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New realities, new paradigms:

the new agricultural revolution

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Climate change and food security: cross-cutting axes of agricultural policies

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Summary

The present article examines the impact of climate change on food security, particularly from the point of view of agriculture, a relationship that must be borne in mind when public policies are being defined to improve food security. This implies promoting productive innovations that allow countries to face adverse climatic conditions in their effort to satisfy the demand for food of a growing population.

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Key words: climate change, food security, agricultural policies, outlook for climate change.

Introduction

Climate change is without doubt the main challenge affecting all areas of human activity and its inter-connectivity, ranging from global political decisions to individual actions that can make the difference between the quality of life of one generation and another.

In order to deal with the consequences of climate change and find solutions that could prevent a worsening of the situation, far-reaching political decisions must be taken, changes must be made to individual and collective consumer patterns, programs and strategies that promote technological inputs, innovation and institutional arrangements that make it easy to attend to this multi-causal and multi-dimensional challenge.

The consequences of this phenomenon, which are evidenced by climatic conditions such as droughts, floods and sudden changes in temperatures, have affected and will continue to affect the lives of millions of persons around the world. The populations that are vulnerable to this phenomenon also seem to be those who are the most vulnerable. This has put in jeopardy the achievement of the Millennium Development Goals and some specialists are convinced that climate change could seriously affect the achievement and sustainability of any successes gained from the globally-defined objectives of the Millennium Summit.

New development paradigms have begun to emerge and with them, the challenges facing our countries and governments to understand the situation and issue coherent and consistent policies and legislation in a novel and sustainable way that does not compromise future resources.

This has led to a search for creative solutions that guarantee economic growth and social equity in a context of sustainable development. New development paradigms have begun to emerge and with them, the challenges facing our countries and governments to understand the situation and issue coherent and consistent policies and legislation in a novel and sustainable way that does not compromise future resources.

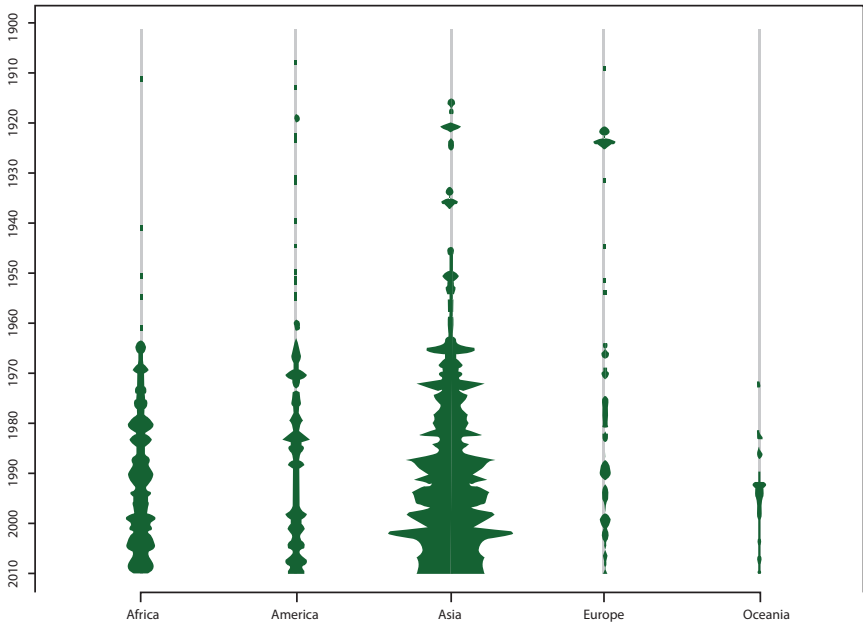
Trends and consequences of climate change

According to 2010 data published by the World Bank, over the last millennium, the average temperature shift of the Earth remained at below 0.7° C. However, greenhouse gas emissions of human origin over the past 150 years (industrial period) have caused an increase in the world temperature of nearly 1° C, a trend that is rising, according to projections by the World Bank, which predicts a period of possible world temperatures for this century. These estimates reveal that even the most ambitious mitigation efforts can cause a 2° C temperature rise (a level that is still considered as dangerous) and that most forecasts determine that reduced mitigation would cause a 3° C to 5° C warming (although this is less certain with respect to these higher levels of global warming).

This level of global warming has never been experienced in the history of mankind and the physical results would seriously limit sustainable human development, especially in the ag-

ricultural sectors (agriculture, livestock, fishing, aquaculture, and forestry) which are some of the most seriously affected by this type of extreme phenomenon).

One example of the above was the damage and losses in agriculture and livestock caused by Hurricane Mitch in Central America, representing 21% of total losses in Costa Rica, 39% in El Salvador, 51% in Nicaragua and 68% in Guatemala. These countries, like all other developing countries in the tropical and sub-tropical regions, continue to be highly impacted as a result of their vulnerability. For these reasons, the priority is adaption and change to new and productive paradigms. Nevertheless, these countries are generally less prepared to confront these changes.



Source: CRED 2010.

FIGURE 1
NUMBER OF PERSONS AFFECTED BY NATURAL DISASTERS BY REGION AND DECADE (1990-2010).

According to data provided by the International Database on Disasters (EM-DAT) of the Centre for Research into Epidemiological Disasters (CRED), since the decade of the sixties, the number of natural disasters has continued to grow steadily, along with an increase in the average temperature (1° C) over the past 50 years, as a result increases in the emission of greenhouse gases (GHG).

Figure 1 shows that the continents with the greatest increase in number of persons affected by natural disasters are Asia, followed way behind by Africa and America.

According to World Bank estimates, climate change threatens the entire world, but developing countries are more vulnerable, since they will have to bear between 75% and 80% of the cost of the damage caused by climate variation (World Bank 2010).

Populations and authorities in Latin America and the Caribbean (LAC) are quite aware of the devastation caused by flooding, hurricanes, land slippage and drought. Over the past ten years, natural disasters have accounted for more than 45,000 deaths, have left 40 million persons homeless and have caused more than US$32,000 million in damage (IDB, 2002).

For those countries, climate change represents an increase in vulnerability, erasing progress made with much effort and seriously jeopardizing development forecasts. It would be even more difficult to achieve the Millennium Development Goals and guarantee a safe and sustainable future beyond 2015 (World Bank 2010).

CLIMATE CHANGE AND FOOD SECURITY

This climatic phenomenon presents paradigmatic challenges in all productive sectors; however, it is urgent for the agricultural sector to achieve not only productive sustainability, but also food security, which is considered to exist when all people, all the time, have physical and economic access to enough safe and nutritious food (FAO 2008). This approach is shared by IICA, who defines it as "… the existence of conditions that make it possible for human beings to access, in a socially acceptable way and in agreement with their cultural preferences, a physical and economic safe and nutritious diet to meet their dietary needs for a productive and healthy lifestyle." Such conditions are: food availability, access to food for all people, food utili-

zation, and access stability (Chavarría and Salazar 2008).

This approach and its four conditions for food security depend necessarily on two aspects being affected by climate change:

a. Physical food availability, limited by the consequences of climate change in crops, such as flooding, drought, hailstorms, fire, and, in the best-case scenario, abrupt temperature changes impacting agricultural productivity, which decreases food quality and safety.

b. Economic capacity to acquire food, due to important losses resulting from climate change, especially when considering the costs incurred by families and enterprises to reduce or face the effects of natural phenomena associated with climate change, which not only limits production possibilities (infrastructure and technology), but also consumption, due to the resulting rise in food prices.

Climate change and agriculture

According to Thomas Schelling, Nobel Prize winner in Economic Sciences (2005), "Climate change is real, and its most devastating effects will occur in agriculture, and it will impact food supply and distribution" (quoted in IICA Nicaragua 2008).

According to Greenpeace estimates, agriculture is responsible for 25% of the emissions of greenhouse gases (GHGs), mainly as a result of the use of agrochemicals, pesticides, machinery, changes in soil, and the development of water resources (Greenpeace 2008).

On the one hand, this implies that agriculture is responsible for contributing with the GHG emissions that accelerate climate change; but, on the other hand, this sector is the most affected by the phenomenon. This is why there is huge interest not only in adapting, but also in developing the potential of agriculture (unlike other productive sectors) as a natural carbon sink, in order to reduce the effects of the emissions through modern practices, technologies and policies.

Another valuable aspect to analyze is the uncertainty caused by climate change in agricultural activities, as a consequence of the risks that long-term rainfall and temperature trends imply, as well as the greater impact of extreme climatic conditions.

Today, more than ever, agriculture remains one of the most important sectors in the entire region, not only as a result of the high level employment it generates, but also due to its productive linkages. In fact, according to recent estimates, the agricultural sector recovered more quickly from international financial crises than any other sector (IICA 2010), which contributes to improving general macroeconomic conditions, taking into ac-

count the important increase in food prices that began in August 2010.

In recent years, political awareness of climate change has increased; however, public policies for adaptation to the new scenario are still limited. Farmers can adapt to climate change locally, for instance, by changing crops or varieties, using more efficient irrigation systems, advancing or delaying sowing periods, or by simply varying the location of its activities. Therefore, national and international public investments aimed at improving the adaptation capacity of agriculture represent an innovative and completely necessary perspective for the agricultural and rural sectors of the region.

It is necessary to increase significantly the number of projects and amount of resources aimed at linking an environmental and social approach to adapting to and reducing the impacts agriculture and climate change have on each other, with agricultural and rural investment for the sustainable and inclusive development of agriculture.

Moreover, the genetic improvement of traditional varieties and the development and diffusion of new varieties better adapted to the foreseen changes in the climate, the provision of infrastructure to manage water scarcity and excess (e.g. irrigation and drainage) and the development of insurance schemes for small-scale producers with coverage for climate risks and early warning systems, inter alia, represent potential areas of investment that, besides improving the adaptation capacity of agriculture before climate change, contribute to strengthening its competitiveness. Therefore, it is necessary to increase significantly the number of projects and amount of resources aimed at linking an environmental and social approach to adapting to and reducing the

impacts agriculture and climate change have on each other, with agricultural and rural investment for the sustainable and inclusive development of agriculture.

Outlook for climate change

Climate change constitutes a challenge for the entire humanity, particularly at a time when increasingly stronger pressure is exerted upon the Conference of the Parties (COP) to reach global and binding agreements that supersede the Kyoto Protocol, determine differentiated limits for developed and developing countries and foster certified environmental services as an alternative for environmental compensation.

This forces us to think that climate change transcends national borders and that it is irreversible; nevertheless, its impact can be reduced if we succeed in decreasing the GHG emissions that threaten us with warming up the world more than 2°C, with dangerous consequences. Governments, enterprises and joint and consensual efforts by civil society, as well as technical assistance provided by institutions such as IICA, will be necessary to achieve such a reduction by:

a. Establishing participation agreements with the stakeholders involved, in which goals are set for each actor.

b. Defining innovative strategies, systems and public policies that will contribute to the fulfillment of the goals.

c. Promoting sustainable institutional mechanisms for the implementation of the strategies and policies.

d. Designing a monitoring mechanism that allows for follow-up to the goals and commitments acquired by each sector and country.

Agricultural policies and climate change

In order to cope with climate change, a new development paradigm with agricultural policies that take into account human development in the transition towards low carbon emission economies, and make the effects of this change adaptable, is required. In this context, the governments of the region will have to support the formulation of public policies for promoting long-term innovative national programs and strategies, as well as decentralized strategies for climate change mitigation and adaptation.

Governments, enterprises and civl society require joint and consensual efforts, as well as technical assistance provided by institutions such as IICA.

Without a doubt, modern agriculture needs to be integrally sustainable in the future. It is therefore essential to promote sustainable productive models that supply safe food and contribute to improving the lives of farmers and local communities.

To achieve this purpose, some policies should be adopted:

- Replacing the productive development model based only on economic growth with one based on sustainable human development. To this effect, it will be necessary to:

  - Design public policies for institutional modernization in a global environment to facilitate the shift in productive paradigm, which will support institutional modernization and strengthening, and organize and integrate the productive systems, especially with respect to agriculture and the rural milieu.

  - Promote, through more public and private investments, the implementation of an agenda for institutional innovation, in order to strengthen national institutions.

- Carrying out actions that allow acceleration of the recovery in the agricultural sector from the international impact of the food crisis and the international economic crisis. This is particularly important in view of the questioning of the sustainability of the incentive policies used to tackle the international economic crisis.

- Promoting the appropriate use of methods and technologies for sustainable agricultural production and, by comparing existing experiences (benchmarking), boosting their use in the countries. For instance, the efficient use of water and fertilizers allowed an increase in rice production. At the present time,

this practice has been adopted worldwide.

- Using fertilizers rationally and sustainably. By using the precise levels of fertilizers at the right time, a great quantity of GEI emissions can be avoided.

- Protecting the soil. Most of the current problems in agriculture originate in the soil, with consequences not only for climate change, but also on food production. Very frequently, intensive chemical agriculture produces a spiral of soil and water degradation and causes a reduction in crop yields, environmental destruction, poverty and hunger.

- Reducing the use of fossil fuels, not only in agricultural activities, but also worldwide, through the utilization of biofuels. This implies an increase in agricultural production to avoid limiting food availability and threatening food security.

- Improving conditions for forestry services to contribute to climate change mitigation.

- Developing "green" production, industrialization and marketing systems, as well as the corresponding certification, to achieve better prices and responsible agricultural models (Corporate Social Responsibility, CSR).

It is therefore essential to promote sustainable productive models that supply safe food and contribute to improving the lives of farmers and local communities.

Agriculture and rural development policies, as well as institutional frameworks, are in a constant process of change. In some countries of the region, it has been a deliberate and planned process, but in most of the others, it has been specific for of the aspects and conditioned by an international context that continuously puts pressure on governments to assume tangible international commitments in the Summits on Climate Change.

In any event, there are enough reasons to be concerned, and even more motives to cope with climate change through sustainable efforts aimed at reducing GEI emissions. This implies an analysis with a comprehensive view and a work agenda drawn up by decision makers. Here is where IICA plays a fundamental role in endorsing these concrete actions.

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