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**Application and further development of a tool
kit to assess the impacts of implementation of
response measures for Maldives**

UNFCCC – Mitigation Programme

MIRO_CC v.2.1 QUICK START DEMO GUIDE

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Preparing to run MIRO_CC

1. Ensure that the following software are installed: GAMS with MIRO connector licence, GAMS MIRO desktop, GitHub Desktop
2. Clone the GLOBE-SINGLE main repository and make a branch (if you plan to upload changes in the code)
3. Launch MIRO_CC by opening SINGLE.gms in GAMS studio and pressing F8.

A. Overview

There is increasing demand to evaluate the impact of policy responses to the climate crisis. Impact assessments are regularly conducted by international organisations including IPCC, United Nations, World Bank, and European Commission, as well as by national governments. However, the models used to assess these impacts are often complex and using them requires substantial training. MIRO_CC is a user-friendly interface that enables users to run their own (simple) policy scenarios & visualise results using the same models used for in-depth impact assessment.

The models are run in comparative static mode via the interface, meaning that the impact of a change in a policy instrument is shown compared to the base situation.

MIRO_CC is aimed at policy advisors and stakeholders who wish to interact with models to explore the possible impacts of response measures. It should be noted that, while MIRO_CC is based on complex impact assessment models, the use of the interface is not a substitute for in depth policy analysis by policy analysts using the core models. In depth analysis is needed ahead of any policy change being implemented. MIRO_CC offers a 'window' into an impact assessment toolbox rather than replacing the direct use of the toolbox for policy analysis.

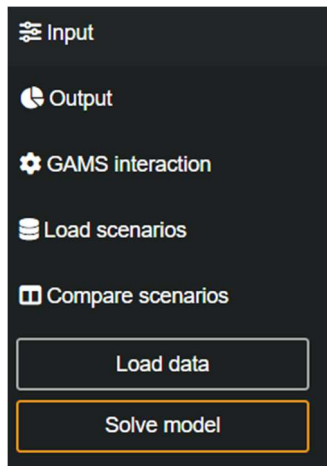
B. Data and models

The national version of MIRO_CC can be used to evaluate both the impact of global response measures and domestic climate policies aimed at meeting a country's Nationally Determined Contributions (NDCs). The national interface is tailored to an economy wide CGE model of the Maldives based on 2019 data (Mainar-Causapé *et al.*, 2023). The representation of the economy includes 48 commodities (of which 37 are produced within Maldives), 38 activities, 12 factors (labour and capital), and 10 household groups. Of the 12 factors included, there are 6 labour types grouped by location (Malé/Atoll) and skill level, and 6 capital types grouped by location (non-resort/resort) and type of capital (other/energy capital by fuel input). Households are disaggregated into 10 representative groups by location and income quintile. The remaining accounts consist of (incorporated business) enterprise accounts, a margin account, the government account and six tax accounts, the capital account (savings and investments) and the rest of the world (RoW) account.

C. Introduce the input part of the interface

C.1.1. Overview

Show the structure of the MIRO_CC interface: *Input*, *GAMS interaction*, *Load scenarios*, and *Compare scenarios* and how it is navigated via the menu bar on the left-hand side of the screen.



C.1.2. Input

The input section has one welcome tab, two policy tabs (world prices and climate policy), one assumption tab and three data related tabs.

Welcome

Show the welcome tab including the glossary of terms.

Data

Show the SAM tab and search for **petroleum** to show the use of petroleum in the data.

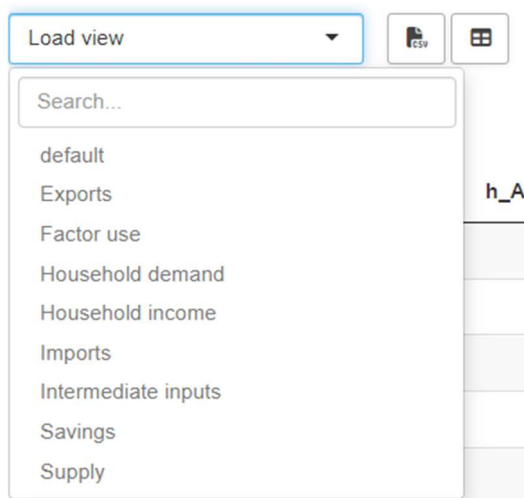
Show the syntax guide in the dropdown box accessed via the arrow circled in red below:

Social Accounting Matrix for Maldives, 2019 (100 million Rufiyaa)



c_	Commodity accounts	FACTTAX	Factor taxes
m_	Margin accounts	DIRTAX	Direct income taxes
a_	Activity accounts	GOVT	Government
h_	Household accounts	ENT	Enterprises
f_	Factor tax accounts	KAP	Savings/Investment
VATTAX	Value added taxes	DSTOC	Stock Changes
IMPTAX	Import duties	ROW	Rest of World
EXPTAX	Export taxes		
ECTAX	Excise duty		
SALTAX	Sales taxes		
INDTAX	Production taxes		

Choose one of the views to show how the load view options can be used to view sub-matrices of the SAM:



Mention the expenditure and income share tabs as other useful information about the structure of the economy.

Assumptions

Show the assumptions tab and the option for the user to decide how government will make up any shortfall in revenue.

Policy

Show the climate policy tab and the policy options included.

Show the world prices tab and explain how the sliders can be used to simulate changes in world prices arising from international response measures.

D. Run a scenario

Scenarios to examine the impact of changes in world prices arising from climate response measures are implemented in the national interface via the *World prices* tab.

Show how the user can vary the world prices of different import and export commodity groups, and the exchange rate, by moving the sliders.

An option to reset all sliders to the default position is included to the right of the screen.

Implement a 20% decrease in the import price of fuel by moving the slider to 0.8.

Press *Solve model* and note how the interface first displays the progress in solving the model in the GAMS interaction section, before switching to the dashboard in the output section.

Show how to save the scenario by selecting *Scenario>Save as* via the drop-down menu on the top right-hand side.

Assumptions

Demonstrate how the user can change how the government accounts for any shortfall in revenue.

E. Compare scenario results

The *Compare scenarios* section is similar to the *Output* section but with comparisons across multiple scenarios.

Load two scenarios by selecting *Compare scenarios* and then *Load*. Choose which scenarios you want to include, click *Choose selected scenarios* and then *Dashboard compare*:

Select action

What would you like to do with the selected scenarios?

Select columns for naming scenarios

Download data (GDX) | **Dashboard compare** ▼

Cancel | Delete scenarios

The indicators in the *Compare scenarios* section follow those in the *Output* section.

Populate the tiles on the right-hand side using the drop-down menu:

Summary indicators (percentage change for selected scenario)

Select scenario ▼

Illustrate the Compare scenarios section by exploring a few sets of results and the SDG indicators.

Highlight how MIRO_CC allows for 'what-if' type analysis. Additional scenarios can easily be run to evaluate other scenarios under alternative assumptions such as different magnitudes of policy/world price changes, other domestic policy options, and/or different government financing options and carbon revenue transfers. Multiple scenarios can also be run to decompose the observed impacts e.g., an initial scenario in which all import prices rise by 10% could be decomposed into a 10% rise in the import price of each commodity group separately, thus identifying the main drivers of the impacts.

F. Summary

MIRO_CC is a suite of global and national user-friendly interfaces that enables users to explore impacts of climate policies using toolkit models without extensive training. The interface provides a window into a global and national CGE modelling Toolbox (UNFCCC *et al.*, 2023). It includes multiple policy instruments and produces a comprehensive set of modelling results. MIRO_CC is intended for use by policy advisors and stakeholders alongside in-depth assessment by policy analysts using the modelling Toolbox directly.