

GTAP-AEZ (Land Use Model)

By Iman Haqiqi

Based on a presentation by Nelson Villoria

21st GTAP Short Course

istanbul, August 2013

WHAT IS GTAP AEZ?

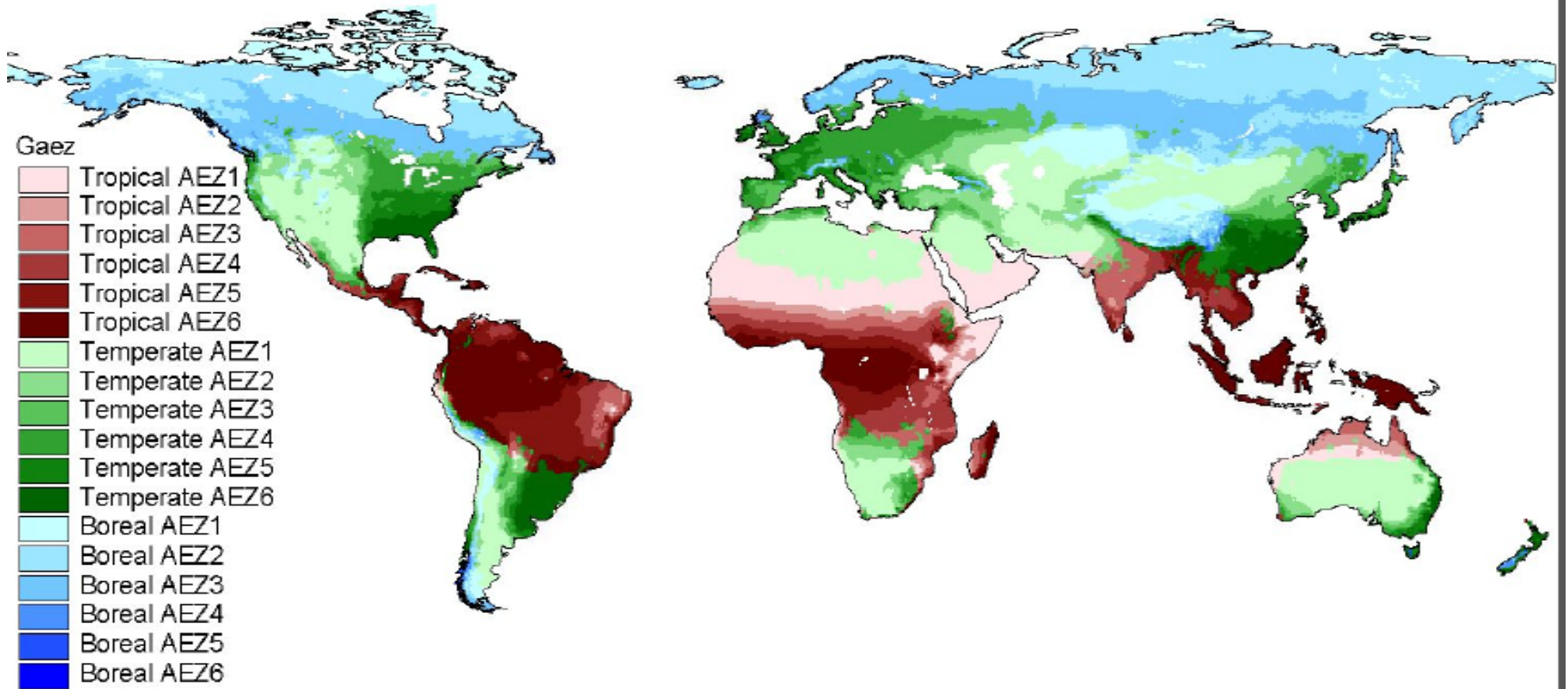
An CGE economic framework:

- Multi region, multi sector, multi land
- For Detailed economic modeling of land use
- To account for the opportunity costs of alternative land uses/land based mitigation strategies
- To account for heterogeneous lands

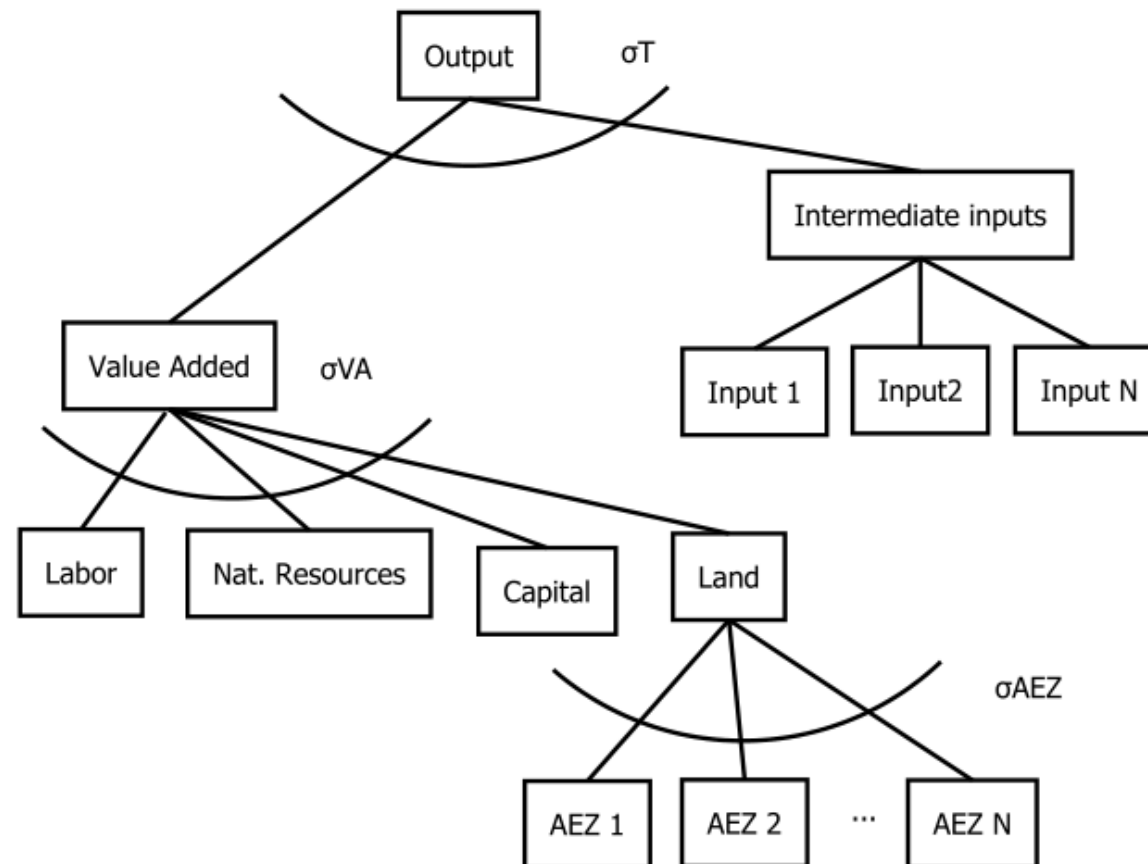
The GTAP-AEZ Model: Heterogeneous Lands

- 18 Agro-Ecological Zones
 - 6 growing period (6 categories x 60 day intervals)
 - 3 climatic zones (tropical, temperate and boreal)
- The competition for land within a given AEZ across uses is constrained to include activities that have been observed to take place in that AEZ
- Within AEZ, land supply is constrained via a nested CET frontier
- AEZs are inputs into a single national production function for each commodity

Agroecological Zones



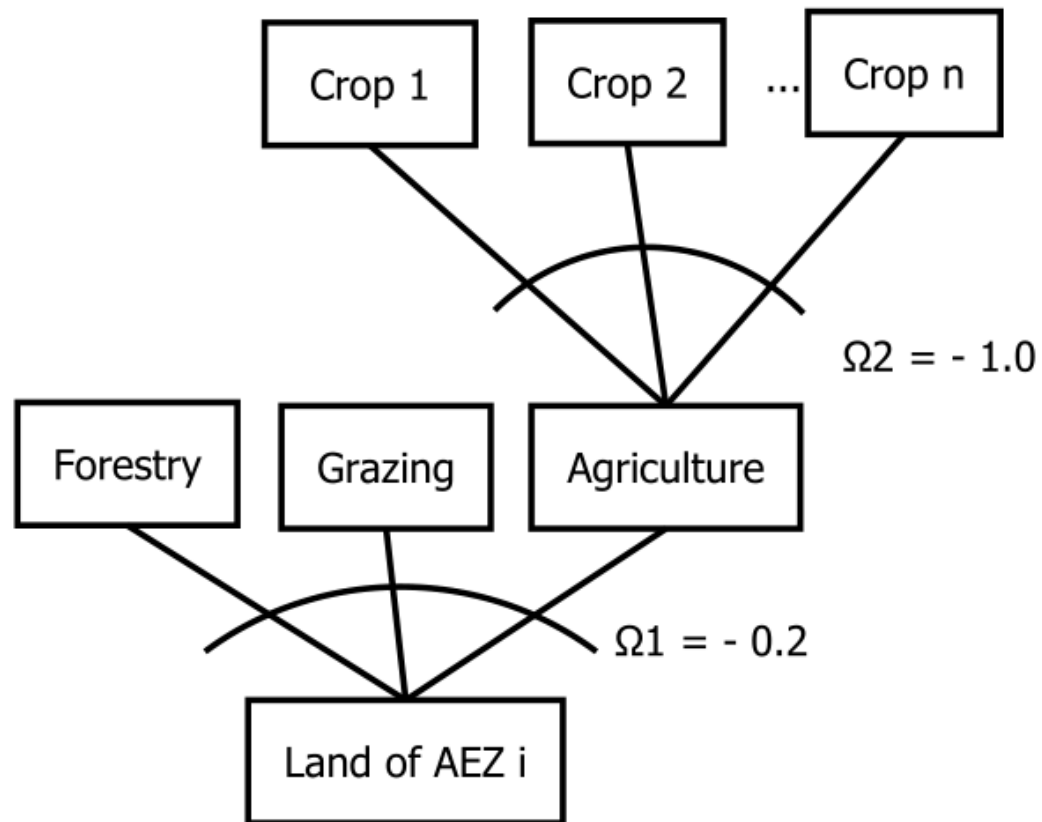
Land Demand in the GTAP-AEZ Model



Land supply: rent maximization

- Land does not move freely between alternative uses.
- Such movement is constrained by a Constant Elasticity of Transformation (CET) frontier
- A nested CET structure of land supply is implemented
- The rent-maximizing land owner first decides on the allocation of land among three economic uses/broad land cover types, i.e. forest, cropland and grazing land, based on relative returns to land.
- The land owner then decides on the allocation of cropland between various crops, again based on relative returns in crop sectors.

Land Supply in the GTAP-AEZ Model



Application

- impacts of climate change:
 - Draught
 - increase in productivity in some region
 - Decline in productivity in some region
- impacts of economic policy:
 - Land cover
 - Emissions
- ...