

Report of the Working Group on Monitoring and Information Collection

1996-09-26

SUMMARY REPORT: WORK DONE IN FIVE YEARS

1.PROFILE

The China Council for International Cooperation on Environment and Development (CCICED), is a high ranking consultation agency in environment, and is committed to strengthening cooperation and exchange in the field of environment and development. In particular, it is important in the policy making process for Chinese environmental Protection; it acts as a bridge between China and various Under this guidance, the Monitoring and Information Collection Expert Group (referred below as Expert Group) conducted the following activities with support and direct ion from CCICED, National Environmental Protection Agency of China (NEPA) and experts both at home and abroad.

1.1 Subject Studies

The Expert Group views sustainable development as the core of environment and development issues. In order to sustain development in China, fundamental research on sustainable developments should be carried out at this time.

Monitoring and information are the foundation and baseline for both environmental protection practice and policy making, while environmental indicator systems can be applied to incorporate environmental concern with national economic development. In an effort to solve the urgent need to centralize, unify, standardize, reform and construct national environmental monitoring systems and networks, regional environmental pollution control policy making support systems, and new environmental indicator systems, we focused our attention on three subjects:

China's Environmental Monitoring Network Developing Strategy;

Design and Development of Environmental Decision Support System at Provincial and Municipal Levels; and

Studies on China's Environmental Indicator System and its Application.

1.2 Organizing Study Tours Abroad

Seminars of Expert Groups were combined with study tours abroad which enabled members to expand their knowledge, see advanced technology, and gain new experiences.

A study tour to the Netherlands in November 1993 included a survey of Dutch environmental policy, plan, legislation, production (prediction model for global climate change and sustainable utilization of ground water), air quality monitoring system, cleaner technology, waste disposal and so forth.

A study tour to the USA in January 1996 inspected an Air Quality Management District (AQMD) on southern coast of California .The group witnessed air environmental monitoring ,data analysis and was introduced to associated policy and legislative control means ,such as monitoring and hotline broadcasting of photochemical fog .We also visited groundwater protection at a refinery ,saw treatment of rain and wastewater ,explored the co-generation of heat and electricity, saw renewable heating control of odor and hydrocarbons in wastewater, and attended a seminar on "Strengthening the Effectiveness of International Policy Making Toward Climate Change'.

1.3 Training and Exchange

Training oriented information was disseminated through training workshops, material exchange and discussion, With support from Dr.T.Schneider and Dr.Si Duk Lee in preparation and fund raising, training workshops for environmental monitoring staff are tentatively scheduled to be held in September 1996in Beijing. The works hops will be conducted by foreign experts and will focus on pollutant monitoring techniques, dispersion models and risk assessment techniques. Experts from Dutch National Statistic Bureau participated in the Expert Group seminar for idea exchange in May 1996,and plan to hold two training workshops on environmental indicator systems in September 1996and March 1997.IN a bid to bring Chinese in May 1996, and plan to hold two training workshops on environmental indicator systems in September 1996 and March 1997.Inadid to bring Chinese environmental monitoring up to international standards, Dr.Schneider personally contacted related international bodies to secure the observer position in international meetings for Chinese side .As a result of this participation ,the Dutch environmental policy indicator system, information about risk assessment ,and the Czech environmental quality program proved to be helpful to the Chinese side.

1.4 Developing Proposals

The Expert Group attached great importance to developing proposals. Four proposals (see the third part of the report) focusing on several fundamental problems we re forwarded to the Chinese government this year, separate from the annual reports submitted to NEPA on environmental monitoring.

The Expert Group has close relations with NEPA. Both worked together to identify subjects for study; working seminars were frequently attended by directors and officials of NEPA. For example, a seminar on optimization of environmental monitoring network was jointly organized by the Department of Development and Supervision of NEPA and the Expert Group .In this way, both the quality and the efficiency of the study improved. More importantly, it ensured outputs from the study which were applicable and specific.

2.OUTPUTS AND WEAPPOINTS

2.1 Studies on China's Environmental Monitoring Network Developing Strategy

Since 1974, environment, ecology and pollution sources monitoring stations have been widely set up by Chinese Academy of Sciences, resource departments, industrial sectors, public health and military system, In 1984, NEPA proposed targets of networking of monitoring stations and points, normalization of sampling and locating, standardization of test method, computerization of data processing and systemization of test method, computerization of data processing and systemization of quality insurance". Afterwards, NEPA established and optimized a nation-wide environmental monitoring network (governmental controlled network) consisting of 200 environment monitoring stations, among which the air monitoring network numbered 113 stations, and the surface water monitoring network numbered 135 stations, the acid rain monitoring network numbered 109 stations, noise monitoring network numbered 54 stations and radioactivity monitoring network numbered 34 stations. Hydrology departments setup a monitoring network in the Changjiang River Basin, while National Ocean Bureau established a cross-province, cross -city and multi -department ocean monitoring network .So far there are a total of 4,000 monitoring stations across the country with over 70,000 employees. Various networks, up to46 types, can be divided in to five categories in terms of models of management, i.e exclusively set up by environmental section (accounting for 19%), set up by other sectors (accounting for 75%), nation -wide cooperative network (ocean network and radioactivity network), cross-region cooperative network (Changjiang River Network) and regional cooperative network. The regional cooperative network, limited by regional jurisdiction and lack of exchange, has poor comparability of their data. The networks are large but they have their weak points and even blind areas. For example, there are only about300ecology monitoring stations, less than 10% of the total number of 4,000 stations across the country; this indicates that ecology monitoring in China is weak and insufficient to prevent serious destruction of ecological environment. Therefore, urgent effort should be made to form a unified, rational environmental monitoring network and improve its quality and efficiency. The expert Group worked jointly with NEPA to put forward a unified, rational environmental monitoring network and improve its quality and forms, and then conducted an investigation in over 30provinces and cities by mail and on site survey in Beijing, Guangzhou, Suzhou and so forth. Several sequential reports have been made. namely;

- 1.Report on Composition of Environmental Monitoring Network in Guangzhou and Environmental Quality in 1993,
- 2.Study on Optimum Locating for Air Quality Monitoring in Beijing,
- 3.Current Situation of China's Environmental Monitoring Network,

4. APPRAISAL OF China's Environmental Monitoring Network Capacity, and

5. Framework of Proposal for Development of China's Environmental Monitoring Network,

Based on these reports, a seminar on the development of nation-wide environmental monitoring network was held and attended by people from resource departments (hydrology, ocean, meteorology, geology, mineral, agriculture and forest), Chinese Academy of Science, industrial sectors (oil, petrochemical, metallurgy, color metals, coal, light industry, transportation, machinery) and the military. The seminar aimed to investigate the current status of each monitoring network, and exchange views and ideas, particularly on how to investigate the current status of each monitoring network, and exchange views and ideas, particularly on how to reinforce coordination function of networks. As a result, a report entitled "Studies on China's Environmental Monitoring network Developing Strategies" was prepared which summarizes two decades of practice in environmental monitoring and makes suggestions for improvement and future development." Proposal for Improvement Plan of China's Environmental Monitoring' is expected to provide technical support for implementation of environmental protection goals in the Ninth Five-Year Plan as well as a long term goals for the year 2010

2.2 Design and Development of an Environmental Decision Support System at Provincial and Municipal Levels

Development of an environmental information system is not only behind that of developed countries, but also lags behind some other domestic sectors in terms of technical means and application status. Information collection lacks systematization, demonstrates data overlap, and has poor utilization and exchange capabilities with other potential users. To meet the urgent demand from local policy making perspective, the Expert Group chose two systems at different levels for Coordinated Growth of Environment and Energy of Huhhot City (at city level-referred to below as the Hu project); the other, the Environmental Decision Support System at Provincial Level (referred to below as the Provincial project).

(1) The Hu project applied a Decision Support System (DSS) structure containing a user language system, a problem solving system, and a knowledge system. The information aspect of the knowledge system is composed of database management system and a geographic information system (GIS). The Integrated Planning System for Urban Environment (IPSUE), developed by the Chinese Research Academy of Environmental Sciences, was selected as a model system. IPSUE is a large-scale mixed integer linear programming model targeted at searching for the least cost optimum option for urban comprehensive improvement within related environmental constraints. Five constraint modules (water, air, solid waste, feasibility and logic constraint module), together with various integer variables and coupling coefficients, link water, air and solid waste management to a configuration of industry, ecological growth, energy and resources consumption and living style of residents to better simulate the sophisticated environment ecological energy system. IPSUE expertise is in basic data management, space data operation, pollution abatement planning, environment and environment and energy development.

Subjected to existing conditions for ecological growth, the Hu project provided 362 point source and 46 non-point source control options, thirty-three control options for centralized sewage treatment facilities, six options for solid waste sites, and sixty nine options for solid waste collection stations. In addition, coordinated development plans for urban environment, energy and related ecological incentives have been advanced countering three different types of local living style, varied environmental goals, their technical feasibility and ecological risk. The output of the Hu project, which was evaluated in 1993, was considered to be advanced internationally by the evaluation committee because it had applied a large scale mixed integer linear model to simulate complicated issues of environment and energy, and was highly praised by the Huhhot municipal government since it gave practical and specific support for local environmental management policy making.

(2) Environmental decision support systems at provincial level were developed to provide practical, general, macro and advanced support systems for provincial policy makers and administrators of twenty seven provinces and cities throughout China. The provincial system undertook chronological monitoring, data analysis, assessment of the current environmental situation, and environmental impact assessments. Two other modules (decision support for load reduction allocation and decision support for sustainable development between environment and economy), will be developed and installed in one province. DSS modules, in combination with structural analysis and prototype methods, have been used for both the top-down and bottom-up analysis of systems and design of models. The space information system of GIS will incorporate technical requirements of components of DSS module as operation and management tools. Analysis and design of the systems have been completed, and the program is being compiled. The Expert Group will go to Jiangxi to install and adjust the system, and input practical data in August 1996. This experience will benefit the installation and operation of similar systems in the other 26 provinces and cities involved. The entire project is expected to be completed by the end of 1996. Operation of a unified environmental decision support systems in such a populated, geographically diversified country like China is a difficult and complicated undertaking. However, the systems will function for the improvement of China's

environmental management after they have been put into operation.

2.3 Studies on China's Environmental Indicator System and its Application

The indicator system, composed of both environmental and national economy indicator systems, will function as a guide for social and ecological growth. Currently, the environmental indicator system is divided into seven categories:

1. natural resources,
2. natural ecological destruction,
3. regional environmental quality,
4. regional pollution prevention and control,
5. environmental industry,
6. environmental management, and
7. global environmental management.

Although it contains hundreds of indicators, the present indicator system has limited statistical indicators, is weak in relative index, but is strong in absolute index. Due to lack of inner linkage among indexes, it is difficult to quantify, analyze and assess. Since all existing indexes are at the same level within the environmental system, with neither value form index nor relations with economy and society, it is difficult to reflect properly internal relations and the interaction between environment and economy growth.

In order to establish an indicator system that complies with sustainable development, the research team addressed the development of environmental industry and environmental accounting in the light of sustainable development strategy. It adopted three starting points of national economy indicator systems and eight principles for design as follows:

(1)reflect basic status of the environment and the relations between environment and economy, meet the requirements of three starting points;

(2)reflect the real situation of China;

(3)be concise and have priorities;

(4)reflect the dynamic change in environment, ecology and resources;

(5)meet the requirements of the system;

(6)set up and strengthen value form environmental indicators;

(7)reflect the mutual complementary, regional, general and developing features;

(8)be practical and have ease of operation.

The system was constructed into three sub-systems closely linked while at the same time independent from each other (environmental pollution prevention, natural resources and ecological system). The system was divided vertically into three levels:

1. High rank social and economic comprehensive assessment indicators,
2. Middle rank environmental assessment indicators, and
3. Basic rank descriptive measuring indicators.

The procedure for research is general to individual and top to bottom with value form indicators being emphasized. Quantitative indicators in kind, absolute indicators, relative indicators, average indicators and dynamic changing rate constitute the overall indicator system with emphasis

on environmental value from indicators.

Environmental value indicator system includes pollution caused loss, environmental asset evaluation, cost effectiveness of environmental facilities, input and output analysis of environmental industry, value of both visible and invisible assets, and so forth. The pricing method and formula for the value of environmental quality, resources and ecology have been mapped out. The Expert Group proposed a research report of over 60,000 words in the seminar held in May 1994 and selected Panyu City of Guangdong Province for a case study. Based on the substantial information collected so far, major indicators of Panyu's pollution, resources and ecological system were designed, measured and calculated, while its pollution prevention, land resources and ecological value for tourist purpose were also preliminarily calculated. In accordance with the environmental, social and ecological status, analysis was made of major problems in environment, resources and ecology of this city with policy proposal for sustainable development. In April 1996, the Expert Group put forward general report containing framework design of environmental indicator system and case study. This drew the attention of experts of both at home and abroad.

Experts from Dutch Central Statistic Bureau joined in the meeting and drew up a workplan for study of a new indicator system. The new system passed evaluation in February 1996 and was evaluated as being creative and internationally advanced by the evaluation committee. We further understand that environmental indicator system is an essential foundation for macro-comprehensive policy making. Identification of new environmental indicator system will benefit understanding of the influence of environmental issues on the economy, and allow coordination of the environment with ecological growth. More effort should be made to do in-depth studies on more and different types of cases, if resources permit.

The Expert Group has achieved much, but still has some shortcomings:

(1) The three subject investigated by the Expert Group lack close relationships with each other necessary to form an integral body with coordinated content and case selection;

(2) There is insufficient exchange with other experts group, such as the economy and resources audit group, the biodiversity group, or the pollution control group, even though we all have mutual technical interests; and

(3) Timely publication and dissemination of information from the various stages of studies are far from enough. For example, the study on environmental indicator system is fairly new in China, but its published results lack exchange and dialogue within the domestic environmental protection circle even after reports are forwarded.

These shortcomings are caused by constraints in funds as well as organization difficulties at different levels. The funds are far from sufficient compared with the real need, and more support from the next international cooperation committee is expected.

3. PROPOSAL TO CHINESE GOVERNMENT

When China increased its reform and established a socialist market ecological mechanism, the Central Committee of China's Communist Party called for sustainable, fast and healthy economy growth, and a change in ecological growing mode with focus on cost effectiveness, science and technology. As implementation of sustainable development is a new challenge for China, the Expert Group performed intensive study, and put forward some fundamental work which it hopes will be adopted into the government's agenda.

(1) Strengthen current environmental monitoring. The monitoring mode and distribution system should be changed for higher efficiency. We suggest that administrative bodies should be committed to optimally set up a cross-region and cross-section environmental monitoring network to unify and specify environmental monitoring. Enhance input and improve capacity of monitoring, especially monitoring of total discharge and global environmental concerns, to provide an overall picture about environmental monitoring nation-wide in a timely manner. Measures should be taken as soon as possible to interconnect with international monitoring networks.

(2) Monitoring of ecological destruction is currently very weak in China. According to the International Biodiversity Treaty, a survey of ecological destruction in China should be conducted to identify risk assessment of ecological destruction and composition of ecological destruction and composition of ecological division.

(3) There is an urgent need to formulate a comprehensive, general and concise sustainable development indicator system, with each indicator verified pertinent to sustainable development, measuring and calculating methods also need to be stipulated as simple, easy to operate, and easily modelled and developed into software. The system can be used to judge whether and to what extent the economy, society and

environment develop sustainability, so that prediction, precaution and policy making can be carried out smoothly, The study should be based on existing research output and the experience from research of this kind abroad.

(4) Establish a comprehensive information system related to sustainable development at national, provincial and local level which functions as a support for environmental information exchange and management both domestically and abroad. In order to support strategy planning and policy decisions, the system should include policy, planning and implementation, international technology development, global environment trends, and potential for technology transfer.

The Expert Group has made significant progress considering what it has done in such a short time period, and has met the requirements of the China Council for International Cooperation on Environment and Development. It also proved that cooperative research by experts from home and abroad is an effective way of international cooperation in the field of environment. All staff of the Expert Group achieved consensus on an environmental monitoring network, an information collection system, and an indicator system. This is a good beginning and needs further dissemination and promotion to enhance the study. Since the monitoring, information collection and indicator system are closely connected with administration of NEPA ,we hope the Expert Group will be continued and strengthened in the next China Council for International Cooperation on Environment and Development.

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