



Evidence based policy design for climate resilience

Capacity building approach and country experiences from GIZ | Sebastian Homm

Third Global Dialogue on the Impacts of the Implementation of Response Measures

Supported by:



based on a decision of
the German Bundestag



Modelling and capacity development for adaptation and resilience planning



Climate Economy Modelling approach developed by CRED and DIAPOL-CE IKI projects

In the frame of the International Climate Initiative (IKI)



Partners: Modelling capacities supported in Africa and Asia: Georgia, Kazakhstan, Vietnam, Mongolia, Nigeria, Uganda (Ministries of Economy & Planning, Central Banks)

Funder: German Federal Ministry for the Environment, Climate Action, Nature Conservation and Nuclear Safety (BMUKN)

Overall term: 01/2014 - 12/2026

Objective: Approaches for a climate friendly, resilient and nature-compatible economy are transferred to partner countries and disseminated on a supra-regional level



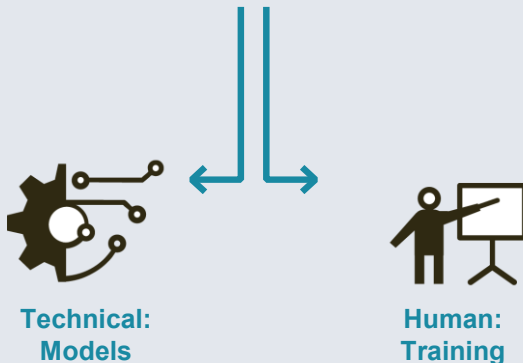


Climate Economy Modelling approach – supporting resilient planning

GIZ Climate Economy Modelling approach

1 Macroeconomic modelling

Capacity development



2 Policy advice

Supporting policy recommendations & adaptation plans



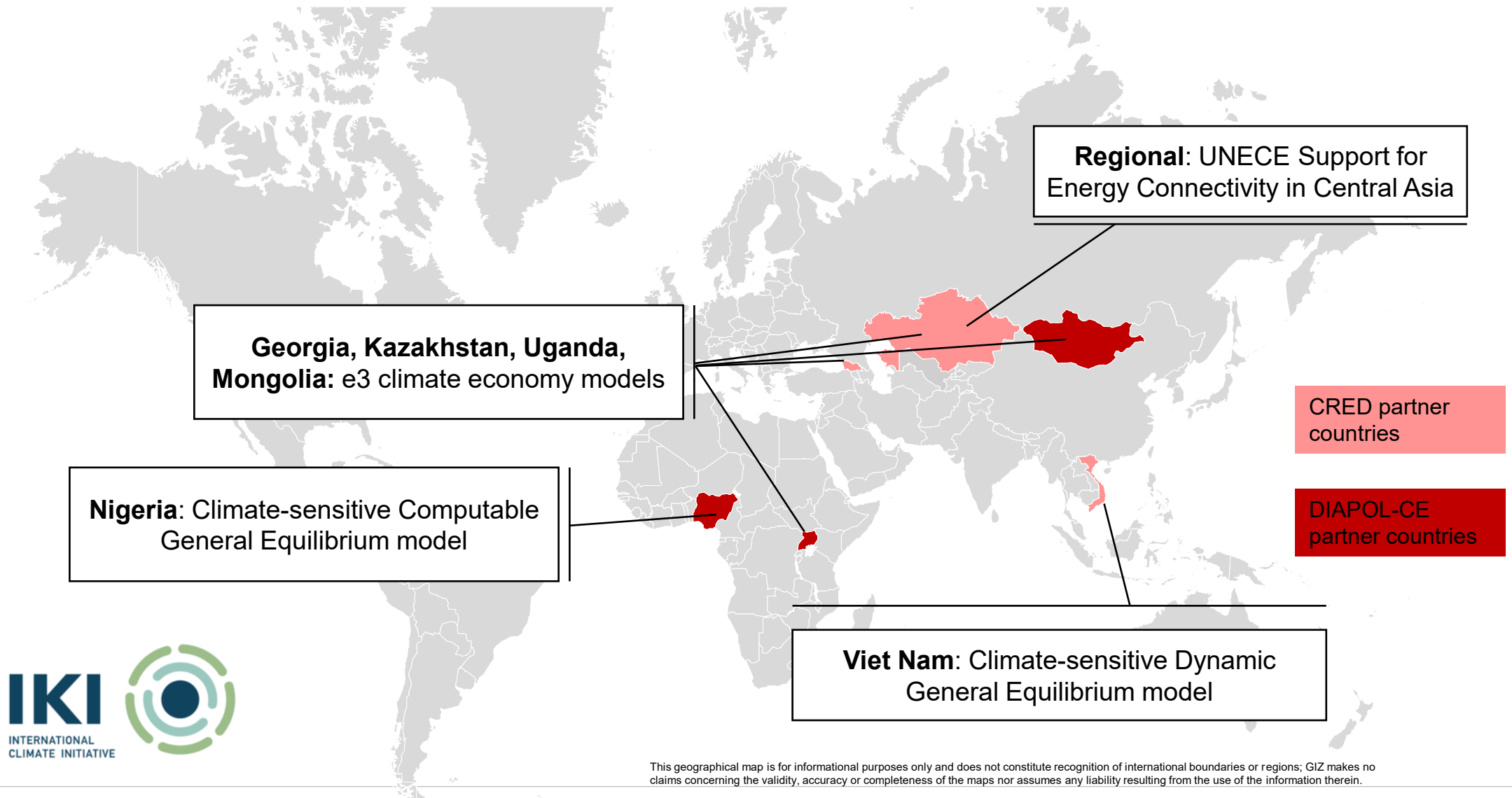
3 Financing options

Identifying financing options for adaptation programmes





Implementation countries of Modelling Climate Resilient Economic Development

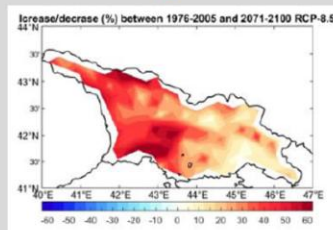
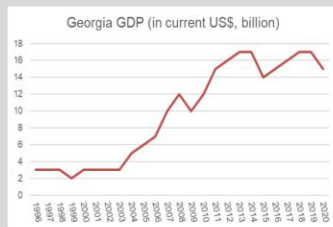




Overview on key steps

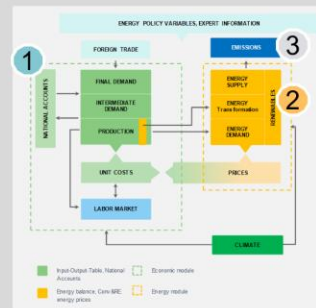
DATA

collect data sets:
economic and climate
hazard data



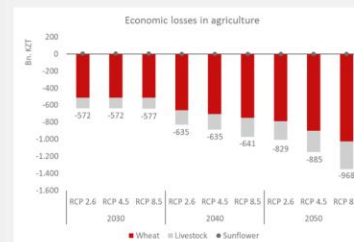
MODEL

macro-economic model:
country specific and
dynamic vulnerability



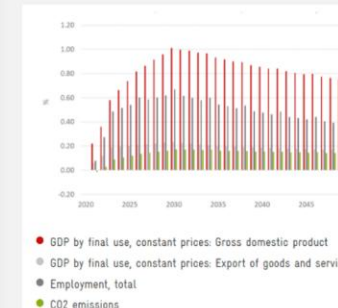
RESULTS

analyse adaptation
scenarios:
economy-wide and
indirect effects



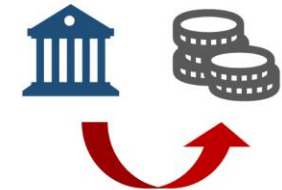
POLICY

policy integration:
incorporate results into
national and sectoral
policies



FINANCING

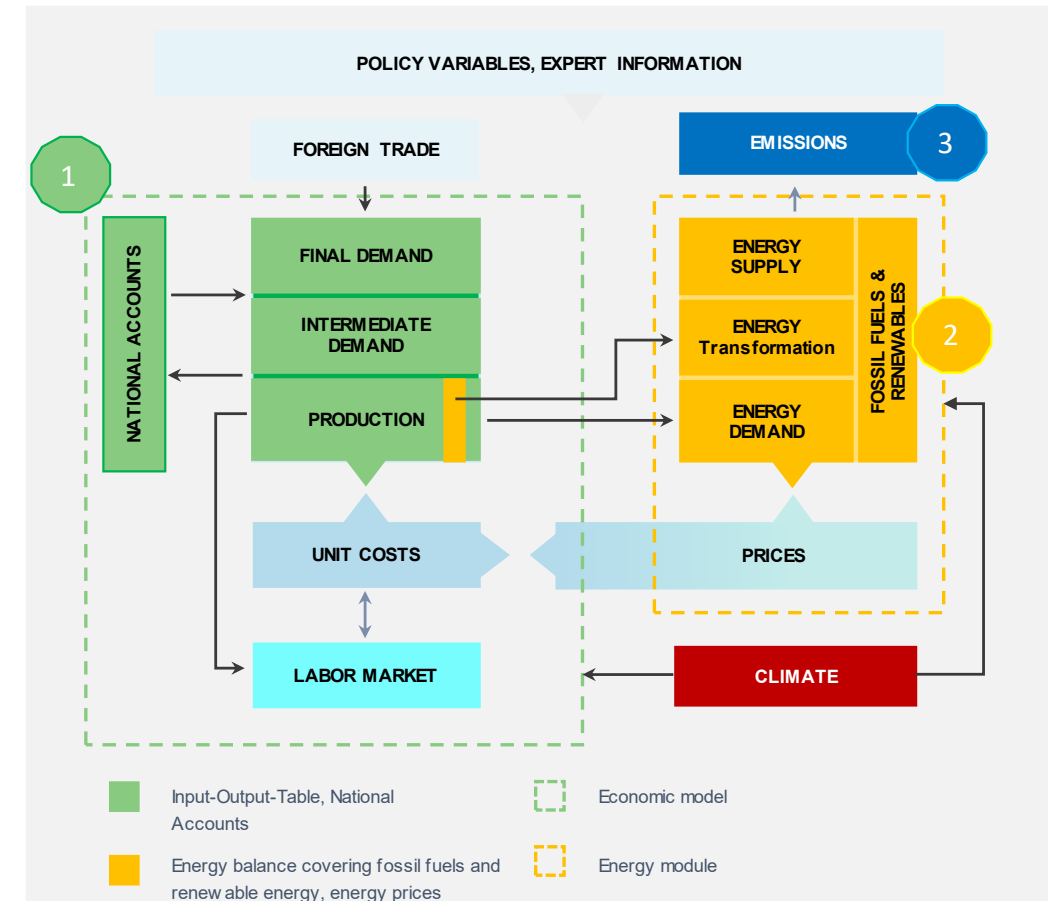
financing adaptation:
facilitate investments and
climate-sensitive budget
allocation





E3 Model | An Environmentally Extended Dynamic Input-Output Model

- **Integrated approach** combines economic data with energy and emission data (“E3 modelling”)
 - **consistent picture of impacts from policy measures**
- Climate impacts are translated into economic effects
- **Quantitative, data-driven analysis** to allow for **evidence-based** policy analyses
 - Official **country-specific** data is used
 - Future developments are derived from the analysis of (historic) data sets
- **Mid- to long-term perspective** (until 2050, yearly resolution)
- Macroeconomic scope (“National level”), extended by subnational indicators



Source: GIZ 2022, based on GWS 2022



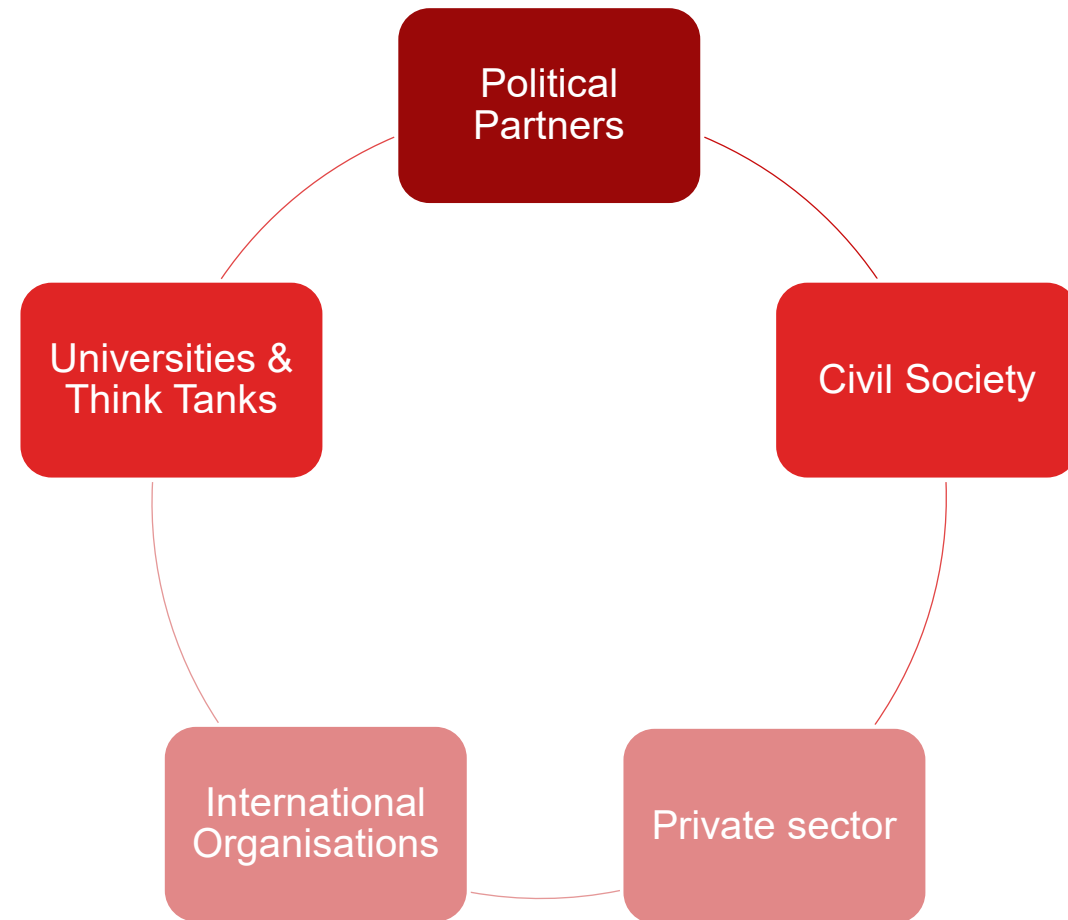
Capacity development within stakeholder networks

Key part of the Climate Economy Modelling approach:

- Ensuring **national ownership**
- Ensuring a **close fit of the model** to the national economic and sector conditions as well as available policies.

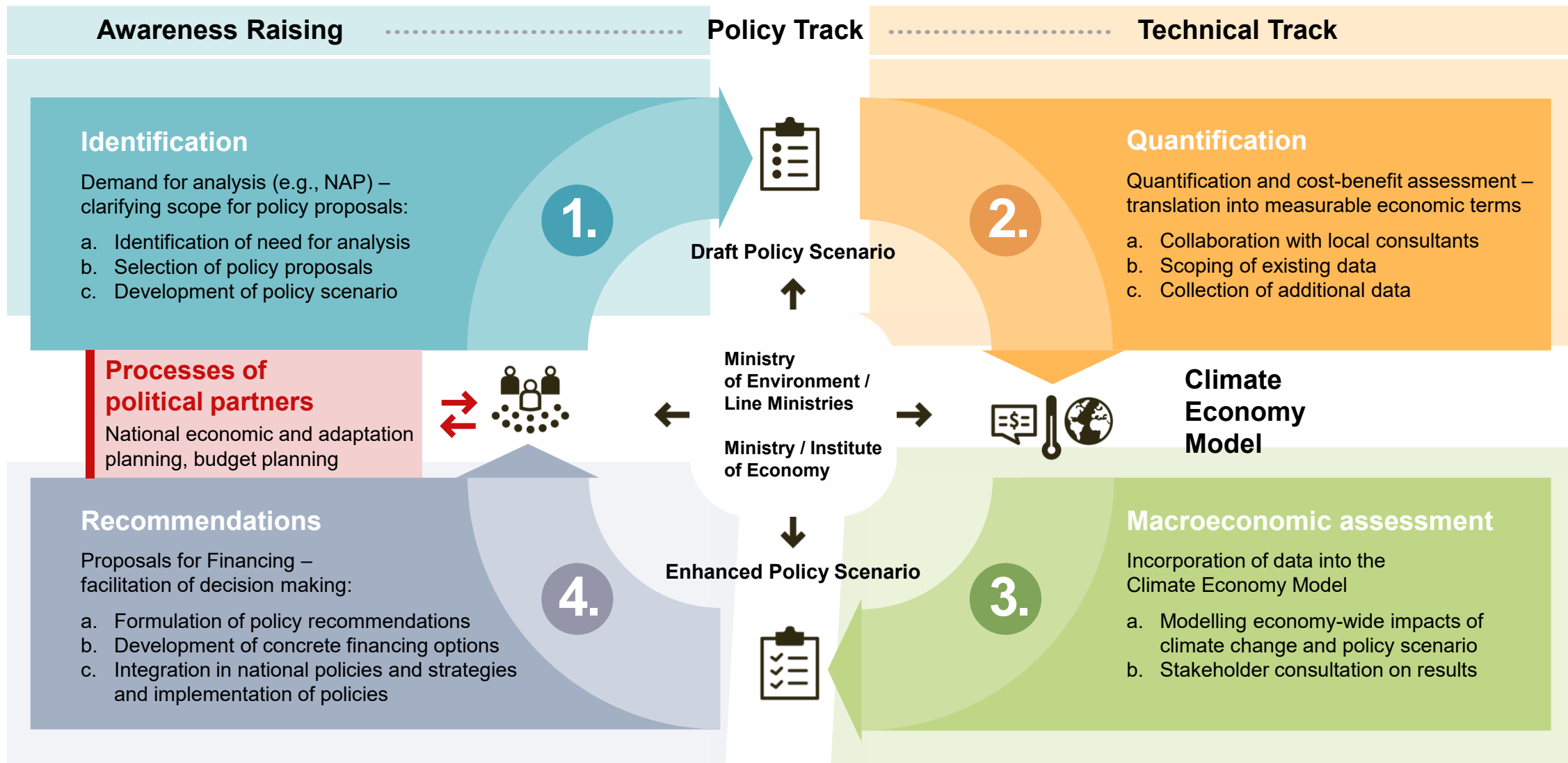
Continuous involvement on:

- Data collection and selection
- Discussion on policy questions
- Definition of scenario assumptions
- Capacity building





Four steps of developing investment-ready sectoral adaptation programmes





Examples from Kazakhstan



Step 1: Identification of case for action & economic assessment

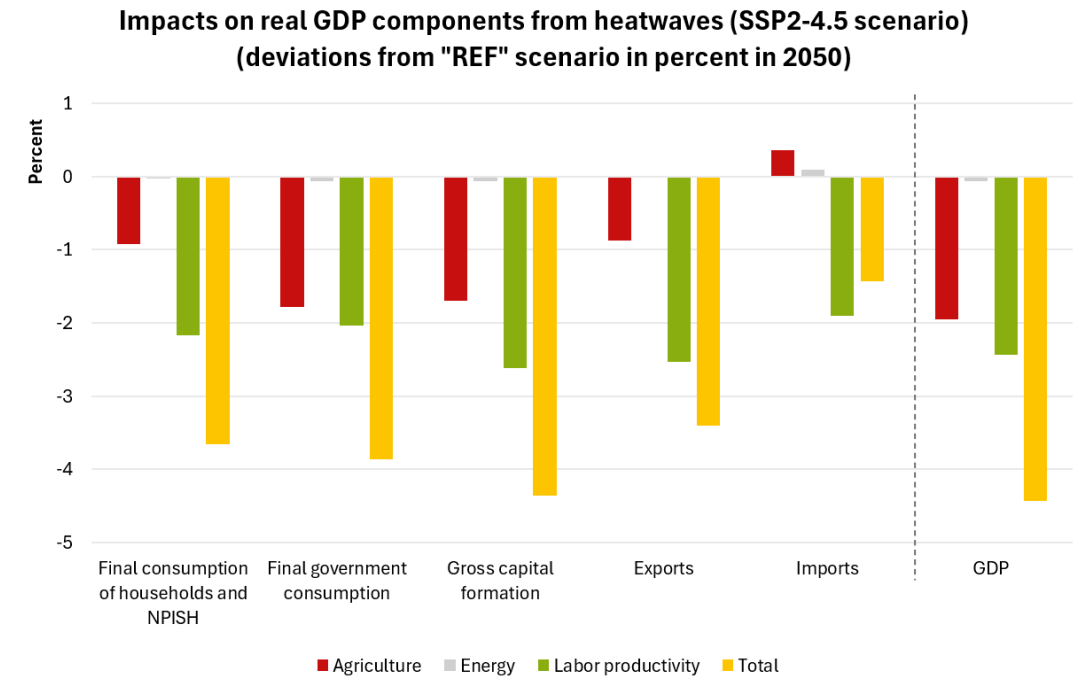
Identification

Demand for analysis (e.g., NAP) – clarifying scope for policy proposals:

1.

- Identification of need for analysis
- Selection of policy proposals
- Development of policy scenario

- **Heat stress creates economy-wide impacts** as long as no preventive adaptation measures are taken → GDP is up to 4% p.a. lower compared to REF/ baseline scenario
- **High GHG emissions** and heat waste due to low insulation of existing building stock
- **“Enhanced Energy Efficiency in Buildings”** identified as one priority policy scenario to be assessed





Step 2: Quantification of policy scenario and stakeholder engagement

2.

Quantification

Quantification and cost-benefit assessment – translation into measurable economic terms

- Collaboration with local consultants
- Scoping of existing data
- Collection of additional data

- **Private sector consultation:** what regulatory reforms and financing support would be needed to create a business case for energy efficiency in buildings?
- **Cost-benefit assessment:** Quantification of CAPEX and OPEX investments needed
- **Qualitative report:** Informing on economic transmission channels, financing and reform needs

RESULTS of the Cost-Benefit Analysis					
Currency		0			
Discount Rate		3%			
Risk		0			
Adaptation measure		0			

Year	Discount Factor	Discounted total costs per year	Discounted total benefits per year	Undiscounted cashflows per year	Accumulated undiscounted benefits
Now (0)	1,00	0,00	0,00	0,00	0,00
1	0,97	0,00	0,00	0,00	0,00
2	0,94	0,00	0,00	0,00	0,00
3	0,92	0,00	0,00	0,00	0,00
4	0,89	0,00	0,00	0,00	0,00
5	0,86	0,00	0,00	0,00	0,00
6	0,84	0,00	0,00	0,00	0,00
7	0,81	0,00	0,00	0,00	0,00
8	0,79	0,00	0,00	0,00	0,00
9	0,77	0,00	0,00	0,00	0,00
10	0,74	0,00	0,00	0,00	0,00
11	0,72	0,00	0,00	0,00	0,00
12	0,70	0,00	0,00	0,00	0,00
13	0,68	0,00	0,00	0,00	0,00
14	0,66	0,00	0,00	0,00	0,00
15	0,64	0,00	0,00	0,00	0,00
16	0,62	0,00	0,00	0,00	0,00

Net Present Value (NPV):	0,00
Cost-Benefit-Ratio (CBR):	#DIV/0!
Internal Rate of Return (IRR):	#ZAHL!
Return on Investment (RoI):	#DIV/0!
Payback Time (in years)	1



Interim Report on the Project "Policy Recommendations for Climate-Resilient Economic Development"

Section: "Comprehensive analysis of efficiency through cost-benefit assessment (CBA) of improving energy efficiency of residential buildings in Kazakhstan"



Step 3: Macroeconomic assessment of policy scenario

3.

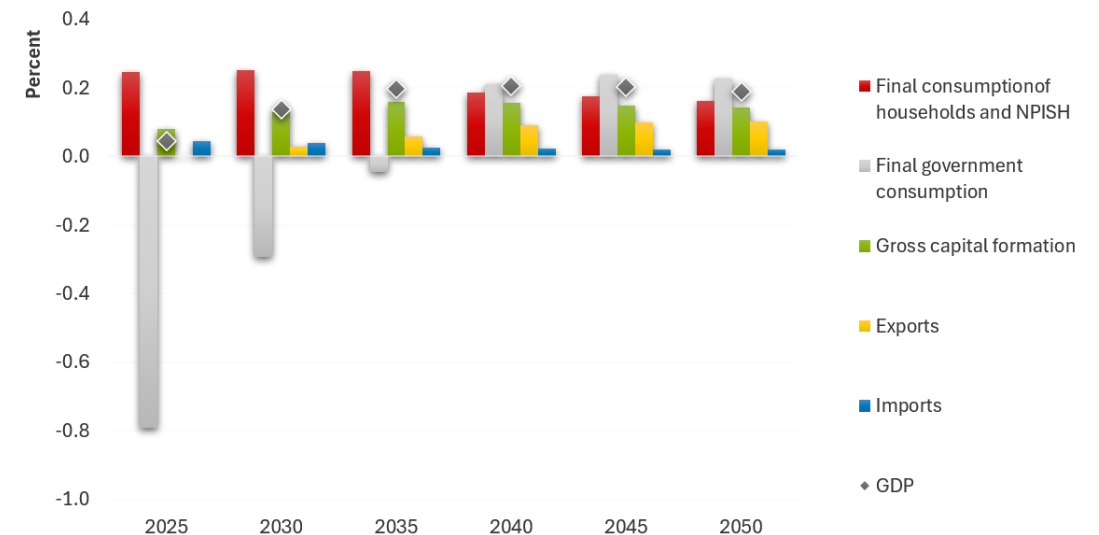
Macroeconomic assessment

Incorporation of data into the Climate Economy Model

- Modelling economy-wide impacts of climate change and policy scenario
- Stakeholder consultation on results

- Based on CBA and qualitative data: **implement macroeconomic assessment**
- Selected results:
 - Investments** and household expenditures increase due to the refurbishment of buildings during the implementation.
 - Export** opportunities may arise for the freed-up energy – mainly coal and gas
 - Imports** are **higher** due to **economic growth** and the import dependency

Real GDP impacts of "SSP2-4.5_EEB" scenario
(deviations from "SSP2-4.5" scenario)





Step 4: Deriving policy recommendations, identifying policy options

Recommendations

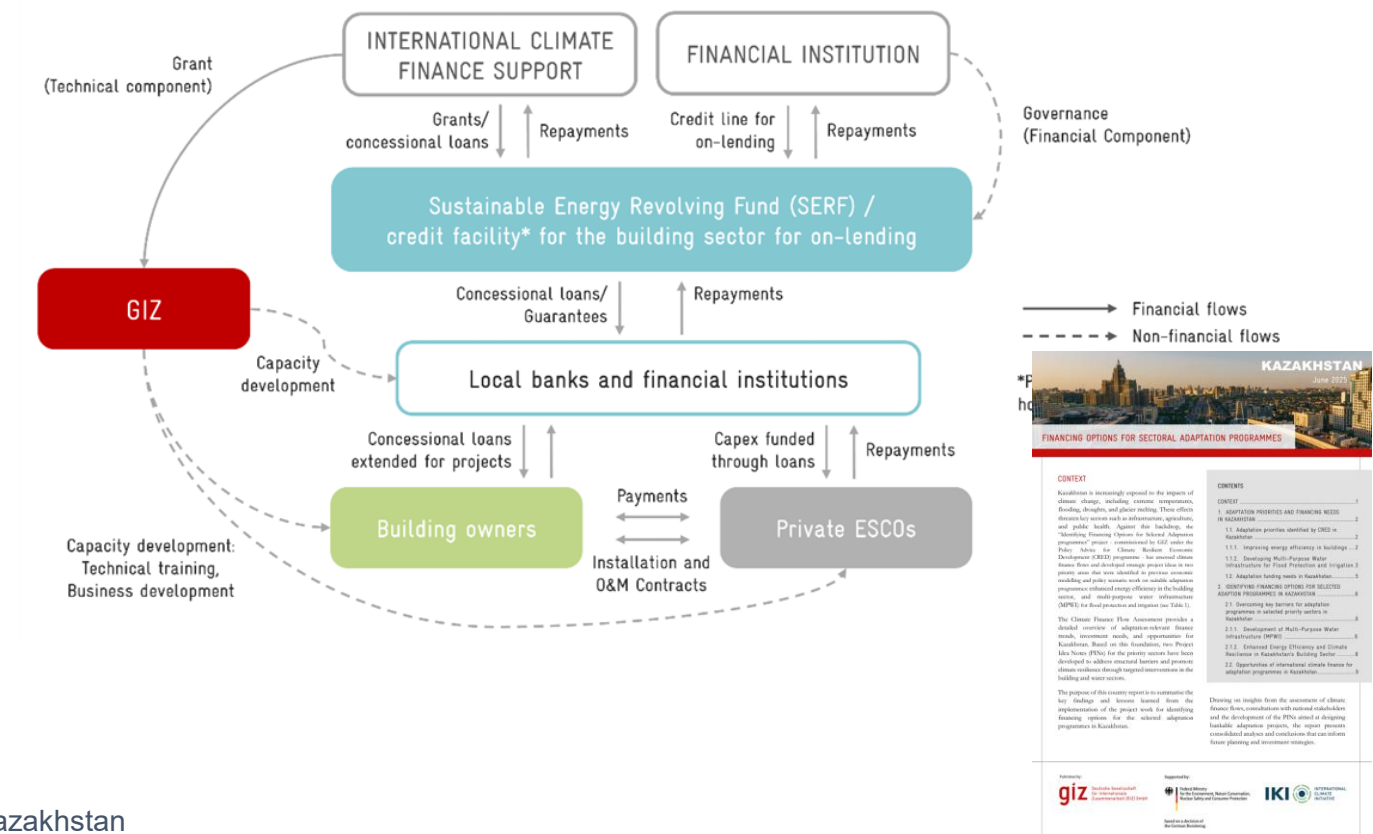
Proposals for Financing –
facilitation of decision making:

- Formulation of policy recommendations
- Development of concrete financing options
- Integration in national policies and strategies and implementation of policies

4.

Jointly develop financing options:
Project ideas notes (PINs) based on
macroeconomic modelling results outline
actionable financing options for selected
adaptation policies

Figure 7: Illustration of proposed financial mechanism for Enhanced Energy Efficiency and Climate Resilience in Kazakhstan's Building Sector



GIZ 2025: Financing Options for Sectoral Adaptation Programmes in Kazakhstan



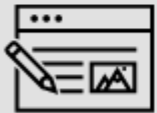
Objective: Build lasting modelling capacities in partner country



6 educational trainings on adaptation project design, measures, and climate financing have been conducted



154 representatives from universities, businesses, and government agencies joined to develop pilot projects on climate change adaptation



16 climate change adaptation projects for Kazakhstan have been developed by educational institutions and NGOs, along with a Stakeholder Map "University – Business – Government"



5 training course sessions on E3.kz model to analyse the economic impacts of climate change and adaptation measures have been conducted for national modellers from governmental institutions in Kazakhstan



45 model builders in Kazakhstan received certificates upon completion of a training on E3.kz model for analysing the economic impacts of climate change and adaptation measures

As of August 2026, see: [Policy Dialogue and Knowledge Management on Climate Protection Strategies | GIZ](#)

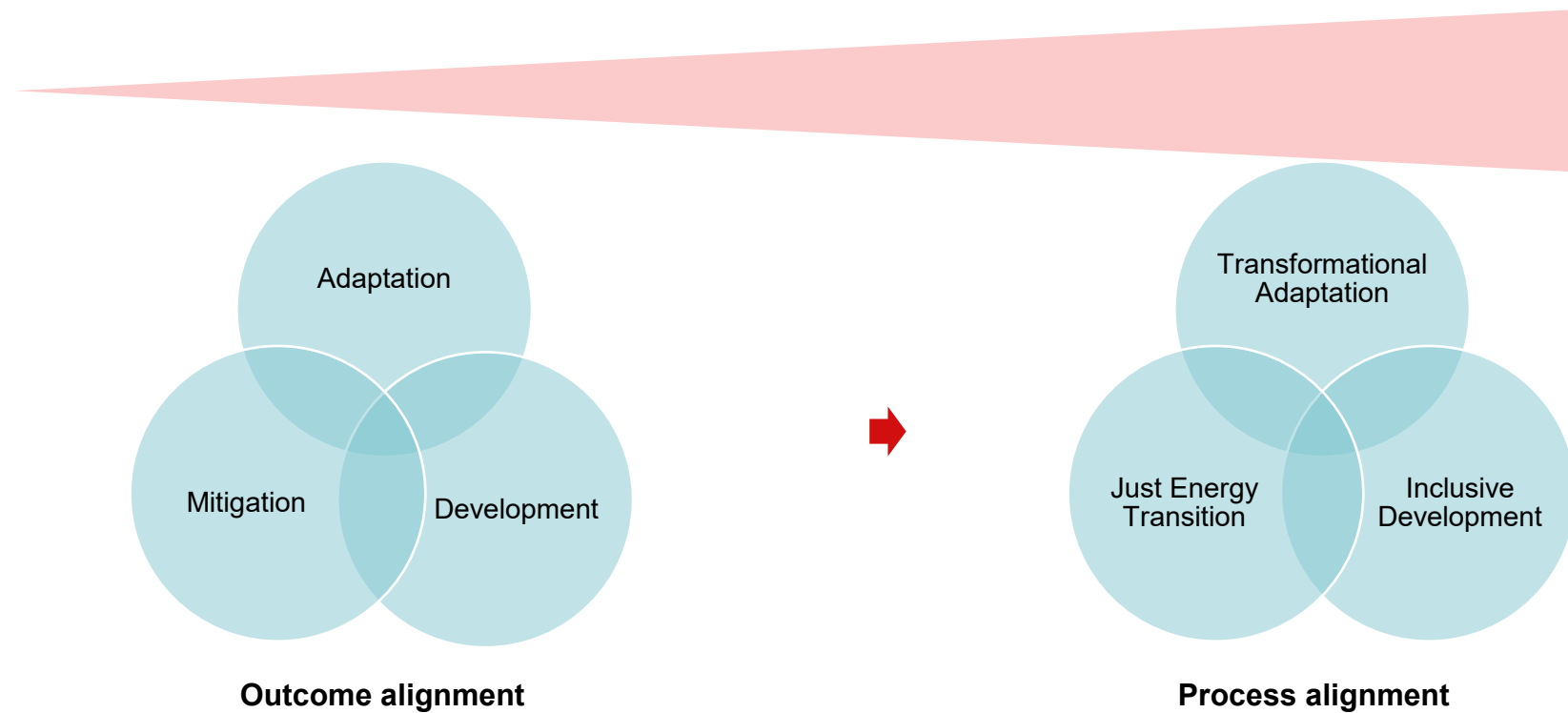


Climate Economy Modelling and Response Measures



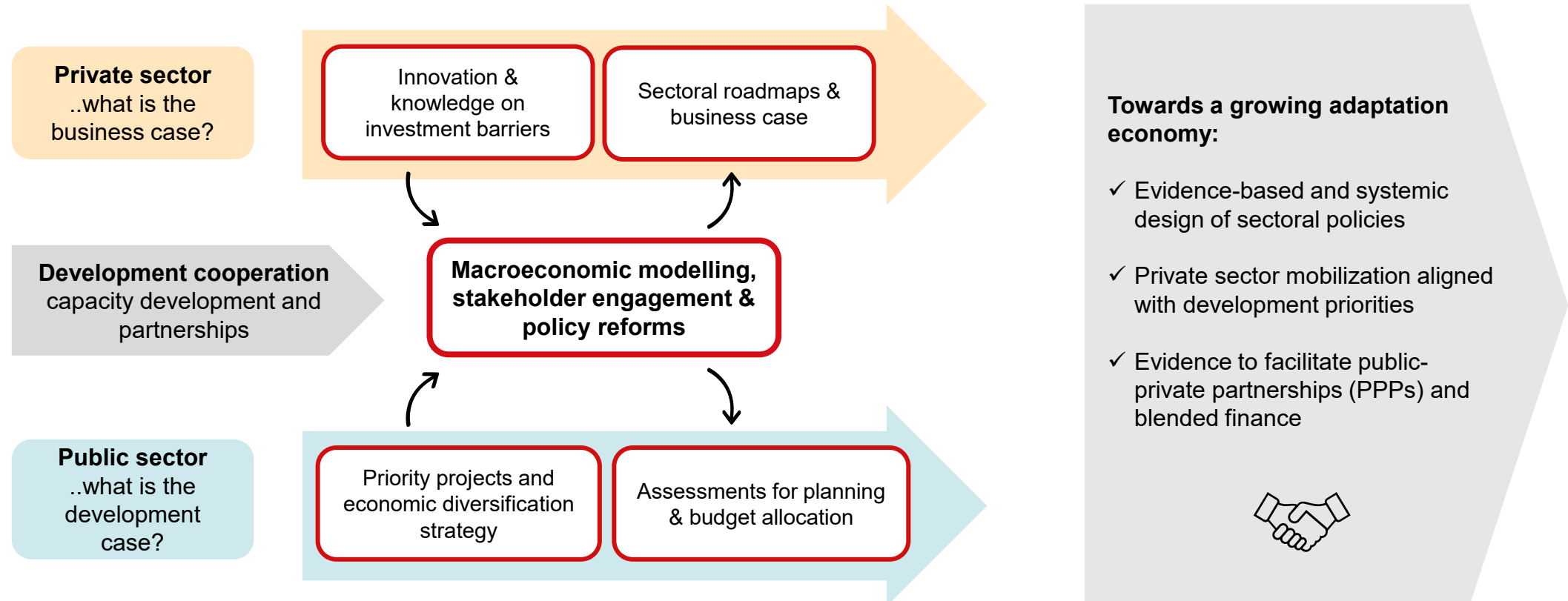
Demand for evidence based diversification efforts linked with resilience-building

From outcome alignment to process alignment – growing need to navigate trade-offs and synergies





Alignment of business case and development case





Summary: Lessons learned from implementing Climate Economy Modelling

- **National ownership:** Models need to be used by partners. Alignment with national context, training and exchange between countries key.
- **Modelling fosters cooperation between ministries:** Modelling supports inter-ministerial cooperation and a shared evidence for NAP and NDC implementation, connect climate ambitions with development and fiscal mandates
- **Modelling results are not stand-alone products,** but part of a process to translate climate objectives into sector specific policy interventions or programmes where public finance is leveraged with intl. climate finance and enables private sector investments
- **Enables pre-feasibility assessments of projects:** Economic scenarios based on cost-benefit assessments, supporting pipeline building for MDBs and IFI, based on country owned data and processes
- **Inform development case for strategic diversification:** Based on long-term economy wide impact assessments of sectoral programmes
- Potential to integrate **national development, mitigation and adaptation** objectives

Contact and further resources

Global Programme Policy Dialogue and Knowledge Management on Climate Protection Strategies (DIAPOL-CE)

Bundesministeriums für Umwelt, Klimaschutz, Naturschutz und nukleare Sicherheit (BMUKN)

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Further country cases, concept papers available at:

Adaptation community overview on „Economics of Climate Adaptation“
[Economics of Climate Adaptation - Adaptation Community](#)

CRED project website:
[Policy Advice for climate-resilient economic development | GIZ](#)

DIAPOL project website:
[Policy Dialogue and Knowledge Management on Climate Protection Strategies | GIZ](#)



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