Country case studies: Senegal & Kenya

Impacts of response measures

- Pathways: capital, **goods**, human resources, natural resources (OECD, 2021)
- **Different impacts**
  - Scope: **economic**, social, environmental
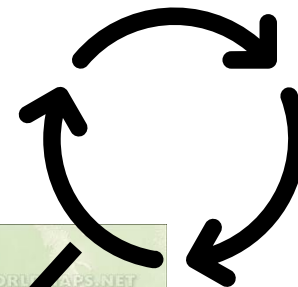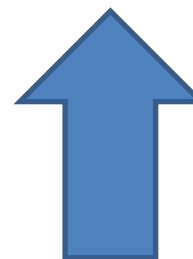 - Domain: domestic, **cross-border**

Types of impacts

Domestic policy with
domestic impacts

International policy
with domestic impacts

Country focus

cgemod

- **Linking global and country models**
  - Capture changing global conditions arising from climate mitigation policies
  - Greater detail at country level
  - Country level indicators
- **Country selection**
  - Data availability
- **Different economic structures → different impacts**
  - Trade openness: Senegal 62%, Kenya 36% (World Bank, 2018)

Toolkit: single country

- **Single country CGE models**
  - STAGE_CC
  - Linked to GLOBE_CC
  - Comparative static mode
- **Social Accounting Matrix data**
  - Senegal: 2014 (Boulanger et al., 2017)
  - Kenya: 2014 (Mainar-Causape et al., 2018)
- **Results**
  - Headline and detailed economic results
  - Household results: identify vulnerable households
  - Selected Sustainable Development Goal indicators

Global to country level

cgemod

Results of response measure simulations in GLOBE

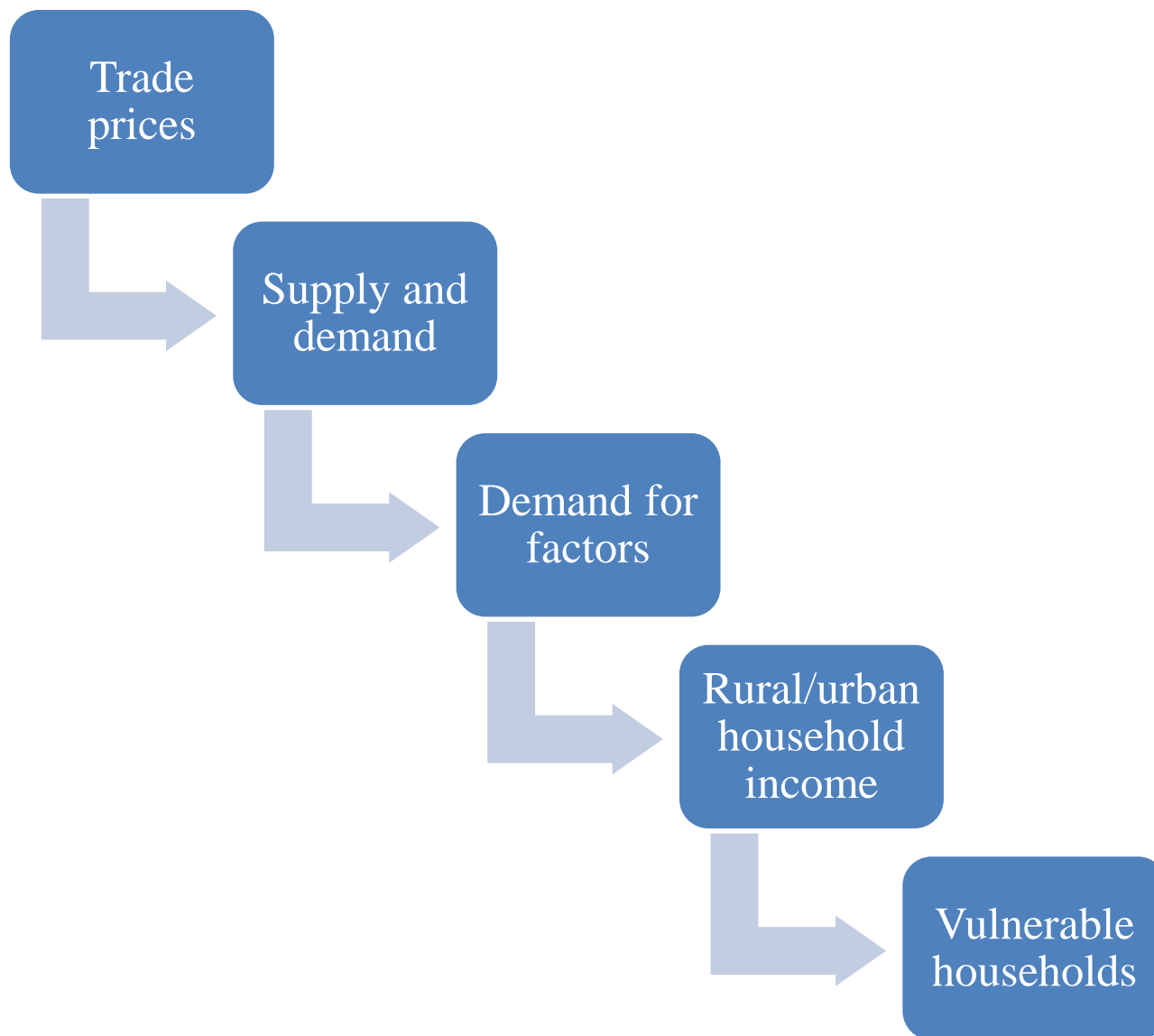World import prices, world export prices, exchange rate effects

Run STAGE_CC → Impact of the implementation of response measures

Simulation overview

GLOBE_CC	Carbon tax		Energy input taxes		Quantity restrictions	
	West Africa	East Africa	West Africa	East Africa	West Africa	East Africa
World export prices	↓↓	↓	↓↓↓	↓↓	↓↓↓	↓↓↓
World import prices	↓↓	↓	↓↓	↓	↑	↑↑
Exchange rate (↑ = depreciation)	↑↑	↑	↑↑↑	↑↑	↑↑↑	↑↑
STAGE_CC	Senegal	Kenya	Senegal	Kenya	Senegal	Kenya
Domestic export prices	↑	↑	↑↑	↑	↓↓	↓↓
Domestic import prices	↑	↑	↑↑	↑	↓↓↓	↓↓↓

- **Lower world prices**
- **Higher domestic trade prices**
- **N.B. Average effects**

Linkages

cgemod

Trade prices

↓

Supply and demand

↓

Demand for factors

↓

Rural/urban household income

↓

Vulnerable households
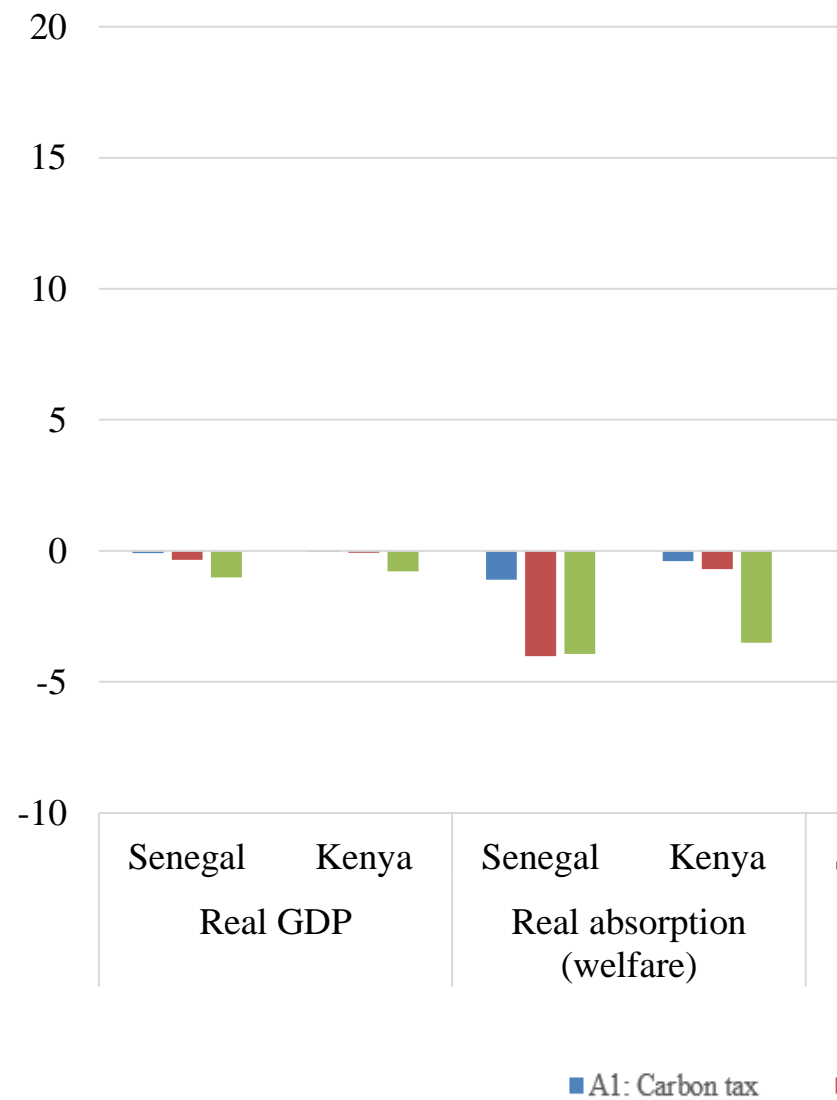
Impact of response measures (% change)

- **Lower GDP**
- **Lower welfare**
- **Senegal > Kenya**
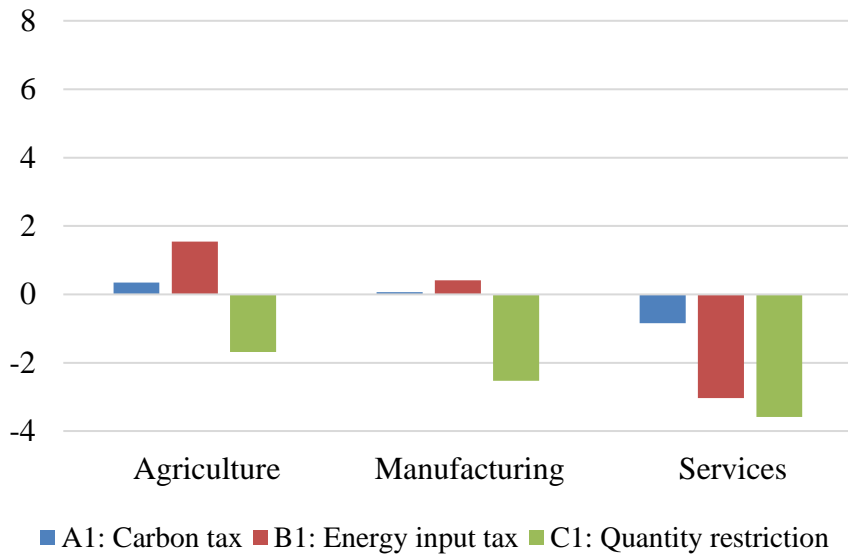
Impact of response measures (% change)

Detailed Impacts in Senegal

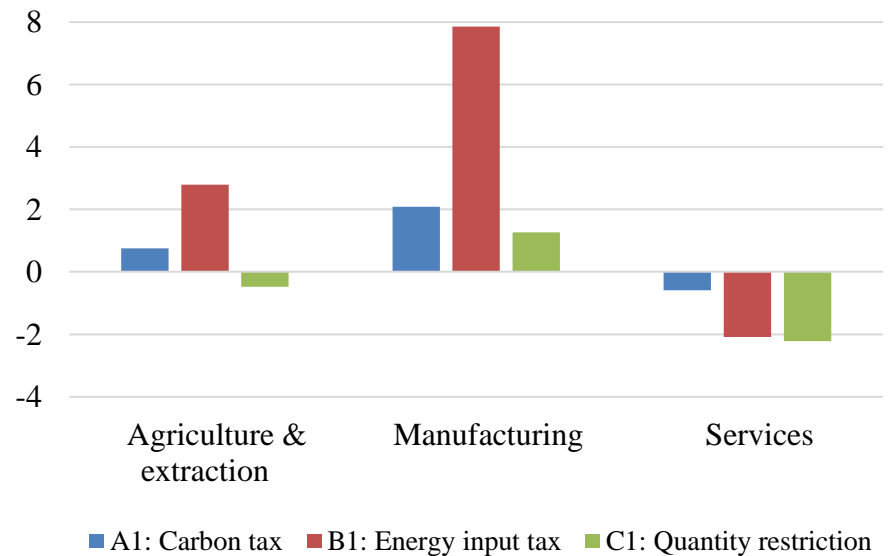# *Structural change (% change)*

Commodity demand

Agricultural demand growth
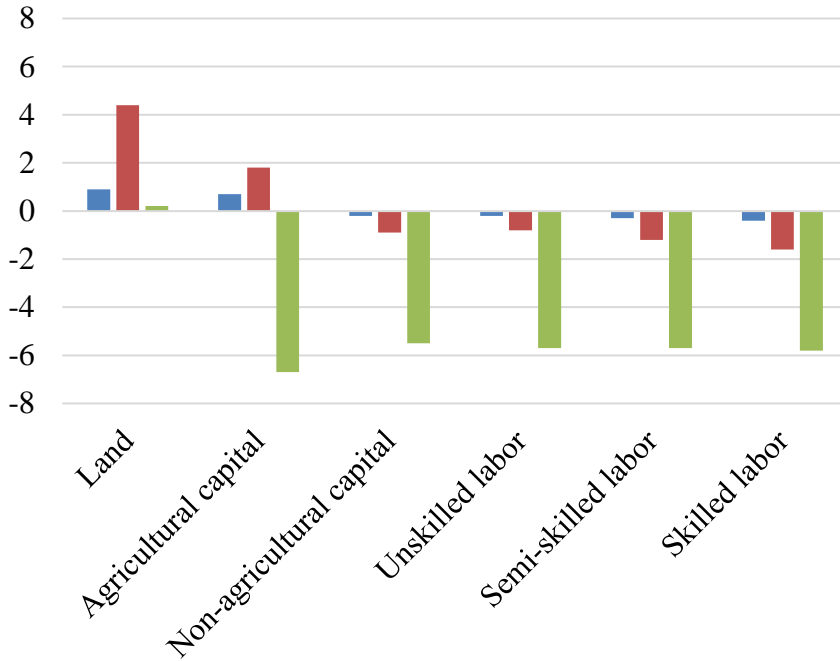
Export growth

Production

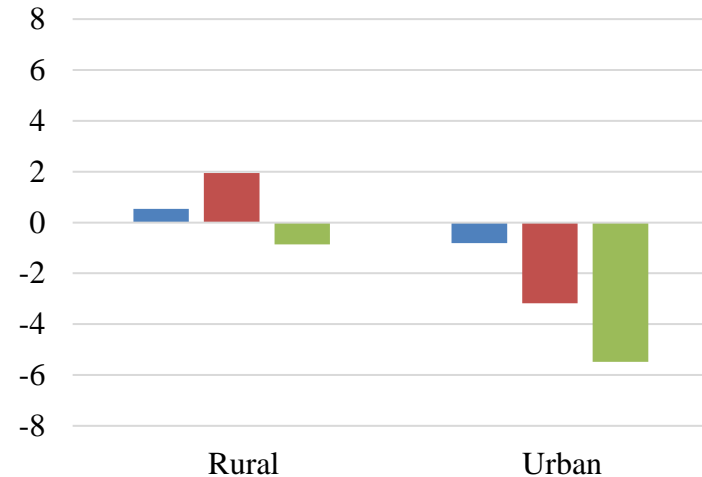# *Factor returns & household income (% change)*

cgemod

Factor returns

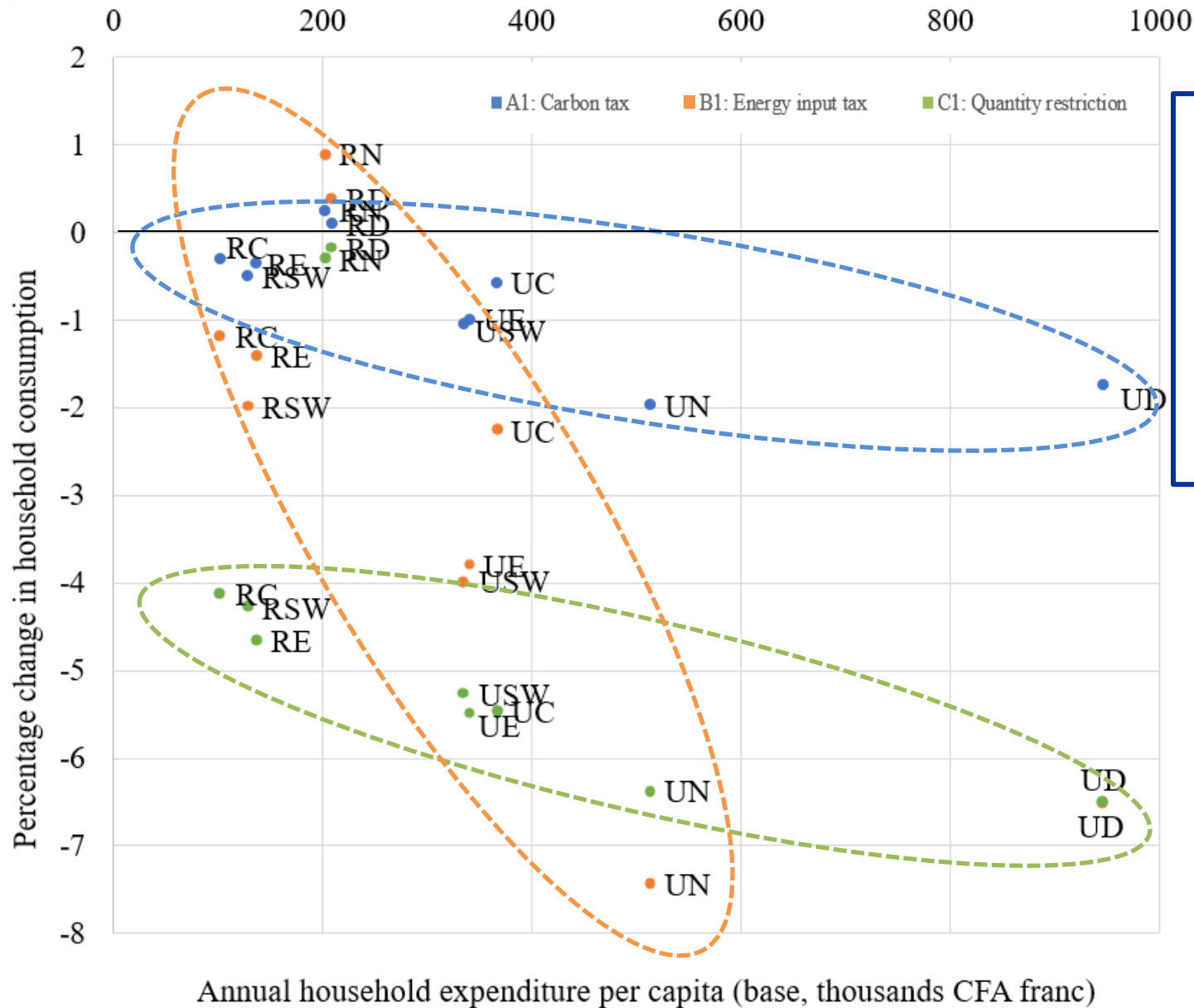**Demand for agricultural factors**

Buffers impact on the rural population

Household expenditure per capita

■ A1: Carbon tax ■ B1: Energy input tax ■ C1: Quantity restriction

14

Identifying vulnerable households

Household impacts depend on the type of response measures implemented by other countries

Key

RD	Rural Dakar
RC	Rural Central
RN	Rural North
RSW	Rural South West
RE	Rural East
UD	Urban Dakar
UC	Urban Central
UN	Urban North
USW	Urban South West
UE	Urban East

Impact on progress towards the SDGs (% change from base)

SDG Indicator	A1: Carbon tax	B1: Energy input tax	C1: Quantity restriction
8 DECENT WORK AND ECONOMIC GROWTH			
8.1.1 Real GDP growth per capita			
8.4.2a Domestic material consumption			
8.4.2b Domestic material consumption per capita			
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE			
9.2.1a Manufacturing value added as a share of GDP			
9.2.1b Manufacturing value added per capita			
9.b.1 Proportion of medium and high-tech industry value added in total value added			
10 REDUCED INEQUALITIES			
10.1.1a Growth rates of household expenditure among the bottom 40 per cent of the population			
10.1.1b Growth rates of household expenditure among the total population			
10.4.1b Labour share of GDP, comprising wages and social protection transfers			

Legend:
- Progress: >5%, 1%-5%, <1%
- Regression: >-1%, -1% to -5%, <-5%

Findings & implications

- Findings
  - Presence: ✓ Sign: ▬ Magnitude: ↑↑
  - Tax on carbon more efficient than a tax on fossil fuels: less variation in real GDP and household consumption

- All countries should care about the outcome of the negotiations for global reductions in CO_2 emissions
  - Different instruments → different world price effects
  - Greater integration with global markets → stronger impacts
  - Average trade openness among LDC group: 53.6%