
Acknowledgments

The joint FAO/OECD Workshop on Building Resilience for Adaptation to Climate Change in the Agriculture Sector was organized by FAO and OECD, and held on the 23–24 April 2012 at FAO headquarters in Rome, Italy.

We would like to extend our special thanks to all the participants for their contributions and papers. Our appreciation also is expressed to the organizers of this Workshop – Andrew Dale, Jussi Lankoski, Alexandre Meybeck, Nadine Azzu and Vincent Gitz. In addition, we would also like to thank Shivaji Pandey, Caterina Batello, Véronique de Saint Martin, Suzanne Redfern and Elizabeth Pain Innamorati.

Agenda

Monday, 23 April 2012

09.30 – 10.00 **Introductory remarks**

FAO: Modibo Traoré, Assistant Director-General, Agriculture and Consumer Protection Department

OECD: Dale Andrew, Head, Environment Division, Trade and Agriculture Directorate

10.00 – 11.30 **I. Global view**

Chair: Dale Andrew

The first introductory session gives a broad overview on the notions of risks, vulnerabilities and resilience and how to consider them in the context of climate change. It addresses the issues of interactions between the various types of risks and vulnerabilities, from biophysical and economic perspectives, including considerations of scale and time, in order to better define resilience, there again from biophysical and economic perspectives and including considerations of scale and time.

- **Agriculture and climate change: overview** (Peter Holmgren, FAO, Director Climate and Energy Division, Natural Resources and Environment Department).
- **Risks, vulnerabilities and resilience in a context of climate change** (Vincent Gitz, FAO, Agriculture and Consumer Protection Department).
- **The assessment of climate change related vulnerability in the agricultural sector: reviewing conceptual frameworks** (Thomas Fellmann, University of Seville, Spain).

11.30 – 12.30 **II. Types of risks and of risk management**

and
Chair: Berhe Tekola

14.00 – 15.00 The second session considers various biophysical risks affecting production, economic risks, both for producers and small holders as consumers, the impact climate change may have on them and the ways to address these various risks.

- **Animal diseases: more disease...old and new** (Juan Lubroth, FAO, Agriculture and Consumer Protection Department).
- **Climatic risks: assessment and management in agriculture** (Selvaraju Ramasamy, FAO, Natural Resources and Environment Department).

Chair: Aseffa Abreha

- **Coping with changes in cropping systems: plant pests and seeds** (Manuela Allara, FAO, Agriculture and Consumer Protection Department).
- **Building resilience for adaptation to climate change in the fisheries and aquaculture sector** (Cassandra De Young, FAO, Fisheries and Aquaculture Department).
- **Building resilience to climate change through sustainable forest management** (Susan Braatz, FAO, Forestry Department).

15.00 – 17.00

Chair: Bob MacGregor

- **Farm risk management policies under climate change** (Jesús Antón, OECD/TAD).
- **The assessment of the socio-economic impacts of climate change at household level** (Panagiotis Karfakis, FAO, Economic and Social Development Department).
- **The urgency to support resilient livelihoods: FAO disaster risk reduction for food and nutrition security framework programme** (Cristina Amaral, FAO, Technical Cooperation Department).
- **Agriculture in National Adaptation Programmes of Action (NAPA)** (Alexandre Meybeck, FAO, Agriculture and Consumer Protection Department).
- **The International Treaty for Plant Genetic Resources in Food and Agriculture** (Shakeel Bhatti, Secretary, International Treaty on Plant Genetic Resources for Food and Agriculture).

17.30 – 18.30 Welcome reception hosted by FAO

Tuesday, 24 April 2012

9.30 – 10.30

III. Case studies (Part 1)

Chair: Guido Bonati

The third session is devoted to case studies, which have been selected to cover a broad set of issues, farming systems and social and economic situations. For each, specific risks and vulnerabilities are analysed, the way they are expected to be influenced by climate change and how resilience can be improved to adapt to climate change.

- **Crop production in a northern climate** (Helena Kahiluoto, MTT Agrifood Research, Finland).
- **A broad overview of the main problems derived from climate change that will affect agricultural production in the Mediterranean area** (Demetrios Psaltopoulos and Dimitrios Skuras, University of Patras, Greece).

10.30 – 11.30 **III. Case studies (Part 2)**

Chair: S.K. Pattanayak

- **Crop-livestock production systems in the Sahel: increasing resilience for adaptation to climate change and preserving food security** (Alexandre Ickowicz, CIRAD).
- **Rice systems in Southeast Asia: challenges to production** (Caterina Batello, FAO, Agriculture and Consumer Protection Department).

11.30 – 12.30 **IV. Tools, policies, institutions**

Chair: Marca Weinberg

These sessions focus on tools, policies and institutions designed to monitor and manage risks and vulnerabilities and how they can be enhanced and modified to better help agriculture adapt to Climate Change.

14.00 – 15.30 **Country presentations:**

- **Italian presentation on “Perspectives on risk management in agriculture in Italy”** (Antonella Pontrandolfi, INEA, Italy).
- **Canadian presentation on “The resiliency of the Canadian crop insurance system under climate change: testing quantitative methods”** (Bob MacGregor, Agriculture and Agri-food Canada, Canada).
- **Spanish presentation on “Exploring adaptation to climate change in Spain (looking into the future without a crystal ball)”** (Ana Iglesias, Universidad Politecnica de Madrid, Spain).
- **Dutch presentation on “Towards climate resilient agriculture: the Dutch touch”** (Sjoerd Croqué).

Chair: Chang-Gil Kim

Country presentations continued:

- **EU presentation on “The EU agricultural policy: delivering on adaptation to climate change”** (Maria Fuentes, EC).
- **Swiss presentation on “Swiss climate strategy for agriculture”** (Daniel Felder, Federal Department of Economic Affairs FDEA, Switzerland).
- **Japanese presentation on “Japanese adaptation policy and AMICAF (Analysis and Mapping of Impacts under Climate change for Adaptation and Food security) project”** (Hiroki Sasaki, Ministry of Agriculture, Forestry and Fisheries, Japan).
- **Australian presentation on “Australia’s Carbon Farming Initiative (CFI)”** (Eliza Murray, Director, Department of Climate Change and Energy Efficiency, Australia).
- **United States of America presentation on “Agricultural response to a changing climate: the role of economics and policy in the United States”** (Marca Weinberg, USDA).

15.30 – 16.30 **Summary remarks from session chairs and open discussion**

16.30 – 17.00 **Concluding remarks (FAO/OECD)**

Summary report and main conclusions

The joint workshop on *Building resilience for adaptation to climate change in the agriculture sector* was organized by FAO and OECD, and was held from 23 to 24 April 2012, at FAO headquarters in Rome.

BACKGROUND AND OBJECTIVES OF THE WORKSHOP

This workshop was a follow-up of the Joint OECD-INEA-FAO Workshop on *Agriculture and Adaptation to Climate Change*, which was held in June 2010. One of the conclusions of that 2010 Workshop was that, as climate change brings new uncertainties, adds new risks and changes already existing risks, one of the most effective ways for agriculture to adapt to climate change could be to increase its resilience. This is why this workshop started from the various types of risks to which agriculture is prone, considered the impact that climate change is expected to have on them, and discussed various risk management strategies, depending on types of risks, and the country and region in question.

This two-day workshop consisted of four sessions including setting the scene, types of risks and risk management, case studies and, finally, tools, policies and institutions.

FIRST SESSION: SETTING THE SCENE

The first introductory session presented an overview of the main issues in agriculture and climate change, provided definitions of risks, vulnerabilities, resilience and adaptive capacity, and reviewed conceptual frameworks for climate change-related vulnerability. The presentations stressed that there are two main long-term goals for agriculture: (i) achieve food security; and (ii) adapt to climate change. Climate smart agriculture addresses multiple goals, such as the sustainable increase of productivity, increased resilience and reduction of sector's GHG emissions, whereas the FAO-wide framework "FAO-Adapt" aims to mainstream climate change adaptation into all FAO development activities. It was noted that it is important to build resilience to existing risks and to changes in an evolving context. Alternative concepts of vulnerability were reviewed, including outcome and contextual vulnerability of which the former is based mainly on natural science and the latter on social science. A framework table for the practical assessment of climate changed-related vulnerability was also presented.

SECOND SESSION: TYPES OF RISKS AND OF RISK MANAGEMENT

The second session considered various biophysical and economic risks affecting crop and livestock production, fisheries and aquaculture, forests and agroforestry, as well as households. It also considered risk management strategies to address these risks and how they are

adapted to changing conditions. It also briefly reviewed national adaptation plans for least developed countries (LDCs) as related to agriculture.

The presentations stressed the fact that various biophysical risks (weather, animal diseases, plant pests) are going to change – in terms of their nature, frequency and location – and in many cases in an uncertain way. This makes the need for tools and means to monitor risks even more necessary. The presentations also emphasized the fact that it is difficult to predict the impacts of climate change on ecosystems as each component of the system will react differently, and hence changing relationships within the system. This is of crucial importance for forestry and fisheries, but also for agro-ecosystems. Moreover, it was stressed that building resilience to climate change starts by building resilience through sustainable management of natural resources and ecosystem restoration. Interventions on both plant pests and animal diseases emphasized the importance of early action to prevent the spread of the risk. This requires having the proper tools, policies and institutions in place. A typical example is seeds – an essential tool for farmers to adapt to change. It requires preserving genetic resources and then making them accessible: multiplying and diffusing them where they are needed. As regards farm risk management policies such as different types of insurance and *ex-post* payments, it was shown that the possibility of extreme climatic events significantly changes the decision environment and that government's best response to this ambiguity is the implementation of "robust" policies, which may not be optimal under any given scenario, but which allow avoiding negative outcomes.

THIRD SESSION: CASE STUDIES

The third session was devoted to case studies, which had been selected to cover a broad range of issues, farming systems and social and economic situations. For each case study, specific risks and vulnerabilities were analysed, and looked at the way they are expected to be influenced by climate change and how resilience can be improved to adapt to climate change.

The Finnish case study on crop production in a northern climate addressed the issue whether diversity enhances resilience and adaptive capacity and whether there is a trade-off between diversity and efficiency. It was found that there is no trade-off in land use diversity and resource use efficiency – and in fact there are even cases of positive correlation between diversity and efficiency. The Mediterranean case study gave a broad overview of the main impacts of climate change in the area. It was noted that the Mediterranean is a climate-change hotspot area, and building a resilience strategy is a priority "no regret" action. The third case study considered vulnerabilities and conditions for resilience in crop-livestock systems in the Sahel region. The study shows that these systems have to address, in addition to climate change, other important sources of risks, including economic and land tenure risks but also important drivers of change including population growth. The fourth study considered challenges to production in rice systems in Southeast Asia. Importantly, it underlined that population increase in Southeast Asia has not been matched by an equivalent increase in production. It also underlined that the international rice market is very thin (7 percent of production) and that it is dominated by a few countries. This increases importing countries' vulnerability to price volatility.

FOURTH SESSION: POLICIES, TOOLS AND INSTITUTIONS

The fourth session focused on tools, policies and institutions designed to monitor and manage risks and vulnerabilities in OECD member countries. This was an informative session of concrete policies and institutions that OECD countries have in managing farm risks in a changing climate and introduced several new policies and policy frameworks to address adaptation to climate change.

MAIN CONCLUSIONS

The various sessions of the workshop questioned the notion of resilience from very different angles, confronting concepts, specific risk management strategies, case studies and national policies, from different perspectives, biophysical, economic, or social and institutional, and at various scales, from farm and household to national and global.

The confrontation of these various approaches and the discussions that followed led to some important points.

- There are huge uncertainties in the way climate change will directly and indirectly impact agricultural and food systems, and related vulnerabilities.
- Building resilience now is central to being prepared for future changes.
- The notion of resilience enables examining together various domains – biophysical (ecosystems), economic, social and institutional – and scales of operation.
- It also allows the interactions between domains and between scales to be analysed.

The workshop also identified some general ways to increase resilience:

- Identify and monitor potential risks and vulnerabilities. Early action is needed, especially to avoid cumulative and long-term effects.
- Increase the adaptive capacity of farmers and systems, both to recover from shocks and to be prepared for changes.
- Take into account interactions between domains and scales in order to reduce the transmission of shocks between them.

Opening remarks

Modibo Traore'

*Assistant Director-General, Agriculture and Consumer Protection
Department, FAO, Rome*

Your Excellencies, Ambassadors and Permanent Representatives, OECD Delegates, Members of the Advisory Group to the Bureau of CFS, distinguished Participants, Ladies and Gentlemen.

It is my great pleasure and honour to welcome you to this FAO/OECD workshop on Building Resilience for Adaptation to Climate Change in the Agriculture Sector.

The collaboration between FAO and OECD is old and rich. The OECD-FAO Agricultural Outlook is probably the best known example of this, but there are many other fields in which we work together.

The Joint Working Party of OECD on Agriculture and Environment has been a pioneer in linking agriculture and environment from an economic and policy perspective. The work of your group on agro-environmental indicators has exerted a tremendous influence on the design of such indicators, worldwide.

More recently, the work of your group has been essential in the global reflection about green economy and agriculture. What does green economy mean for agriculture? What is agriculture's contribution to green economy, to green growth?

I would like to take this opportunity to thank you for these contributions to our common understanding of the complex interactions among agriculture, environment and economics for improving policy design.

Your group and my Department work on the same issues, from different but complementary perspectives. That is why, since your first invitation to us in 2007 to participate as an observer to the work of your group, the collaboration has been extremely fruitful. This workshop is a good example of it.

Agricultural systems – food systems – are complex. They are biophysical systems, economic systems, social systems. And these dimensions interact with each other, at various scales, from local to global and, again, from global to local.

This is why, to consider adaptation of agricultural and food systems, we need to adopt a holistic approach, from different angles and different perspectives. Here again, it is not only about ensuring a “balanced” view. It is to take into account, at the same time, diverse perspectives and approaches. To consider very technical issues: animal health, plant pests; and also economic perspectives, and households, and policies. Because all of these make up the food system. All of these, and their interactions, are going to be modified by climate change.

In June 2010, we had a first joint workshop, hosted by the Istituto Nazionale di Economia Agraria, on Agriculture and adaptation to climate change.

Climate change brings new uncertainties, and adds new risks and changes to already existing risks. One of the conclusions of the workshop was to consider how building resilience in agriculture could be a way to adapt to climate change. This workshop builds upon these conclusions.

Building resilience is not specific to climate change; climate change adaptation responses are “embedded” in agricultural systems (therefore, sometime there is a difficulty to distinguish adaptation practices *stricto-sensu*). How do we need to increase resilience and build adaptive capacity? We need to adopt a holistic approach, embracing various risks, and accounting for synergies and trade-offs. There are huge variations between countries, in terms of risks to be faced and capacities to face them.

The workshop will consider various types of risks to which agriculture is prone, the effects that climate change is expected to have on them, and various risk management strategies, depending on types of risks and the country in question. It will examine technical issues and case studies in order to determine how addressing various types of risks and vulnerabilities, including plant pests and diseases, animal health and socio-economic vulnerabilities, can contribute to prepare agriculture for future climate-induced risks and uncertainties.

In the international negotiations on climate change, in the United Nations Framework Convention on Climate Change, there is now a much stronger interest for adaptation: the Cancun Agreement contains a framework for adaptation, including a programme of work on loss and damages and the establishment of national plans of adaptation for developing countries.

The Committee on World Food Security (CFS) has requested its High Level Panel of Experts (HLPE) to undertake a study on climate change and food security, which will be presented to CFS in October 2012.

During the UNFCCC meeting in Bonn in May this year, there was a dialogue on agriculture and climate change, which could lead to a decision in Doha on a programme of work.

For all these reasons, there is now an opportunity to better emphasize the importance and the specificities of the adaptation of agriculture to climate change.

This meeting can make a very timely and useful contribution to these various processes. I wish you a successful discussion.

Thank you.

Opening remarks

Dale Andrew

Head, Environment Division, OECD Trade and Agriculture Directorate

This joint workshop is an undertaking between the OECD Trade and Agriculture Directorate and the FAO and builds on the workshop on *Agriculture and Adaptation to Climate Change*, hosted by INEA and held in June 2010.

In the intervening year and half since our joint workshop in 2010 on agriculture and adaptation to climate change, international discussions on the importance of agriculture in slowing climate change have progressed: risk management tools continue to be developed, climate-smart agriculture has deepened its operational activities in technical agencies and the multilateral development banks, and new national initiatives have emerged. Agriculture is no longer a forgotten sector in climate change discussions and action programmes.

Among the key messages emerging from our joint workshop in 2010 were:

- 1) ***Impacts are region-specific:*** As a result we have commissioned three studies for the workshop today on the probable effects of climate change on the Mediterranean, on the Sahel and in northern climates.
- 2) ***The need for agriculture to adapt was specific to activity and crops:*** Today we will hear specific presentations on fisheries, forestry, rice, animal diseases and plant pests and seeds.
- 3) ***Adaptation affects individual farmers, agricultural policies and defining activities in international bodies:*** Relevant here is the OECD presentation on its work on risk management at the farm level. And FAO will explain several of its activities including those on the consumer side. Concerning the most vulnerable economically, *National adaptation programmes of action* or NAPAs will be surveyed. NAPAs provide a process for least developed countries to identify priority activities that respond to their *urgent* and *immediate* needs to adapt to climate change – those for which further delay would increase vulnerability and/or costs at a later stage.

Finally, what is the appropriate role of government action ?

In conclusions of the 2010 workshop, government interventions were portrayed on a continuum from that of providing infrastructure, including information, through that of re-designing incentives, for some limiting incentives to the provision of public goods while some possibly considered going further. The workshop came up with a few reference points:

- a) *It was too soon for specific targeted measures; maladaptation was a distinct possibility.* But several generic policies were appropriate and should be considered. In this context, areas for building resilience in supporting institutions will be taken up today.
- b) *Models can be helpful but are an unsafe basis for adaptation strategies – their results depend on the storyline.*

There is uncertainty about the uncertainties – as our OECD team has discovered and will be explained today in the presentation. Other tools will be touched on.

- c) *Therefore it is safe to say that uncertainty reigns on how much will be needed from governments beyond the basic provision of information*

This is an ongoing debate. We will hear in the next two days how eight OECD countries and the European Union are adapting their policies to address challenges of supporting adaptation to climate change in their agriculture sector.

With these general remarks on the context of the ongoing cooperation between OECD and FAO, we will get underway with three presentations on the broad overview of adaptation of agriculture to climate change before moving on to sectoral and geographical aspects of building resilience for adaptation. A warm welcome to all.