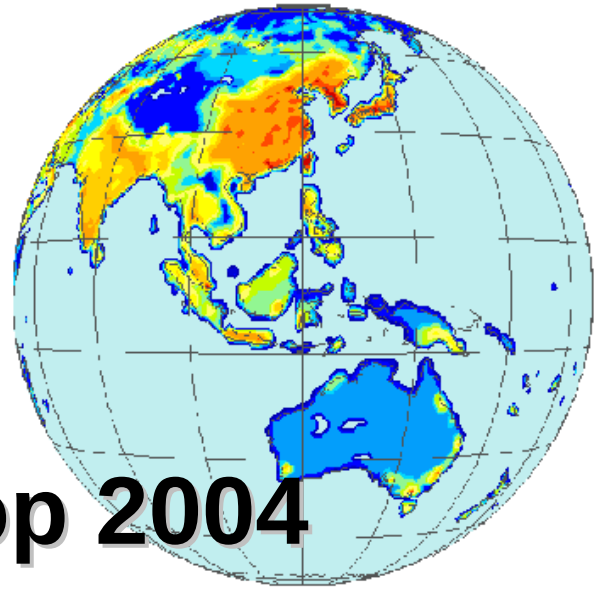

APEIS Training Workshop 2004

Preparation for CGE modeling

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&

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What's CGE?

- "Computable": quantitative
- "General": treatment of all commodities, sectors and production factors in the treated society
- "Equilibrium": demand and supply of each commodity and factor are balanced through the price mechanism

Features of CGE

- Multiple interacting agents.
- Individual behavior based on optimization.
- Most agent interactions are mediated by market and prices.
- Typically disaggregate, with many agents and markets.
- Limited data in comparison with the number of behavioral and technological parameters in the model.
- Equilibrium allocations which typically cannot be characterized as the solution to a single (planner's) optimization problem.
- Formulation has as implicit or explicit focus on policy analysis.

Steps in building CGE

- General design of the whole model.
- Individual choice design.
- Demand and supply functions.
- Develop a system of notation.
- Specify parameters.
- Program the model.
- Replicate the benchmark.
- Test the model.

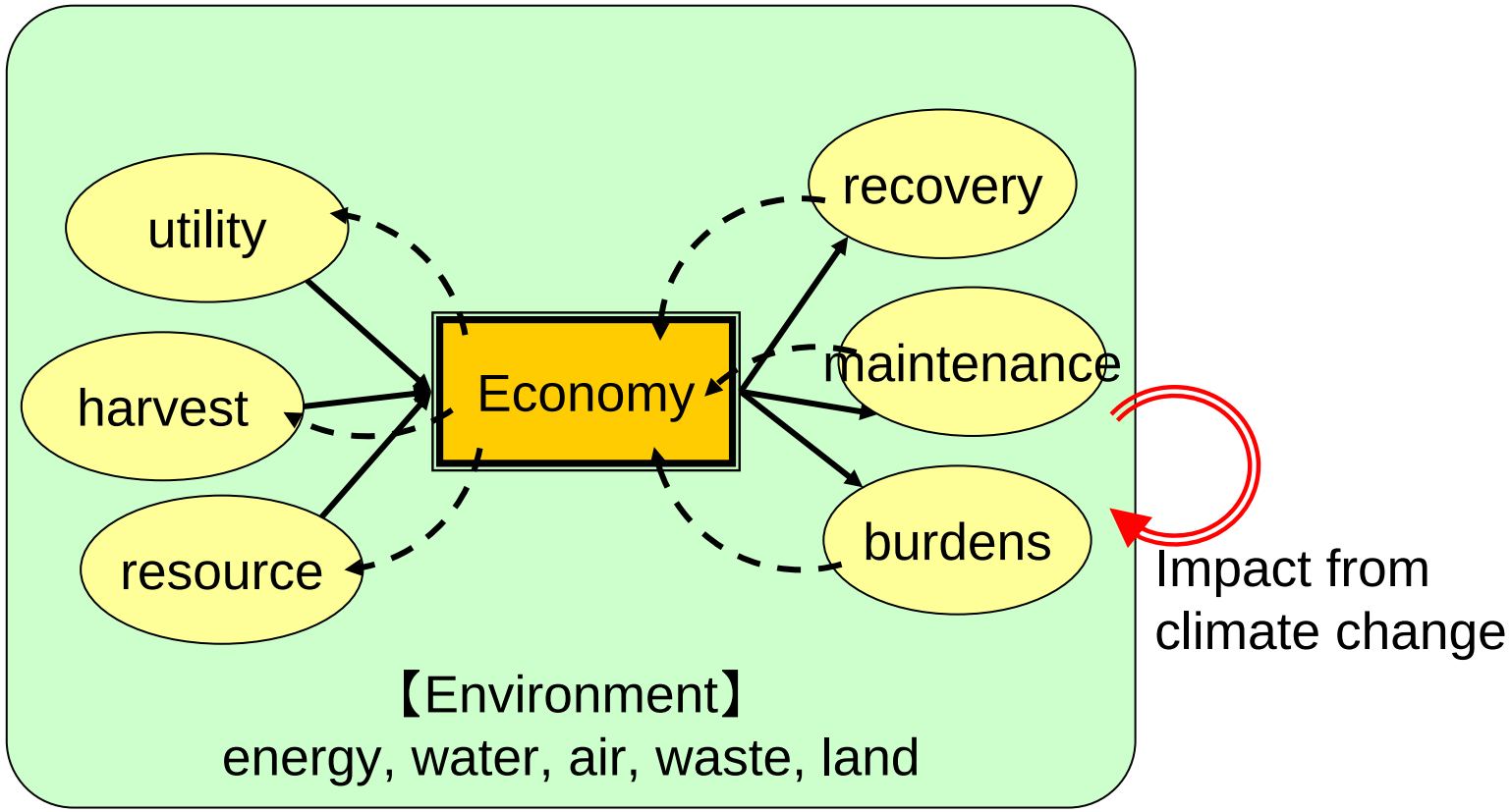
How to apply CGE

- Translate policy into the model instruments.
- Guess at the policy results.
- Run the simulation and compare results.
- Compare the model results with your earlier guess.
- Evaluate the outcome and write up your key findings.
- Develop sensitivity analyses.
- Write up the model.

Expansion of CGE to environment

- Not only economic activity but also environment will be taken into account.
- What's the relationship between environment and economy?
  - Supply of services and goods
  - Assimilation of pollutants
  - Degradation of environmental quality
  - Maintenance of environment

Modeling of economy and environment in CGE



In order to develop CGE model

- Preparation of dataset
  - U matrix and V matrix
  - Fixed capital formation matrix
  - Rate of fuel combustion by sector
  - Carbon emissions
- These data should be consistent
- If you do not have U matrix (usually IO table is well known), you will make U matrix by yourself. ➜pp.5−12

Input-Output table

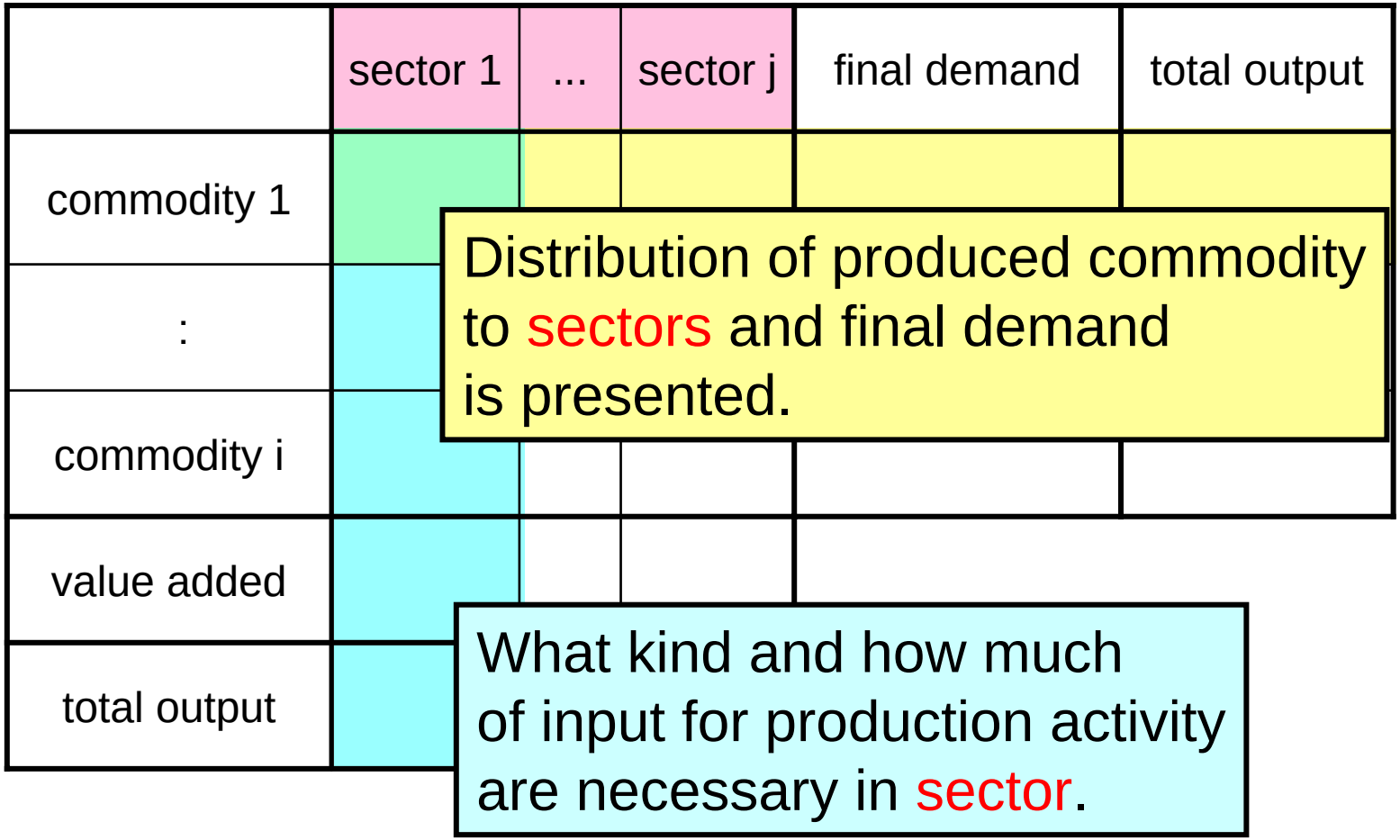
household consumption, government consumption, investment, export & import

	commodity 1	...	commodity i	final demand	total output
commodity 1					
:					
commodity i					
value added					
total output					

Distribution of produced commodity to production of commodity and final demand is presented.

In order to produce commodity, what kind of inputs and how much of them are necessary.

U matrix (Use matrix)



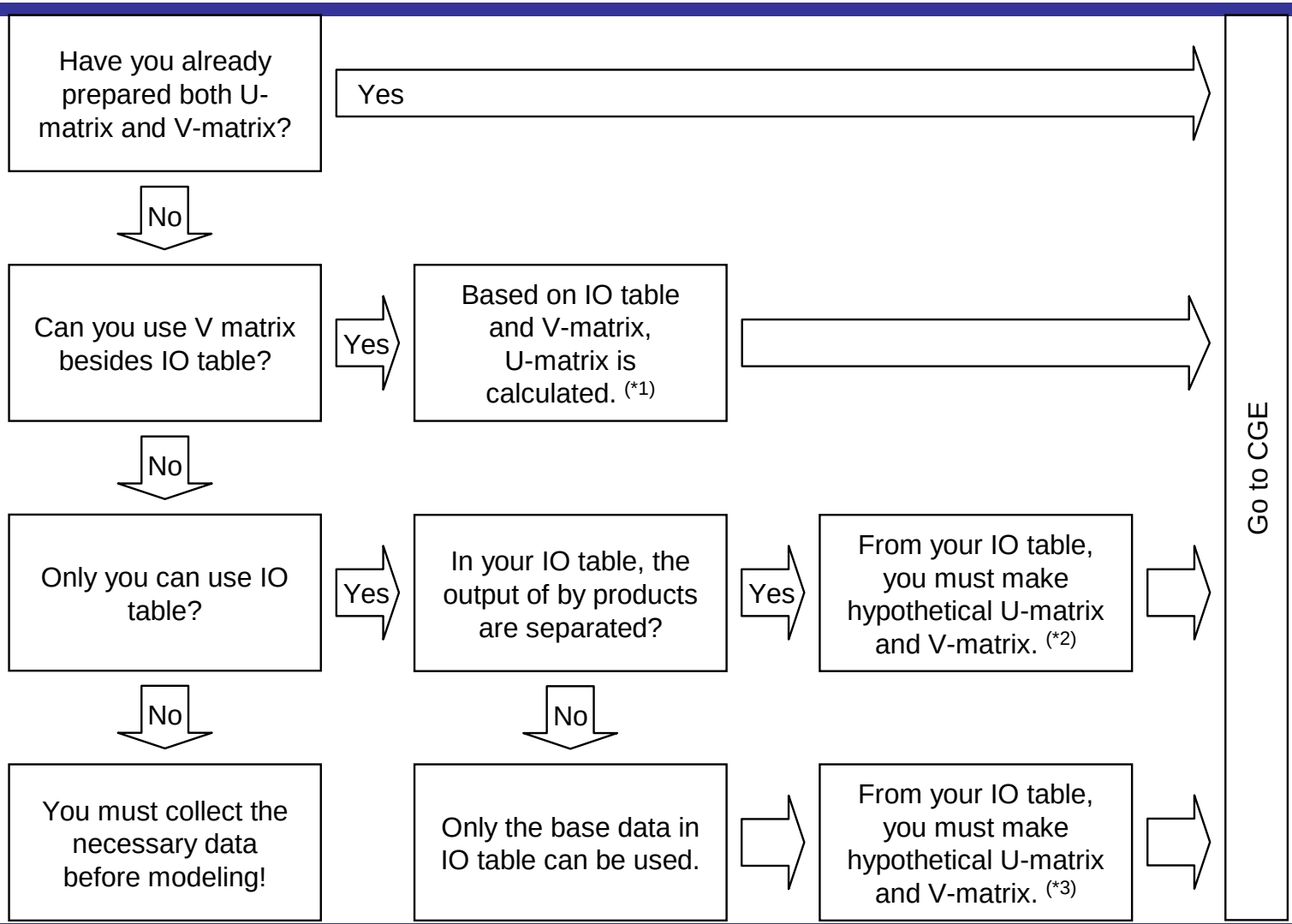
V matrix (Make matrix)

	commodity 1	...	commodity i	total output
sector 1				
:				
sector j				
total output				

How much of commodity i produced by sector j is represented.

Investment by sector

	sector 1	...	sector j	fixed capital formation in U matrix
investment goods 1				
:				
investment goods i				
total investment				

How much of investment goods i invested to sector j is represented.

Flowchart for U matrix