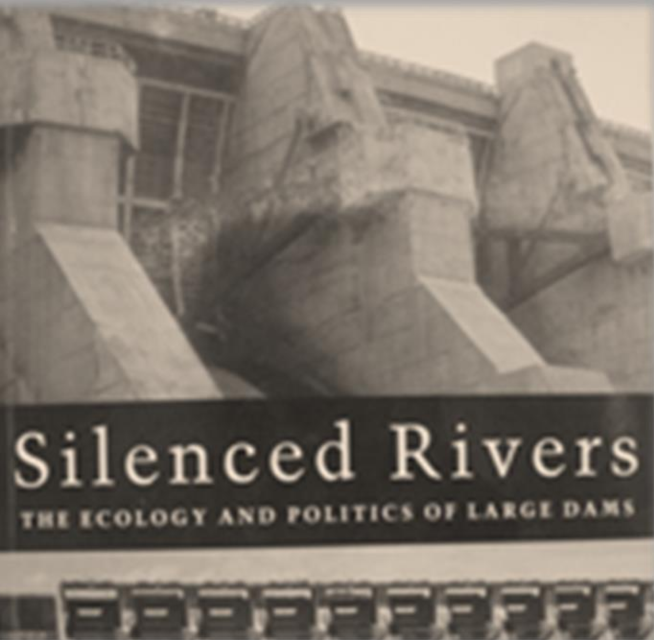


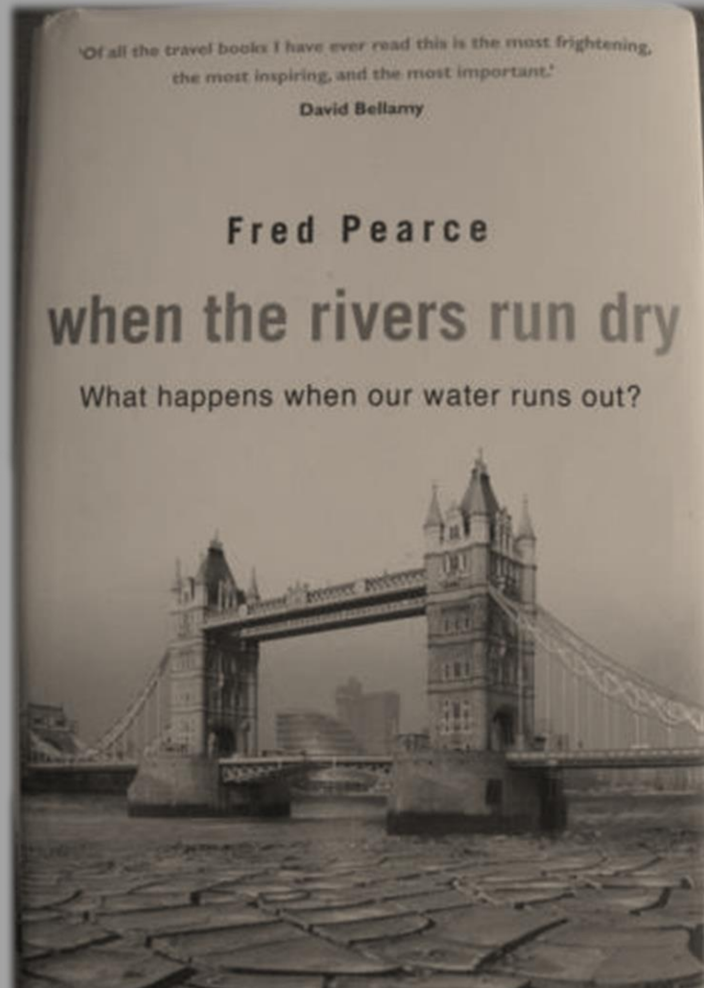


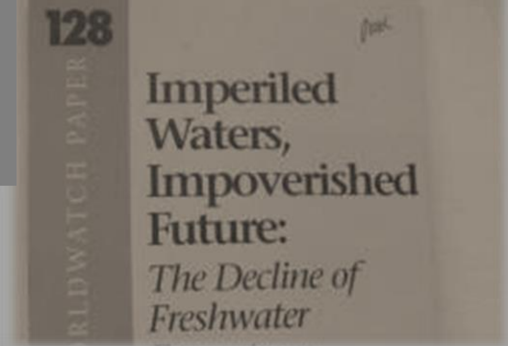


Leaving no-one behind - not just about providing safe water and sanitation

1980s-1990s


Silenced Rivers
THE ECOLOGY AND POLITICS OF LARGE DAMS


'Of all the travel books I have ever read this is the most frightening, the most inspiring, and the most important.'
David Bellamy
Fred Pearce
when the rivers run dry
What happens when our water runs out?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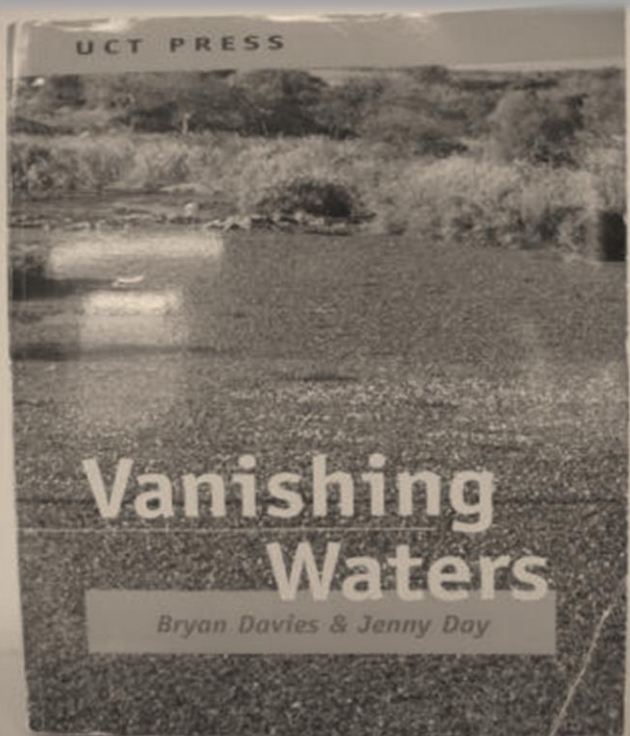
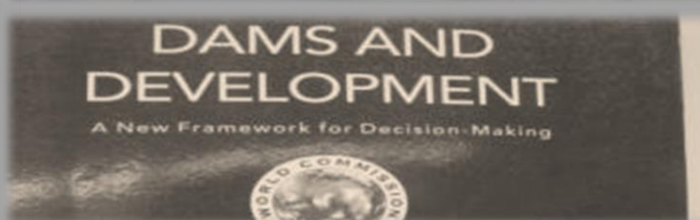
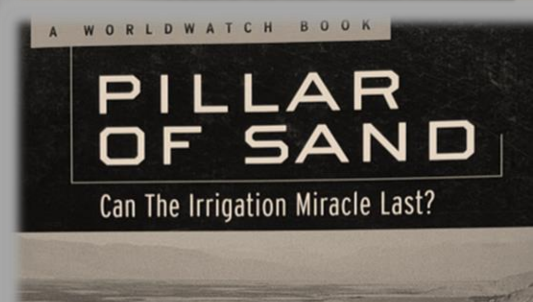
Imperiled Waters, Impoverished Future:
The Decline of Freshwater


RIVERS FOR LIFE
MANAGING WATER FOR PEOPLE AND NATURE
SANDRA POSTEL AND BRIAN RICHTER


UCT PRESS
Vanishing Waters
Bryan Davies & Jenny Day


DAMS AND DEVELOPMENT
A New Framework for Decision-Making

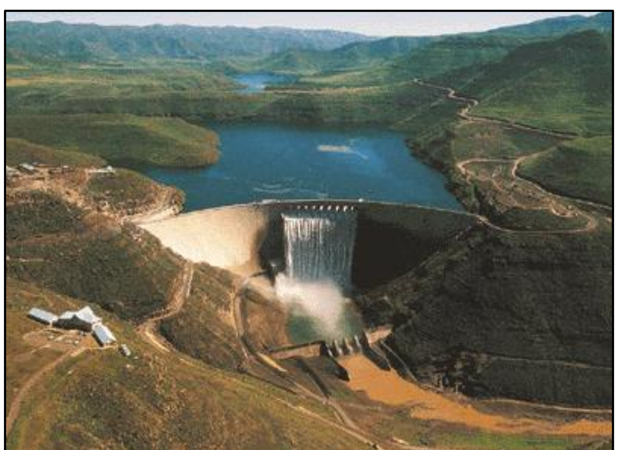

A WORLDWATCH BOOK
PILLAR OF SAND
Can The Irrigation Miracle Last?

1980s-1990s

Benefits of development well motivated …
… but the costs starting to appear …

Who wins, who loses?

Ecological costs differ from river to river



Social costs differ from river to river

Loss of safe washing and drinking water

Loss of safe and available food

Social costs differ from river to river

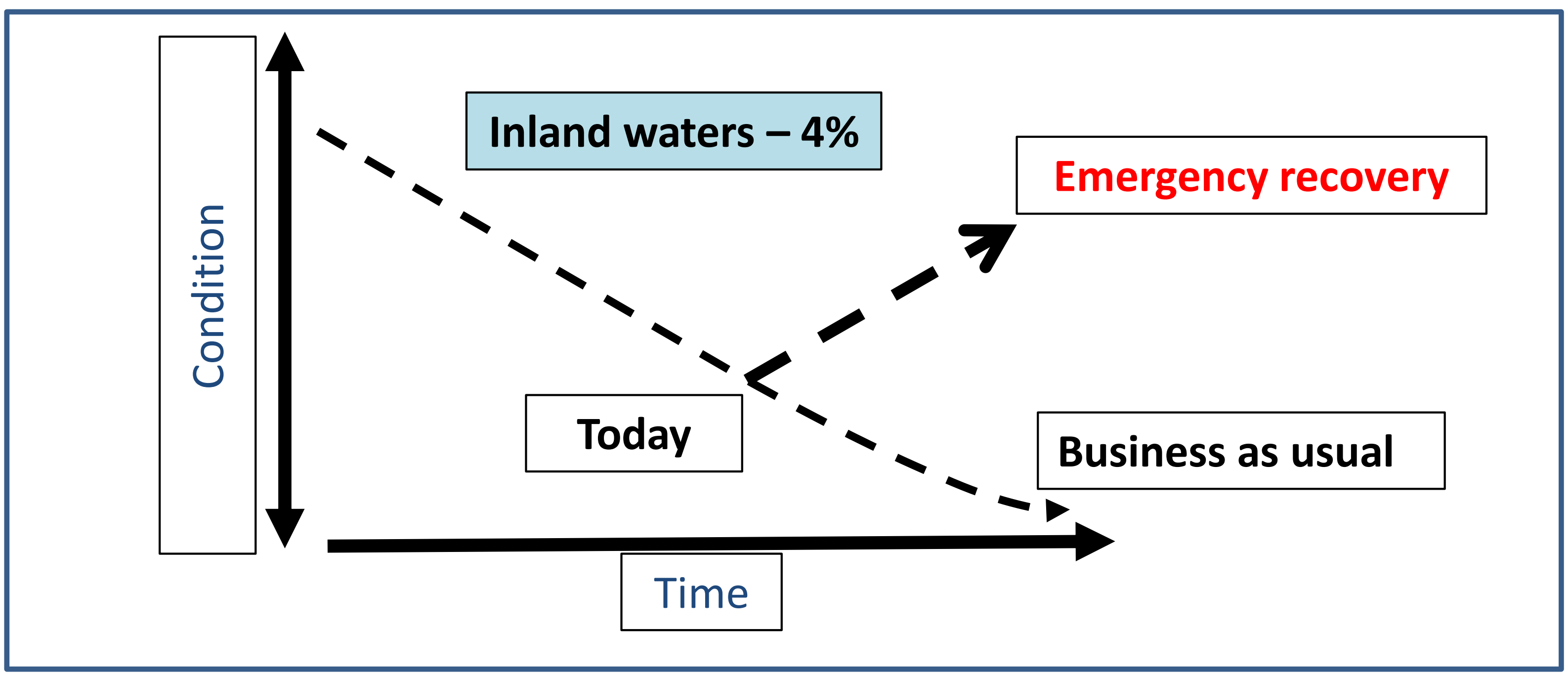
Collapse of dairy industry

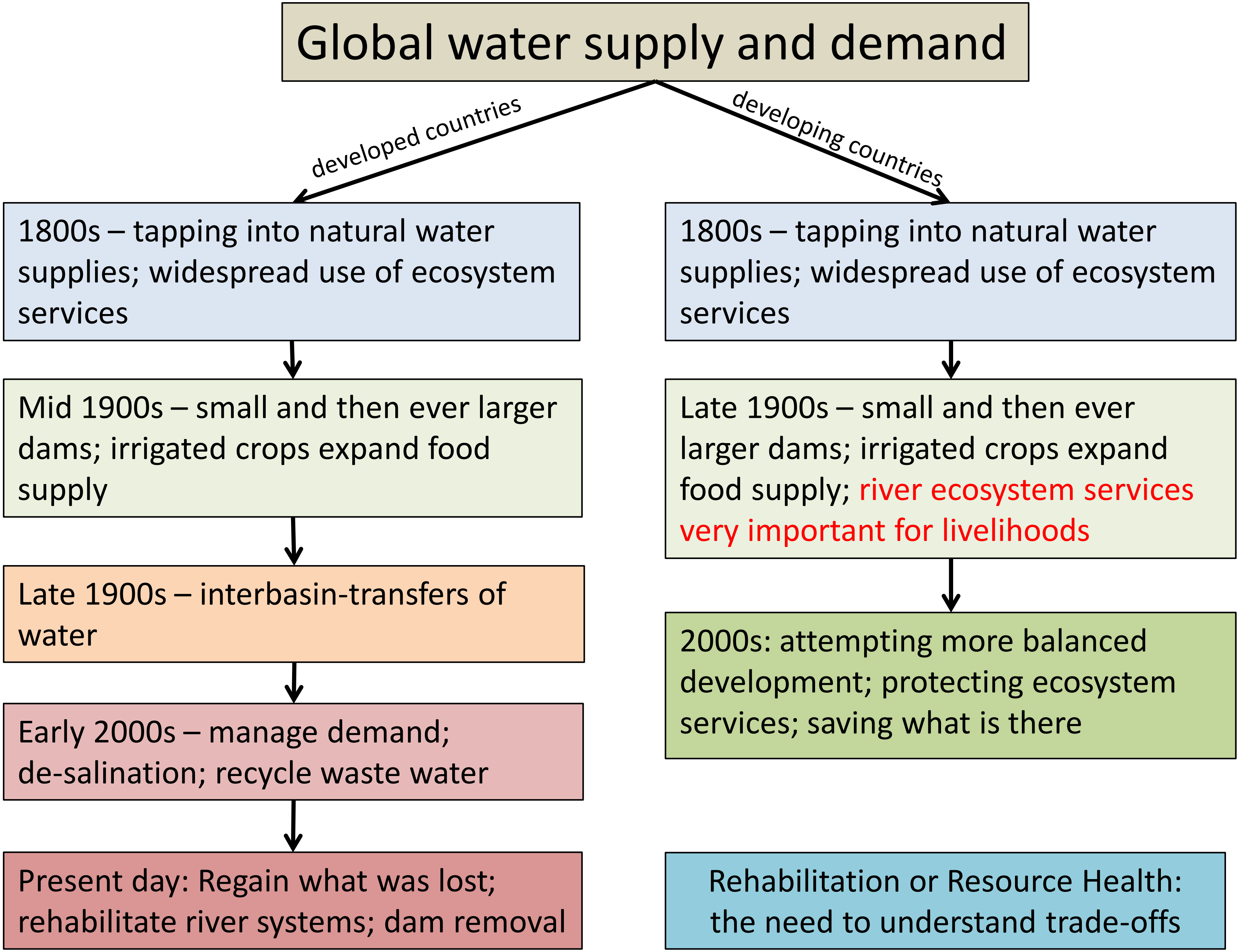
Pastoralists - loss of grazing, food and water

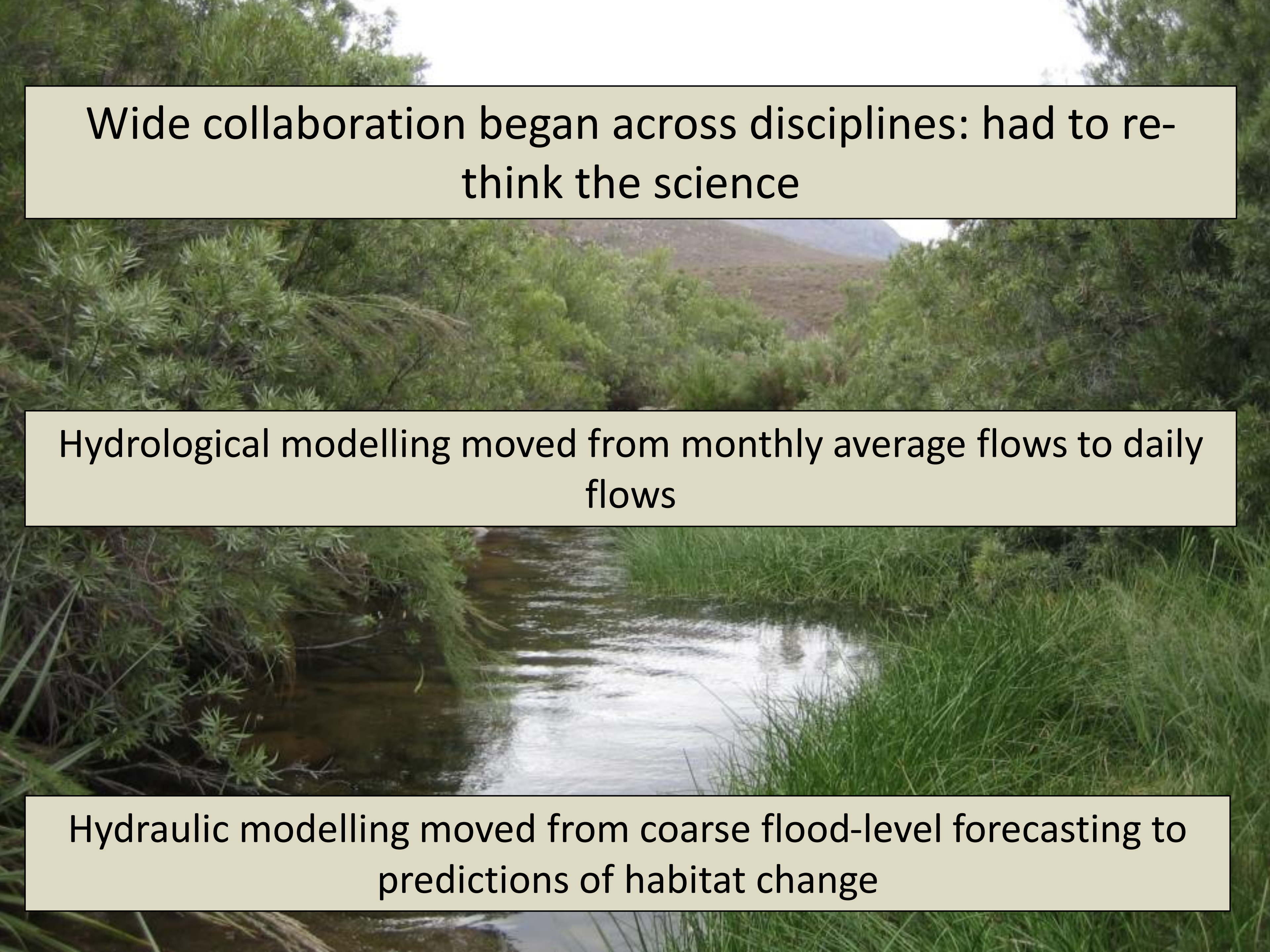
Small boys missing school to herd livestock

Growing demand for water-resource development that focuses on all three pillars of Sustainable Development

- Ecological integrity
- Social equity
- Economic wealth




Global water supply and demand
developed countries
developing countries
1800s – tapping into natural water supplies; widespread use of ecosystem services
Mid 1900s – small and then ever larger dams; irrigated crops expand food supply
Late 1900s – interbasin-transfers of water
Early 2000s – manage demand; de-salination; recycle waste water
Present day: Regain what was lost; rehabilitate river systems; dam removal
1800s – tapping into natural water supplies; widespread use of ecosystem services
Late 1900s – small and then ever larger dams; irrigated crops expand food supply; river ecosystem services very important for livelihoods
2000s: attempting more balanced development; protecting ecosystem services; saving what is there
Rehabilitation or Resource Health: the need to understand trade-offs



Wide collaboration began across disciplines: had to re-think the science

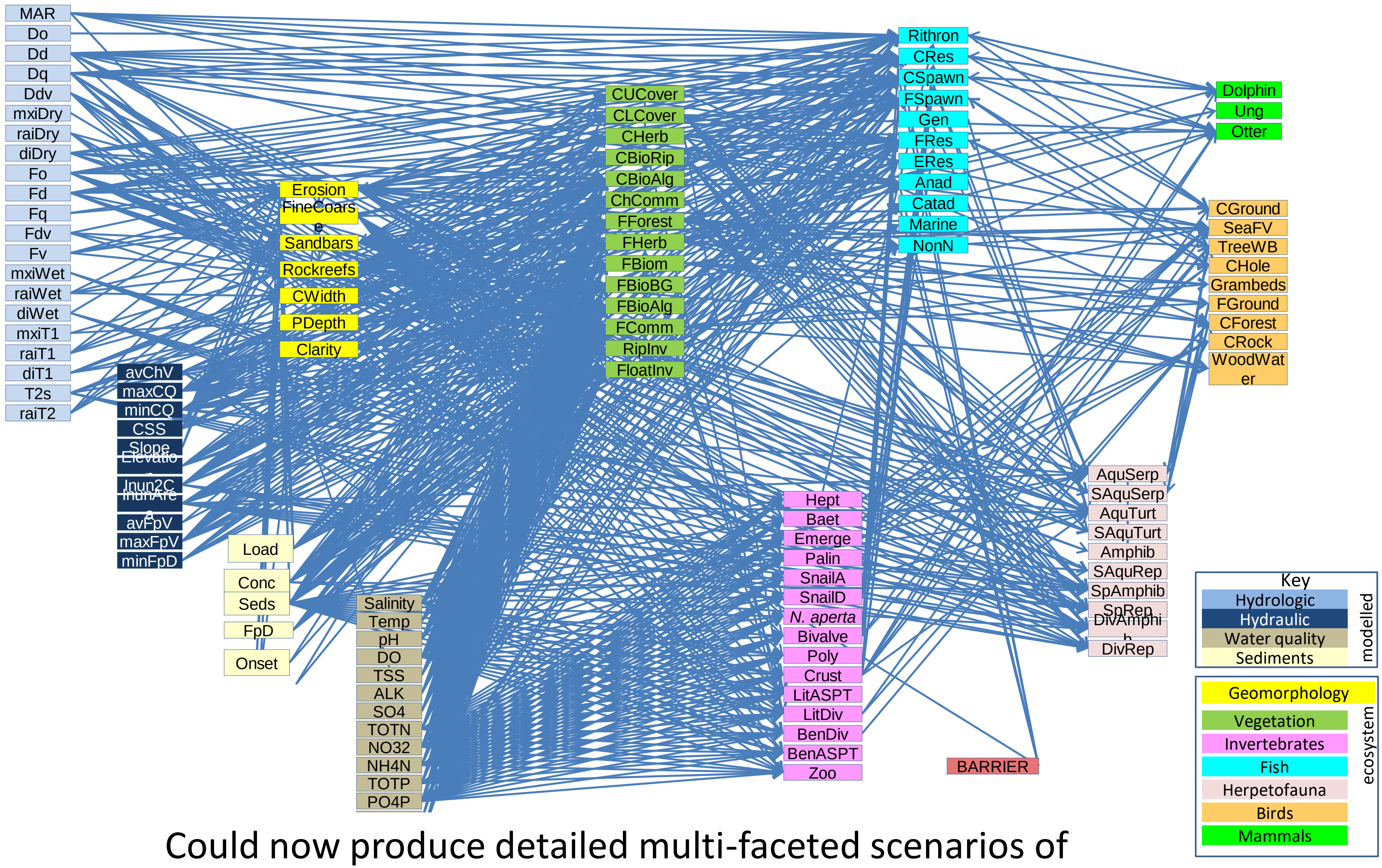
Hydrological modelling moved from monthly average flows to daily flows

Hydraulic modelling moved from coarse flood-level forecasting to predictions of habitat change

Ecological studies focussed on links between flow, habitats and species

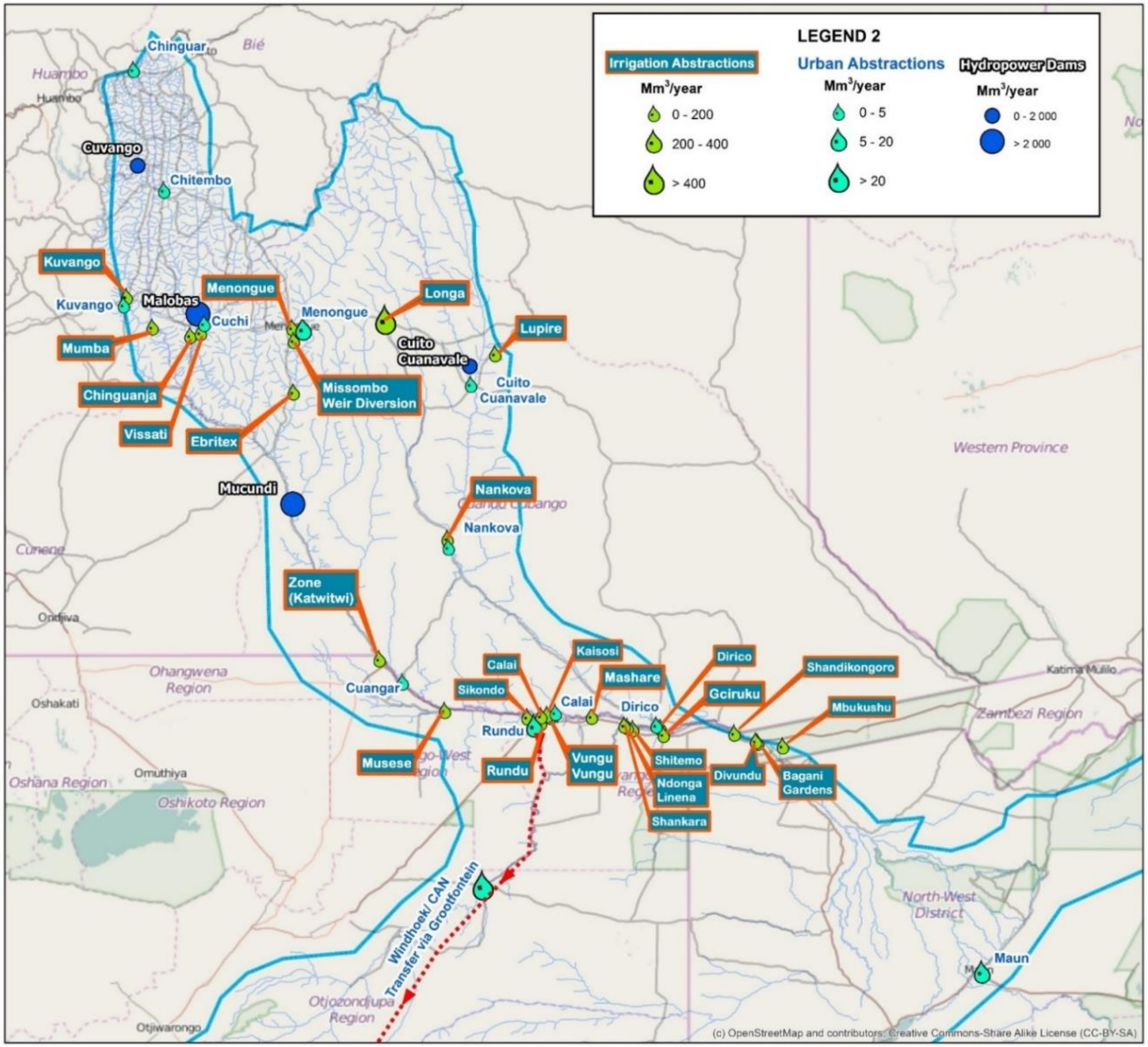
Social studies focussed on links between river ecosystem health and livelihoods

Developed ecological and social models

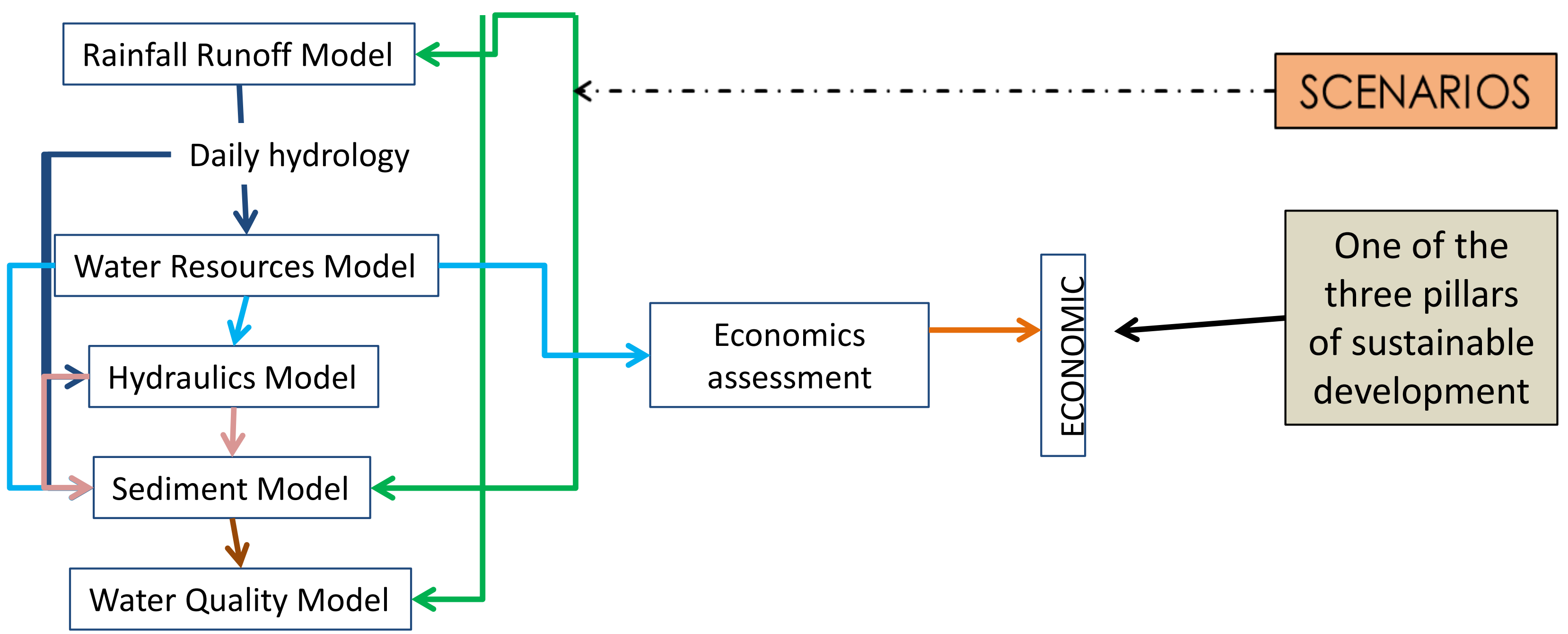


Could now produce detailed multi-faceted scenarios of possible futures - IWRM

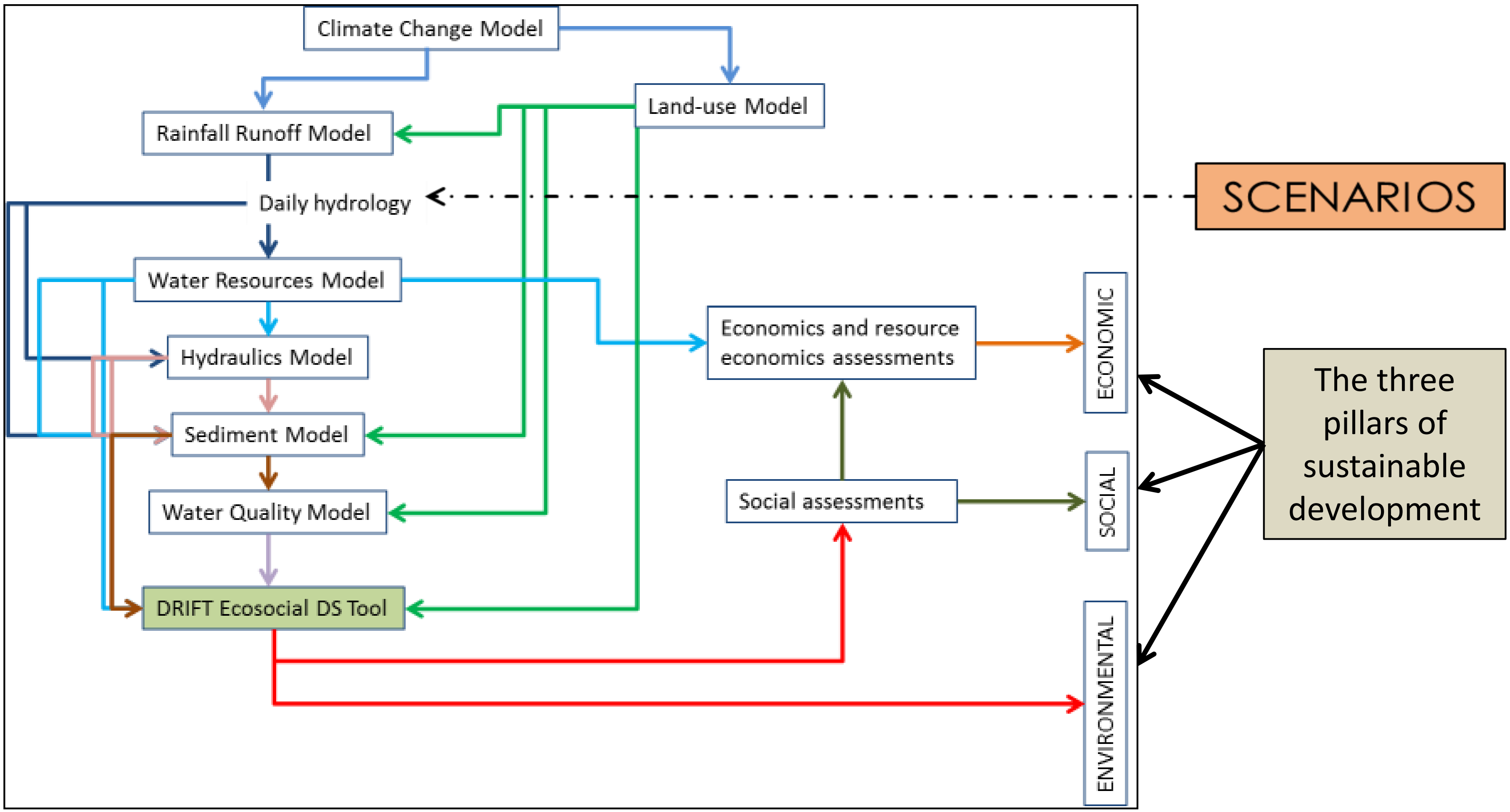
The Cubango-Okavango Basin – poised to develop ….. in a way that protects the river



Collaborative modelling – before



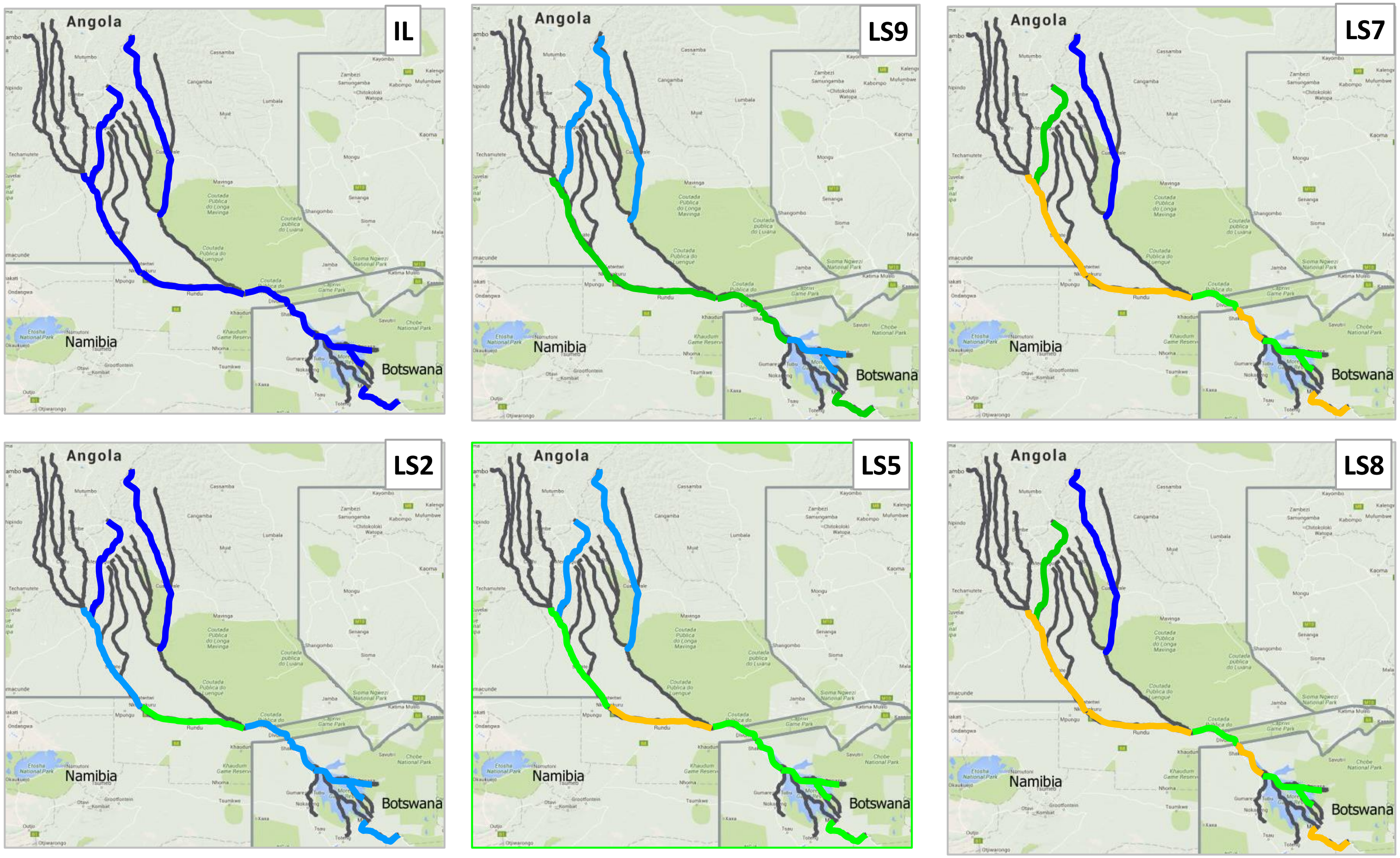
Collaborative modelling – now

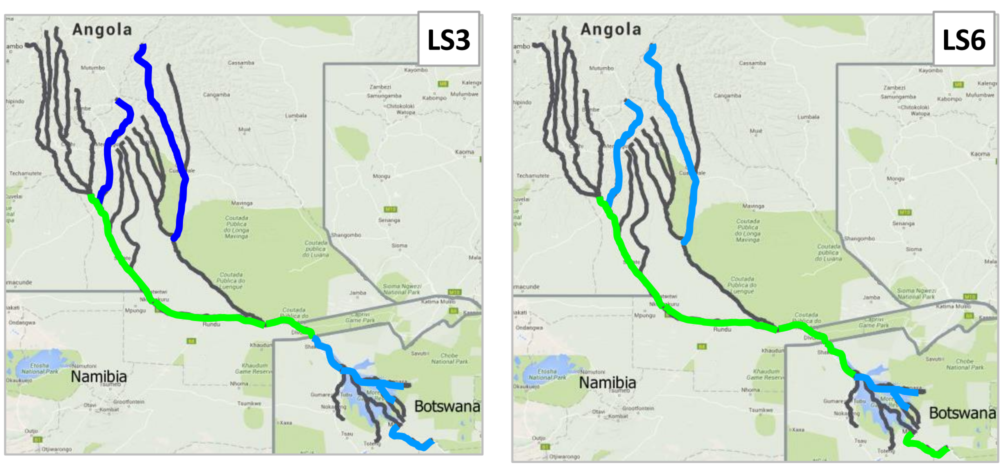


Needs specialist teams, just as does building a dam

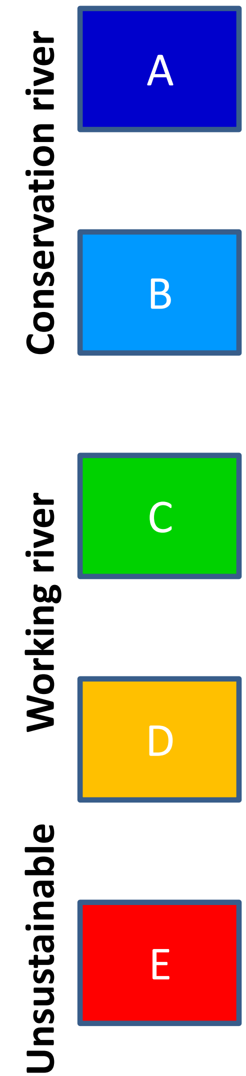
Collaborative modelling supports balanced transboundary basin planning

- Provides insights on complex issues in an accessible form
- Enables exploration of planning and management options
- Promotes **shared visioning**
  - within Member States
  - between Member States
  - between Member States and their stakeholders
- Supports informed decision-making





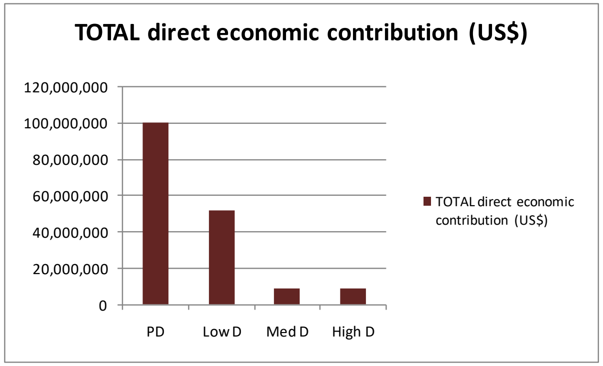
Okavango Basin per scenario – helping stakeholders understand



Examples of predictions for one site along a river

Flow variable	Present Day	Low Dev	Med Dev	High Dev	Comment
Dry Season Onset (month)	Aug	July	July	June	Progressively earlier: 1, 3, and **7** wk than PD
Dry Season Minimum Flow (m^3s^{-1})	114	101	93	21	Progressive decline to 89%, 82%, **18%** of PD
Flood volume (Mcm)	5269	4980	4450	3294	Progressive decline to 96%, 84%, **63%** of PD

Changes in magnitude and timing of different flows

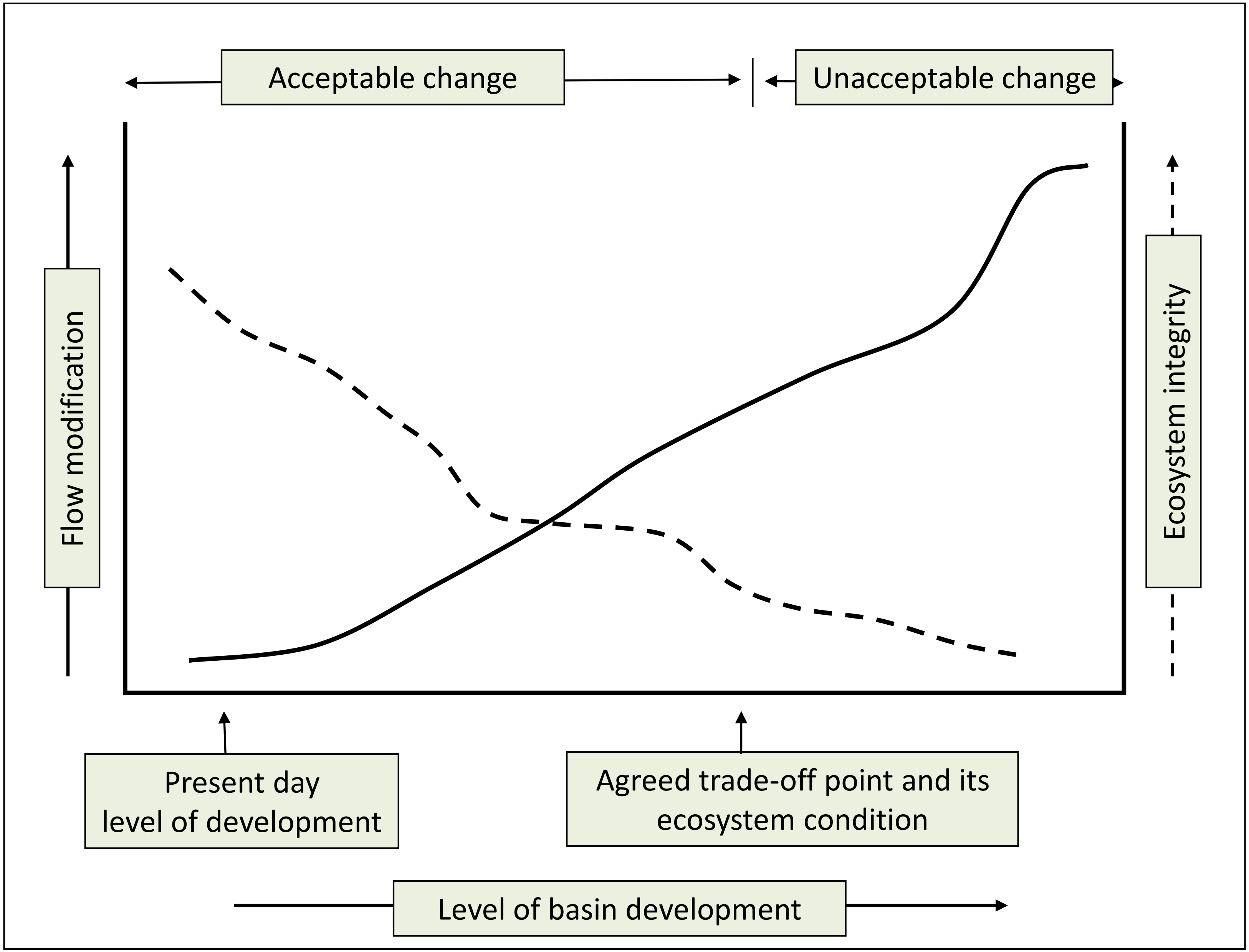


Changes in value of river's resources

Floodplains: percent cover	Permanent swamps			Seasonal swamps			Savanna
Present-day	0.49	0.98	47.58	0.89	27.27	16.32	6.47
Medium Dev	0.11	0.22	10.64	1.29	31.50	31.70	24.55

Changes in land cover

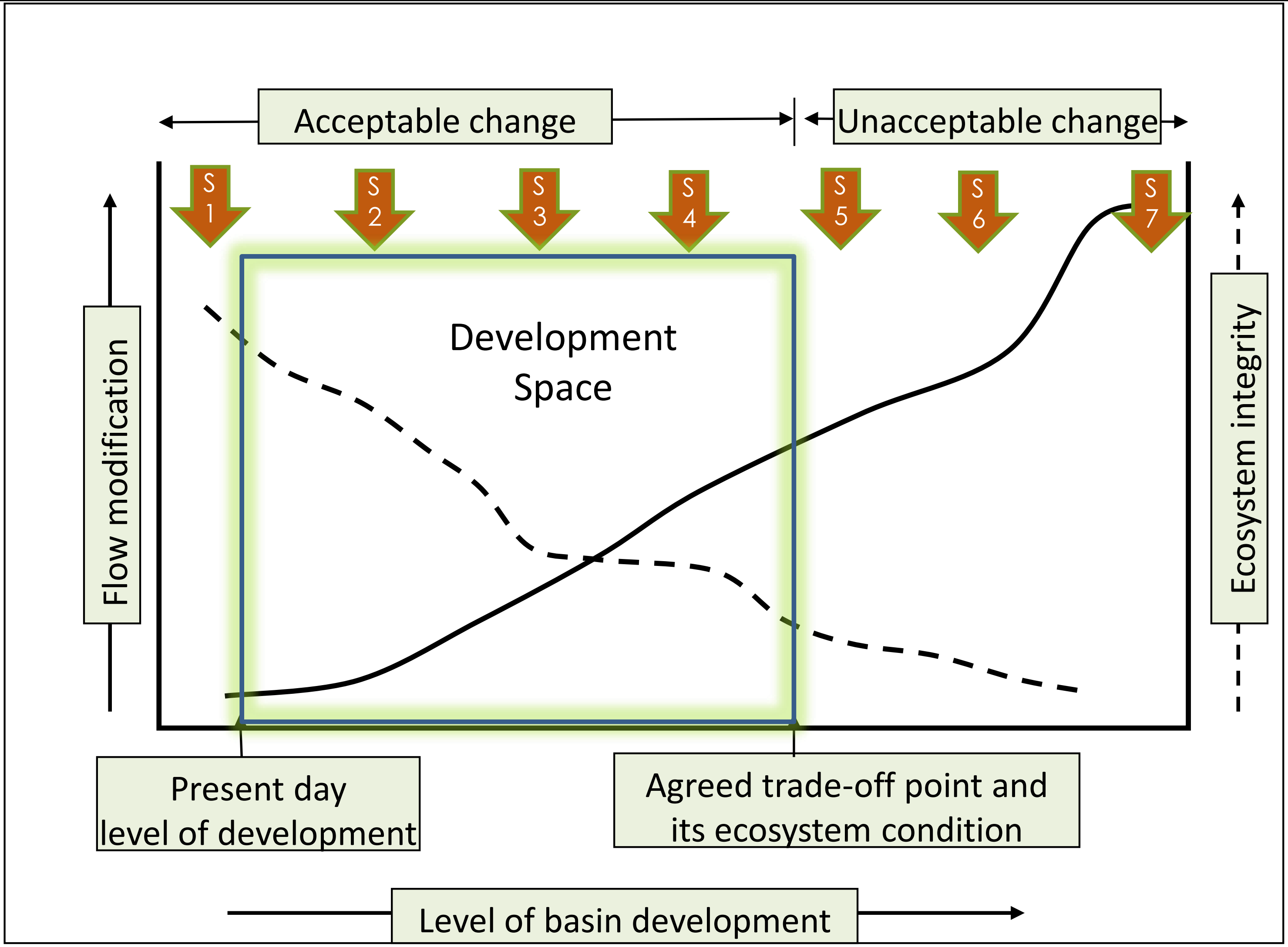
Helping shared visioning: the Development Space Concept



What might represent “unacceptable change” for the people of that basin (and thus an unsustainable future)?

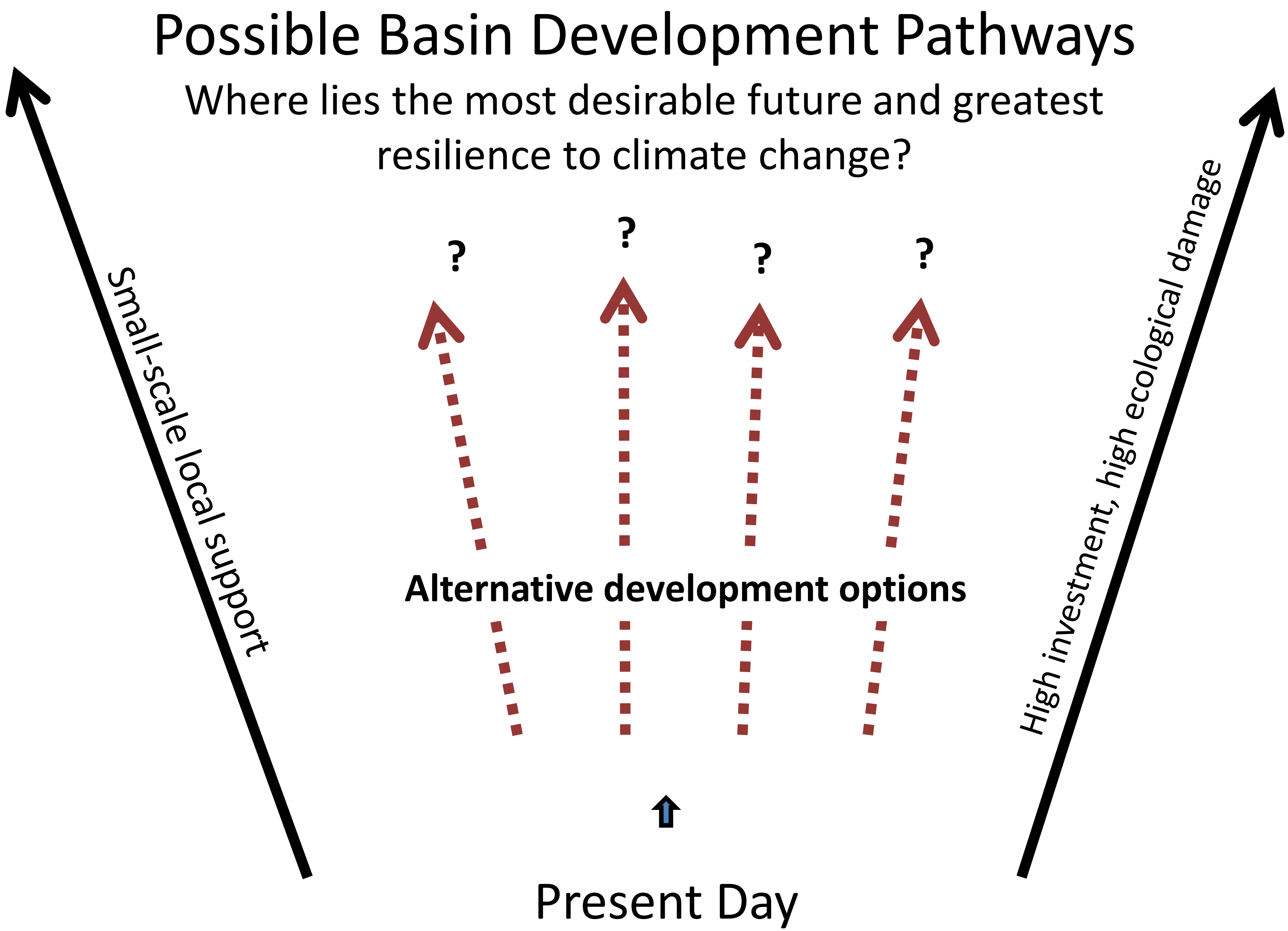
- Parts of the main channel drying out seasonally?
- Floodplains not flooding?
- Water too polluted to drink or wash in?
- 30% loss of biodiversity?
- 60% decline in fisheries?
- Loss of areas of religious or cultural significance?
- 80% reduction in subsistence livelihoods?
- ?

DRIFT Scenarios (S1 to S7) help identification of unacceptable change



Countries then in a position to negotiate their share of the Development Space – to use now, or later, or not at all, as they see fit

Helps countries negotiate a sustainable future



Timing and aims to maximise effectiveness

- Timed to inform decisions rather than react to them
- Analysis and outputs objective and balanced
- Models set up and run by combined teams from all Member States
- Collaborative models remain in functioning order in the Basin as assets
- Capacity to run them housed within the Member States