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Information Tool Kit Will Help Improve Environmental Management in Central America

Applications of the Tool Point to Alarming Development and Environmental Problems in the Region as well as Possible Solutions

A powerful information tool kit, featuring a CD-ROM called Rural Sustainability Indicators for Central America, was released in December at the [World Bank](#). The first product of its kind for any region of the world, the information package gives decision makers an unprecedented ability to analyze problems in development and the environment, determine their causes, and weigh the consequences of different courses of action.

Published in a bilingual English/Spanish version, the product resulted from a 2-year project carried out jointly by the International Center for Tropical Agriculture (CIAT), the World Bank, and the United Nations Environment Programme ([UNEP](#)). Financial support was provided by the governments of Denmark, Norway, and Sweden.

"Indicators enable us to communicate complex scientific information in a simple, usable form," explains CIAT environmental scientist Manuel Winograd. The indicators tool for Central America includes 11 indices that help analyze development and environmental problems; 68 "core" indicators for determining the causes and effects of these problems; and 114 "complementary" indicators that help apply the analysis to decision making.

"The real power of this tool lies in its ability to transform information into action," says Norberto Fernández, UNEP's regional coordinator for environmental information, assessment, and early warning in Latin America and the Caribbean.

"Decision makers in Central America are already accustomed to using economic and social indicators," comments John Dixon, lead environmental economist at the World Bank. "But the region's economic and social well-being is closely tied to the health of its natural resources. Indicators of rural sustainability will make it possible to integrate vital environmental issues into policy making and planning."

The indicators tool will enable decision makers not just to analyze past and present problems but to explore future possibilities. With a "spatial land-use model" developed at Wageningen University in The Netherlands, users can explore the potential impact of specific policies, strategies, and actions under different scenarios, such as "business as usual," "natural disasters," or "sustainable rural development."

"The lessons learned from this work are highly relevant to other parts of the developing world. That's why we've published a 'lessons-learned' report, as part of an information package, whose centerpiece is the decision-support tool on CD-ROM," comments Lisa Segnestam, operations analyst/economist in the World Bank's Environmental Economics and Indicators Unit.

Application of the indicators tool in Central America has already produced alarming results. For example, a study on land use -- the central determining factor of environmental health and economic development -- showed that nearly half of Central America's land surface is being used inappropriately, giving rise to serious problems of soil degradation. Ironically, the 25 percent of the region's land surface that has agricultural potential is being used largely for other purposes, such as secondary forest. Meanwhile, 14 percent of the land area that is currently in agricultural production is better suited for forestry.

The study also calls attention to a decline both in traditional mixed cropping systems (based on maize and beans) and in forests. These are being replaced by intensive production of permanent crops (such as coffee, banana, and sugarcane) and improved pastures for livestock. Driven by short-term factors such as crop prices as well as long-term factors such as access to land, these trends translate into reduced food security, increased rural poverty, and accelerated environmental damage.

A companion study on Central America's vulnerability to natural disasters showed that a third of the region is at risk of flooding. A full 60 percent of Honduras's territory is vulnerable to flooding and landslides. Little wonder, then, that this country was hardest hit in 1998 by Hurricane Mitch, the region's worst natural disaster in a century. The vulnerability study also documents the economic, social, and environmental impacts of Mitch and compares different approaches to reconstruction on the basis of their potential for helping the greatest number of poor people.

"The indicators provide a practical way of seeking answers to questions that affect the welfare of millions of people," says Winograd. "Why are some countries more vulnerable to natural disasters than others? Can they be made less vulnerable through road maintenance, reforestation, and soil erosion control? And if so, where should these actions be concentrated?"

In the hope of answering such questions, the Honduran Secretariat of Natural Resources and the Environment plans to use the new indicators tool in a national study of the state of the environment, according to Costa Rican GIS Specialist Adrián G. Rodríguez.

The new product for Central America builds on the foundation laid by a previous CIAT/UNEP project, which published Latin America's first computerized environmental indicators atlas in 1998. Like that product, the Central America tool kit draws largely on information already available, though its level of detail and power of analysis are greater.

"The supreme advantage of these tools over other data sources is that they enable users to visualize and analyze data through a user-friendly geographic information system, or GIS, interface," explains Andrew Farrow, a GIS specialist at CIAT. This interface provides access to maps, tables, graphs, and animation of the various indices and indicators. By overlaying indicators in map form, users can examine cause-and-effect relationships between such factors as agricultural land use, incidence of fires, and protection of forested land. "Central American countries spend millions of dollars collecting census and other data. The indicators tool demonstrates how they can get value from that investment by actually using the data in decision making," says Farrow.

"Rural Sustainability Indicators for Central America" was developed through a collaborative process, involving 6 regional and 50 national institutions. All took part in extensive consultations, workshops, and training events. "We need to organize more such events," says Winograd, "so that decision makers can become truly adept at using the indicators to benefit people throughout the region."

CIAT is a nonprofit, nongovernment organization that conducts socially and environmentally progressive research aimed at reducing hunger and poverty and preserving natural resources in developing countries. It is one of 16 food and environmental research centers working toward these goals around the world in partnership with farmers, scientists, and policy makers. Known as the [Future Harvest](#) centers, they are funded mainly by the 58 countries, private foundations, and international organizations that make up the Consultative Group on International Agricultural Research ([CGIAR](#)).