Understanding the influence of agro-ecological zones on land use projections

Alan V. Di Vittorio
Lawrence Berkeley National Laboratory

SDWG/LMWG Meeting, NCAR
20 February 2013
In the context of the integrated Earth System Model (iESM)

• How do we make robust projections of land use change in the context of projected climate change?

• How do spatial boundaries influence projected land use?
Overview

• What are agro-ecological zones?
• Why do agro-ecological zones matter?
• Current versus projected agro-ecological zones
• Next steps
Agro-Ecological Zones (AEZs) are bio-climatically defined.
Absolute minimum temperature;
> 0 °C = tropical; < -45 °C = boreal
Growing Degree Days; splitting temperate and boreal

Worldclim 1961–1990 annual Growing Degree Days (C)
Original agro-ecological zones

Original baseline climate agro–ecological zones

Latitude

Longitude

Tropical

Temperate

Boreal
Land use distribution assumes uniform vegetation productivity within zones.
Current AEZs become heterogeneous.
Projected AEZs differ by climate model.
Next steps

• Calculating AEZ initial conditions
  • Crop area
  • Crop yield
  • Land value

• Sensitivity experiment with iESM
  • Current versus projected AEZs
Land use distribution assumes uniform vegetation productivity within zones

ECHAM 2071–2100 climate agro–ecological zones
Land use distribution assumes uniform vegetation productivity within zones.

- Do projected Agro-Ecological Zones alter land use trajectories?