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LTAS Phase 2: Climate Change Implications for the Human Settlements sector in South Africa

Overview of proposed approach to the Desktop Study to inform discussion

Project Team

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This Presentation

Methodology:

- Report Structure
- Information sources
- Conceptual framework
- Settlement and spatial typology

Risk and Vulnerability

- Coastal | Inland
- Rural | Urban

Human Migration and Conflict

Adaptation Responses

Key policy issues

Discussion

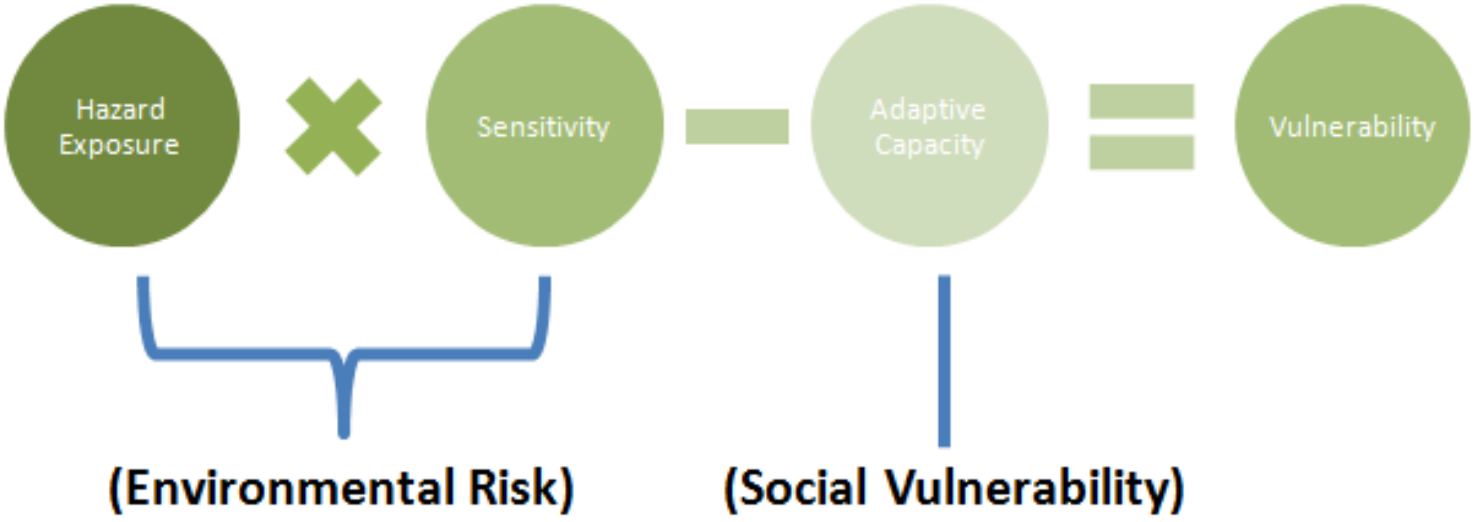
Report Structure

- Introduction
  - framing of human settlement policy issues identified in ENS Policy Review
- Methodology
  - description of conceptual model of risk and vulnerability, settlement typology and overview of data sources
- Impacts:
  - Urban | Rural
    - Coastal | Inland
  - Migration and Human Conflict
  - Case Studies
- Adaptation Responses
  - Urban | Rural
    - Coastal | Inland
  - Case Studies
- Policy Recommendations
- Future research needs

Information Sources

- LTAS Phase 1 Technical Reports (Climate modelling)
- Focus is on synthesis and comparison of existing studies and settlement plans:
  - Risk and Vulnerability Assessments:
    - Metros (JHB, CT, eThekwini)
    - DRDLR (Rural Settlements)
    - Namakwa, Western Cape
    - etc
  - Climate Change Plans, IDPs and EMPs
- SARVA, StatsSA
- IPCC (SREX) and UNDP
- Independent Research e.g. Heinrich Boll Institute, OneWorld, Academic research
- Suggestions to matthew@8linkd.com !

Conceptual Framework: Risk + Vulnerability



- Climate modelling from Phase 1 provides the basis for analysis of hazard exposure
- Focus of this work is on **unpacking sensitivities** of human settlements and identifying drivers of **social vulnerability** and **adaptive capacity**

Settlement Typology

Purpose:

- Meaningful categorisation of human settlements to inform analysis of climate change impacts
- Together with spatial typology, informs selection of case studies:

	Inland	Coastal
Metros	Johannesburg	Cape Town, eThekwini, Buffalo City
Peri-urban	Gauteng	Cape Town, eThekwini
Mixed	Bushbuckridge	OR Tambo
Rural	CRDP sites	CRDP sites

Spatial Typology

- Geographical location and local topography (determinants of hazard exposure)
- Coastal /Inland distinction has specific relevance for urban planning, less for rural development
- Rural sensitivity to climate change influenced by:
  - Social history e.g. Former homelands, land claims
  - Water management regimes
  - Biomes
  - Topography
  - Agricultural zones

Impacts: Hazard Exposure (LTAS Phase 1)

LTAS sub-regional near term analysis (water management regions)
Zone 1: Up to 2°C increase by end of the period. Possibility of drying, but within range of natural variability
Zone 2: Under low mitigation scenarios,1 – 2°C increase possible.
Zone 3: Under low mitigation scenarios, 1 – 2.5°C increase possible. Possibility of drying, but within range of natural variability
Zone 4: Under low mitigation scenarios, 1 – 2.5°C increase possible. Slight drying
Zone 5: Under low mitigation scenarios, +2°C increase possible. Pronounced, anomalous drying
Zone 6: Under low mitigation scenarios, 1-1.5°C increase possible. Pronounced, anomalous drying

Impacts: Sensitivity + Social Vulnerability

Factors influencing the environmental sensitivity and social vulnerability of human settlements to climate change hazards (changes to temperature, rainfall, and extreme weather):

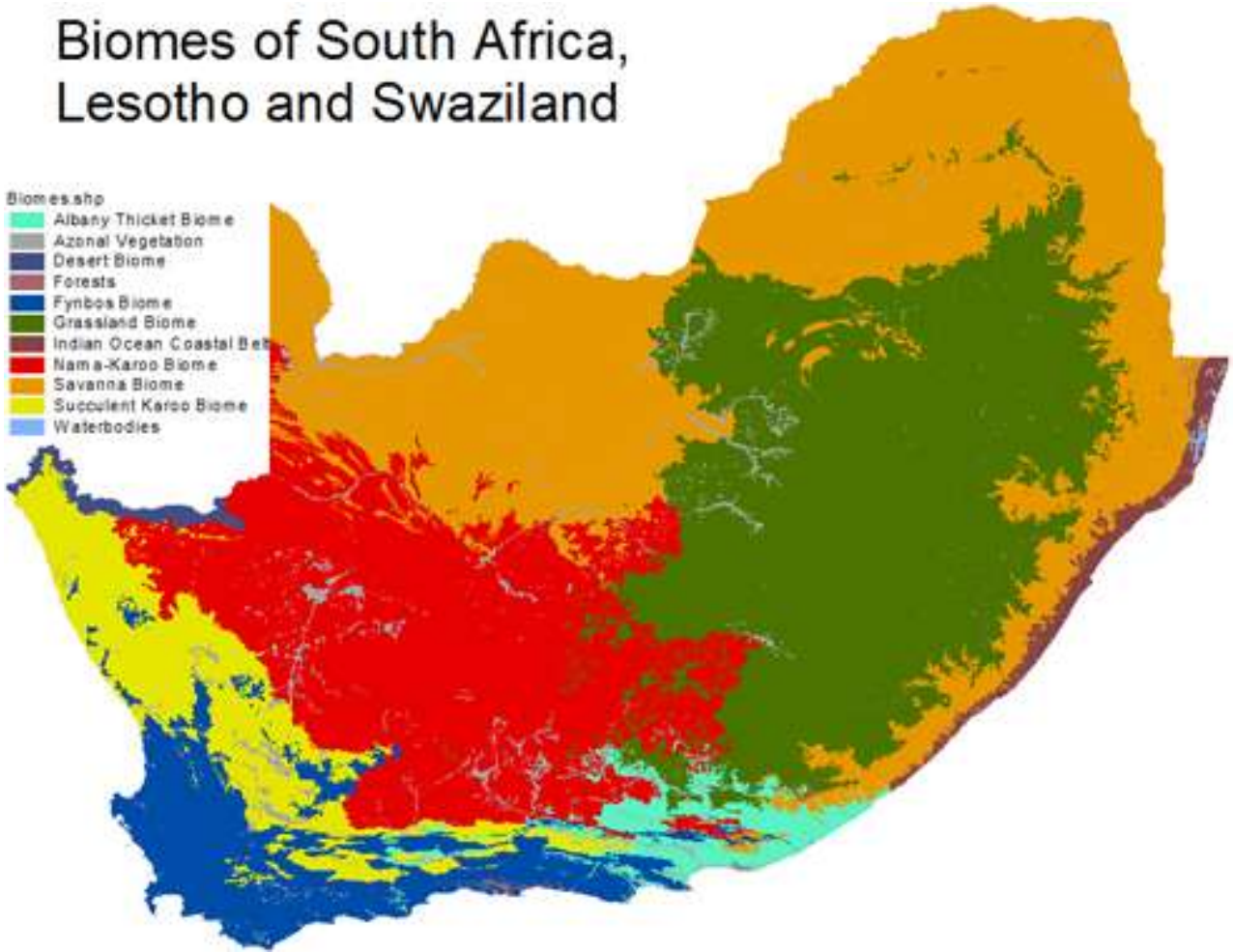
- Settlement typology (urban, peri-urban, mixed, rural)
  - Infrastructure and services
  - Community and governance
- Local topography (including inland/coastal)
- Population demographics:
  - Age, Gender, Poverty
  - Spatial and temporal population distribution and migration patterns
- Economic base of settlement (e.g. agriculture, other water-dependent, non-water-dependent)

Impacts: Sensitivities

	Urban	Rural
Extreme weather	Floods, “heat islands”, storm surges (exacerbated by sea level rise in coastal areas) threatening infrastructure and housing.	Floods, veldt vires, drought and disruption of eco-system services threatening livelihoods, housing and infrastructure
Seasonal rainfall changes	Water security and infrastructure	Water security, food security and crop selection
Temperature changes	Human discomfort index – urban “heat islands”.	Human discomfort index, crop selection
Sea level rise	Floods and coastal erosion threats to housing and infrastructure	Limited impact – salinisation of coastal fresh water
Ocean Acidification	Limited impact	Potential impact on subsistence fishers

Biome Sensitivity

- Fynbos, Succulent Karoo, Nama-Karoo, Savannah and Grassland biomes are particularly at risk



Sensitivity Drivers

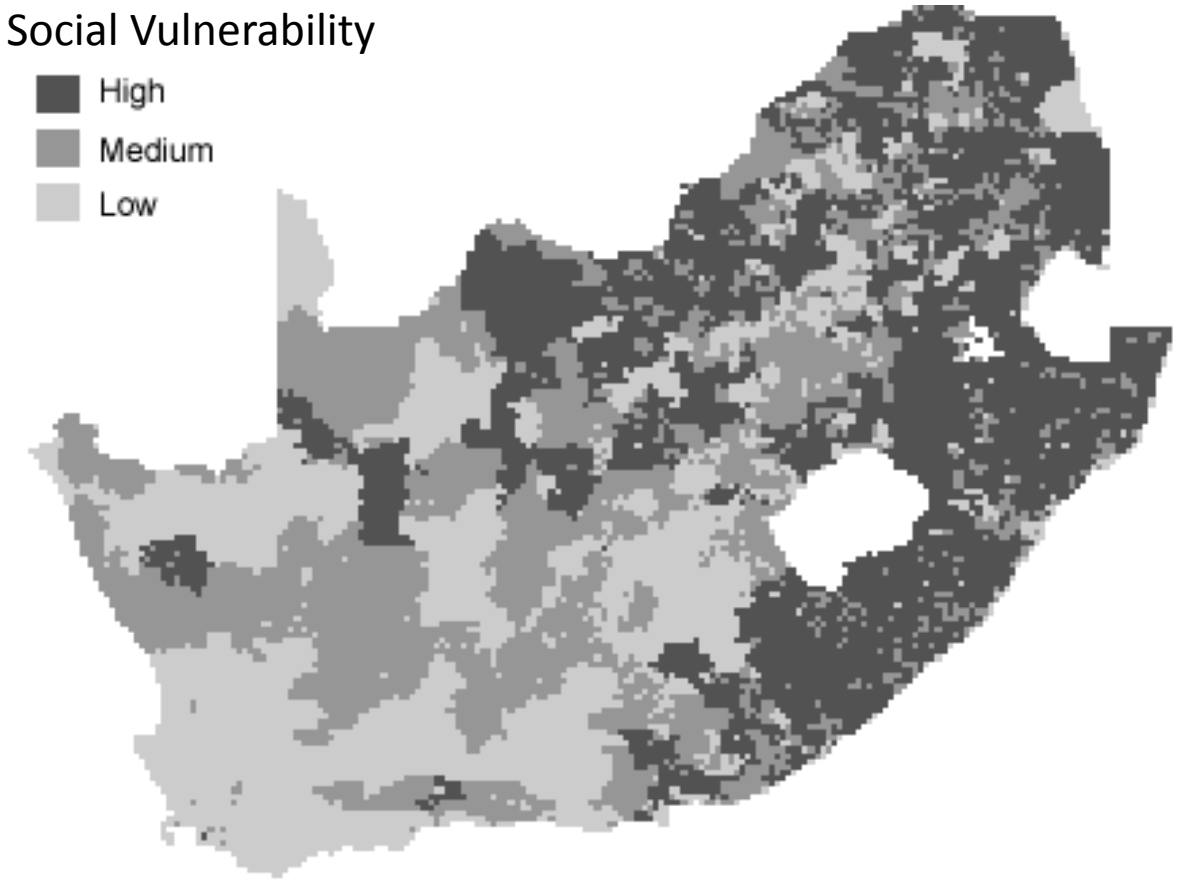
- Exposure of infrastructural assets e.g. Housing, water reticulation systems, roads vulnerable to flood damage
- Spatial dispersion and isolation – basic services harder to deliver to dispersed settlements, isolated settlements, isolated communities face heightened disaster risk
- Ecological vulnerability – vulnerable and degraded ecosystems less able to provide services
- Economic vulnerability – climate change impacts, market and regulations (e.g. carbon tax)
  - Agriculture (Very sensitive to climate change - temperature, precipitation, water security, pests, invasive aliens
  - Mining and industry (sensitive to climate change *policy*: e.g. emissions policy, policy affecting export prices of coal
  - Commerce (little direct sensitivity, knock-on effect of prices)

Social Vulnerability

Social vulnerability varies within settlements and between settlements:

- Poverty/class/unemployment
- Access to services and infrastructure (water, electricity, waste, roads, health, education)
- Tenure and landownership
- Land ownership
- Gender
- Population migration patterns
- Social history and community coherence

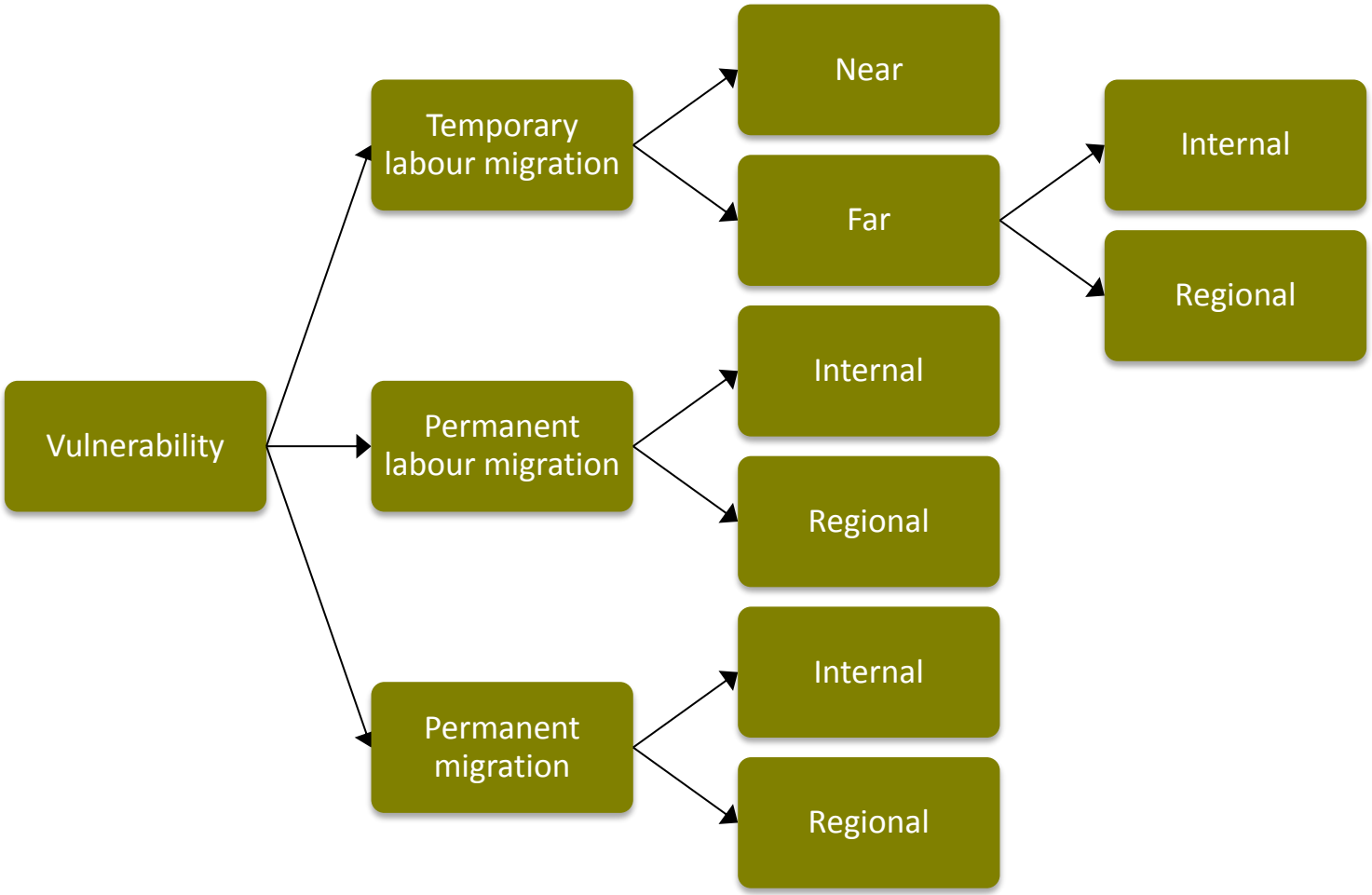
Spatial mapping of demographic vulnerability



Climate and migration: global issues

- Climate change affects the capacity of specific areas to sustain populations
  - “Push” and “pull”
  - Moderate temperature predictions vs. extreme predictions
- Primary climate drivers of migration
  - Extreme weather events
  - Agricultural yields (ecosystem degradation)
- vulnerability -> migration -> vulnerability (to disease, exploitation, violence)
  - People without a community are vulnerable, and settlements without communities (because of mass migrancy) are vulnerable
  - Weakens existing state interventions (e.g. grants)
- Migrants or refugees or IDPs?

A climate migrant's decision tree



Climate and migration: issues for SA

- Climate change as “threat multiplier”
  - exacerbates other causes of migration (especially food and water insecurity)
  - Causes of migration are also causes of conflict
- SA already experiences high levels of migration (both internal and regional)
  - People who have moved once are much more likely to move again
- Urbanisation?
  - Cities offer relative protection from climate change
  - But SA cities offer few opportunities for livelihoods
- Migration as failure of adaptation or strategy for adaptation?

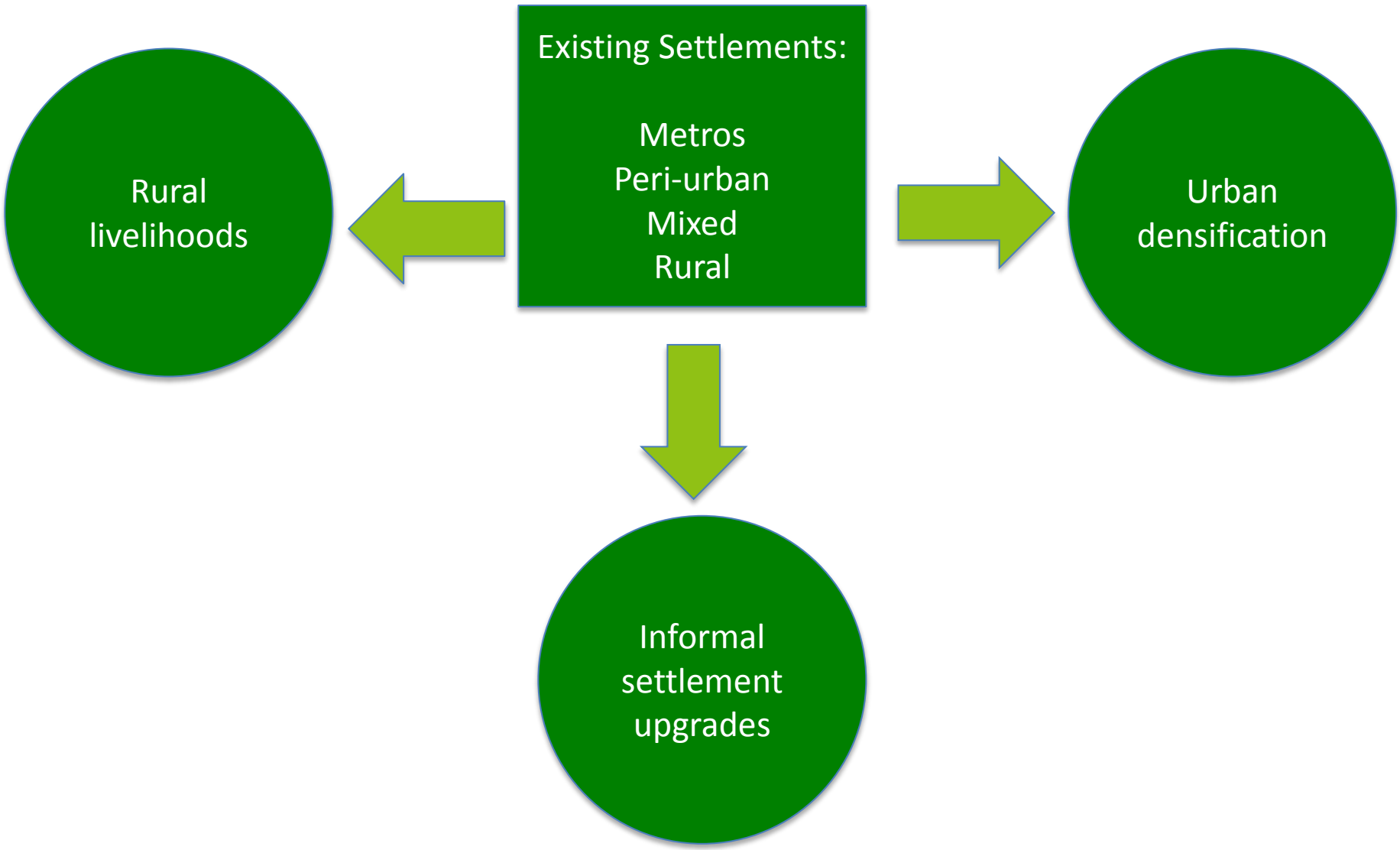
Adaptive Capacity

- **Access to services**
- **Resilient infrastructure and housing**
- **Sustainable rural livelihoods**
- **Access to economic opportunities**
- **Food security**
- **Health care and education**
- **Land ownership**
- **Vibrant civil society institutions**

Adaptation responses

- Must be designed for the specific environmental risk of the settlements in question
- Must focus on those least capable of self-adaption: the socially vulnerable
- Must focus on increasing the ability of citizens to self-adapt
  - E.g. improved access to information, capital, etc.
- Must avoid maladaptation
  - E.g. increased irrigation in response to water insecurity

Development Strategies



Adaptation Responses: Cross-cutting dimensions of analysis

Rural livelihoods	Informal settlement upgrades	Urban densification
Land/tenure/ownership		
Governance and community		
Infrastructure and services		
Housing		
Economy and livelihoods		

Adaptation responses need to be tailored to settlement types!

Adaptation Examples

- To water insecurity and shortage:
  - Increased access to water services
  - Water-saving measures
- To increased exposure to disease vectors
  - Preventative education
  - Increased access to treated water
- To increased temperatures
  - Cooling measures (such as tree-planting)
  - Behavioural changes
- To extreme precipitation
  - Better flood-prevention infrastructre
  - Better water stockpiling