

Land-use and Land-cover Change in the Philippines during the 20th Century: links to population growth, food and trade

Thomas Kastner*, Sanderine Nonhebel
Center for Energy and Environmental Studies IVEM / University of Groningen
*contact: t.kastner@rug.nl; +31 363 7177



1) Introduction

Understanding dynamics of land-use and land-cover changes (LUCC) is of crucial importance when discussing global change. Historically, LUCC has contributed a large share to total emissions of greenhouse gases. Close links between LUCC, population growth and increased demand for agricultural produce have been suggested.

We investigate these links for the Philippines during the 20th century at macro-scale. This forms a compelling case, as over this period the nation's population grew exponentially, from 8 to 80 millions and massive LUCC took place.

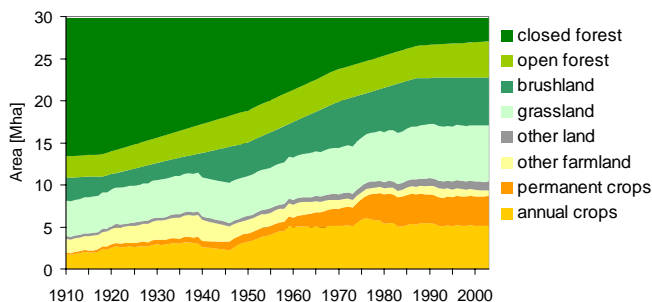


2) Method

A consistent data set of LUCC in the Philippines during the 20th century was established through extensive literature research, utilizing the best available sources and applying simple modeling approaches to fill gaps.

To link LUCC to food consumption, land required for the prevailing dietary patterns was calculated. For this we used FAOSTAT data along with various historical sources to establish a time series covering almost a century. In addition land requirements of trade of agricultural goods were calculated.

3) A century of LUCC in the Philippines



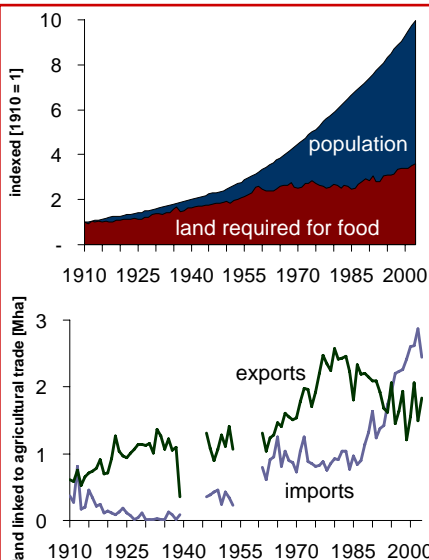
Drastic LUCC occurred with rapid decreases in forest cover.

Increases in cultivated land until the late 1970s.

Large areas of grass- and brushland emerged.

Clear links between deforestation and expansion agriculture disappear in the second half of the century.

4) Land required for food and the role of trade



Land required for food (LRF) increased 4-fold from 1910 to 2003, albeit slower than population.

Crucial role of agricultural intensification.

The Philippines as traditional exporter of tropical crops.

Recent increases in LRF were met by a change in the trade balance.

5) Implications for the climate change debate

The massive LUCC during the 20th century were linked to a release of large amount of greenhouse gases.

Presently large areas of land not under forest or used intensively for agricultural production.

Potential to increase carbon stocks through reforestation exists, BUT

- this may imply higher land requirements linked to food imports.

- social problems have to be solved; fragile lands are utilized by the poor, tenure regimes are unclear.

Social and ecological sound agroforestry practices may be a way to increase carbon stocks and alleviate poverty.