ORGANIZATION OF AMERICAN STATES

NATURAL RESOURCE AND ENVIRONMENTAL ACCOUNTS FOR DEVELOPMENT POLICY

Final Report on a Seminar Held in Washington, D.C., April 13-14, 1993 by the Committee on the Environment of the OAS Permanent Council

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CONTENTS

FOREWORD

It is increasingly clear that the existing economic accounting framework--the national income accounts--fails to provide policy- and decision-makers or the general public with essential information for steering economic progress into a sustainable path. Particularly, the national accounting system fails to value natural resources as productive economic assets. Thus, it makes no distinction between activities that make use of the sustainable yield of a nation's natural assets and those that deplete or degrade them.

This situation is changing. In recent years, a fundamental change has taken place in the way national governments and the international community measure and think about countries' economic performance. Leading economists now agree that national income accounting should treat natural resources as it does other tangible economic assets. Standard-setting agencies, such as the United Nations Statistical Office, have formulated new methodological guidelines. More and more industrialized and developing countries are constructing revised resource and environmental accounts in order to make them more relevant to sound environmental management and sustainable development. In our own hemisphere, while Canada and the United States have taken the lead in this initiative, other countries are also taking steps to initiate the process of revision. Those countries that have completed pilot accounting projects--including Canada, Costa Rica, Mexico, and Uruguay--have gained significant new insights into environment-development interactions and a more accurate basis for policymaking.

In serving as host of the seminar reported on in this document, the OAS is pleased to have provided, through a joint effort with the World Resources Institute, a pioneering hemispheric forum for discussion of the issues arising from its member countries' new and incipient accounting experiences. I am sure that the seminar's results will benefit all the institutions of the region working on environmental and accounting matters, and the wider development community as well.

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SUMMARY

Background

The 1992 United Nations Conference on Environment and Development (UNCED) and its extensive preparatory process have reinforced the activities of the OAS related to sustainable development and integrated natural resources and environment management. Specific mandates for action by the OAS are contained in two documents approved by its General Assembly: the "Inter-American Program of Action for Environmental Protection" (1991) and "The Organization of American States and the Issues of Environment and Development" (1992).

As part of its response to these mandates and to Agenda 21, the General Secretariat of the OAS has recently conducted two regional meetings of experts and government officials. The Inter-American Seminar on Environment and Development, held in Washington, D.C., on September 8 and 9, 1992, defined specific technical cooperation efforts to meet the needs of various Latin American subregions in resolving issues of environment and development. The second meeting, the Seminar on Natural Resource and Environmental Accounts for Development Policy, which was undertaken by the Commission on the Environment of the OAS Permanent Council, is the subject of the present report.

Description and Results

The Seminar took place at OAS headquarters on April 13 and 14, 1993, under the auspices of the World Resources Institute (WRI) and the Department of Regional Development and Environment (DRDE) of the OAS. It brought together experts and officials responsible for national income accounting from countries in the hemisphere to consider how natural resource and environmental accounting (NREA) could be introduced into national income accounts and used to formulate development policy.

Ninety-four people attended, including 54 representatives from 30 member states, 14 participants from 9 international development assistance institutions, 13 participants from nongovernmental organizations, and 13 staff members of the General Secretariat. Fourteen official documents were specifically prepared for the seminar, including case studies from Brazil,

Canada, Colombia, Costa Rica, Mexico, and Uruguay, and background material from WRI, the United Nations Development Program (UNDP), the United Nations Statistical Office (UNSO), the U.S. Agency for International Development (AID), the World Bank, the OAS, and the Inter-American Statistical Training Center (CIENES). The agenda of the meeting and the list of participants appear in Appendixes 1 and 2, respectively.

The meeting proved most successful, not only as a means of exchanging the latest information on NREA among OAS member states, but also in defining a concrete program of hemispheric cooperation. It produced four important results: (1) it brought together the principal officials responsible for national income or environmental accounts from almost every country of the Americas; (2) it provided information on the status of the NREA systems being developed in the region, allowing a useful exchange of views among experts and officials on experiences gained and lessons learned; (3) it provided participants with information on the kind of NREA-related assistance that the development agencies participating in the meeting could provide; and (4) it generated a proposal for a coordinated regional program on NREA, involving mutual cooperation between member states and support from development agencies.

Outline of Case Studies

Countries with NREA programs in progress presented their experiences in a panel discussion. The panelists included Jerry Gravel, Canada; Camilo Montoya, Colombia; Raúl Solórzano S., Costa Rica; Antonio Rodriguez Gonzalez and Ronaldo Seroa da Motta, Brazil; Hector de Alzua Romo and Roberto López Pérez, Mexico; and John P. Hoehn, Uruguay. Background papers they had prepared were distributed at the meeting and are available to requesting institutions from the Department of Regional Development and Environment of the OAS (see Appendix 3 for the list of documents). The papers and presentations are summarized below.

No national NREA program was reported at the Seminar for **Brazil**. However, the Brazilian panelists presented two studies that suggest the presence of lively independent efforts and debates on NREA within the country. The first paper discusses the main topics and some of the issues that the Government should take into account in implementing a NREA system, at national and regional levels. It deals with the evolution of national accounts since the inclusion of environmental accounts was first considered, the content of and principles involved in environmental accounting, the relevance of regional accounts and international data, the dimensions and productivity of natural resources in Brazil, the importance of physical indicators, and the relationship between environmental accounting and sustainable development. The independent development of regional accounts is emphasized in view of the large size and resource diversity of the country. A classification of the country's resources is proposed as follows: (a) soils; (b) nonrenewable resources (mineral); (c) renewable resources (biomass); (d) water resources; (e) environment deteriorated by clearly identified agents; (f) environment deteriorated in the past (or at present by unidentified agents).

The second paper presents estimates of depletion costs of mineral and forest resources in Brazil using two alternative forms of measurement: the net-price and user-cost approaches. In the case of minerals, estimates of annual depletion costs and factors according to each method show very distinct values. In particular, the difference in magnitude of estimated depletion costs is very large. The difference is also large and significant in the case of forest resources. With the net-price approach, forest depletion costs represent almost 100 percent of the total value of agricultural production. With the user-cost approach, this figure reached a maximum of 36 percent in 1980.

In **Canada**, Statistics Canada is the central statistical agency; its reports cover all aspects of the national economy and social conditions. It has been active in the field of environmental statistics for almost 20 years. In 1978 it published a compendium of such statistics, Human Activity and the Environment, which has been updated twice, in 1986 and 1991. It is working closely with Environment Canada--the federal department responsible for combating pollution and ensuring proper management of resources--in developing and reporting environmental statistics.

Canada's Green Plan (1990) set out a comprehensive environment policy, detailing funding for existing statistical programs and proposing new directions. Statistics Canada received Green Plan funding to develop accounts aimed at showing the effect of economic activity on the environment. These accounts were to be either extensions of existing parts of the Canadian System of National Accounts or satellite or supplementary accounts.

Four sets of environmental accounts were proposed. The first would include natural resource stocks and flows in national balance sheet accounts and stock-flow reconciliation accounts. A pilot project was proposed for both a renewable (forest) and a nonrenewable (oil) resource. These pilot accounts are now well under way; physical and monetary data are being developed for both stocks and flows. A second set of accounts would use the input-output framework to identify resource use. Again, both physical-quantity and money-value data have been developed in a pilot account tracing fuel use. A third set of accounts would use the input-output framework to identify the output of waste and pollutants associated with the level of economic activity. A study of greenhouse-gas emissions by industry and commodity has recently been completed. A fourth set of accounts would cover environmental expenditures on, e.g., pollution prevention or clean-up activity. While many conceptual problems remain, initial conceptual development and some exploratory data collection have begun.

In **Colombia**, the government has formulated a comprehensive and ambitious national Environmental Account Program. Great importance has been attached to broad participation by institutions involved in policymaking and environmental accounting and to strengthening them. An Interagency Committee on Environmental Accounting was created in 1992, composed of authorities from the national institutions responsible for formulating economic policy, allocating and controlling government expenditures, managing natural resources, and preparing national income accounts, together with representatives from the private sector, nongovernmental organizations, and academic institutions.

In developing a Colombian accounting system, the Interagency Committee has emphasized the use of other countries' experience, the discussion of alternative paths for developing the system, and the provision of training for officials and technical staff of participating institutions. Three main lines of action were defined:

1. Constructing physical accounts (stocks and flows) for three natural resources. Three regional corporations--autonomous public entities responsible for the development and zoning of specific regions of the country--are preparing methodological proposals for the construction of natural-assets accounts in each region. A national project to prepare natural-resource inventories through cartographic records and satellite imagery is being drawn up.

2. Developing conceptual and methodological bases for both integrating the new accounts with the existing national accounts system and constructing "green" macroeconomic indicators.

3. Analyzing the size and composition of government spending on the management and conservation of natural resources and developing a proper reclassification of such spending.

In **Costa Rica** the Tropical Sciences Center, a private, not-for-profit research institute located in San José, has undertaken the compilation of natural-resource accounts covering Costa Rica's forests, soils, and fisheries over the years 1970 to 1989. The project was undertaken in cooperation with the WRI, and received support from the Costa Rican Ministry of Natural Resources and Mines and from the Central Bank, which compiles the national accounts. International cooperation was manifested in financial assistance from AID, the International Development Research Center (IDRC) of Canada, the Netherlands Ministry of Foreign Affairs, and the Noyes Foundation in New York. The results of the study have been presented in joint publications by the WRI and the Tropical Sciences Center.

The methodology of the Costa Rican natural-resource accounts is compatible with the guidelines recently developed by the UN Statistical Office. Forest accounts were based on detailed estimates of timber stocks, disaggregated by species type, region, and ecological zone. Year-by-year estimates of timber losses through deforestation, burning, timber harvesting, and other sources were compared with estimates of growth, reforestation, and regeneration. Value accounts were based on detailed estimates of stumpage values, disaggregated by species, geographic zone, and year.

Soil and forest accounts were based on detailed geographic information system mappings of bioclimate, topography, soil types, and land uses. Soil-erosion rates were then estimated by applying the universal soil-loss equation. Value accounts were constructed using the nutrient-replacement-cost method.

Fishery accounts were constructed from a bioeconomic model of resource depletion in the Gulf of Nicoya, Costa Rica's principal coastal fishery. Data on yields and fishing effort were used to estimate a sustainable yield curve, which, combined with information on fishing costs,

provided an annual estimate of resource rent and asset value in the Gulf of Nicoya fishery. Resource-depletion estimates were derived directly from changes in the fishery's asset value.

In the aggregate, the natural-resource accounts indicate annual depletion averaging approximately 5 percent of Costa Rica's GDP, rising to almost 9 percent in 1989 and offsetting more than one third of gross capital formation.

In **Mexico**, a case study was carried out in 1990-91 by the National Institute of Statistics, Geography, and Informatics (INEGI), UNSO, and the World Bank. The system of satellite accounts developed by UNSO was used as the overall analytical framework. A system of economic and environmental accounts (Sistema de Cuentas Económicas y Ecológicas de México, SCEEM) was developed by reformatting the standard system of national accounts and adding new areas of concern: oil depletion, deforestation, land use, and degradation of environmental assets.

The study involved four stages. First, a standard net domestic product (NDP) was calculated by deducting from gross domestic product (GDP) the depreciation of produced-asset balances. Second, an adjusted net product was obtained by deducting the depletion of oil and other nonproduced assets. Third, an assessment was made of the degradation of nonproduced assets that affects the quality of life and is brought about by such occurrences as pollution of water and air, erosion of soils, use of groundwater, and the deposit of solid wastes. Fourth, land-use concerns and deforestation were incorporated into the accounting framework; the depletion of forests over and above their maximum sustainable yield was counted as depletion costs.

Depletion and degradation were first assessed in physical terms and then expressed in monetary units by different methods of valuation. The resulting NDP for 1985 was around 42 billion pesos. The first environmentally adjusted net domestic product (EDP), obtained by deducting environmental costs related to depletion and land use from NDP, was 94 percent of traditional NDP. The second environmentally adjusted NDP (EDP2), obtained by further deducting degradation costs, was 87 percent of NDP.

Efforts were made to assess the effects of depletion and degradation not only on the overall economy, but also on different sectors. Follow-up studies, by INEGI or others, are expected to improve data and estimates in selected areas.

In **Uruguay**, national accounts are prepared by the Central Bank, which is currently working on changing the basic year for the system. This is a major effort that will probably be followed by the development of an NREA system. An independent environmental account pilot project was conducted in 1991 as part of the National Environmental Study executed by the Government and the OAS with IDB funding. The project involved the preparation of soil physical accounts and a proposal for the establishment of an NREA system in the country.

The objective of the soil accounts was to obtain a physical measure of soil depreciation on agricultural lands through an estimation of historical erosion rates in those lands. Estimates of erosion rates were derived from an application of the universal soil loss equation and based on detailed information on soil types, topography, climate, crop types, and technology of production. Estimates of 24 and 36 ton/hectare were obtained as, respectively, averages for net and gross erosion rates. These figures are high as compared with, say, the 12 ton/hectare observed in the United States for average net soil loss.

The soil-account results suggest that economic and technology policy have a significant impact on soil loss in Uruguay, and the environmental accounts have an important role to play in the analysis and formulation of environmental policy. Soil accounts show, for instance, that soil loss would decline by 13% if the current mix of crop subsidies and taxes was shifted to a policy based on market prices, and by 29% if existing conservation technology was extended to all agricultural areas in Uruguay.

On the basis of the experience gained with the application of the soil accounting methodology, a proposal was prepared for extending its use to other natural resources of the economy. Guidelines and criteria were provided for the step-by-step development of a national NREA system.

Issues and Conclusions

The following issues raised and conclusions reached are derived not only from discussions and presentations during the meeting, but also from a short statement on NREA implementation issues submitted by many participants before the event and from comments received on the proposal for a hemispheric program.

The participants agreed that throughout the hemisphere there is a growing awareness of the need to introduce natural-resource and environmental accounting into national income accounts and to use it in the formulation of development policy, even though a standard or generally accepted methodology is still in the process of development. Participants also recognized the many purposes that NREA systems can accomplish, even at an early stage of development, and their low cost in relation to the magnitude of the problems they may help to solve.

The vital role of NREA systems in improving macroeconomic accounting and environmental management, and as a tool for policy- or decision-making was widely accepted by national institutions in charge of national accounts or environmental matters. Most of the official participants expressed the interest of their governments or institutions in establishing NREA systems, especially if they could obtain appropriate knowledge and assistance.

The introduction of new accounting frameworks in the hemisphere has so far been uneven. A few countries (notably Canada, the United States, and to a lesser extent Mexico,

Colombia, Costa Rica, and Brazil) are taking concrete steps to adopt the new systems, and even to develop their own methodologies to deal with specific resources. Some other countries, including Chile and Argentina, have launched research efforts outside of government. Most of the others are in various exploratory or preparatory stages, or have not yet launched serious NREA efforts.

Among the countries that have already initiated the process of establishing NREA systems, some (Mexico, Colombia, Peru) are seeking to follow a standard accounting framework, that of the United Nations Statistical Office (UNSO), while the others (Brazil, Canada, Costa Rica, the United States, Uruguay) that have proceeded independently of the UNSO have nonetheless used methodologies that are fundamentally compatible, although adapted to the particular needs of the country or institution involved.

The experience reported at the Seminar also showed that while some countries sought to correct or improve macroeconomic data, mainly by revising national income accounts, others concentrated on sectoral or resource-specific data, seeking to deal with specific issues or policies. Since national aggregates are built up from sectoral accounts, these approaches are convergent. It is to be expected that the institutions in charge of national accounts would emphasize a more comprehensive accounting, and institutions responsible for environmental matters or specific resources might initiate sectoral accounts. Moreover, from the expositions of the IDB and World Bank representatives, it can be inferred that the IDB is concentrating on the sectoral approach as part of its work with individual projects or structural adjustment loans, while the World Bank is formulating a work program encompassing both aspects. The UNSO is attempting to reconcile the two approaches by providing a common framework that may be used in whole or in part, and at different levels of aggregation.

Many participants stressed the need to develop common technical language and standards that facilitate both communication between member states on this subject and international comparisons of performance. Some also found it desirable to develop a common framework for determining and prioritizing information needs, especially for developing member countries. The current work of UNSO is of great importance in both regards, but creating appropriate mechanisms of information and assistance for a continuous application of that work in all hemisphere countries remains a challenging task. A coordinated effort by member countries and development agencies is required.

The participants agreed that member countries could benefit greatly from a systematic exchange of information and ideas on accounting methodologies, practical applications, valuation techniques, studies in progress, etc. Establishing a system of information gathering, updating, and dissemination to facilitate that exchange would be useful. The creation of an information network was formally proposed during the meeting and accepted as a very desirable goal.

The participants strongly supported the provision of training on NREA through regional programs. Different institutions of the region, especially those supported by development agencies, could usefully provide specialized courses, workshops, and in-service training for

officials and technical staff of institutions responsible for the preparation of national income or resource-specific accounts. The representative of CIENES described the NREA training program that this institution will be initiating in the near future.

Proposal for a Hemispheric Program

In view of many of the foregoing issues, and of the interest shown by participants in establishing some form of the NREA system in their countries, a proposal was made at the end of the meeting for the creation of a hemispheric program on NREA to coordinate and strengthen the initiatives and actions of countries and development institutions in this field, especially through cooperative efforts.

A committee was formed to draft a proposal for such a program, and the OAS was asked to serve as its secretariat. The Committee included representatives from Barbados, Brazil, Colombia, Peru, Uruguay, Venezuela, UNSO, UNDP, and the OAS. The OAS General Secretariat prepared an initial draft and circulated it among the committee members, who made some contributions of their own and gave widespread support to the proposal.

The proposed Program will support national activities to establish or develop NREA systems and will facilitate technical and financial assistance from multinational, bilateral, and nongovernmental organizations. It will not centralize such activities or assistance in a new international office, but will further the initiatives of countries and development agencies whenever this support is deemed desirable, cost-effective, and acceptable to the parties involved.

Its specific objectives are to facilitate the exchange of information between member states; to promote the development of common technical concepts, definitions, and quantitative indicators, so as to permit meaningful international comparisons; to promote financial and technical assistance from development agencies to NREA-related activities; to enhance the impact of such programs by coordinating or combining them; and to complement them with other appropriate cooperative activities, including the direct provision of technical assistance and training.

The principal activities of the Program are the following: (a) to exchange information among countries, especially through periodic inter-American meetings; (b) to coordinate approaches and methodologies, especially through continuous interactions with UNSO; (c) to provide training, including regional courses or seminars, and in-service training for government officials and technical staff from institutions involved with NREA; and (d) to provide technical and financial assistance to national institutions interested in developing or applying NREA systems.

Each of these activities will be executed by various mechanisms and institutions, with assistance from development agencies such as UNDP, UNSO, the World Bank, the IDB, OAS, AID, and the Canadian International Development Agency (CIDA). The Program will have a

secretariat responsible for overall execution, including the coordination of activities of institutions executing individual components. This secretariat could be located at the headquarters of a regional institution with statistical competencies--such as the OAS, CIENES, the UN Economic Commission for Latin America and the Caribbean (ECLAC), or some other. Initially, the DRDE of the OAS will act as secretariat of the Program and the Committee will provide policy and operational guidelines.

The Program will initially last three years. Each year, it will tentatively involve two hemispheric technical meetings for experts and officials of member countries; 36 months of technical assistance to national institutions; financial support to two national NREA projects, especially those that promise methodological or other advances with spillover benefits within the hemisphere; two two-week inter-American courses or seminars on NREA; and information-exchange activities. At present, external financing is being sought for this Program.