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

Ana Iglesia

Department of Agricultural Economics and Social Sciences, Universidad Politécnica de Madrid, Spain

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.

Towards climate-resilient agriculture: the Dutch touch

Sjoerd Croqué

*Ministry of Economic Affairs, Agriculture and Innovation,
The Netherlands*

The dual relationship between agriculture and climate change is captured in:

- 1) the impacts of climate change on agriculture via, for example, dry periods, salinization, new diseases and plagues. And critically important for a lowlying coastal country like the Netherlands: flooding!
- 2) via greenhouse gas emissions agriculture contributes to climate change.

In the Netherlands there are two complementary approaches for agriculture:

- national efforts on climate change targeting the Dutch agrosectors;
- at international level the need to promote food security and climate smart agriculture.

The Dutch approach is based on intensive cooperation between the private sector, scientific institutes and the government: the golden triangle. It is a starting point for the Dutch enterprise policy and agriculture policy. It is also becoming a priority in our development cooperation efforts. A specific feature of our climate change policy is that we encourage linking adaptation and mitigation interventions. An example of this approach is the project “Adaptation to climate change in agriculture in Northern Netherlands”.¹ The aim of the project was to develop strategies and action plans for agriculture to adapt to both climate and market changes. The project focused on three questions:

1. What are the threats and impacts on arable farming in the region?

This is about governance and the strategic choice whether a sector has strategic and future importance. A basic question is whether large investments in adaptation efforts are justified. The learning issue is to not to hang on to present sectors and production systems but also look at the future importance.

2. What are the impacts of extreme events and how to identify adaptation measures?

Here the focus is on impact and adaptation at field and farm levels looking at the influence of extreme events on crop production. Science and farmers work closely together. An “agro climate calendar” was set up as a tool to deal with estimating the climatic impact on crop or animal production. This phase also identified adaptation strategies.

¹ The Dutch Federation of Agriculture and Horticulture, LTO Noord, together with Wageningen University and research centres.

3. *How to identify regional and farm level adaptation action plans?*

This concerns regional and farm level action plans: identify bottlenecks and challenges, draw up adaptation strategies and action plans and finally ensure the use of proper forms of risk management.

The learning issues are:

- doing things differently (i.e. water management);
- doing different things (i.e. new [robust] production systems).

Food security is important for many developing countries. Besides the importance of markets, a stable food production base, that keeps pace with an increasing population, is crucial for achieving food security. Increasing production also means introducing new, climate-resilient, working methods.

The foci of the Netherlands are:

- facilitate global discussions on agriculture, food security and climate change;
- contribute to concrete actions and excellent preconditions;
- contribute to capacity building via organizing workshops and courses.

Climate change is clearly a global problem and therefore requires a global solution. For that reason, the Netherlands remains committed to contributing to concrete actions and to facilitating international discussions on agriculture, food security and climate change.