

World Bank Research Evaluation: Environmental Research
Geoffrey Heal

Project title: GEF Adaptation Count

This project studies the impact of climate change on poor countries. I read in detail the paper “Will African Agriculture Survive Climate Change?” and sampled other items from the project. I was impressed by this work: it has been executed to very high professional standards and represents a significant contribution to our (very limited) understanding of the impacts of climate change outside the major industrial countries – which, ironically, will probably be affected much less than the developing countries.

The paper “Will African Agriculture Survive Climate Change?” uses the “Ricardian” methodology now standard in the studies of the impact of climate change on U.S. agriculture, with some adjustments for water availability, the lack of which was a shortcoming of the original U.S. studies. Clearly a constraint is that the data available for Africa are very limited, and quite possibly rather inaccurate, relative to those available from the USDA. Nevertheless the authors of this paper have made excellent progress in estimating the impacts of climate change on agriculture in various regions of Africa and have brought best-practice techniques to their work.

Project title: Cost-effectiveness Analysis of Coral Reef Management

This project addresses the deterioration of coral reefs near tropical and sub-tropical islands as a result of growth of economic activities on those islands, especially tourism. There are other factors affecting coral reefs at the moment, including changing ocean temperatures and changing pH as a result of the solution of CO₂ from the atmosphere, but these exogenous factors are quite appropriately held constant in the analysis.

The project’s main output is a simulation model that represents the interactions between various pollutants from human activity and the state of a coral community. The model is calibrated to each island to which it is applied, and is supplemented by an economic model that links economic growth to the flow of pollutants into the oceans. This flow can be mediated by various pollution-reduction policies, such as sewage treatment, deep ocean outfalls, etc.

This methodology was applied to several islands to evaluate the consequences for coral reefs of alternative growth paths and pollution-treatment policies. The results are summarized in the papers that were made available. This approach is hard to evaluate: simulation models have to be taken on trust to a greater degree than the other research projects that I have evaluated. Without seeing their details, one cannot tell whether they are sensible or not. With this caveat, my sense is that this is a good and useful project. Coral reefs are valuable environmental assets, and can also be managed in such a way as to have real economic value both as drivers of marine tourism and as fish nurseries. Yet

the connections between the health of coral ecosystems and the economic activity on the neighboring shores are rarely understood and consequently there is a real danger that these valuable assets will be destroyed unintentionally. The modeling exercise reported here should make this less likely, and also shed light on how best to manage coral systems and the economies associated with them. Also included in the documents from this project was a contingent valuation study of the value of marine biodiversity, conducted in Jamaica and in Curacao. This seemed a professional study, well executed, but its contribution to the overall goal of coral reef management was not immediately clear to me.

Project title: Greening of Industry

This is a truly first-rate project. I have often cited some of the outputs of this project in my own work and used it in courses that I teach. The work here is original, well executed and interesting. Some of it is also published in first-rate economics journals. Particularly interesting are the studies of the reactions of developing-country capital markets to the environmental performance of listed companies. This is a fascinating topic and shows that there are many mechanisms that work to control pollution even in the absence of formal pollution-control legislation, or in situations where such legislation exists but is not implemented.

Project title: Other Pollution Issues Affecting Rural Areas

This is another good project, although not quite as first-rate as the “Greening of Industry” project. The research has focused mainly on pollution in China, and on the sensitivity of this to pollution charges. The main finding is that pollution charges have induced a significant response, but that from a welfare perspective the charges are far too low. There is also an insightful paper on indoor air quality in Bangladesh. The research methodology is best practice and the results are novel, but they have less surprise value than the greening project.

Project title: Support for Carbon Finance

There is one very interesting and important research paper here, on the gains from trading sulfur dioxide allowances after the 1990 amendments to the Clean Air Act. There is substantial literature on the topic, but this is the best paper I have seen. In addition, there are several shorter papers that review what the Bank has done to promote carbon trading, and that review the evolution of carbon markets. The Bank’s Prototype Carbon Fund and its Biocarbon Fund have played an important role in developing carbon markets, and this role is well articulated in these papers.

Project title: Social and Environmental Consequences of Growth

The output of this project is a rather diverse set of papers. In subject matter they cover the interaction between economic growth, environmental degradation and the incentives to have children; the impacts of various national policies on deforestation in Belize and in Mexico; the reality of the Environmental Kuznets Curve; and further studies of China's pollution levy system. The deforestation papers tackle a complex and important issue, and face some challenging econometric problems in generating unbiased estimates of key parameters. I think the papers were well executed and very interesting, although I was not completely convinced that the choices of instrumental variables resolved the endogeneity problems faced. Nevertheless these papers are an interesting contribution to the literature on the drivers of deforestation.

The paper on population, growth and environmental degradation in Pakistan tests the Dasgupta-Maler hypothesis that there is potentially a vicious circle in which cutting down forests leads to incentives for families to have more children and this in turn leads to more pressure on forests. This hypothesis has received considerable play in the theoretical literature but no previous empirical testing, so this paper is timely. Its skepticism about the reality of the model seems well founded at least in this case.

Project title: Baseline Study of Climate Change

This project is not a research project in the sense of the other projects presented for review. The output is a report assessing how to evaluate Joint Implementation and Clean Development Mechanism projects that are proposed under the Kyoto Protocol. The central issues for such projects are establishing additionality, which requires the analysis of a baseline, and evaluating the incremental costs of carbon emission abatement. The report presents detailed studies of how these tasks were accomplished in several Joint Implementation and Clean Development Mechanism projects, and also reports on a workshop organized by the Bank on Joint Implementation possibilities in the Ukraine. I am not an expert on the implementation or evaluation of JI or CDM projects and so cannot really evaluate the report in detail. However it seems sensible, written clearly if a little technocratically, and the need for such a report is very compelling indeed. Developing countries have the potential to earn considerable sums from the CDM and in the process make valuable contributions to abating greenhouse gas emissions. I know from personal experience that lack of understanding has clearly been an obstacle to the execution of CDM projects, and the Bank has a natural role as a facilitator here. It is an extension of the role it is playing with its Prototype Carbon Fund and its Biocarbon Fund.

Overall Assessment of the World Bank's Environmental Research Program

My overall assessment, based on the material provided and on my prior knowledge of the Bank's work in this area, is very positive. The research addresses important current issues, is based on a sound understanding of the existing literature, and shows great professional competence. I have no substantial criticisms.

Some of the projects I was asked to evaluate were not academic research in the regular sense of this term. In particular I am referring here to the projects on carbon finance and on baselines for Joint Implementation and the Clean Development Mechanism. I think that these projects were socially valuable and were well executed given their audiences and aims, but they were not research in the sense of the other five.

Something of an outlier was the project on coral reef management. Here heavy use of simulation models, drawing on marine biology, made detailed evaluation impossible for me. Assuming the models to be first rate, the exercises were worthwhile and well executed.

Rather like the two greenhouse gas-related projects, the coral reef project was aimed at least as much at governments as at the academic community, perhaps more so. None of the outputs of these three projects – on carbon finance and on coral reefs – would be publishable in refereed economics journals.¹ I repeat that this is not a criticism of the quality of the work but an attempt to place them clearly within the spectrum of possible projects.

The other four projects all produced outputs that could be – and in several cases were – published in first-rate economics journals.

wb18913
L:\DECRS\Evaluation of Research\Evaluator Reports\Evaluator Reports FINAL VERSION\Geoffrey Heal.doc
11/21/2006 2:01:00 PM

¹ One paper from the carbon finance project – studying the impact of SO₂ trading after the 1990 amendments to the Clean Air Act – was top rate as academic research and published in a top economics journal.