Long-term Development & Adaptation Scenarios under future climates in South Africa

Long Term Adaptation Scenarios Workshop

March 2014

Overview

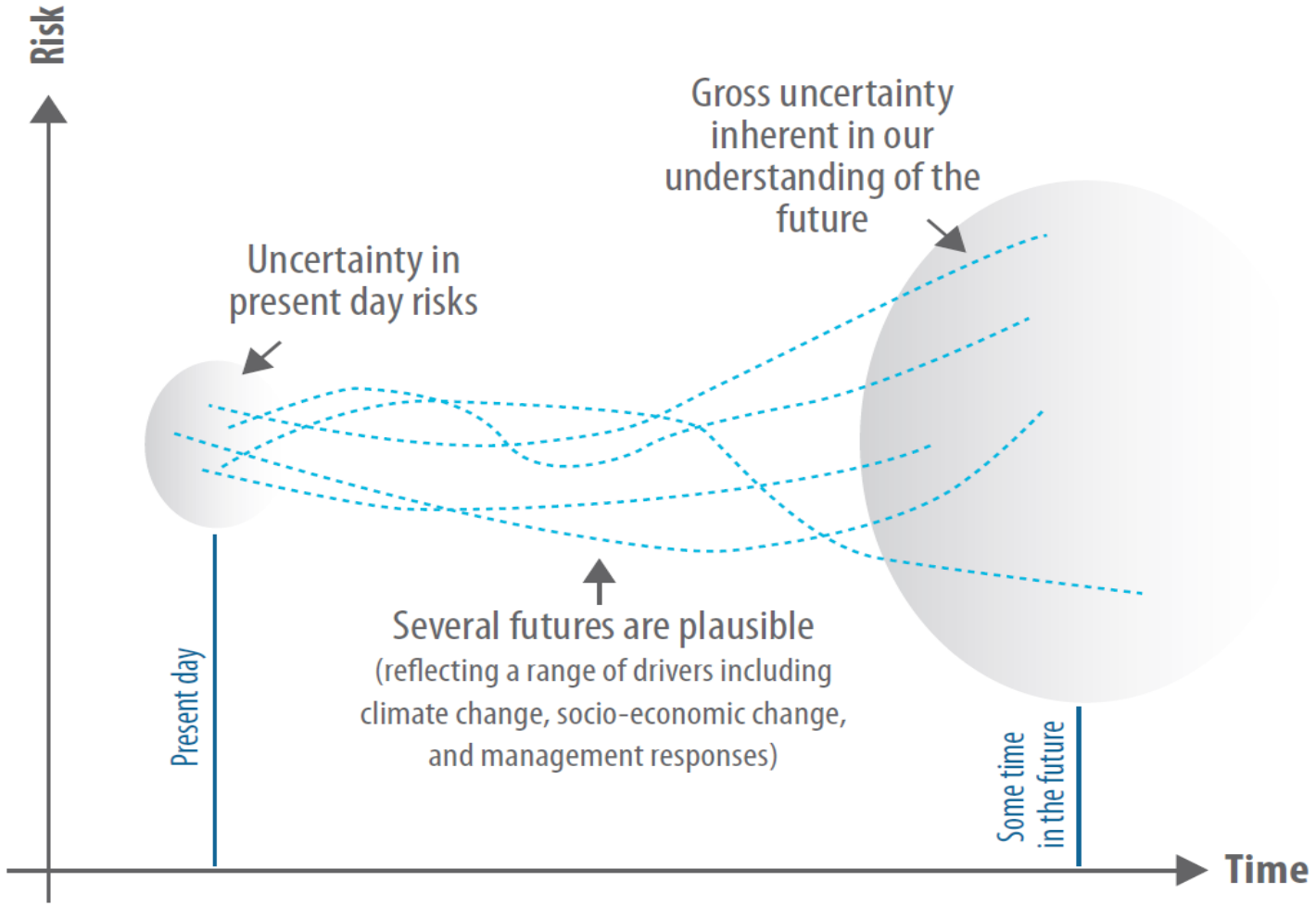
Time	Title
Day 1: 10:00	Adaptation scenario methodology overview and linkages
Day 1: 11:30	South Africa's Climate Future Descriptions 2030, 2050 and 2100 (warmer-hotter and wetter versus warmer-hotter and drier) at a national and sub-national level • National level descriptions of climate futures • Priority/high risk sub-national areas
Day 1: 13:30	Adaptation responses: typologies, scales and sectors
Day 2:	Break-out sessions identifying specific and systemic adaptation options for climate and development futures

Purpose

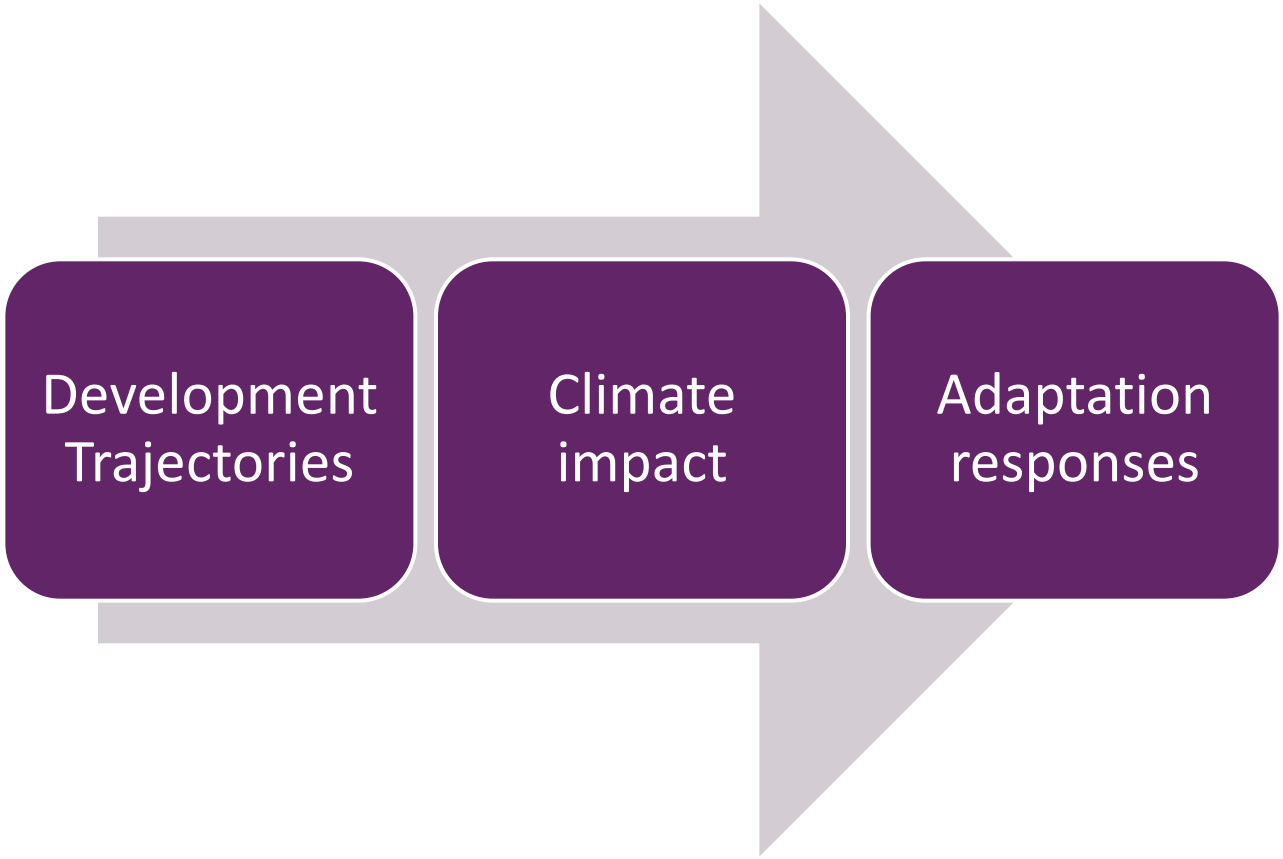
- *Facilitate and provide support for summarising development and adaptation scenarios at sub-national and national level for South Africa under the LTAS climate futures through a lens of water and food security linked to human settlements and disaster risk reduction*

- *Scenarios as narratives of how*
  - *climate impacts on plausible development trajectories*
  - *adaptation options build resilience to vulnerabilities*

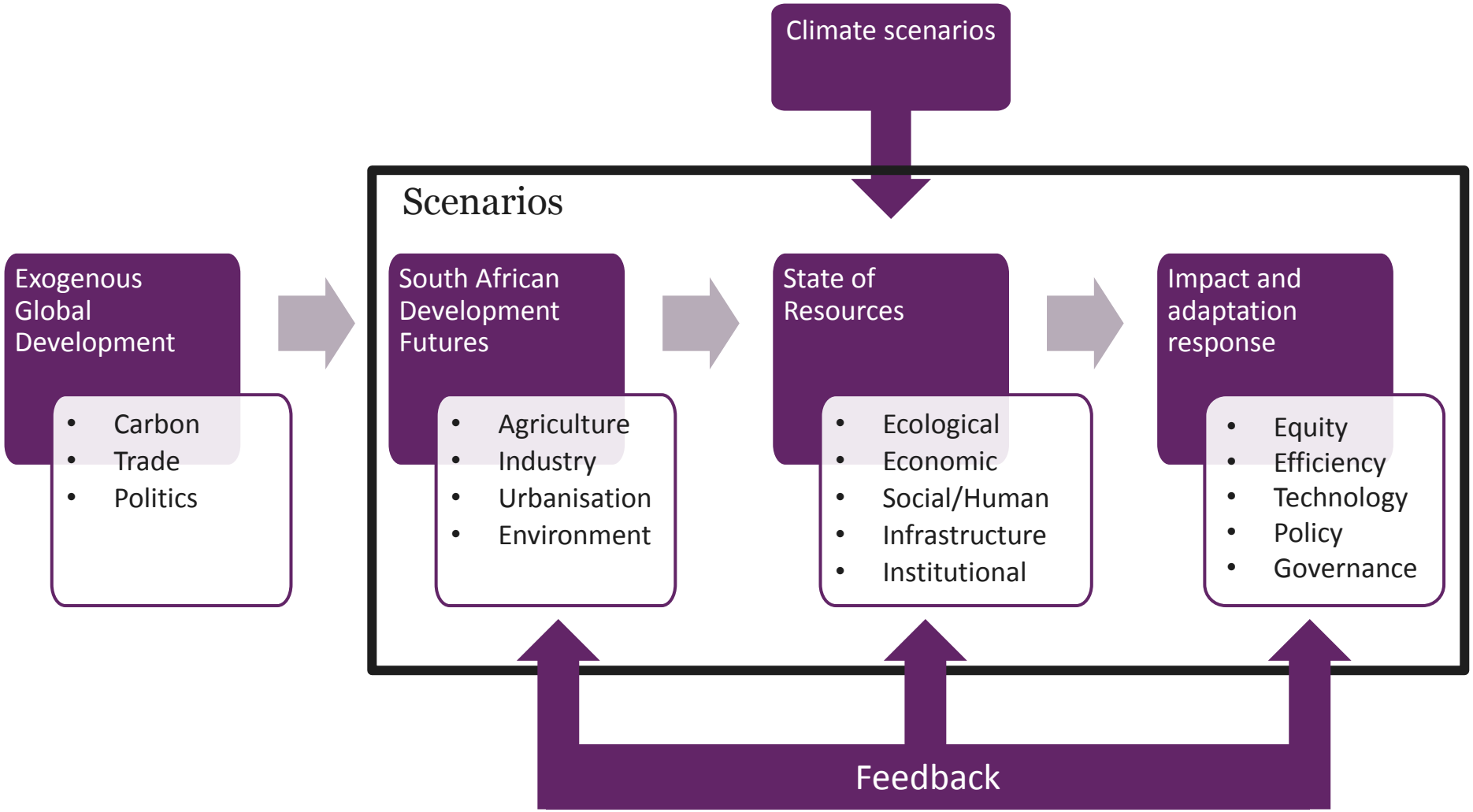
Futures and Uncertainty



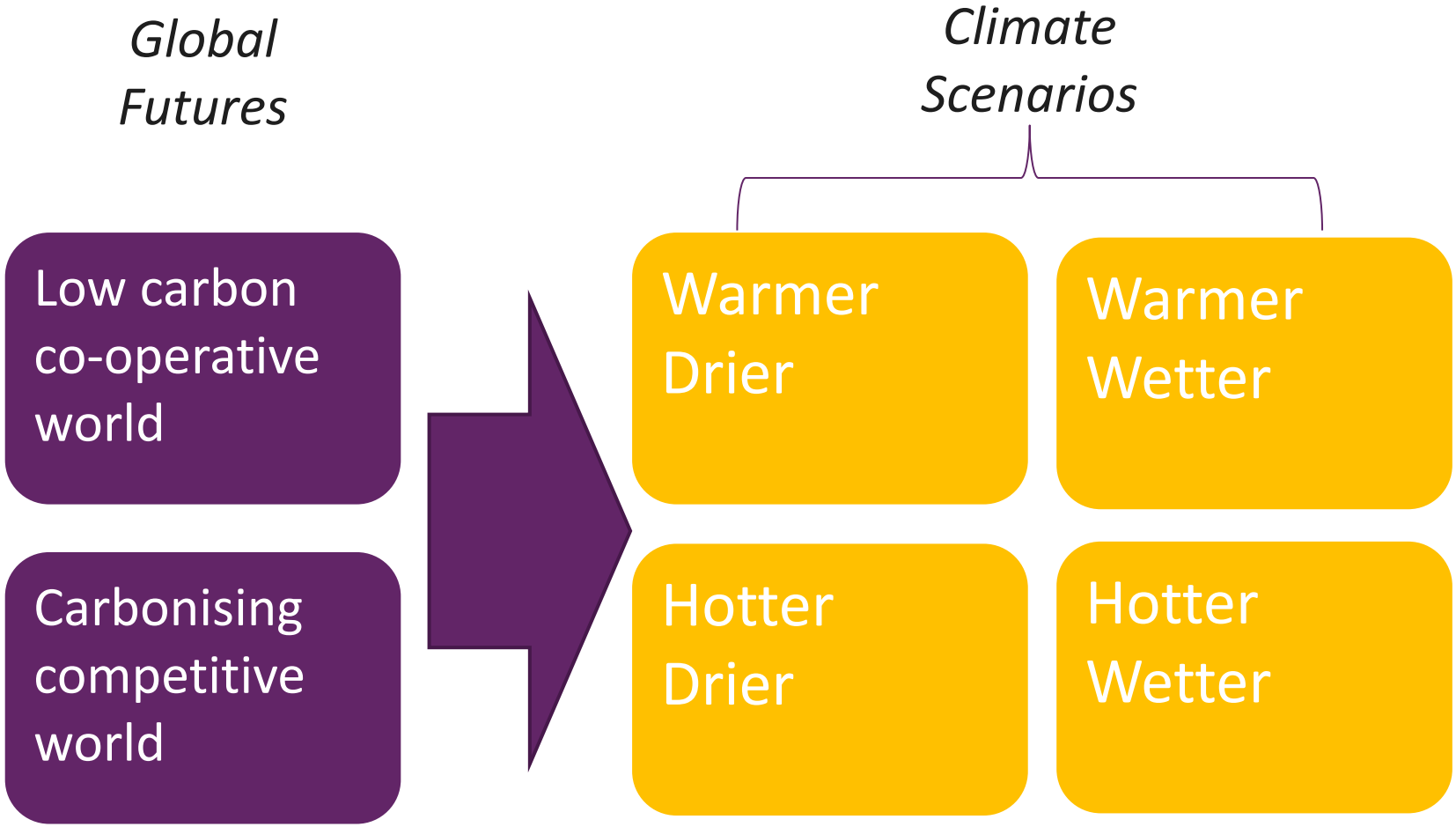
Elements of the scenario development



Workshop 1: Conceptual unpacking



Global uncertainties



Conceptual framing

Climate scenarios

Climate

Disaster | Water | Other aspects

Development themes

Human settlement & demographic | Industry & Power | Agriculture & Food | Natural Environment

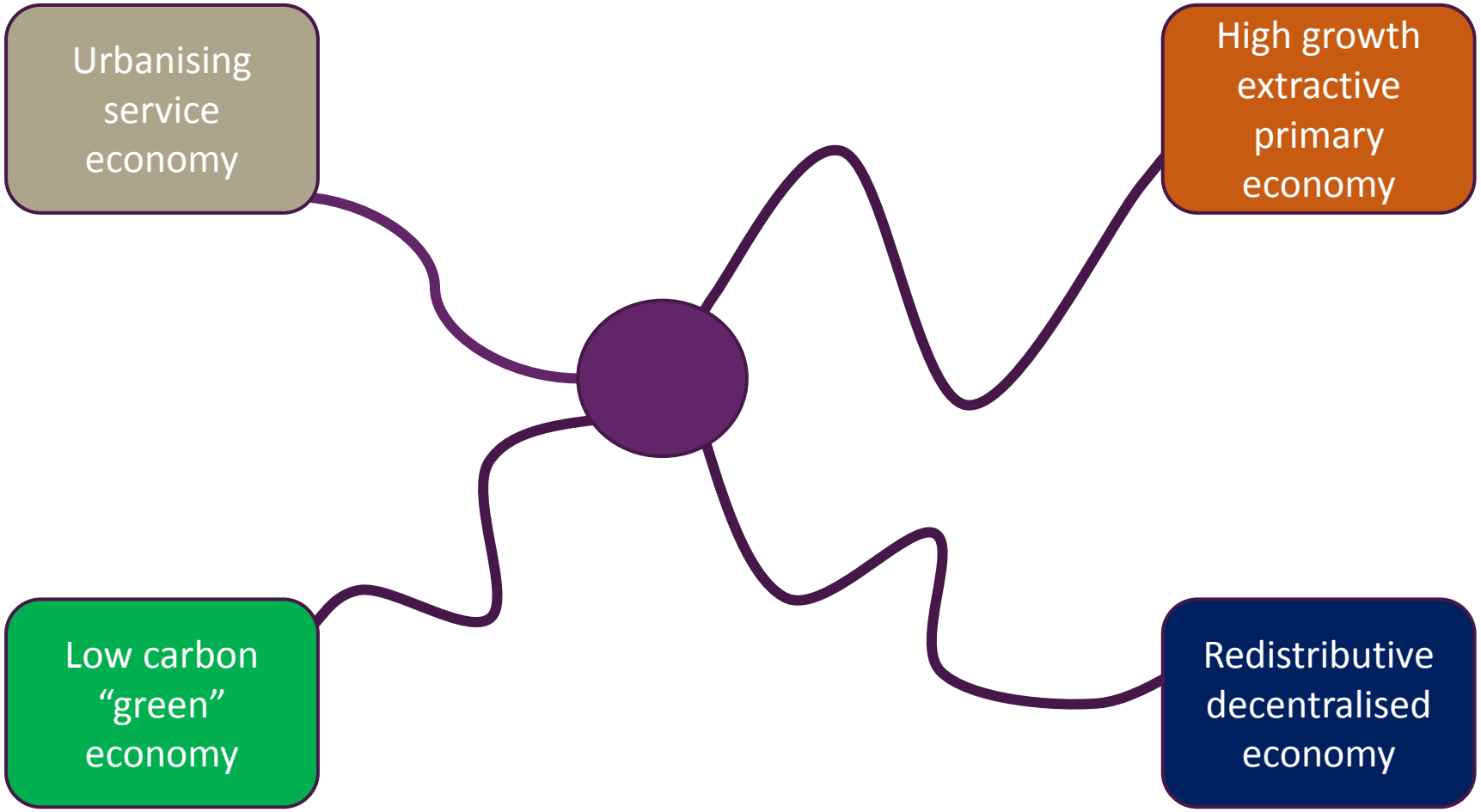
Equity | Trade | Growth | Infrastructure

Adaptation responses

Policy | Capacity | Governance | Technology

Global development

Development themes



Development themes & sectors

- Urbanising service economy
- High growth primary
- Redistributive Decentralised
- Low carbon green

- Human settlements & Demographics
- Agriculture
- Industry
- Natural Environment

Result of workshop 1

- Development themes and sectors:
  - Human settlements & demographics
  - Agriculture
  - Industry
  - Natural environment

Result: Urbanising service economy

Human settlements & demographics	• Massive urban centres, large infrastructure, inequality • Education, health, services, employment • Global connectivity
Agriculture	• Mechanisation, commercial, efficiency • Rural depopulation, reduction in employment • Global markets
Industry & energy	• Supply urban centres, large infrastructure • Industry near cities as a source of employment
Natural environment	• Linked to success of agriculture • Degradation and stress in peri-urban and urban areas • Opportunities for recycling water and waste

Result: High growth extractive primary

Human settlements & demographics	• Polarizing • Growing inequality • Unplanned infrastructure and urbanisation
Agriculture	• Industrialised, large, high intensity farms • Reduced employment • High value agriculture for export
Industry & energy	• Extract all opportunities including fracking, mining, nuclear etc. • Dependence on global economy any whether green industry preferred
Natural environment	• Pollution and water degradation • Areas left fallow where agriculture not affordable

Results: Redistributive & decentralized economy

Human settlements & demographics	• Slowing/reverse in urbanisation • Increased planned urbanisation • Higher cost of service delivery in rural areas
Agriculture	• Shift to small scale farming • Shift to self reliance
Industry & energy	• Reduced monopoly of power generation • Shift from global to local markets • Shift from luxury to basic goods • Mineral extraction closely linked to community development
Natural environment	• Small scale farming is beneficial for the environment • Impact of increased rural settlements on the environment?

Results: Low carbon green economy

Human settlements & demographics	• Population growth stabilised • Rural stabilisation through agriculture for livelihoods • Urban areas efficient with green planning
Agriculture	• Conservation focused climate smart and organic • Support of healthy ecosystems around farms • Intensity? High in small area? Low in larger area? • Export or local agriculture? Self sufficient?
Industry & energy	• Decentralisation of energy sources • Focus on renewable energy • Technology transfer and intellectual property important to drive innovation • Scope for green jobs in growing sector
Natural environment	• Increase in employment in ecological management • Strong need for innovation for systems to be sustainable • Community based management, protected areas focus • Healthy ecological infrastructure important

Development theme & climate

Urbanising service economy

Resilient until meets threshold

After tipping point, disastrous

Concentrations of vulnerability

High-growth primary economy

Feedback loops

Technology provides resilience as well as vulnerability

High stress on resources

Low-carbon green economy

Increased resilience, extension of tipping point?

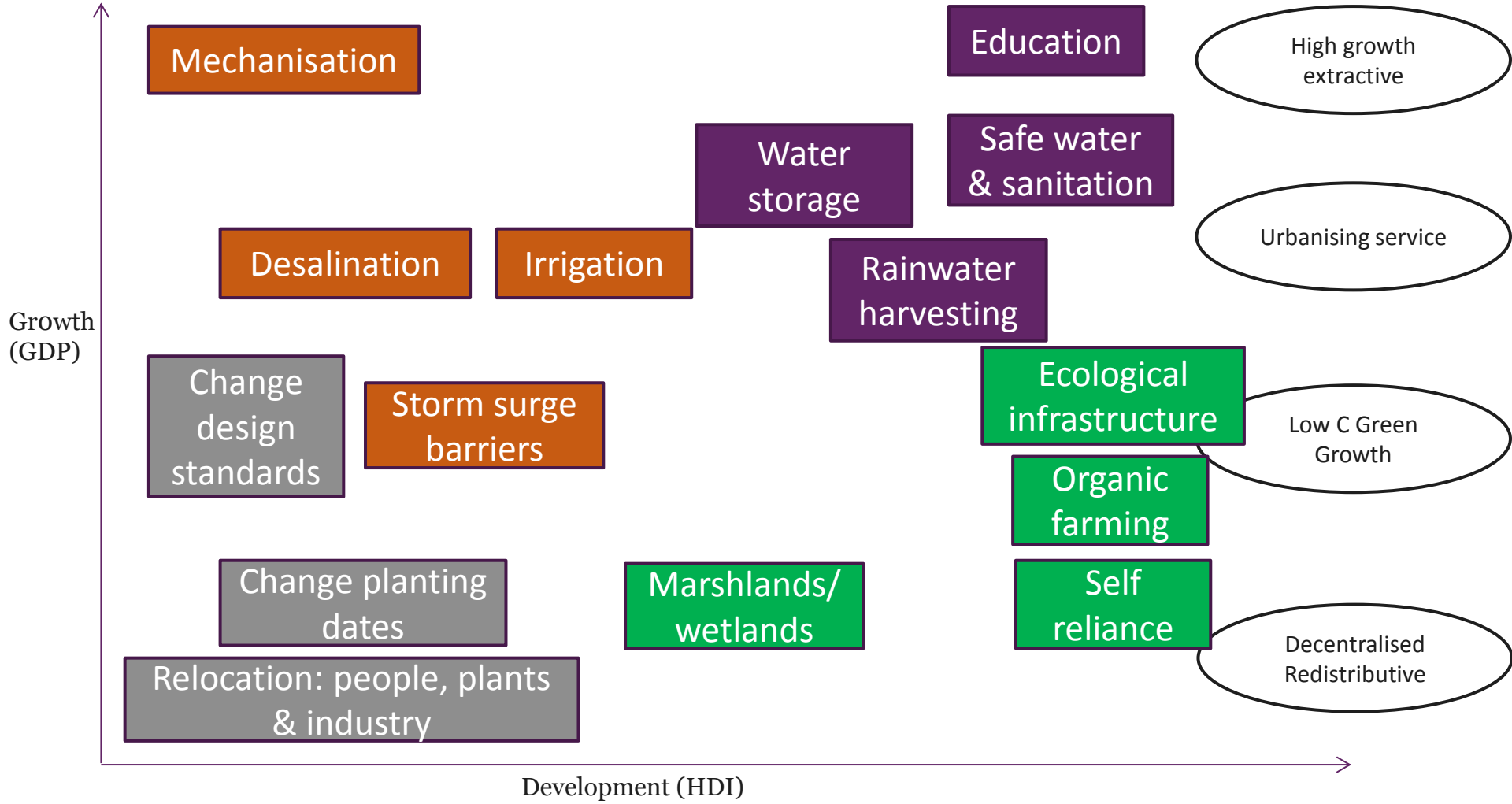
Localised vs. global? Which is riskier?

Redistributive decentralised economy

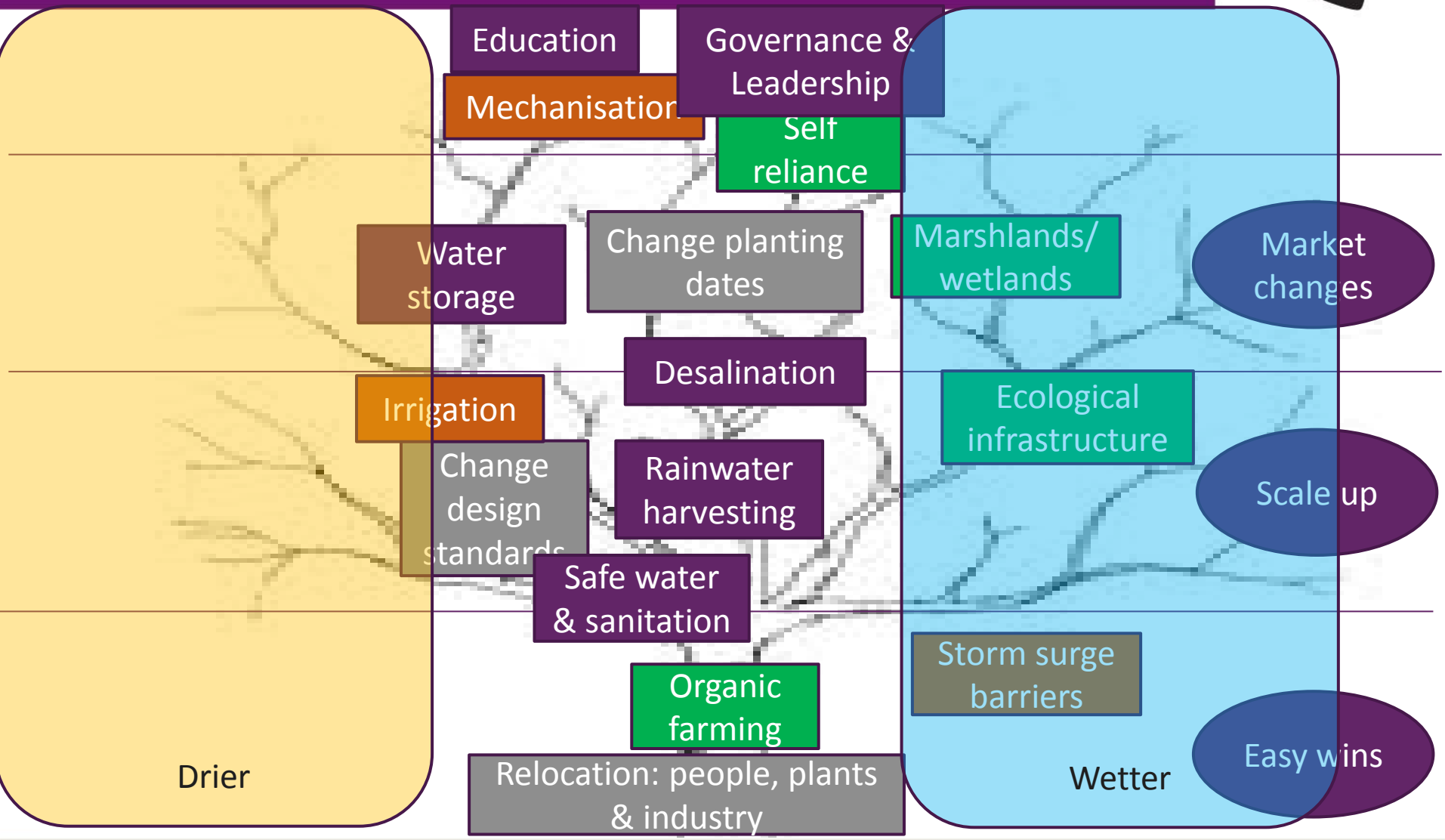
If successful, resilient. If not, high risk.

Governance and leadership important

Adaptation options typology 1

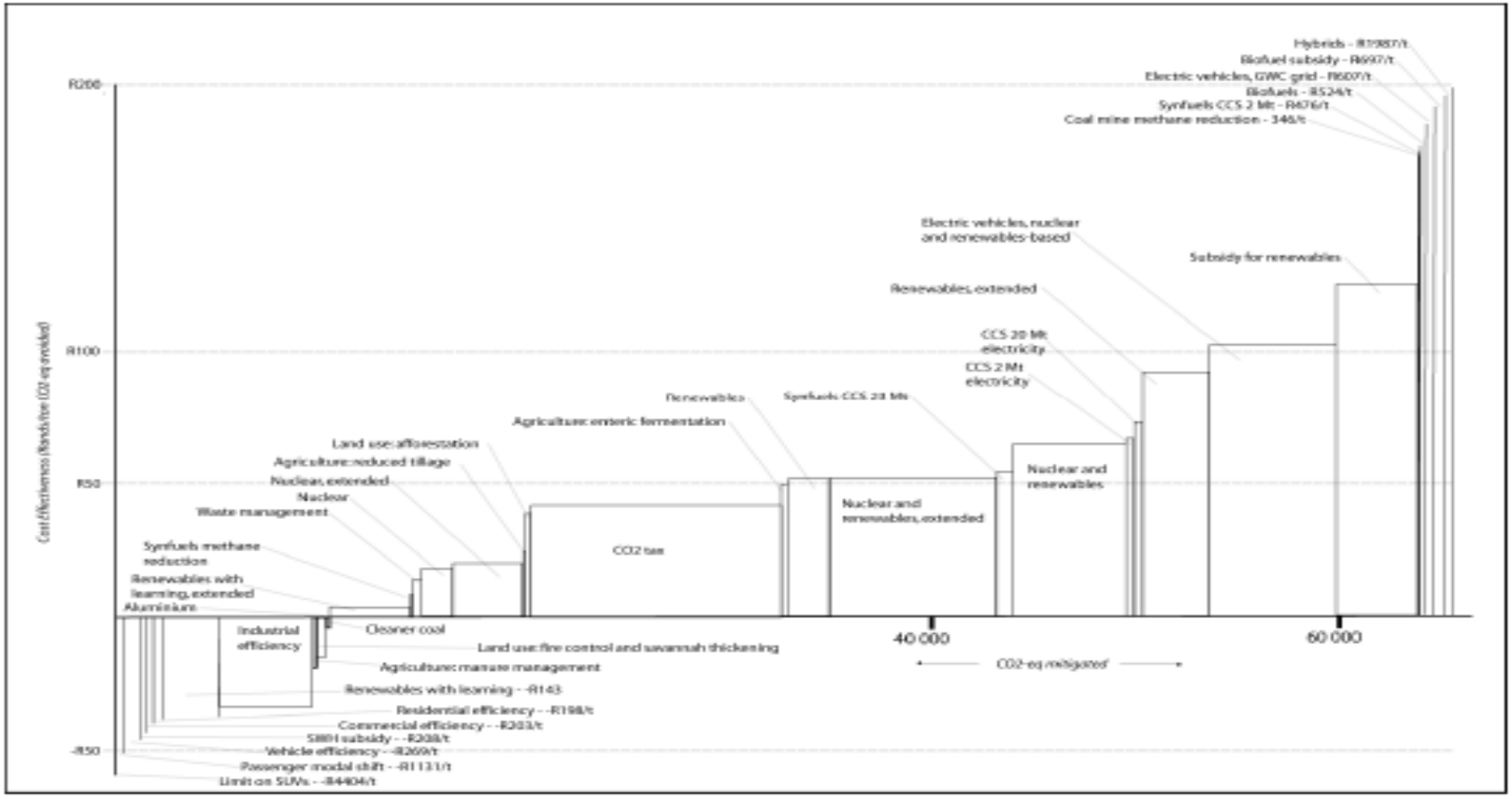


Adaptation decision tree



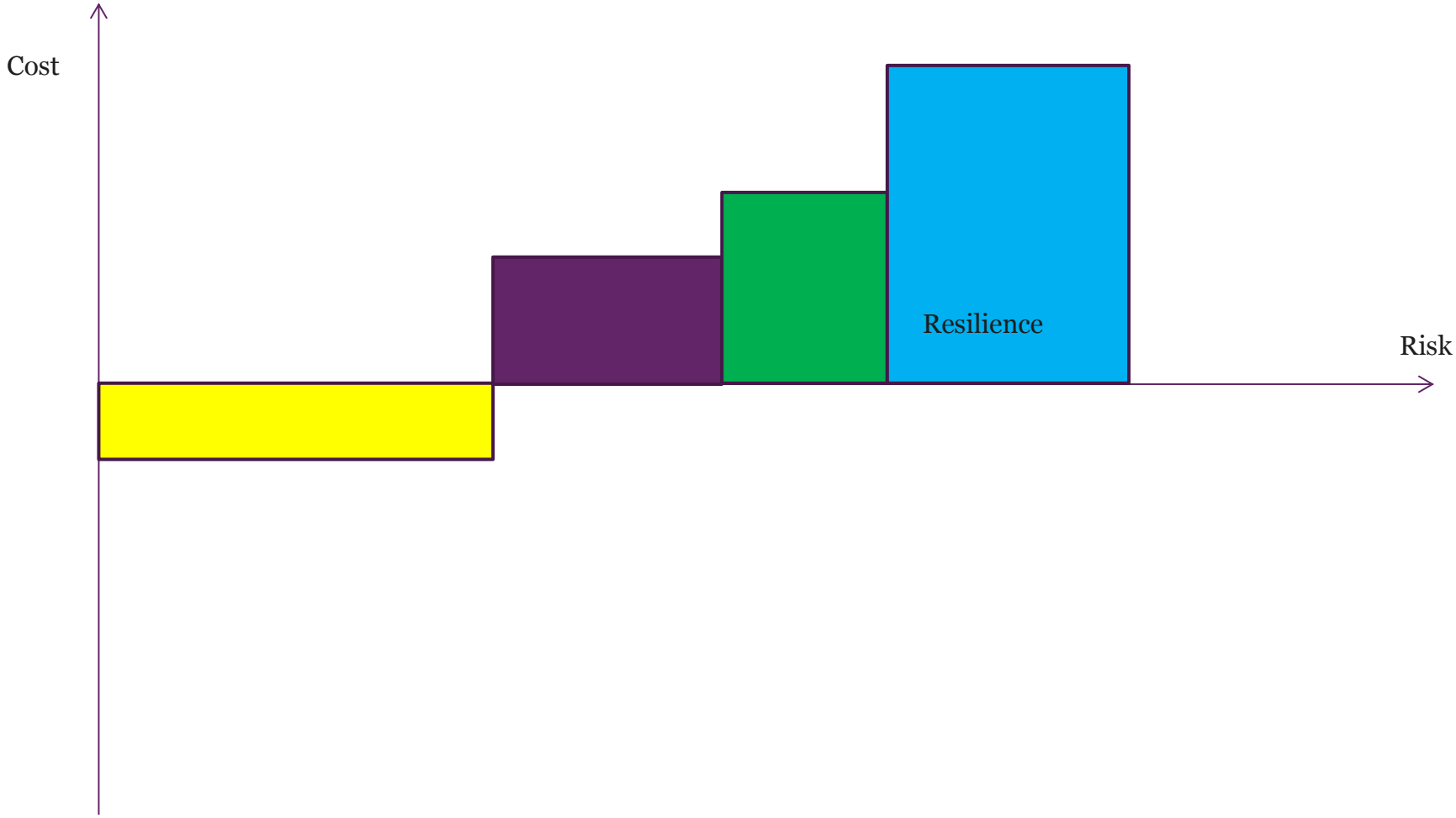
Adaptation scenario communication options?

Mitigation cost curves

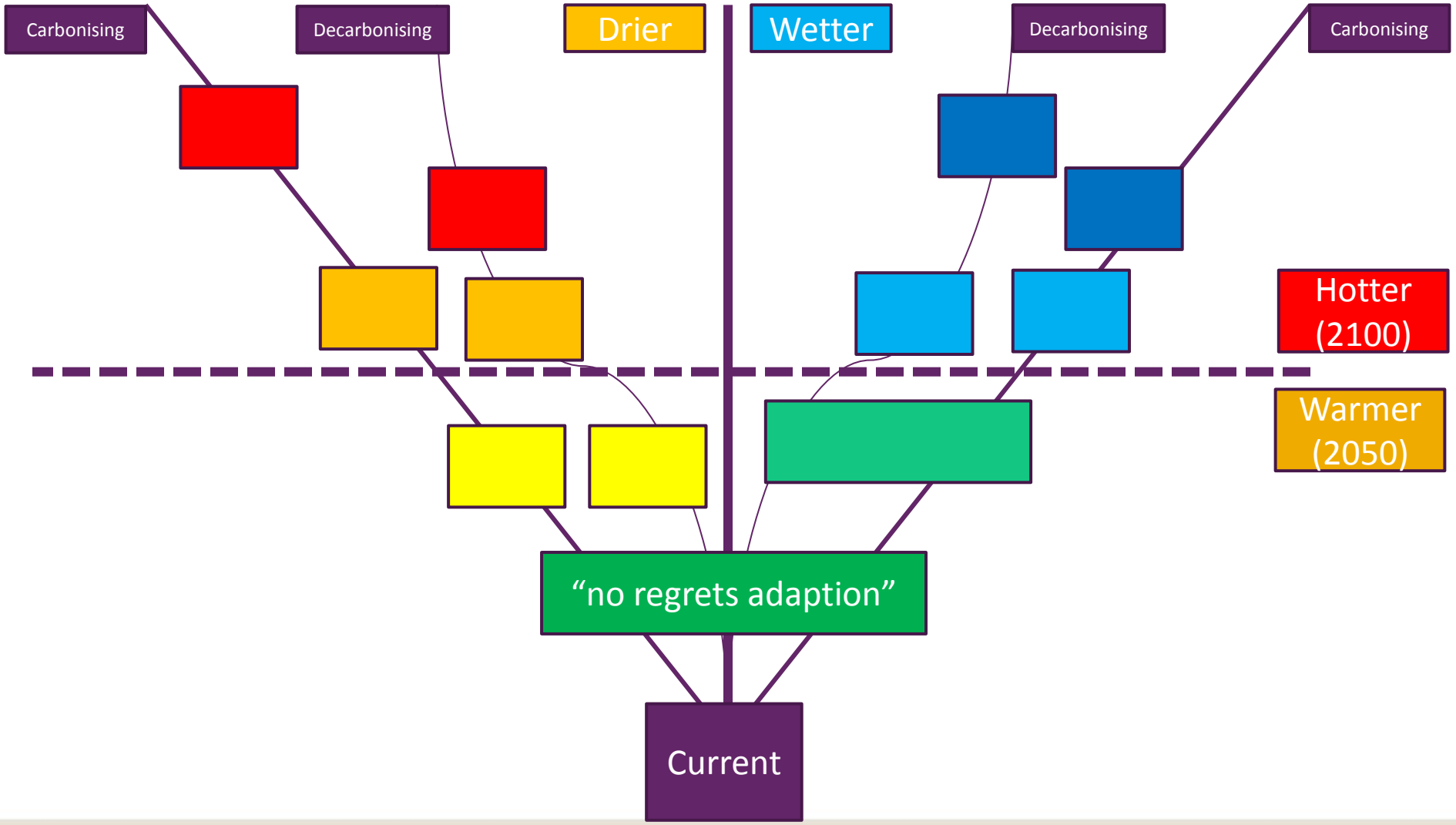


LONG-TERM MITIGATION SCENARIOS ENERGY RESEARCH CENTRE

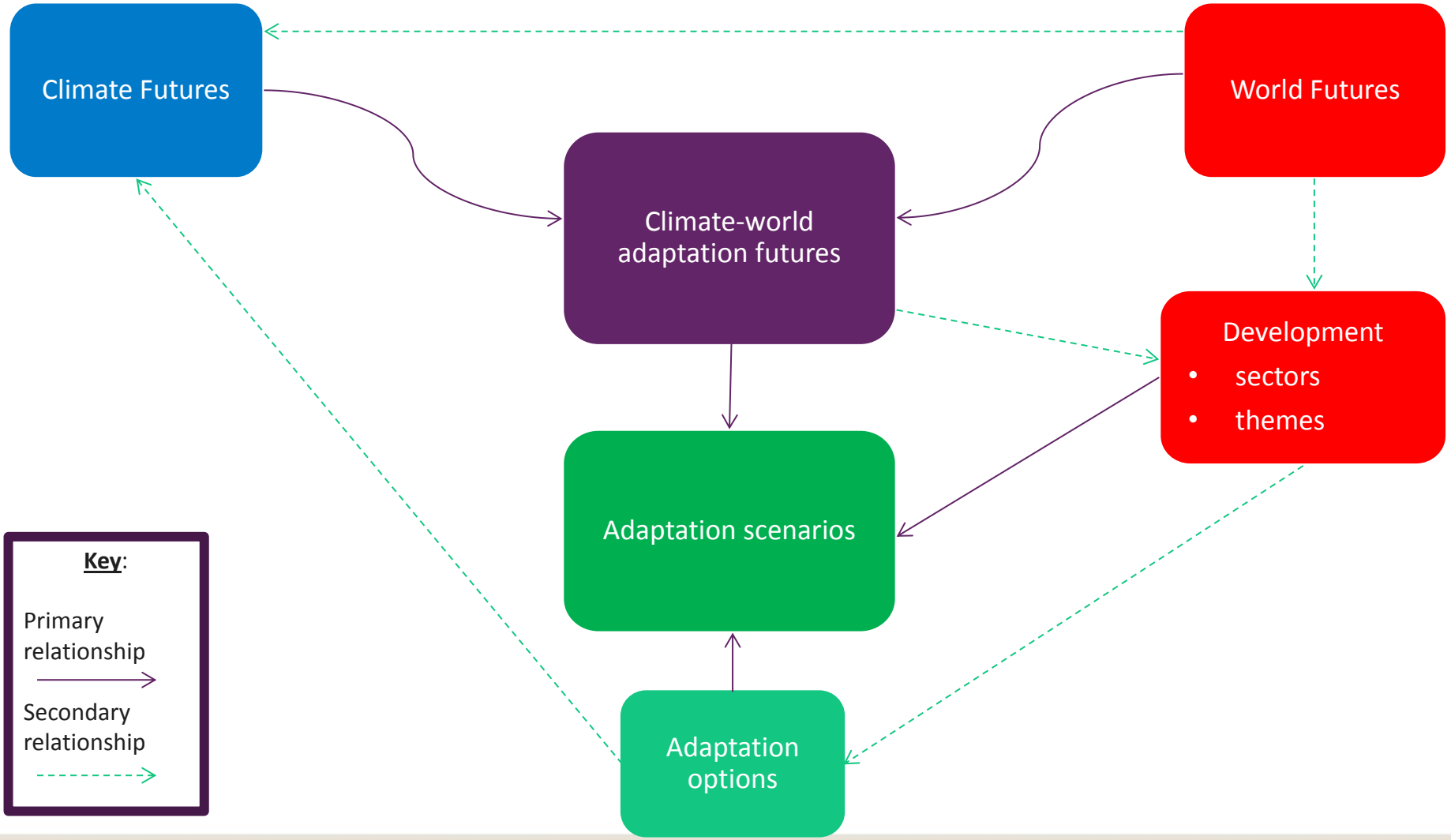
Adaptation ‘opportunities’ curve to fill the adaptation gap



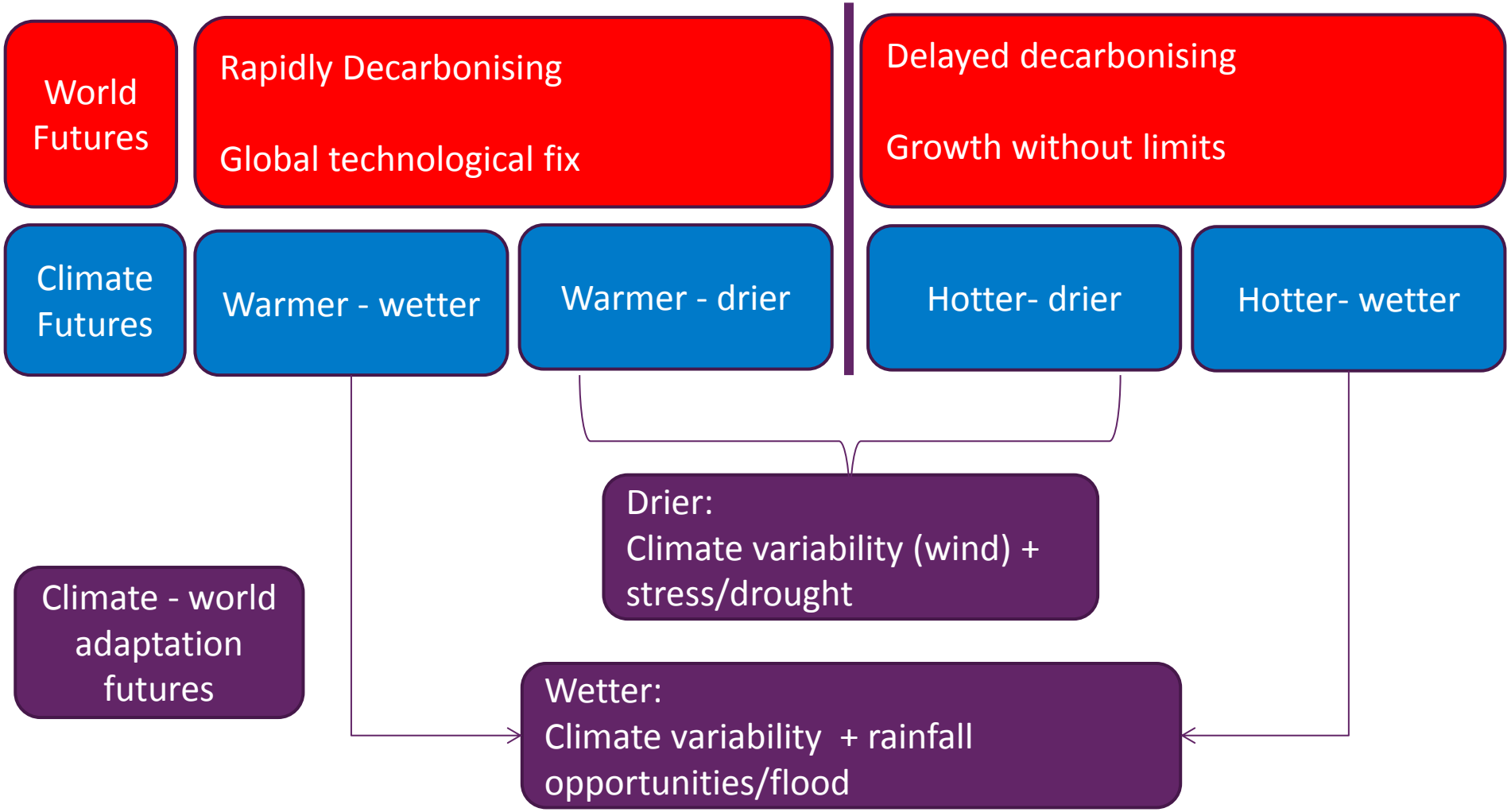
Scenarios conceptual map



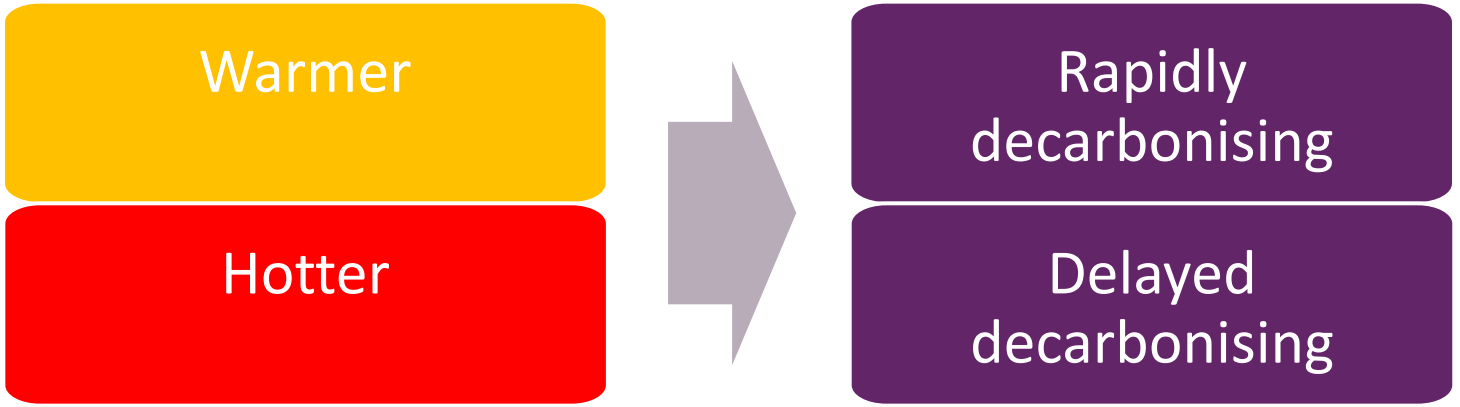
The big picture…

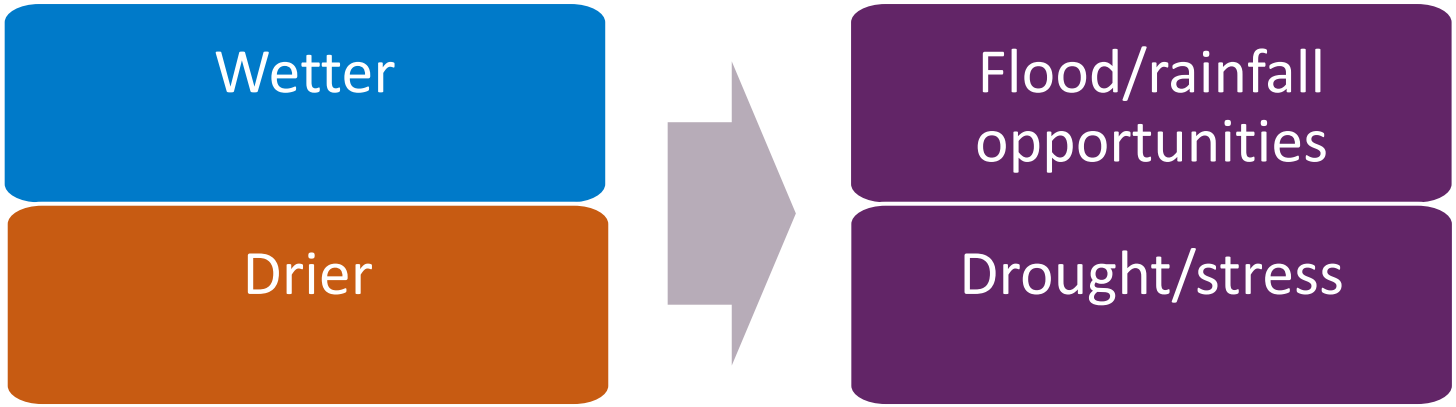


Adaptation drivers



Adaptation drivers





Climate futures

Warmer:

Rapidly decarbonising

Global technological fix

Hotter:

Carbonising

Delayed decarbonising

Drier:

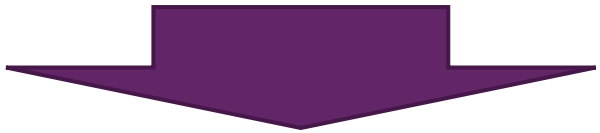
climate variability + stress/drought

Wetter:

climate variability + rainfall/flood

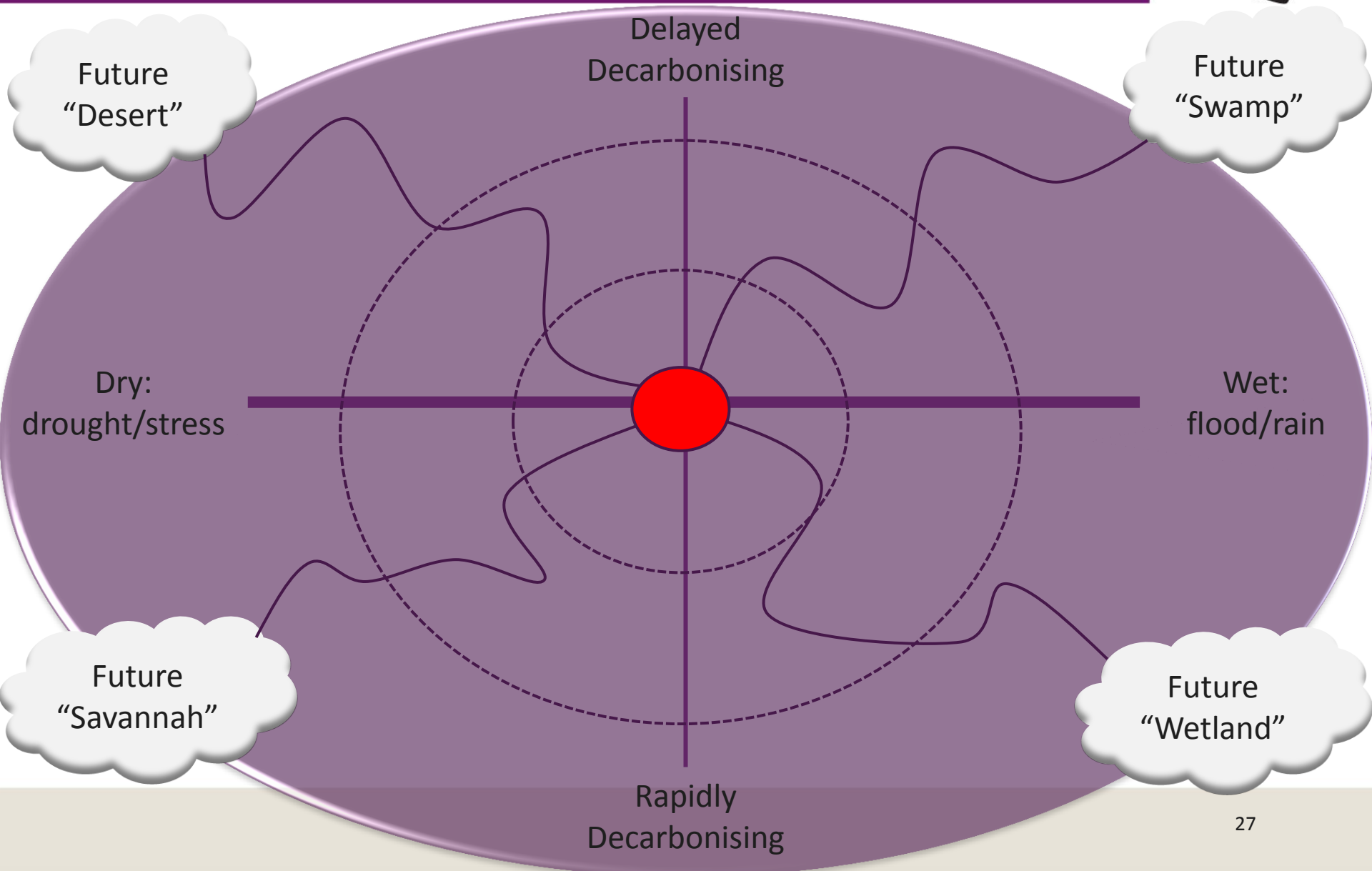
Climate world adaptation futures

	Rapidly decarbonising (cooperative)	**Limited decarbonising (global growth at all costs)**
Drier: variability + stress/drought	Challenge in agriculture + export Aggressive renewable space SADC integration is critical Major trade-offs **Key: Uncoupled economy**	Challenge in agriculture, less so export Growth in industry (not agriculture) **Key: Industrial development**
Wetter: variability + rain/flood	Centralised – agri-business Decentralised – livelihoods (resilience adaptation strategies) **Key: Clean energy production**	Preparation for disasters **Key: Grow primary economy**



Development theme	***Green growth*** ***Decentralisation if wetter future*** ***Services economy possible with SADC integration***	***High growth extractive or industrialisation*** ***Integration less critical***

Adaptation Narratives

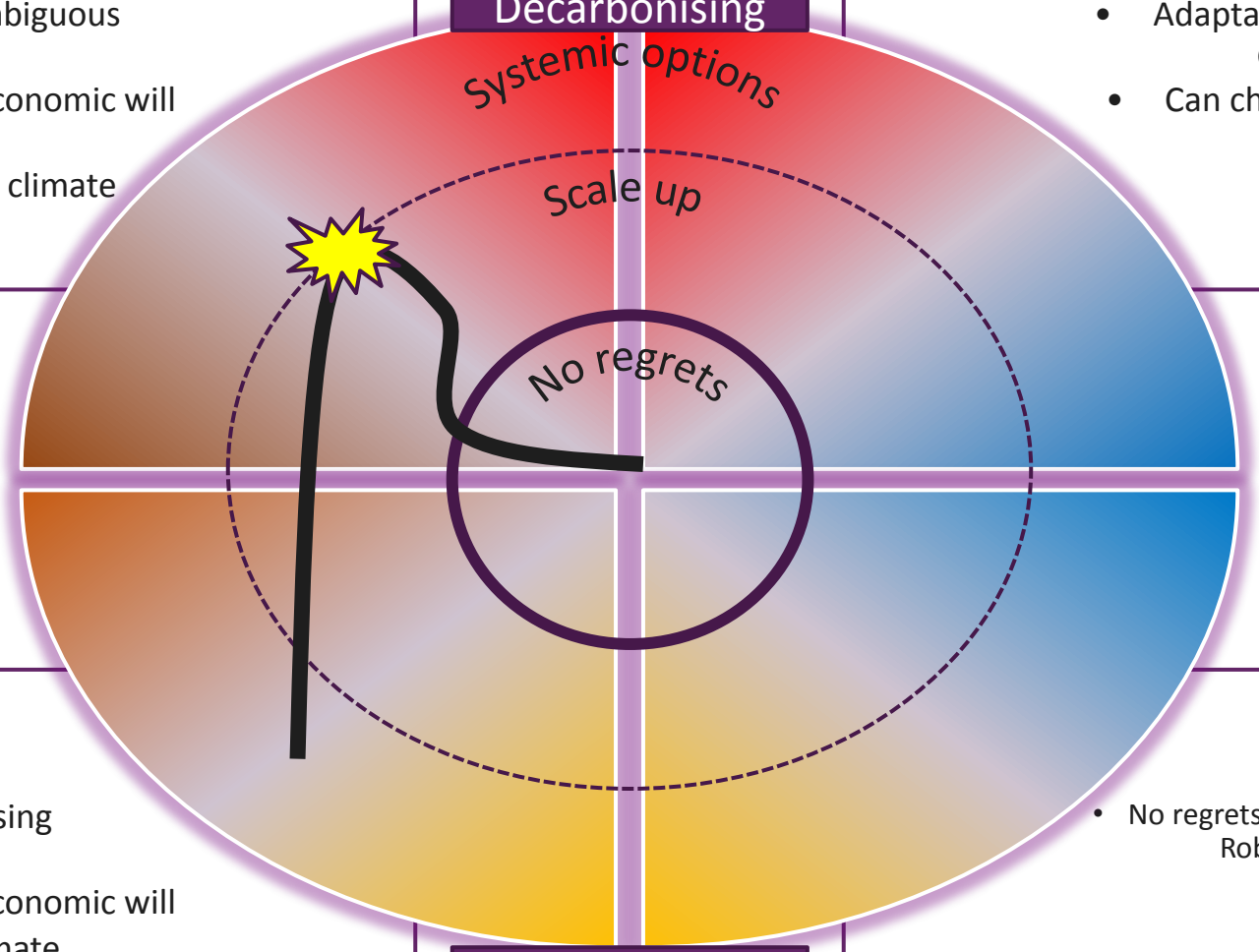


Adaptation scenarios

Delayed Decarbonising

- Carbon ambiguous
- Benign political/economic will weak
- Aggressive climate

- Adaptation options at different levels
- Can change direction



Drier

Wetter

- Decarbonising
- Aggressive political/economic will
- Benign climate

- No regrets: build resilience. Robust to all futures

Rapidly Decarbonising

Typology of adaptation options

- **Proactive and Reactive**

Reactive measures will be the dominant response until threats become better understood. But countries can become more proactive in disaster preparedness.

- **Soft and Hard**

Many soft measures such as water and energy pricing, strengthening property rights, and flood plain and landslide area zoning—have robust adaptation and development results. But they take time and require strong institutions to put in place. The timing may be consistent with the time frame of global warming, however, if concerted action begins now.

- **Public and private:**

Adaptation measures can be classified by the types of economic agent initiating the measure—public or private. The literature distinguishes between autonomous or spontaneous adaptation (by households and communities acting on their own without public interventions but within an existing public policy framework) and planned adaptation (from a deliberate public policy decision).

Typology of adaptation measures

- IPCC (2001)

		Anticipatory	Reactive
Natural systems			Changes in length of growing Changes in ecosystem composition Wetland migration
Human systems	*Private*	Purchase of insurance Construction of house on stilts Redesign of oil-rigs	Changes in farm practices Changes in farm insurance premiums Purchase of air-conditioning
	Public	Early-warning system New buildings codes, design standards Incentives for relocation	Compensatory payments, subsidies Enforcement of building codes Beach nourishment

Typologies of adaptation

- **Systemic vs. Specific**
- Hard vs. soft
- Sector
  - 6 (Agriculture, ecosystem management, energy)
- Scale
  - 3 (National, subnational, local)
- Type
  - 14 (Institutions, policy change, pilot projects)

Kumamoto & Mills, 2012

Types of adaptation options

- Changing natural resource management practises
- Building institutions
- Launching planning processes
- Raising awareness of climate change
- Promoting technology change
- Establishing monitoring and EWS
- Changing agricultural practises
- Empowering people
- Promoting policy change
- Improving infrastructure
- Providing social protection
- Knowledge creation and management
- Financing
- Pilot projects