This project has received funding from the European Union's Horizon EUROPE research and innovation program under grant agreement No. 101086512.

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Call: HORIZON-CL6-2022-GOVERNANCE-01
Project 101086512

INN WATER

Promoting social innovation to renew multi-level and cross sector water governance

Methodological factsheet CGE model

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26/09/2025

Definition: CGE Model

A Computable General Equilibrium (CGE) model is a quantitative economic model that represents the entire economy in terms of economic agents, sectors, production factors, and markets. It simulates the interactions among producers, consumers, governments, and trade, under the assumption that supply and demand are balanced. A WEEFE nexus CGE model considers the four WEFE nexus pillars: W(ater), E(nergy), F(ood) and E(cosystems)

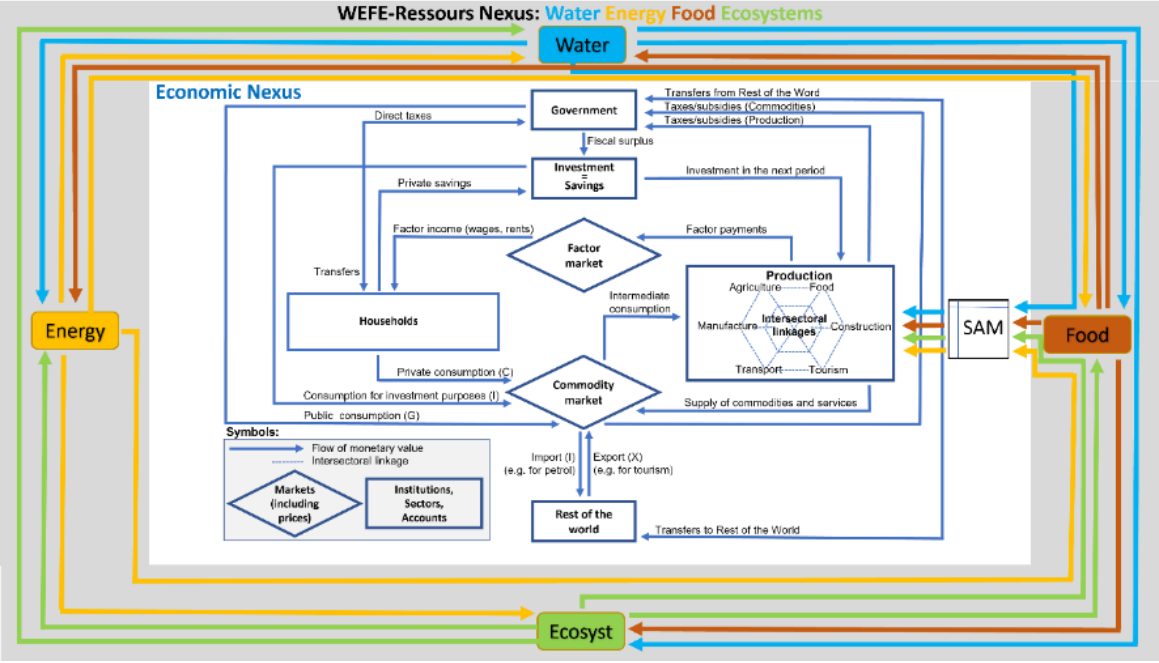

Figure 1: Schematic overview of a WEFE nexus CGE model. Source: Adapted from Henseler et al. (2022)

Key Features of a CGE Model

- Microeconomic foundation: households maximise utility, producers maximise profits.
- Calibrated to macroeconomic data through a Social Accounting Matrix (SAM).
- Represents the economy in a base year

Definition: Social Accounting Matrix (SAM)

A SAM represents the structure of the economy in a base year using monetary values for activities, commodities, factors, and agents. Columns represent payments, while rows represent receipts. It is the calibration basis of CGE models.

Spatial resolution

CGE models can represent national, regional, or multi-country economies. The SAM determines the spatial scale.

Temporal resolution

- Static simulations: show changes between two states without considering time path.
- Dynamic simulations: explicitly model changes over time.

Limits of CGE Models

- Aggregate representation of sectors and households.
- Most behavioural parameters are calibrated, not empirically observed.
- Simplified economic behaviour, may not fully reflect reality.

Forecasting vs CGE Models

Forecasting tools predict future trends (e.g., 'in 2050 output will grow by 4%'). CGE models (as Policy simulation tool), instead, evaluate potential impacts of changes in the economy (e.g., 'if subsidies decrease, output decreases by 4%').

Interpreting CGE Model Results

Results should be interpreted in relation to all variables, focusing on direction and magnitude of changes rather than exact numbers.

Challenges in Building WEFE Nexus CGE Models

Integrating water, energy, food, and ecosystems requires detailed data. Main challenge: ensuring economic data availability for SAM construction.

Funded by the European Union
UK Research and Innovation

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Further Reading & Resources

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