Tropentag, October 6-8, 2009, Hamburg

"Biophysical and Socio-economic Frame Conditions
for the Sustainable Management
of Natural Resources"

Variation of Rice Yields in the Philippines: Impact of Climate Variability and Yied Gap Analysis

Carlos Angulo[1], Reiner Wassmann[2], Mathias Becker[3]

[1] *University of Bonn, Master Programm, Ecuador*
[2] *International Rice Research Institute (IRRI), Rice and Climate Change Consortium, Philippines*
[3] *University of Bonn, Institute of Crop Science and Resource Conservation (INRES) - Plant Nutrition, Germany*

Abstract

This study describes a combined empirical/modelling approach to assess the possible impact of climate variability on rice production in the Philippines. Rice plays an important role as staple food in the Philippines, and represents 25 percent of the food expenditures of the poorest 30 percent of the population. The assessment of climate-induced variations in yields gains special relevance in-view of projected climate change. In spite of existing uncertainties in regional Climate Change scenarios, all Global Circulation Models agree that climate extremes will become more severe and frequent. However, there is a lack of detailed studies about the current influence of climate variability on rice yield.

We determined the climatic trends during the last two decades (1985–2002) and the influence of climate variability on irrigated rice yield for six provinces of the Philippines scattered along a North-South gradient. Data from the climate information system of NASA were collected, processed, and used as input parameters of the model Oryza2000. The simulated yields were compared to recorded actual yields corresponding to official data of the Philippine Bureau of Agricultural Statistics to determine the corresponding yield gaps.

Both simulated and actual yields of irrigated rice varied strongly between years. However, no clear climate-driven trends were apparent for the past 20 years. Also the variability in recorded actual yields showed no correlation with climatic parameters. The observed variation in simulated yields was attributable to seasonal variations in climatic data (differences between dry and wet season) and to differences between provinces. The spatial variation in actual yields could be attributed to soil and management factors and in most cases reflected the farmers' technology level. The resulting yield gap was hence largest in remote and infrastructurally disfavoured provinces with a high production potential as reflected by high solar radiation and day-night temperature differences. They were lowest in central provinces with good market access but with a relatively low yield potential due to near-permanent cloud cover. We conclude that climate variability does not seem to play a primary role in current rice yield trends and that agroecological, seasonal, and management effects are over-riding any possible climatic variations.

Keywords: Climate change and variability, Philippines, rice yield, simulation and modelling

Contact Address: Carlos Angulo, University of Bonn, Master Programm, Bonn, Ecuador, e-mail: karlosangulov@gmail.com