Eco Asia Project

ECO ASIA PROJECT
- A Long-Term Perspective on Environment and Development in the Asia-Pacific Region -

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1. Background

Eco Asia '93 was held on 30 June and 1 July, 1993 as a follow up to the Eco Asia '91 and the 1992 Earth Summit. The objective of Eco Asia '93 was to determine the course that environmental cooperation should take in the Asia-Pacific region on a long-term basis.

At the Eco Asia '93 the Japan Environment Agency proposed the "Eco Asia Project: Long-Term Perspective on Environment and Development", which received positive support from participating governments and international organizations. The Chairman's Summary of the Eco Asia '93 made the following comments about this:

It is necessary to have a long-term view, beyond the present generation, in order to satisfactorily cope with the issues of environment and development as well as to achieve sustainable development. Accurate and adequate information, not only on the present state of the environment but also on trends and future prospects for environment and development can provide decision makers with a scientific basis for policy formulation. Drawing up such perspectives would also contribute to the establishment of shared perceptions among policy makers in the region, and to the promotion of regional cooperation. Participants welcomed the initiative of the Environment Agency of Japan for its new project "The Long-term Perspective on Environment and Development in Asia and the Pacific". It is hoped that this project will be conducted with the active cooperation of other governments in the region, relevant international organizations and research institutes.

The results of the Environment Agency's project on long-term perspectives will be distributed to each nation through Eco Asia, as well as other opportunities such as workshops for this project. It is hoped that this will result in a new development of regional cooperation. Such activities could provide input to the special session of the UN Assembly which will be held not later than 1997 for the overall review and appraisal of Agenda 21.

The above states the background upon which this project will be implemented. This work plan is intended to provide a guide on how to proceed with implementation.

2. Overview

Policy discussions on environmental problems have generally been concerned with what might be called the negative aspects of development: the environmental damage caused by expanded economic activities resulting from development. It is a fact that in the Asia-Pacific region, now regarded as the world's center of economic growth, there are deep concerns about the growing seriousness of acid rain, caused by rapid urbanization and rising energy consumption, as well as the danger of a rise in sea level caused by global warming.

At the same time, however, this region also has many poverty-stricken developing countries with large numbers of inhabitants whose lives are threatened by of problems including contaminated water supplies and inadequate sanitation. Poverty, in turn, is a serious cause of environmental damage such as indiscriminate land use and forest clearing. Poverty is a result of

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1 Prof. Imura is a member of the working group for the Eco Asia Long-Term Perspective. This report is a draft work plan as of February 1994, prepared by the group.

insufficient economic development in these countries, and its alleviation requires both quick efforts aimed at promoting development, as well as a broad spectrum of aid provision from developed countries.

Viewing the situation from another perspective provides hope for creating a positive link between environmental protection and development, in which the development of this region will raise the environmental consciousness of its people, and facilitate environmentally-benign economic activities. The Asia-Pacific region needs to bring about sustainable development in order to achieve the necessary socio-economic development which will allow countries to tackle environmental problems in the long term.

Thus, the objectives of this project are:

- to eradicate poverty in the region and prevent the environmental damage it causes;
- to encourage appropriate environmental protection policies that are based on societies and economies also achieving growth; and
- to lay a foundation which will insure that environmental problems do not hindethe future advancement in the region.

It is intended that this project will not only provide forecasts of the environmental problems that can be expected from future economic growth in the region, but also prepare projections of the socioeconomic situations that are likely to result. It will then aim to thoroughly evaluate the results. Having done this, the project will attempt to determine what sustainable development in this region actually means, and examine policy options that meet each country's own circumstances.

3. Project Methodology

The project methodology is summarized in Fig. 1. This project will begin with formulating "business-as-usual" scenarios which assume that the Asia-Pacific countries will proceed with economic development as is currently planned, at least until the year 2025. The project will then develop socioeconomic projections for the region over this period and forecast its environmental problems on the basis of the "business-as-usual" scenarios. Finally, it will use these projections and forecasts to evaluate "development and environment" portraits and to select policy issues from various perspectives such as (1) the quality of life, (2) resource consumption, and (3) the extent of environmental degradation.

As the second step, the project will examine the viable policy options for the region on the basis of the policy issues selected above, and formulate "alterative" scenarios by reassessing the "business-as-usual" scenarios. Projections and forecasts will also be developed for these alternative scenarios. The project will then evaluate the effectiveness of these policy options after a comparison with the "business-as-usual" scenarios.

In the final stage, the project will consolidate the findings obtained through the above process and related discussions, and then propose policy options.

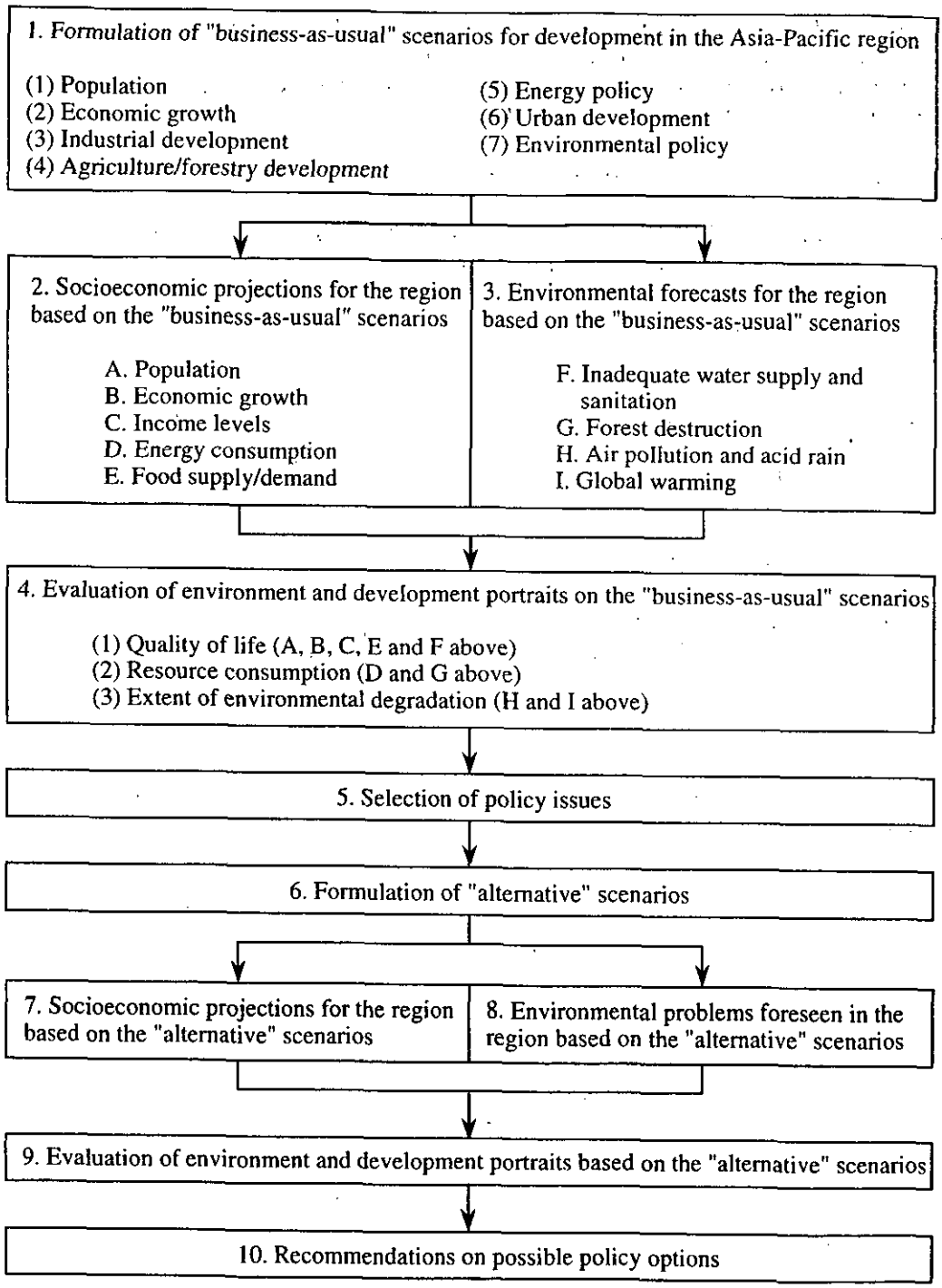


Fig. 1 Project Methodology

4. Process Description

1. Formulation of "Business-as-Usual" Scenarios for Development in the Asia-Pacific Region

The first step in this project involves obtaining the cooperation of participating countries in the collection of data on their main policies plus the predictions and outcomes expected to result from the implementation of those policies. "Business-as-usual" scenarios for development in the region will then be formulated on the basis of these data.

Current situation scenarios for the following sectors need to be formulated:

(1) Population scenario (eg: population growth rates and migration trends)
(2) Economic growth scenario (eg: economic growth rates)
(3) Industrial development scenario (eg: industry types, investment, and production [amounts and values])
(4) Agriculture/forestry development scenario (eg: investment, production [amounts and values], and forest area)
(5) Energy policy scenario (eg: energy demand reduction, rate of improvement in energy use efficiency, and energy mix)
(6) Urban development scenario (eg: investment in water supply and sanitation facilities)
(7) Environmental policy scenario (eg: direct regulations, and economic mechanisms)

2. Socioeconomic Projections for the Region Based on the "Business-as-Usual" Scenarios

On the basis of the previously formulated "business-as-usual" scenarios, projections for each of the following items will then be developed for the region's socioeconomic conditions for the year 2025:

A. Population

According to the United Nations Population Fund (UNPF), the Asia-Pacific region's population will grow at an average annual rate of 1.3 percent, and is predicted to reach approximately 4.6 billion by 2025. The region's inhabitants are also expected to concentrated in the urban areas. An Asian Development Bank report predicts that while 30 percent of the region's population was centered in urban areas in 1990, this will rise to 50 percent by 2020. This project will prepare projections that take this prediction into account when particular population policies are assumed.

B. Economic Growth

Recent forecasts have estimated the economic growth rate in the Asia-Pacific region during the 1990s at 6.7 percent in East Asia and 4.7 percent in South Asia. If these areas maintain this level of growth, then by 2010 the Asia-Pacific region will become a bigger economic bloc than the North and South American bloc or the European bloc. The project will develop a projection that takes into consideration such factors as the effects of energy and other environmental policies on economic growth.

C. Income Levels

According to a World Bank report, it is expected that even though the number of poor in Asia will continue as this century approaches, roughly half the world's poor will still live in the Asia region by the year 2000 (Table 1). The project will build on the results of A and B above to develop a projection of regional income levels for the year 2025.

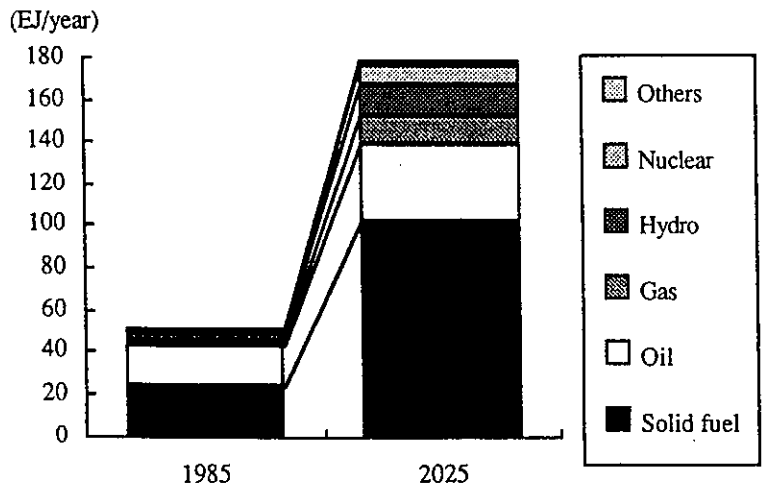
Table 1. Number of Poor in Developing Countries (1985-2000)

Region	Percent of population below poverty line (%)			Number of poor (millions)		
	1985	*1990*	*2000*	*1985*	*1990*	*2000*
Developing countries overall	30.5	29.7	24.1	1051	1133	1107
South Asia	51.8	49.0	36.9	532	562	511
East Asia	13.2	11.3	4.2	182	169	73
Sub-Saharan Africa	47.6	47.8	49.7	184	216	304
Middle East, North Africa	30.6	33.1	30.6	60	73	89
Eastern Europe (excluding former Soviet republics)	7.1	7.1	5.8	5	5	4
Latin America and Caribbean	22.4	25.5	24.9	87	108	126

Note: The poverty line used here ($370 per capita per year in 1985 US dollars) is based on estimates of the poverty line in many countries with low average incomes. Using 1990 prices, the poverty line is calculated at about $420 per capita per year.
Source: Ravallion, Datt, and Chen 1992.

D. Energy Consumption

The National Institute for Environmental Studies (NIES) forecasts that while overall world energy consumption will increase by an average of 1.6 percent annually between 1985 and 2025, it will increase at the much higher rate of 3.2 percent in the Asia-Pacific region. In particular, solid fuel (coal) consumption will rise to replace the declining resources of oil (Fig. 2). For this category, the project will develop a projection of energy consumption in 2025 on the basis of a scenario that assumes energy demand, more efficient use, and a move to other energy sources.



Source: National Institute for Environmental Studies (NIES)

Fig. 2 Primary Energy Consumption in the Asia-Pacific Region (1985-2025)

E. Food Supply and Demand

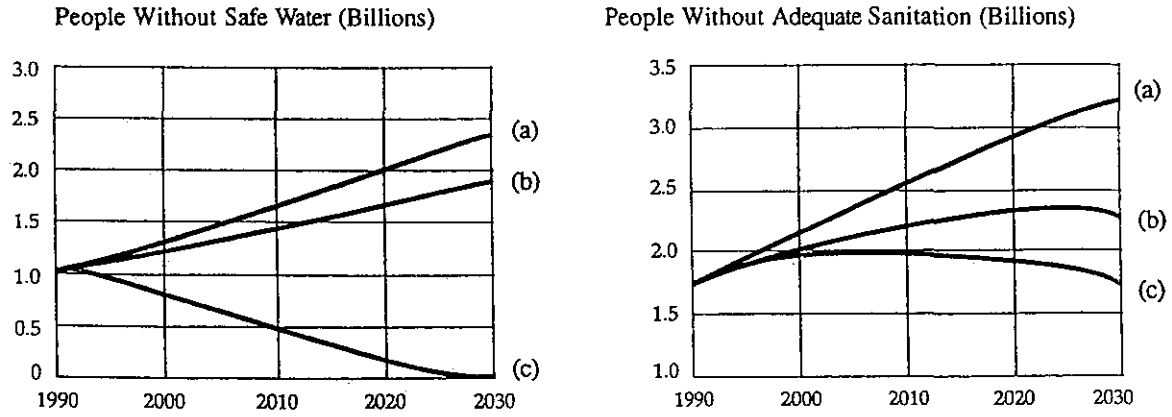
Based on the prediction that the region's population will reach approximately 4.6 billion by the year 2025, the region's food demand is anticipated to rise by at least 50%. A World Bank research shows that while it is possible to meet the two-fold increase in food demand anticipated for 2030, this will require a substantial productivity increase. The project will develop a projection of food supply and demand for the year 2025, based on an agricultural productivity improvement scenario and other relevant factors.

3. Environmental Problem arising from "Business-as-Usual" Scenarios

In parallel with the socioeconomic projections, the project will conduct simulations based on the "business-as-usual" scenarios using analytical models to forecast the region's environmental problems by 2025. It will place emphasis on the following environmental problems because of their relative seriousness and the availability of relevant analytical models.

F. Inadequate Water Supply and Sanitation

The World Bank estimates that at least 1 billion people throughout the world still do not have access to safe water supplies, and that 1.7 billion people lack access to adequate sanitation facilities. Furthermore, it is predicted that even if investments in the water supply and sanitation in the region are increased by 30 and 50 percent, respectively, a large proportion of the population will still remain without such services (Fig. 3). The project will refer to the model used in the above estimation in preparing forecasts of water supply and sanitation problems in the Asia-Pacific region.



Scenario (a): Practices are unchanged
Scenario (b): Investments in water supply and sanitation services during this period increase by 30 and 50 percent, respectively
Scenario (c): Scenario (b) plus the introduction of government policies to improve operating efficiency
Source: Anderson and Cavendish, the World Bank's estimation.

Fig. 3 People Without Safe Water and Adequate Sanitation (1990-2030)

G. Forest Destruction

During the 10 years from 1976 to 1986 the annual average loss of forests world wide was 2 million hectares. It is predicted that if this trend continues, another 6 percent of the world's forests will be completely destroyed by the year 2000 (Table 2). In particular, Southwest Asia is losing its forests at the rate of 0.9 percent per year, which is high compared to other countries in the region. The project will use a forest loss model to predict the state of the forest in the Asia-Pacific region at 2025.

Table 2. Estimated Forest Loss in Tropical Countries (1981-1985)

	Country	Annual rate of forest loss (%)	Area of forest lost annually (1,000ha)
Countries with high loss rate and broad area loss	Malaysia	1.2	255
	Thailand	2.4	252
	Laos	1.2	100
	Nepal	3.9	84
	Sri Lanka	2.1	58
Countries with broad area loss, but low loss rate	Indonesia	0.5	600
	India	0.2	147
	Myanmar	0.3	105
	Cambodia	0.3	25
	Papua New Guinea	0.1	22
	Philippines	0.7	91
	Vietnam	0.6	65
Countries with relatively small area loss, but high loss rate	Brunei	2.2	7
Countries with small area loss and low loss rate	Bangladesh	0.4	8
	Pakistan	0.2	7
	Bhutan	0.1	2

Source: International Institute for Environment and Development (IIED) and World Resources Institute (1986), and quote from Repetto and Gillis, "Public Policies and the Misuse of Forest Resources".

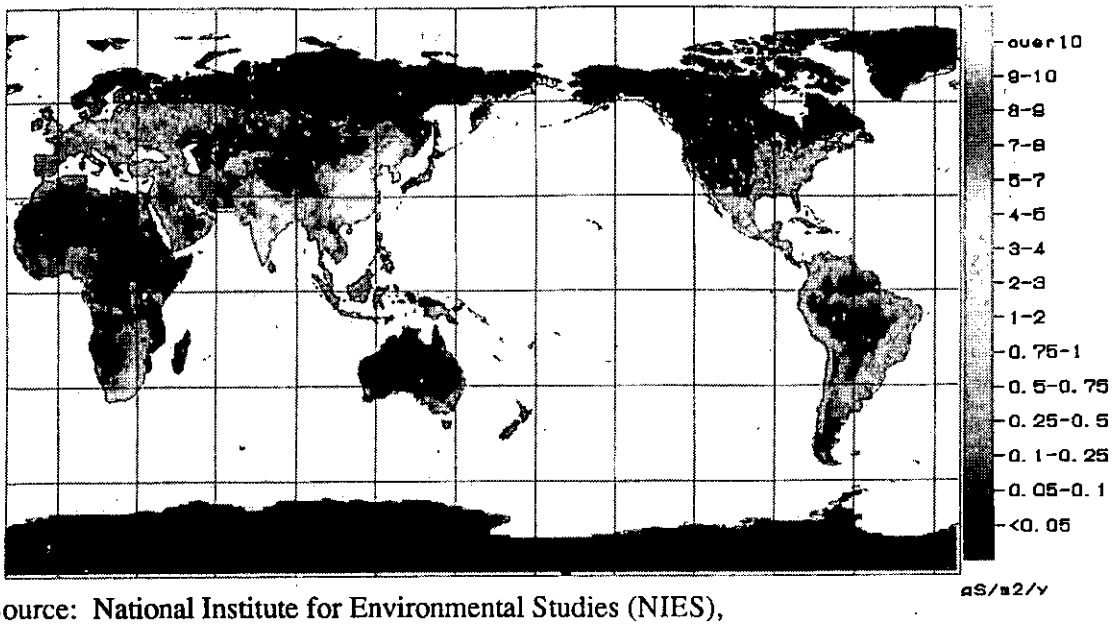
H. Air pollution and Acid Rain (SOx and NOx Emissions)

SOx and NOx emissions are major causes of air pollution and acid rain. Forecasts expect regional emission will more than double over the next 20 years. The predicted distribution of SOx emission distribution in 2100 is shown in (Fig. 4). It can be seen that emissions in the East and South Asia will be high. Here the project will use SOx and NOx emission models to conduct simulations.

I. Global Warming (CO_2 Emissions)

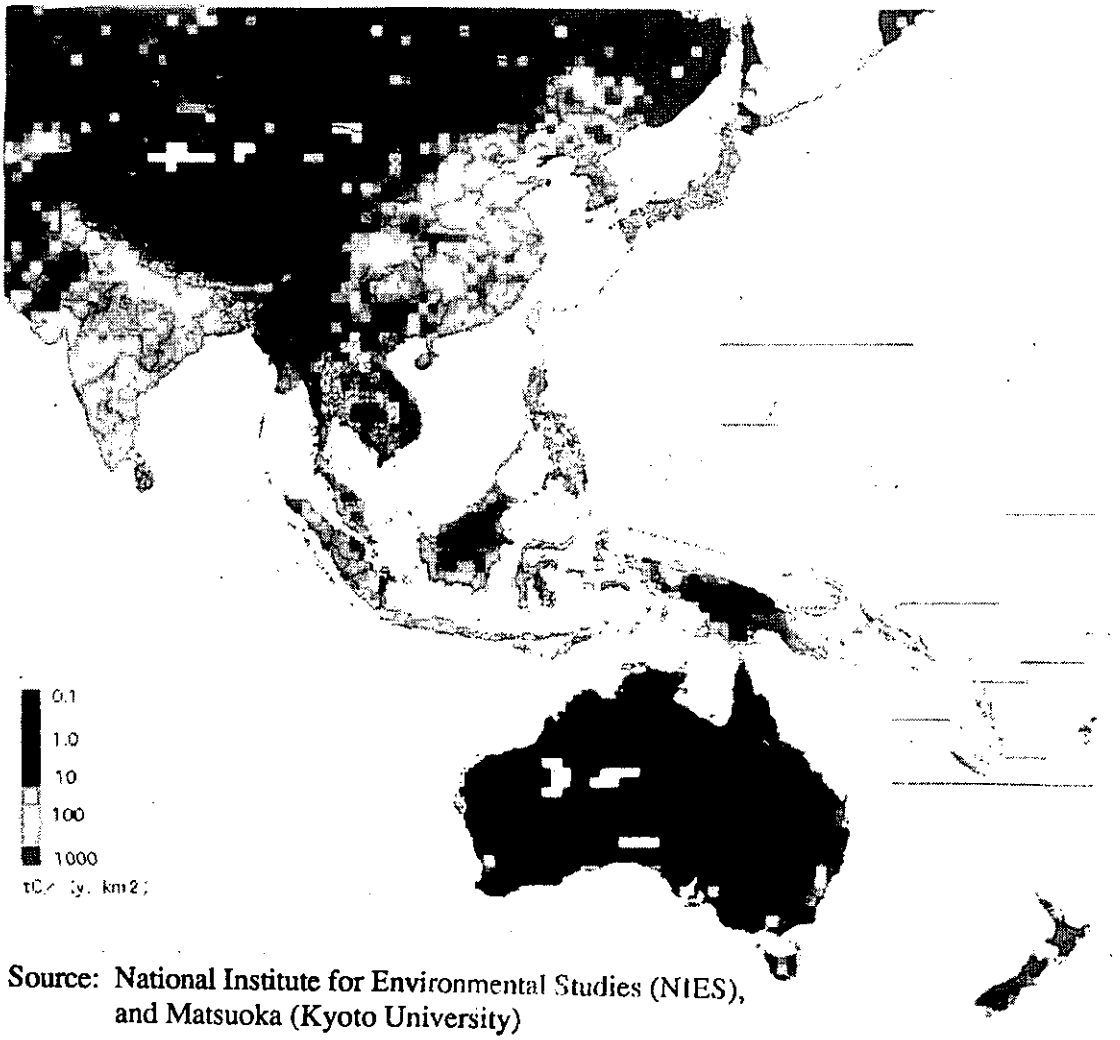
The National Institute for Environmental Studies (NIES) forecasts that emissions of CO_2, which account for roughly 55 percent of the contribution to the greenhouse effect, will increase globally by 1.7 percent per annum by the year 2025. Emissions from the Asia-Pacific region will increase by 3.2 percent per per annum (Fig. 5). CO_2 emissions will especially grow in China, India, Southeast Asia, and the Newly Industrializing Economics (NIEs).

Fig. 4 Distribution of Anthropogenic SOx Emissions (2100)



Source: National Institute for Environmental Studies (NIES), and Matsuoka (Kyoto University)

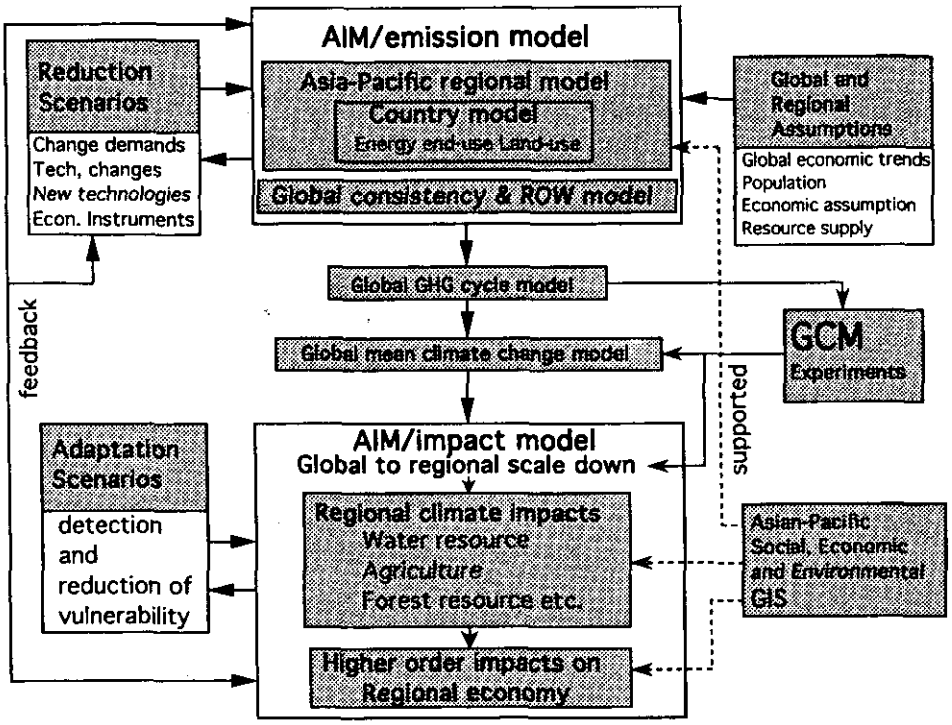
Fig. 5 Distribution of CO_2 Emissions from the Asian-Pacific Region (2025)



Source: National Institute for Environmental Studies (NIES), and Matsuoka (Kyoto University)

The project will use the Asian-Pacific Integrated Model (AIM) being developed at the National Institute for Environmental Studies (NIES) to forecast the amount of CO_2 emissions in the region. AIM will be able to assess the impact of each nation's global warming policies within the context of changes in the global environment and international socioeconomic trends.

The overall structure of AIM is shown in Fig. 6. It comprises the AIM/emission model, which predicts emissions of anthropogenic greenhouse gases (GHGs); the GHG cycle model and the climate change model, which predict the atmospheric concentrations of emitted GHGs and estimate the resulting temperature rise; and the AIM/impact model, which estimates the impacts of climate change on the Asian-Pacific region's natural environment, societies, and economies.



Source: National Institute for Environmental Studies (NIES)

Fig. 6 Overall Configuration of AIM

4. Evaluation of Development and Environment Portraits Based on the Business-as-Usual Scenarios

Using the results of both the socioeconomic projections and the environmental problem forecasts, the project will assess the development and environment portraits of the "business-as-usual" scenarios primarily from the following three perspectives.

(1) The Quality of Life

The assessment of the quality of life will principally rely on the results of the predictions for the following sectors:

A. Population
B. Economic growth
C. Income levels
E. Food supply/demand
F. Inadequate water supply and sanitation

(2) Resource Consumption

The project will assess the resource consumption from several perspectives including the capacity for self-regeneration; use by future generations; and the potential for artificial regeneration. The focus will be based on the following:

D. Energy consumption

G. Forest destruction

(3) Extent of Environmental Degradation

The project will assess the extent of environmental degradation from several perspectives including the capacity for self-restoration, effects on future generations, and the potential for artificial restoration. The focus will be based on the following:

H. Air pollution and acid rain

I. Global warming

In performing these assessments, the project will pay strong attention to the concept of sustainable development as well as the indicators used to measure it as discussed by various organizations around the world and the United Nations.

5. Selection of Policy Issues

Based on the results from the above development and environment portraits, the project will identify policy issues on development and environment in the region.

6. Formulating Alterative Scenarios

The project will review the viable policy options for the previously selected policy issues. It will then use these policy options as the basis for alterative scenarios created by reassessing the "business-as-usual" scenarios.

7. Socioeconomic Projections for the Region Based on the "Alterative" Scenarios

Based on the above "alterative" scenarios, and just as with the "business-as-usual" scenarios, the project will develop projections for categories including population, economic growth, income levels, energy consumption, and food supply and demand for the region in 2025.

8. Environmental Problem Forecasts for the Region Based on the "Alterative" Scenarios

In the same way, the project will also use the "alterative" scenarios to prepare forecasts for topics including the state of water supply and sanitation, forest loss, air pollution and acid rain, and global warming for the region in 2025.

9. Evaluation of "Environment and Development" Portraits Based on the "Alterative" Scenarios

Based on the results of both these socioeconomic projections and the assessments of environmental problems, the same kind of assessments will be made for development and environment portraits.

Additionally, the project will assess the effectiveness of policy options by making comparisons with the predictions based on the "business-as-usual" scenarios.

10. Proposing Policy Options

In addition to consolidating the findings and the results of discussions obtained thus far, there will be detailed discussions on the arrangements for policy option implementation, such as planning and procedures for international cooperation. These will be presented as proposals to meetings of Eco Asia.

5. Project Implementation

The entire Eco-Asia Project, including this workshop, is an international activity implemented with active participation of Asia-Pacific countries and relevant international organizations. In light of this, it is intended to establish the following implementation scheme:

A. Project Secretariat

The project secretariat will be based in the Japan Environment Agency for the time being at least. The secretariat welcomes the involvement of the participating countries and international organizations.

B. Working with Participating Countries

Each participating country will designate a national contact person (NCP). Each country is expected to participate in the project by collecting and providing the necessary information and sending specialists to workshops.

C. Working with International Organizations

The project will be conducted in close collaboration with the international organizations including UNEP, ESCAP, UNU, UNDP, UNCRD, IBRD, ADB, the East-West Center, and the World Resources Institute, and other relevant institutions.

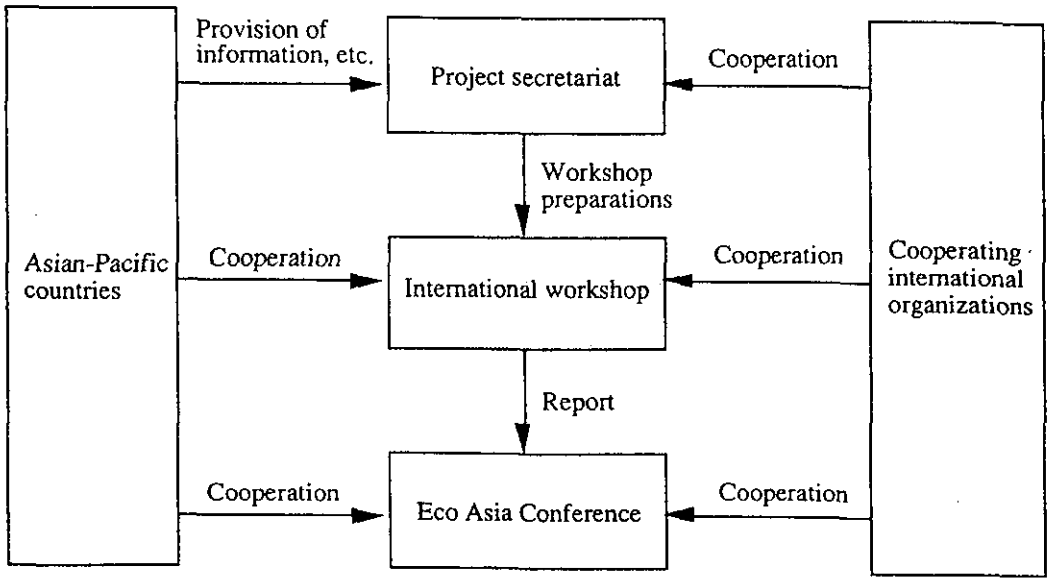


Fig. 7 Implementation of the "Eco Asia Project: Long-Term Perspective on Environment and Development"

6. Project Schedule

The interim report on project achievements is scheduled to be completed for the 1995 ESCAP Ministerial Conference.

It is proposed that the project be consolidated at Eco Asia '97, and the results presented at the special UN General Assembly on Environment and Development, scheduled for 1997, as the input. to the Assembly from the Asia-Pacific region.

1994
First Workshop (March 16 and 17)
- Discussions on work plan
Eco Asia '94 (scheduled for June 1994)
Second Workshop (to be decided)
- Assessments of development and environment in the Asia-Pacific region
- Selection of policy issues on development and environment in the Asia-Pacific region

1995
Eco Asia '95
ESCAP Ministerial Conference

1996
Eco Asia '96

1997
Eco Asia '97 (final consolidation)
Special UN General Assembly

Information to be collected through respective National Contact Persons (NCPs) and International Organizations

February 1994
Secretariat to Eco Asia Project

The secretariat will request the cooperation of the respective National Contact Persons (NCPs) and international organizations in collecting the following information:

(1) The national policies of the participating country regarding "development and environment", as well as the results of and other relevant data on forecasts based on those policies.

A.Major population policies/population predictions
B.Major economic development plans/economic growth predictions
C.Major industrial development policies/industrial production predictions
D.Major agriculture and forestry development policies (including afforestation policies)/agriculture and forestry production predictions
E.Major energy policies (demand reduction, improvements in utilization efficiency, conversion to other energy sources in sectors including industry, transportation, and household-service)/energy demand predictions
F.Major urban infrastructure construction policies (investment plans for water supply and sanitation facilities)/urban infrastructure construction predictions
G.Major food policies/food supply and demand forecast examples
H.Other environmental conservation plans/environmental problem predictions

(2) Macro-trends regarding environmental problems in the participating countries, and their internal debates regarding these problems.

(3) Debates over sustainable development that have heretofore been conducted in the participating country (and specific information and outcomes that resulted from these dialogues).

TOWARDS LAND USE FOR GLOBAL ENVIRONMENTAL CONSERVATION (LU/GEC) PROJECT

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National Institute for Environmental Studies

1. Background

The Asia-Pacific region is the most populous part of the world, with a combined 1990 population of 3 billion, accounting for 57 percent of the world population, expected to reach 4.6 billion by the year 2025. Distribution is highly uneven both among and within countries. Although population growth rates are declining in most countries of the region, the average is still 1.3 percent per annum. Parts of the region are also developing economically at a very rapid rate, especially Southeast Asia, China, Taiwan and South Korea.

Basic structural change accompanies industrial and commercial changes. This gives rise to increasingly serious environmental problems such as the devastation of natural resources including forests and soils, the consequent loss of bio-diversity, land degradation, pollution of water, air and soil in urban areas, transboundary air and water pollution, widening social disparities and unsanitary conditions.

These environmental problems are serious and cumulative; however, they do not occur everywhere and they are usually local. Nevertheless, there is a pervasive feeling of pessimism about our future, at the prospect of an exhaustion of energy and natural resources, a food crisis and other crises. Although our behavior is likely to be most strongly influenced by motives of short-term gain and convenience, we can't help wondering whether we are destined for prosperity or ruin.

Integrated indicators of sustainability are required to discuss the question scientifically. The task of determining such indicators is one of the most urgent on the socio-economic scientific agenda; however, this is not what we are planning to address. Mere we are dealing with the more specific and narrower issues related to sustainability.

But even for such specific issues, we have not yet developed indicators. Problems such as the critical state of terrestrial ecosystems, the loss of large areas of forest, the erosion of bio-diversity, and the extinction or near-extinction of fauna are widely discussed, and many bold guesses are made. There are, however, no sound data on the actual level of bio-diversity loss that has taken place, which may be the basic and indispensable data in developing to develop the indicators for sustainable terrestrial ecosystems. Sound data accumulation is one of our most urgent tasks.

Not a few countermeasures and substitutive systems have been proposed to cope with the above problems. For instance, agricultural countermeasures such as agroforestry and agroecosystems have been proposed as viable alternatives to western agricultural systems. As for socio-economic countermeasures, the concepts of eco-investment and Asian-metabolism have been proposed. Some countermeasures are still in the conceptual stage and some have already been implemented in the field. Industrial countermeasures, including new and appropriate technologies to reduce emissions or effluents from various sources, have been introduced.

However, the feasibility of these countermeasures is unclear. Countermeasure technologies are not implemented systematically but rather by trial and error. Some of them may actually cause other unforeseen environmental problems. Agroforestry or agroecosystems may be useful for the conservation of forests and soils in specific areas. However, there has been no comprehensive discussion as to whether or not these agricultural systems would be affordable if expanded to the entire Asia-Pacific region.

2. Objectives and tasks of LU/GEC

For future generations, we have to find ways of making development and environment compatible with each other. The Eco - Asia Project promoted by The Environmental Agency of Japan is one of one of those aiming for this goal. The project is seeking a way toward sustainable development in the Asia - Pacific region. The Land Use for Global Environmental Conservation (LU/GEC) project, which we are going to promote, is focused on sustainable land use in this region. The first phase of this project will take three years. Its main target is to predict the status of land use and cover in this region in the years 2025 and 2050. It considers problems in forests, crop land, and urban areas, the degree of un-recoverable land desertification; and the level of primary production.

To achieve this target, the following tasks should be done:
(1) to understand the current state of land use and land cover in the region;
(2) to determine the trends in land use/cover change and their rates of change;
(3) to identify the key factors in those changes;
(4) to frame a hypothesis able to explain those changes;
(5) to develop a model to express the hypothesis mathematically;
(6) to assume scenarios of future development or countermeasure implementation in the region;
(7) to run the model for given scenarios;
(8) to analyze the simulated results on which to base predictions of the future state or assessment of countermeasures; and
(9) to study the feasibility of assumed development scenarios and the obstacles in implementing assumed countermeasures.

3. Charges of the feasibility study of LU/GEC

For the above tasks, the following approaches are usually adopted in the LUCC study.

(1) Case Study (process study): Why such change? Inductive approach.
(2) Data Presentation/Spatial Analysis: What happens?
(3) Modeling (Country and Regional): Deductive approach.
(4) Integration and Policy Orientation.
The importance of the fourth approach is pointed out by Dr. T. Kitamura (1992).

We are required to carefully devise a strategy to implement a plan incorporating the above approaches.

For case studies of the LU/GEC program, the following areas should be identified in advance:

a. What is the purpose?
   to understand the mechanism of land use/cover change, or
   to obtain the data to be used in modeling?
b. Where and why to select for case studies?
   - place, size, hierarchy
c. What and how to measure?
   How often? How precisely?
d. How to cooperate or collaborate internationally?
e. Is there any common method or protocol?
f. Are such methods necessary? If so, is it possible to develop them?
   Who develops them?

For Data Presentation and Spatial Analysis, the following things should be identified in advance:

a. What, why and how to collect?
b. Who collects and archives?
c. How to cooperate or collaborate internationally?
d. Is there any common method or format?
e. Are such methods necessary? If so, is it possible to develop them?
   Who develops them?

For Modeling, the following things should be identified:
a. What kinds of model are required?
   Statistical or dynamic model?
b. Are existing models suitable with slight modification?
c. Is a new concept or framework required for modelling?
d. How to link to the Case Study and the Data Presentation and Spatial Analysis?
e. Is a community model required?

For Integration and Policy Orientation, the following things should be kept in mind.
a. Who is the audience?
   - International organizations, national or local governments?
b. What kinds of options are proposed?
   - statement, regulation, implementation program, other?

To accomplish the above tasks, we need information on the critical places and issues in the region. At this stage, conceptual or descriptive information is enough. However, the concept and description should be plausible and logical. In other words, our very first task is to construct a descriptive model for the particular region, based on existing and available information for that region.

There are several initiatives for research programs concerning environmentally sustainable land use, such as IIASA (International Institute for Applied Systems Analysis), UNU (United Nations University), LUCC/IGBP (Land Use/Cover Change) and DIS/IGBP (Data and Information System). When composing the LU/GEC project plan, we have to consider effective collaboration with such institutions so as to avoid duplications of tasks. With this in mind, close communication between LU/GEC and other initiatives should be continually maintained.

Reference

Kitamura, T. (1992): The Research Domain VII of IGBP Japan and Its Perspectives. In: Proceedings of the Asian Symposium on Global Environmental Change, IGBP-Japan, 94-104.