

# Economics of Climate Change in Kenya:

## Toward resilience and sustainable development

1 March 2010

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Nairobi, Kenya





# Key messages

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- Projected climate changes
- Impacts and economic losses
- Adaptation options and costs
- Potential low carbon growth



# Approach

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- No accepted methodology
  - Aggregate (top-down)
  - Sectoral (bottom-up)
  - Case Studies (local experience)
- Multiple lines of evidence
  - No single method, range of models and scenarios
  - Local experts linked to global assessments
  - Building capacity and enduring partnerships
- Dealing with uncertainty
- Very large range of estimates

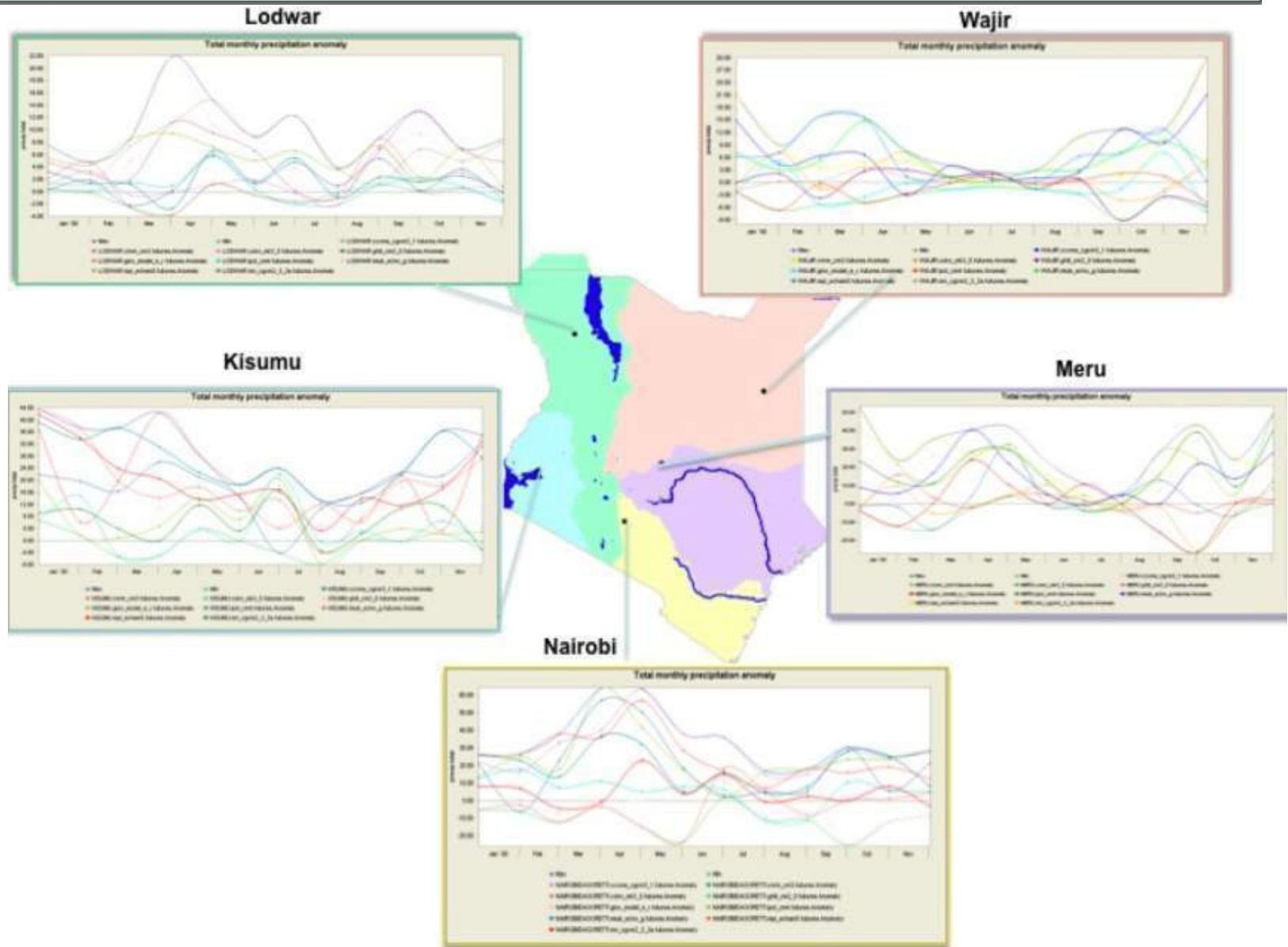


# Climate projections for Kenya

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- Current climate – changing
  - Spatial and annual variation
  - Natural climate variability is large (e.g., ENSO)
- Future climate – will be different
  - Warmer (1°C by 2030; 1.5°C by 2050)
  - Rising sea levels (0.17m to 1.26m, 1995 – 2100)
  - Wetter in places (uncertain – geographic variations)
  - More extreme events (most uncertain)

Projections of future climate change in Kenya show a wide range, especially for rainfall, drought and floods. Robust strategies should prepare for uncertain futures.



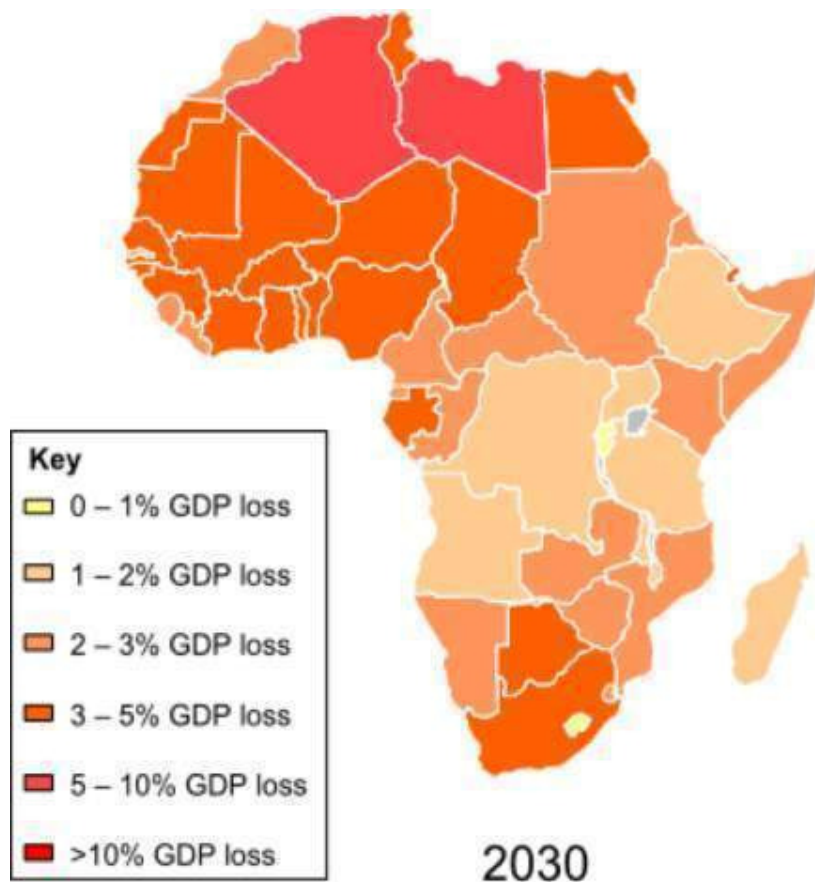


# Socio-economic projections

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- Climate changing in a changing world
  - Population growth (2.9% *pa*, 80m by 2050)
  - Economic growth ('07 - 7%; '09 - 3%, V2030 - 10%)
  - Land-use changes (forestry, agriculture, livestock)
  - Urbanisation (over 50% by 2030)
- Recognise and address uncertainty

# Value of Economic Losses in Kenya



- Current losses \$0.5 bn each year
- By 2030, an additional \$1.5 bn of losses due to climate change
- Thus total impacts by 2030 \$2 bn per year
- Could double by 2050



# Climate Change Impact: Coastal Zones

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- Nature of Impact

- 1500 km coastline, population 2m and growing
- Sea level rise and extreme weather events
- Coastal flooding 10 – 86,000 people per year by 2030
- Impacts on infrastructure, water resources, transport, agriculture and ecosystems.

- Economic losses without adaptation

- \$7-58 million each year by 2030
- \$31-313 million each year by 2050

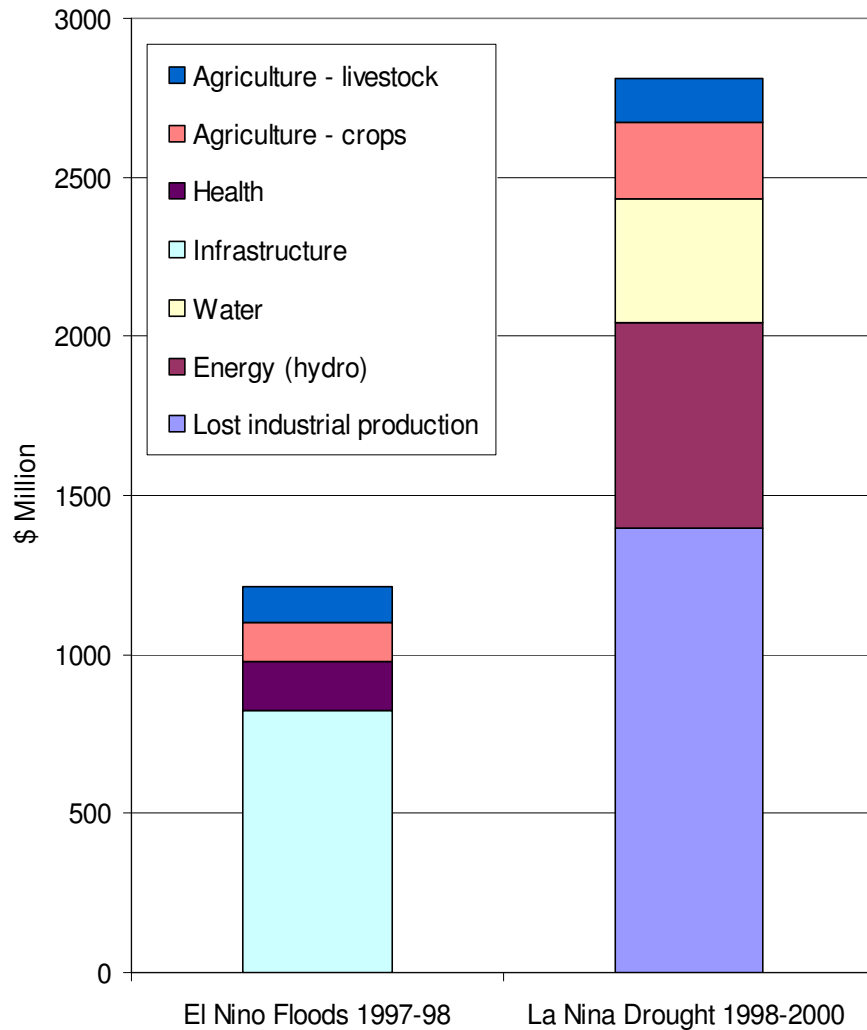


# Climate Change Impact: Health

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- Direct and indirect impacts
  - heat, flood, water, food, vector-borne disease
- Warmer climate spreads malaria to highlands
  - by 2050, population at risk of malaria in rural areas over 1000m altitude is projected to increase by 74%
  - additional 5.7 million people affected by 2055
  - 10,000 additional under-5 child mortality
  - 125,000 additional child hospitalisations
- Value of Losses
  - \$67m additional burden of endemic malaria by 2050s
  - or \$140-185m annually with wider welfare costs

# Climate Change Impact: Infrastructure and Built Environment



## Nature of impact

- Flood damage
- Drought loss

## Value of losses

- '97/98 floods \$850 – \$1.2 bn
- '98/00 drought \$2.8 bn

## Increasing vulnerability

- economic and population growth

# Climate Change Impact: Water Resources

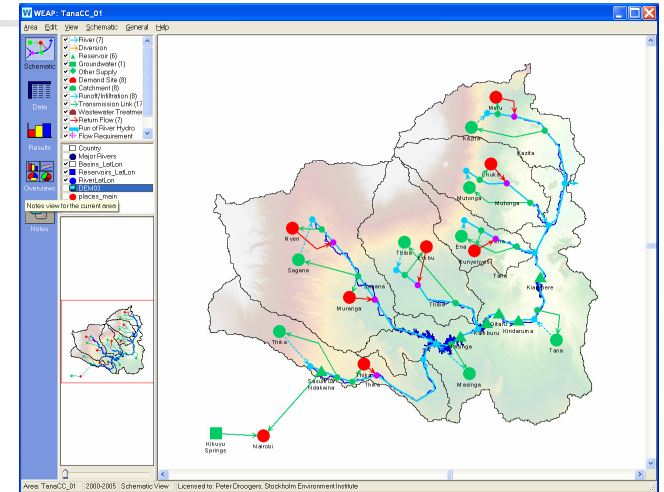
## Tana River Basin case study

### ■ Nature of Impact

- Hydropower generation, irrigation water, rain fed agriculture, urban water

### ■ Value of impacts

- Low change - positive impact \$2 m
- High change - negative impact \$66 m





# Climate Change Impact: Agriculture

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- Nature of Impact

- Yields, growing season, reliance on rain-fed agriculture
- Complex flood and drought effects on soil, pests, diseases
- Large spatial & geographic differentiation

- Value of impacts

- 2 scenarios for changes in net crop revenue by 2030:  
1% gain to 22% loss
- Changing value of agricultural land



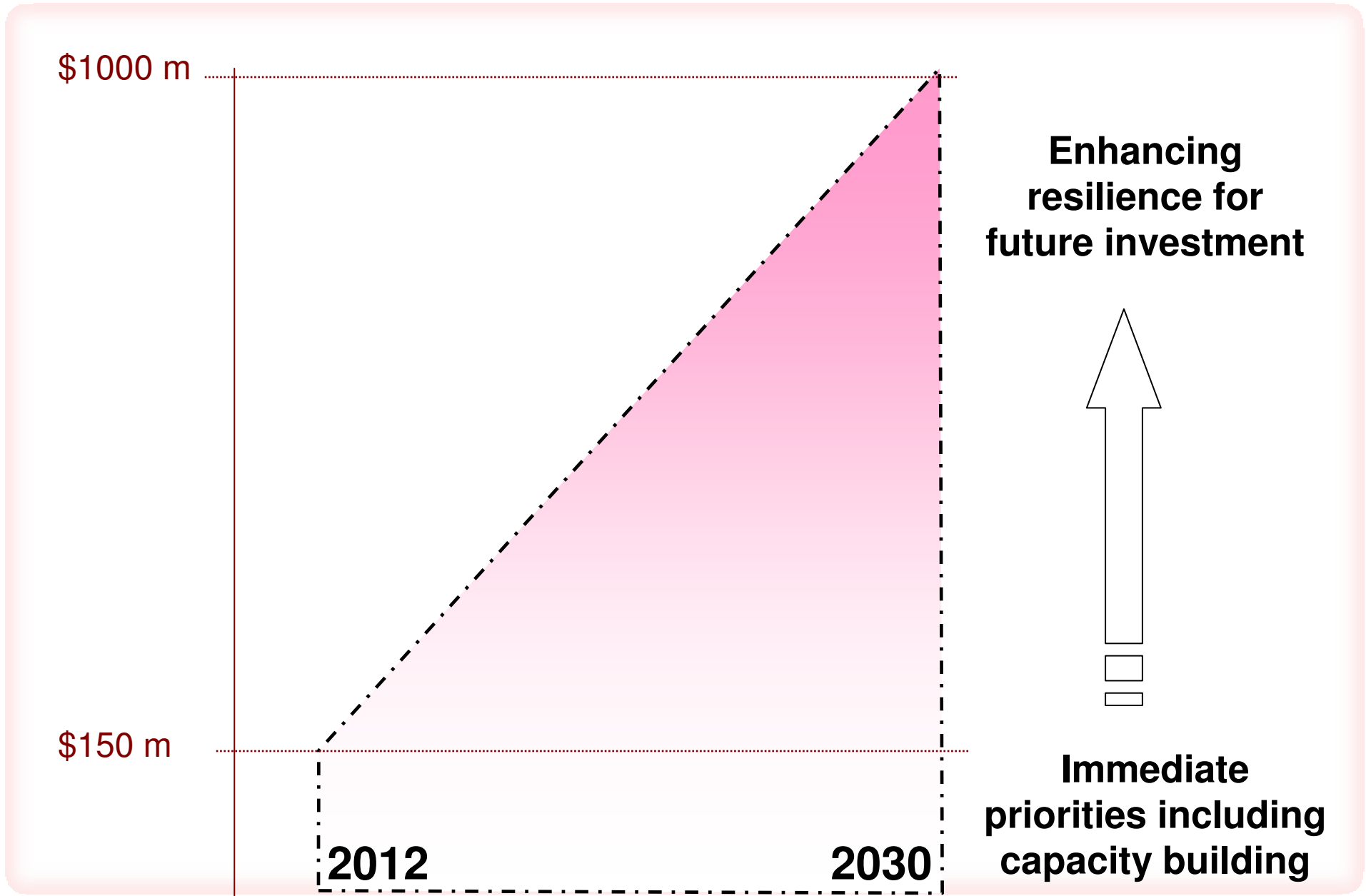
# Adaptation Responses and Costs

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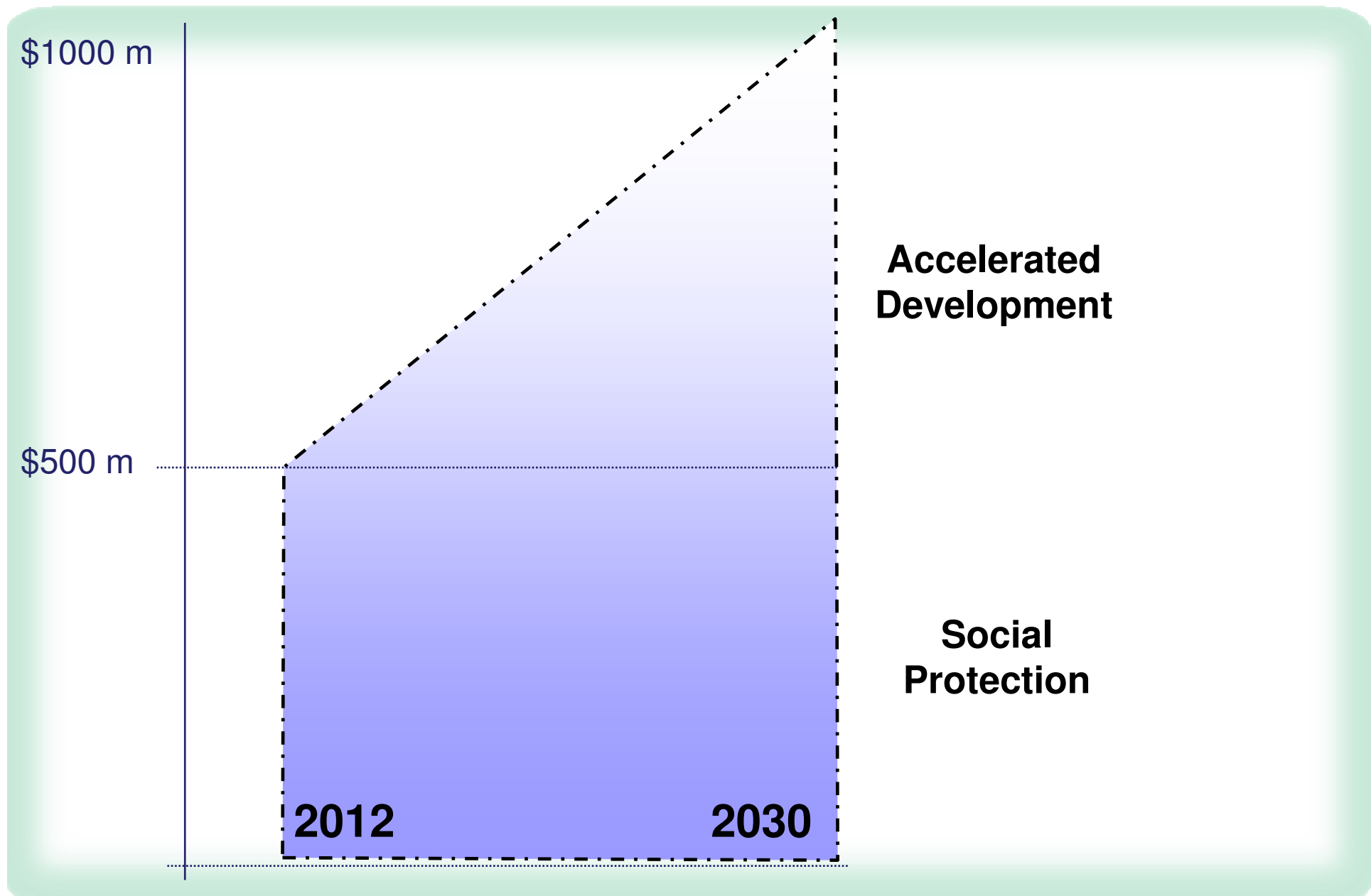
Four types of adaptation to consider:

- Future climate
  1. Immediate capacity and institutional strengthening
  2. Climate resilience of future investments
- Current development
  3. Social adaptation
  4. Current development / historic adaptation deficit

# Adaptation to Future Climate Change



# Adaptation to Current Climate Risks Essential for Future Resilience



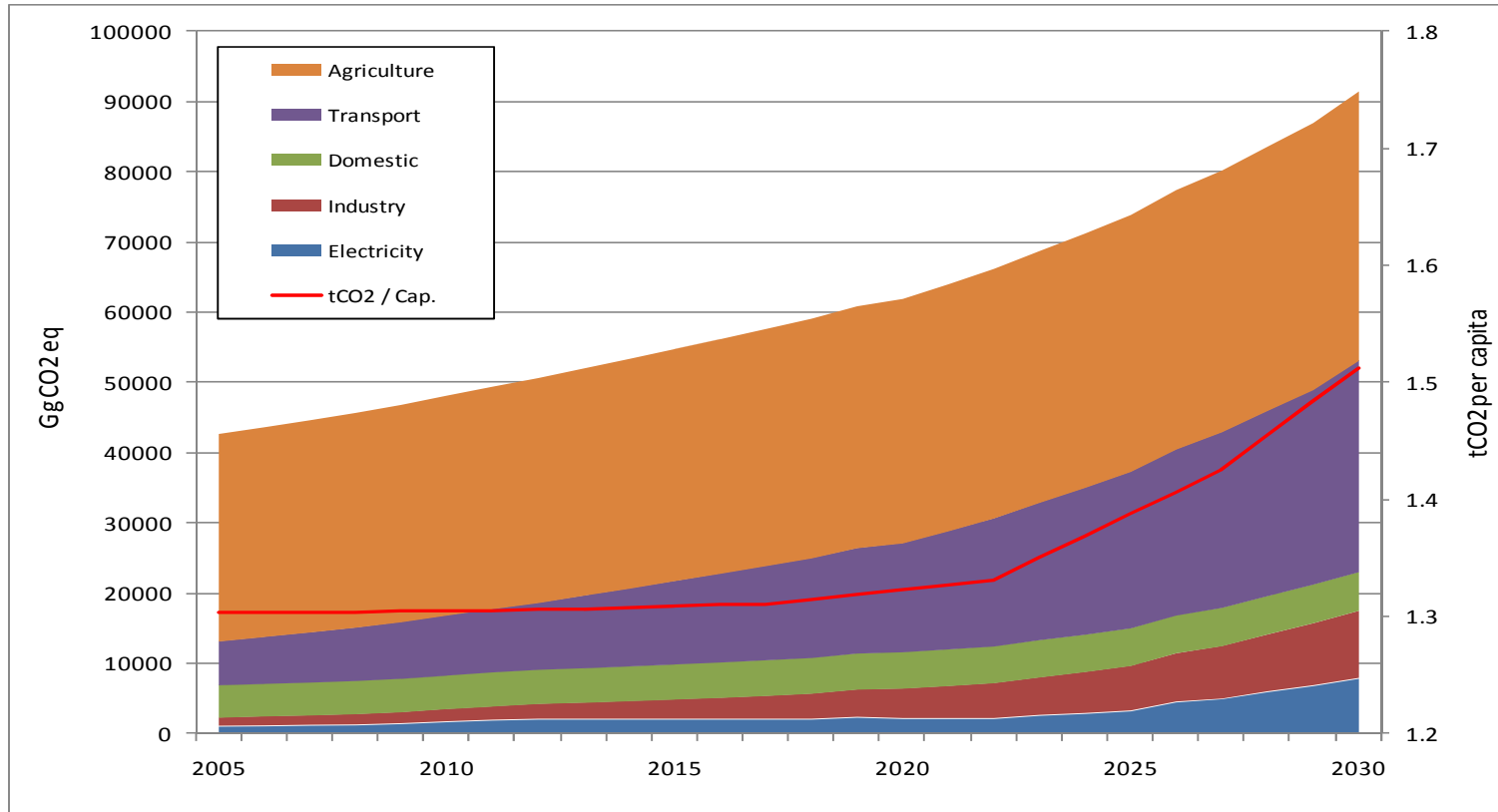


# Adaptation finance needs by sector

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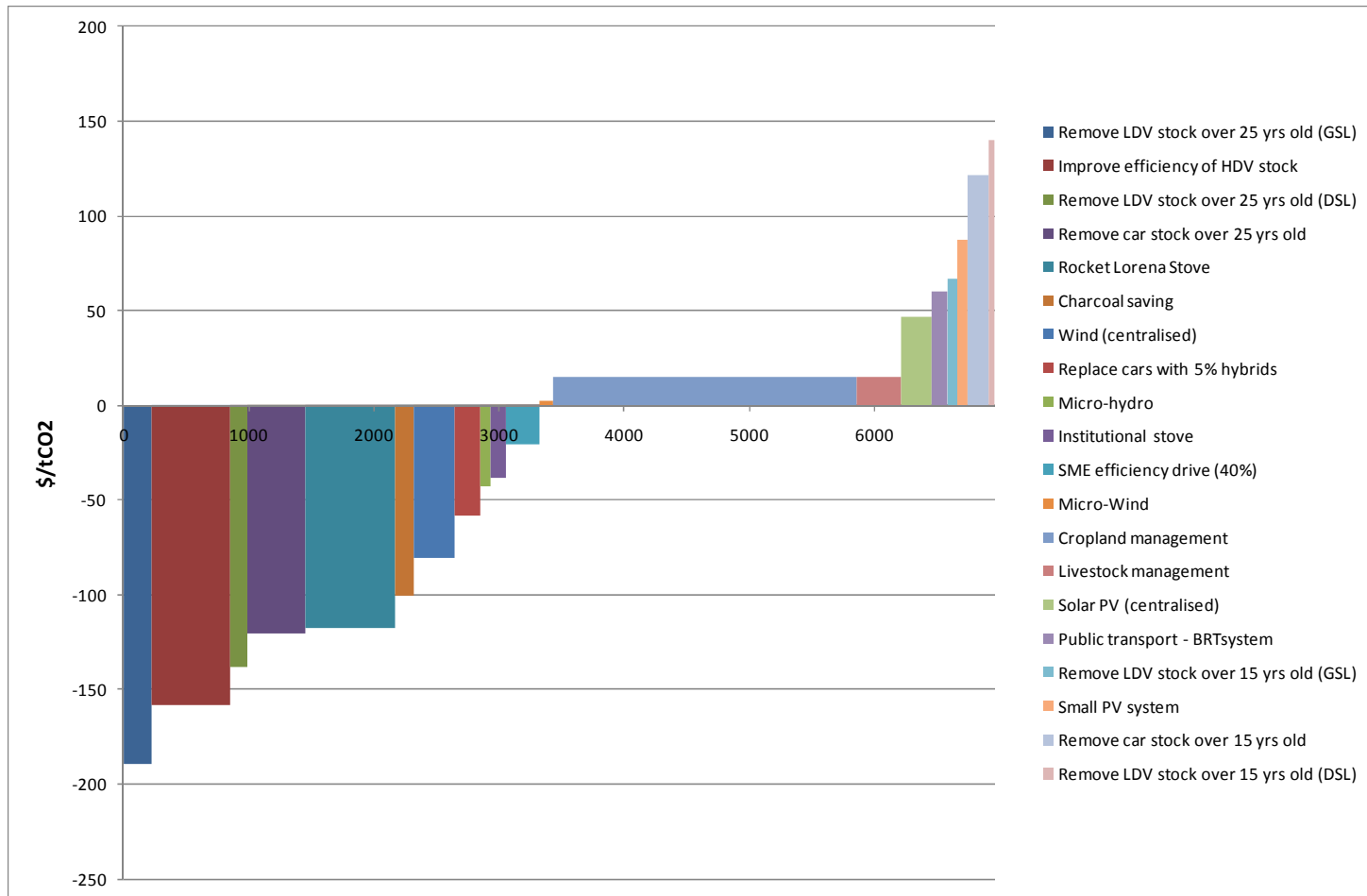
- Coastal
  - \$28-56m per year (by 2030) rising to \$80m (by 2050)
- Health
  - malaria extra \$8m per year (by 2050s)
- Water
  - service investments - \$1.4 bn
- Agriculture
  - immediate \$8-40m per year (by 2012) and rising to \$50-170m per year (by 2030)

# Low Carbon Growth



**Projections of Kenya's GHG emissions (Gg CO2 eq.), 2005-2030**

# Low Carbon Options - Energy



**Indicative marginal abatement cost (MAC) curve of selected energy sector measures, for Kenya in 2020**



# Conclusions

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- Finance is not the real story
  - WB estimates \$75-100 bn/yr by 2030
  - EC committed to \$100 bn/yr by 2020
  - Africa remains the highest priority
- Get ready and act now
  - Strategy, institutional and policy development
  - Improve estimates
  - Sectoral testing
  - Investment analysis
  - Revisit Vision 2030
  - Low carbon growth paths



Nairobi, Kenya

Thank you

<http://kenya.cceconomics.org>

