Macroeconomic Modelling of Natural Capital Assets (NCA) and Carbon Emissions

Objective of the course

This course builds on the Introductory Course on the Integration of Natural Capital Assets (NCA), Biodiversity, and Nature into National Accounts, advancing participants from environmental accounting concepts to economy-wide macroeconomic modelling frameworks. While the introductory training focuses on compiling SEEA-aligned satellite accounts, this course equips participants with practical skills to embed NCA, carbon eissions and employment accounts into Social Accounting Matrices (SAM) and Input–Output (I–O) Tables for policy-oriented multiplier modelling. Using an integrated SAM–NCA/Emission framework, participants will analyse how investments in natural capital (e.g., land, water, forests, ecosystem services) affect output, employment, household welfare, and commodity prices. Emphasis is placed on conducting policy simulations, interpreting economic multipliers, and performing model consistency checks to ensure alignment with macroeconomic accounting identities; supporting macro-fiscal policy analysis relevant to climate-sensitive planning frameworks. By the end of the course, participants will be able to construct and apply SAM–NCA/Emission multiplier models for analysing the macroeconomic impacts of investments in natural capital, biodiversity, and ecosystem services on growth, employment, and price dynamics. The course is delivered in five modules as follows.

- **Module 1: Macroeconomic Accounting Frameworks for NCA Integration**
  - Review of SEEA-based NCA, biodiversity, and ecosystem accounts
  - Linking environmental satellite accounts to the System of National Accounts (SNA)
  - Structure of Social Accounting Matrices (SAM)
  - Relationship between SAM and Input–Output (I–O) tables
  - Representation of natural resource sectors and ecosystem services
  - Treatment of environmental flows and stocks in macroeconomic frameworks
- **Module 2: Construction of SAM-Consistent NCA and emission Satellite Accounts**
  - Building NCA and emission satellite accounts mapped to the SAM structure
  - Mapping land, water, forestry, and energy accounts
  - Linking environmental accounts to production sectors
  - Mapping employment and energy use to I–O tables and SAM
  - Integrating environmental extensions into factor and institutional accounts
  - Balancing procedures for extended SAM–NCA frameworks
- **Module 3: Multiplier Modelling with NCA, Energy, and Employment**
  - Theoretical foundations of SAM multiplier models
  - Quantity multiplier modelling in SAM–NCA/emission systems
  - Environmental and employment multiplier effects
  - Investment shocks in natural capital sectors
  - Forward and backward linkages of NCA sectors and carbon emissions
  - Income and employment transmission channel
- **Module 4: Policy Simulations and Price Multiplier Analysis**
  - Simulation of public investments in natural capital

- Environmental fiscal policy scenarios (e.g., conservation spending)
- Price multiplier models in SAM–NCA/emission frameworks
- Modelling supply-side shocks in ecosystem-dependent sectors
- Interpreting output, employment, and welfare impacts
- Commodity price transmission under NCA investments

- **Module 5: Model Validation, Consistency Checks, and Policy Interpretation**

  - Accounting consistency in SAM–NCA/emission multiplier models
  - Macro closure rules and institutional balances
  - Sensitivity analysis of multiplier results
  - Validation of environmental-economic linkages
  - Interpreting policy simulation results
  - Application to climate-sensitive macro-fiscal policy design

Mode of delivery

The course is delivered through an intensive, hands-on approach in which participants systematically integrate NCA and carbon emissions into economy-wide models over the duration of the training. The programme is highly sequential, requiring full attendance at all sessions, as each step builds directly on the previous one. Participants work in teams to enhance peer learning and methodological coherence, while each participant is required to have an individual laptop and mouse for practical implementation. By the end of the course, each team presents policy simulation results generated from their model. For the online delivery option, participants are required to submit all assignments within the stipulated timelines to ensure completion within the scheduled period, as extensions may incur additional facilitation costs. To apply for this course, fill in the form below or send an email to apply@macrosolve.net or macrosolveinfo@gmail.com.