Exploring adaptation of agriculture to climate change: policy choices and resiliency

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INTRODUCTION

Climate change is a major source of uncertainty for today's vulnerable societies. Prioritizing adaptation policy to these uncertain conditions is a major challenge This uncertainty is especially relevant for agriculture and food security, given that both sectors link to ecosystems, water, cities and culture. Climate change comes in conjunction with high development pressure, increasing populations, water management that is already facing conflicts and agricultural systems that are often no longer conducive to local conditions.

Understanding the impacts of climate change on agriculture as a whole requires a multidimensional analysis at the global level that requires information on a measure of the potential impacts and a measure of the potential limits (social and physical) to adaptation.

METHODS

The innovative aspects of the analysis lie in the multidimensional nature of the assessment and on its use of the latest generation of climate scenarios. Here we undertake such an analysis in two steps. First, we apply the ClimateCrop model (Iglesias *et al.*, 2012), which evaluates crop productivity and water demands as a response to climate adaptation policies (i.e. related to water and land use) and mitigation policies (i.e. related to nitrogen fertilization). Second, we develop an adaptive capacity index to evaluate the resilience of regional agricultural systems.

RESULTS AND DISCUSSION

The need to respond to the regional risks and opportunities is addressed by evaluating the costs and benefits of a number of technical and policy actions on crop productivity, water demand for agriculture and fertilizer use. The results assist in the understanding of how adaptation planning can help strengthen food production in a changing climate and develop measures to reduce the vulnerability of the sector to climate change. However, adaptation planning is inherently complex since it also requires a measure of resilience. Our results show clear linkages have also been demonstrated between poverty and agricultural capacity.

The likelihood is that climate change impacts will continue to increase as long as adaptation and mitigation strategies are not put in place. Currently, the countries with the most

adaptive capacity are also those which enjoy higher levels of socio-economic development; a number of countries highly dependent on agriculture do not enjoy the same levels of adaptive capacity and their vulnerability to climate change is thus intensified. These cases highlight the need for a strategic approach to adaptation.

REFERENCE

Iglesias, A., Garrote L; Quiroga, S. & Moneo, M. 2012. From climate change impacts to the development of adaptation strategies: challenges for agriculture in Europe. *Climatic Change*, 112: 143–168. DOI 10.1007/s10584-011-0344-x.