

The cost of controlling greenhouse gas emissions

Economics,
Policies and
Markets
Programme

The greenhouse effect allows human life on Earth, but the current exponential increase in greenhouse gas (GHG) emissions poses the major threat of climate change. Economic activities involved are primarily those associated with fossil fuels burning or land use change. Agriculture intervenes through its land-use and with the carbon sequestration it allows. Agricultural activities emitting greenhouse gases are mainly fertilised crops, livestock, and rice growing. Levels of emissions depends on farming practices and varies in line with agricultural modernisation and intensification.



Cattle rearing

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permits, clean development mechanism, etc. ECOPOL has been working with the National Institute for Health and Environment (RIVM) in the Netherlands to build marginal abatement cost curves, integrating possible changes in farming practices and land uses as a result of incentives meant to account for GHG emissions.

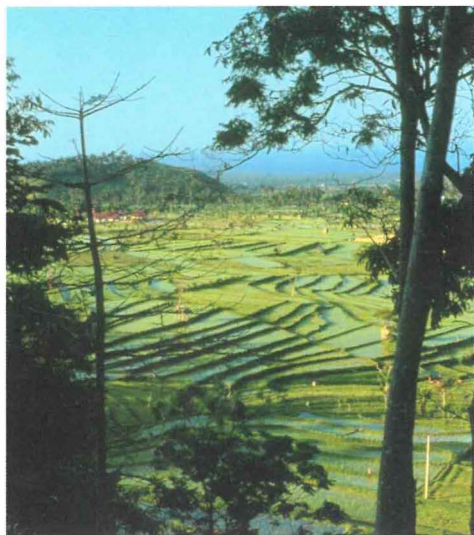
Methods

Identifying greenhouse gas emission reduction strategies is a multi-disciplinary undertaking, since it means understanding production systems, their impact on the global environment and their economic motivations. The method developed is two-sided, empirically and analytically. Empirically, information at the farm level is gathered in a database and aggregated so as to provide quantitative scenarios at the aggregation level of the integrated assessment model Image (the world in 17 regions), a long-term prospective model in which economic and climatic variables

Objectives

It is essential to conduct a systematic quantification work if we are to determine the amount of leeway offered by agriculture in terms of controlling emissions and compare it with the cost of GHG emissions abatement options contemplated in other economic sectors. A European project on greenhouse gas control strategies set out to draw up global scenarios analysing the impact of climate policies resorting to the flexibility mechanisms of the Kyoto protocol: negotiable emissions

Rice fields



interact. Analytically, AGRIPOL is being developed, an optimisation model where decisions on land use, agricultural activities and practices are represented, as affected by the incentive system in force. One specific objective is to analyse the role of a carbon price, were the emitting agricultural activities to be billed for their emissions.

Achievements

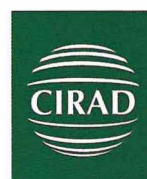
- Establishment of alternative global scenarios depending on the state of knowledge on climate change and on the progress made in international talks on greenhouse gas emissions control.
- Guidelines for a baseline scenario common to all partners of GECS European project.
- For countries in the priority solidarity zone, an appraisal of the options provided by agriculture for benefiting from the flexibility mechanisms considered within the Kyoto protocol.
- Establishment of a database framework.
- Collaboration with the designers and developers of the POLES prospective model and the IMAGE integrated assessment model.
- Development of a simple but generalizable formalized inventory of possible choices in the farming and forestry sector.

Publications

SOLAGRAL, CIRED, CIRAD, 2001.
Analyse comparative des instruments économiques de mise en œuvre des accords multilatéraux sur l'environnement pour les pays membres de la zone de solidarité prioritaire.
French Foreign Affairs Ministry, DGCID.

Prospects

Once compiled, the database will gradually be expanded, as and when it is used. It will provide figures able to fuel the debate on agricultural extensification or intensification and on land use changes such as deforestation. The initial plan is to use this preliminary work to establish reference scenarios concerning the fight against deforestation along the agricultural pioneer fronts of Brazilian Amazonia. On an institutional level, this research provides results useful in international negotiations on climate, particularly on the carbon sequestration issue. The main aim is to look at how farming and forestry interact with respect to greenhouse gas emissions and carbon sequestration, to take account of the feedback effect of climate change on agriculture, and to analyse the conditions for arbitrating between the different techniques.



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