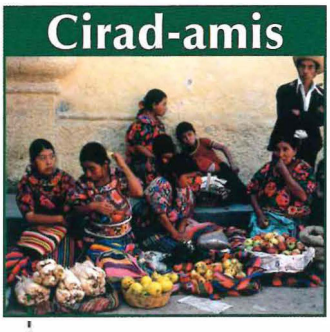

Agricultural forecasting models and complex dynamics

Economics, Policies and Markets Programme

The term globalization, which is used to sum up the recent shift in international economic relations, refers to the increasing interdependence of world economies, combined with more intense exchanges of both goods and capital. Under the auspices of the GATT and then the WTO, this shift has also seen increasing State withdrawal, known as liberalization. Farming, which was long seen as an exceptional sector, has been at the heart of international talks since the Uruguay Round and the 1994 Marrakech agreement. The sector, which is involved in greenhouse gas emissions and sequestration, is also directly concerned by the international talks on global change. Liberalization is expected to result in a global increase in wellbeing, linked on the one hand to increased efficiency through specialization, and on the other hand to the fact that any shocks are spread over a broader market, thus reducing their adverse effects. This is one of the major results of economic theory, illustrated by many simulations backed up by figures, which have estimated the gains in terms of billions of dollars. However, although these results are guaranteed in a theoretical perfect market, they are in fact far from the reality of the current global market, whose very considerable fluctuations can induce huge efficiency losses.

Coffee collection in Vietnam

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Objectives

The existing world models are based on a common representation that underestimates the difficulties of adjustment on agricultural markets. However, several studies have shown that these adjustment difficulties can result in endogenous price instability, which is highly unlikely to decrease as markets expand and which hits the poorest producers and consumers hardest. It would therefore be useful to have models that account for adjustment difficulties between supply and demand in order to give another point of view on the impact of liberalization. Furthermore, changes in land use as a result of liberalization should obviously affect greenhouse gas emissions and sequestration. The project set out to build agricultural exchange models that fit economic theory (disequilibrium theory), integrating the specificities of agricultural markets and the role farming plays in greenhouse gas emissions and sequestration. These models may be sectorial or multi-sectorial. They should make it possible to test different scenarios concerning trade liberalization and management of

Fruit sellers in Saigon

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greenhouse gas emissions and to analyse their impacts on producer incomes, food security, economic growth in different countries, North-South capital flows and the viability of a market trading licences to pollute.

Method

A recursive dynamic model of the international sugar market, representing producers, consumers and traders and integrating risk as well as imperfect expectations.
A recursive dynamic multi-sectorial world model integrating risk, expectations and capital flows.
Use of the reference database used by existing world models (GTAP).
Grouping in ten sectors, five of them agricultural.
Construction of the world model, in three stages: mock-up of the model with three regions (European Union, United States, rest of the world); extension to 14 regions under way (basic model); work on a reference scenario (reproducing current trends) and establishment of alternative scenarios.

Achievements

- Development of a model of the French agricultural sector for the Commissariat général du plan, in 1990-1991.
- Multi-sectorial model including the risk factor and expectations for Poland and Hungary, in 1995-1996.
- Sugar model: establishment of the reference scenario, testing of alternative simulations, publications.
- World model: development of the mock-up, GTAP data processing, work to obtain missing data.

The prospects

These models offer an alternative point of view on the liberalization of agricultural product exchanges and on the consequences of the Kyoto protocol for both economic growth and food security in poor countries. Developing countries will be able to use them in multilateral talks. The scenarios to be tested are determined in partnership with the organizations concerned by the talks (Ministry of Agriculture, Ministry of the Environment, sugar producersí associations, etc). Simulations will help in pinpointing arguments with a view to negotiations. They will also contribute to the current scientific debate through publications.

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Publications

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