ACTION PLAN FOR THE GLOBAL ENVIRONMENT

-AGENDA 21/JSCE-

JAPAN SOCIETY OF CIVIL ENGINEERS

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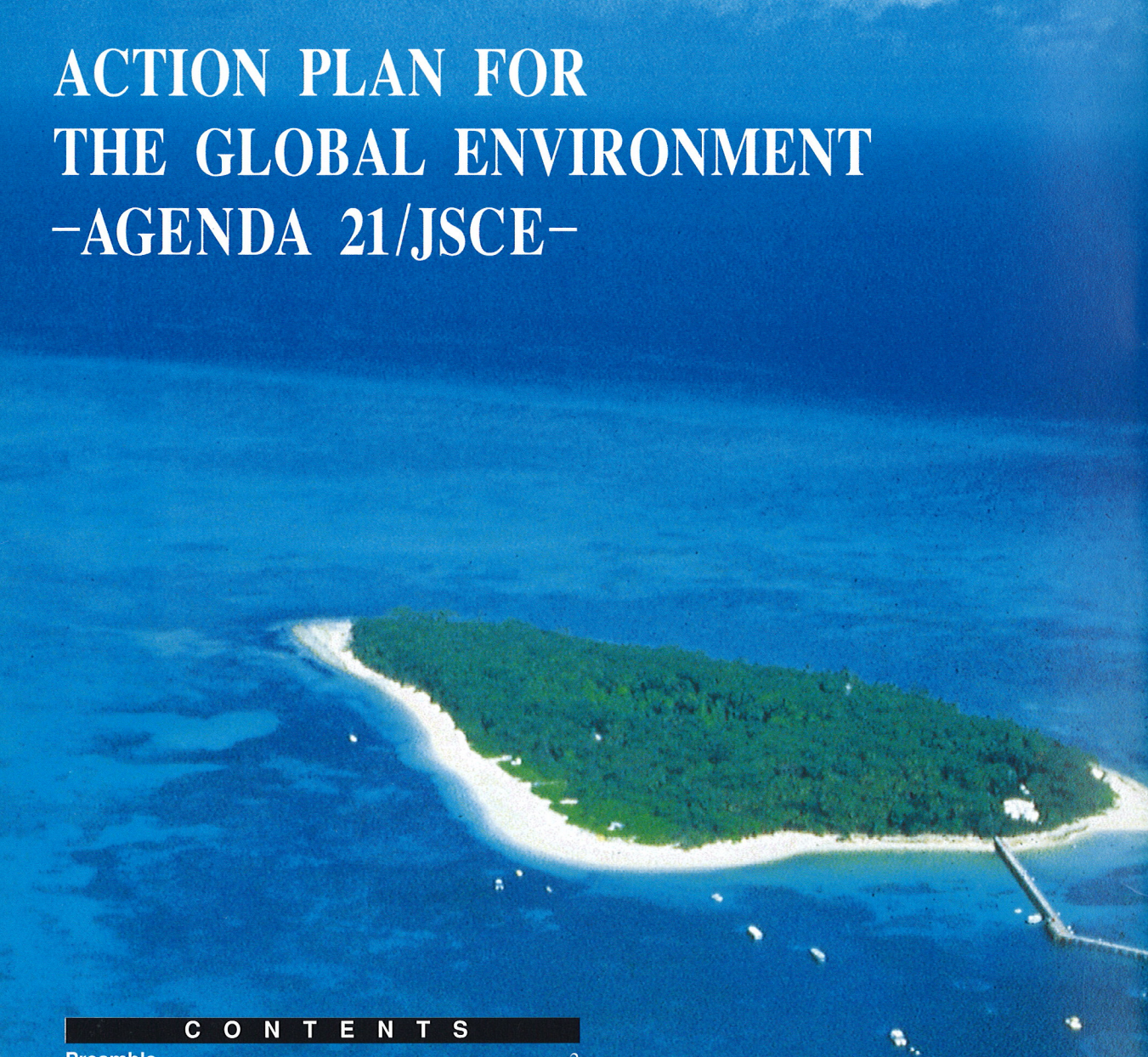

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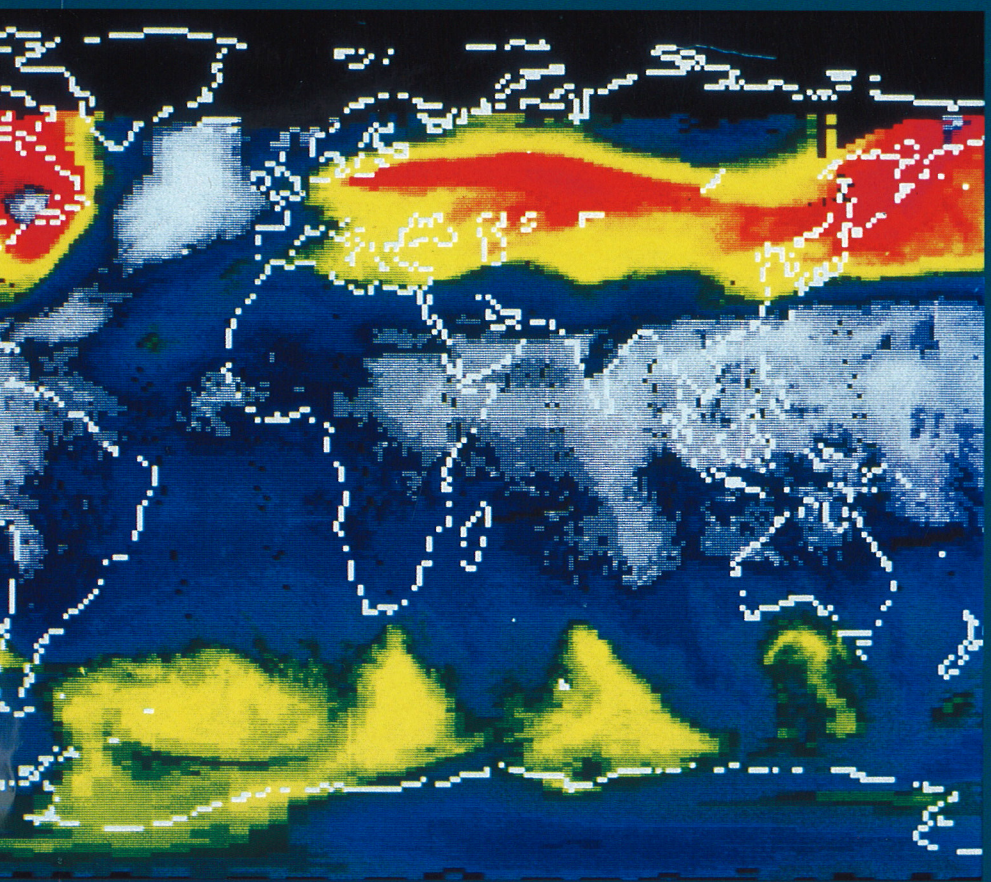
Preamble

The United Nations Conference on the Human Environment held in Stockholm in 1972 recognized the global environmental crisis as a common concern of all human beings. In spite of such warning, global environmental issues have become even more serious during the last 20 years. The United Nations Conference on Environment and Development (UNCED) in 1992 declared that actions for the survival of human beings should be taken according to the principle of sustainable development.

Human beings face a conflict among limited resources and energy, environmental conservation, and economic development and growth. Huge disparities exist between rich and poor countries. In the former, large amounts of resources and energy are consumed: in the latter, the majority of people are suffering from poverty and hunger. Therefore, it has become a duty for human beings to refrain from over-consumption and, at the same time, to overcome poverty and hunger. The present generation is also required to protect, preserve, and restore global ecosystems, and to ensure an adequate stock of energy and environmental resources available for future generations. "Sustainable development" is a multi-faceted concept; it can be used as a tool to satisfy these requirements, and the realization of this concept itself is the purpose of the society.

Agenda 21 adopted in UNCED calls upon world nations and various bodies to prepare and implement an action plan to achieve sustainable development. The Japanese Government enacted the "Basic Environment Law" and defined the "National Action Plan for Agenda 21" to further strengthen environmental policies and to meet global environmental objectives. Responding to the call of UNCED and the new law, the Japan Society of Civil Engineers (JSCE) is herewith creating the "Action Plan for The Global Environment - Agenda 21/JSCE".

Chapter 1



Global Environmental Issues and Civil Engineering

1. Relationship between Global Environment and Civil Engineering

The relationship between the global environment and civil engineering is defined in terms of physical and socio-economic dimensions.

(1) Physical dimensions

Global environmental issues are feared to threaten the survival of human beings by the deterioration of the environment, such as global warming. Such deterioration derives from excessive impact on the environment by human activities such as overexploitation of resources and energy. Civil engineering inherently has a close relationship with global environmental issues, and has an important role in creating a sound living environment while, at the same time, conserving the natural environment.

Civil engineering is able to contribute to the realization of sustainable development by incorporating into its framework the proper consideration of global environmental issues. However, this also means that application of civil engineering without such consideration may adversely affect the global environment.

Overcoming global environmental problems requires three responses, which are 1) elucidating the processes of the related phenomena, 2) analyzing and predicting their impacts, and 3) developing countermeasures to mitigate the phenomena themselves, and to avoid and prevent their impacts. Civil engineering has a major role to play in meeting these requirements.

(2) Socio-economic dimensions

Along with the western industrial nations, Japan has been enjoying the opportunity of consuming world resources and energy for its economic growth. However, justification of the consumption of limited resources and energy from an economic viewpoint alone is no longer acceptable. Instead, equity among countries has begun to be regarded as more important in international relationships. Utilizing resources and energy for national development is the common right of all countries, but, at the same time, each country is responsible to conserve the global environment as a base for the life of all human beings.

Japan is requested not only to overcome the domestic constraints between environment and development, but also to utilize limited resources and energy on a global scale in a sustainable way. The traditional framework of civil engineering needs to be reviewed and reconstructed from this point of view.

In developing countries with rapid increases in population, economic growth is necessary both to maintain people's life and to overcome environmental problems. In order to facilitate economic growth, the transfer of civil engineering technology from industrialized to developing countries is essential, since civil engineering is responsible for construction of a variety of infrastructures necessary for economic development, as well as for conserving natural resources at the national level. Understanding the socio-economic status, natural conditions, social customs, history, race and culture of the countries is essential if technology transfer is to be effective.

2. History and Achievements of the Civil Engineering Community of Japan

From its beginning, the principal tasks of the Japanese civil engineering community have been the conservation of national land and the prevention of natural disasters. These fundamental concepts have not changed for nearly one hundred years since the Forest Law, the Erosion and Sediment Control (Sabo) Law and the River Law, which are collectively called the Three Water-Management Laws, were enacted in 1896 and 1897 during the Meiji Period. The civil engineering community of Japan is proud of the continuous efforts of civil engineers in preventing such natural disasters as typhoons, earthquakes, tsunamis, storm surges, river floods, landslides, heavy rains, droughts and so forth. After World War II, the community devoted its efforts to restoring infrastructure damaged during the war and to promoting economic growth. This infrastructure included transportation systems such as roads, tunnels, long-span bridges, railways, harbors and airports, resource and energy bases such as large dams, and public facilities such as water supply, sewarage and solid waste treatment. In addition, the civil engineering community tackled the needs of urban and regional development for residential and industrial areas, underground spaces, and artificial islands.

Meanwhile, environmental problems, such as industrial and urban pollution, and deterioration of the natural environment were brought about during the period of high economic growth. Granted that there were various restrictions at that time, it is undeniable that the responses of the civil engineering community were not always sufficient to prevent and to solve such problems.

On the basis of these experiences, be they positive or negative, and the accumulated technologies, the Japanese civil engineering community is now required to contribute to coping with global environmental problems.

3. Challenges Facing the Japanese Civil Engineering Community Regarding the Global Environment

Since the global environment is becoming worse, efforts for environmental restoration are required on a global scale. As one of the major consumers of resources and energy in the world, Japan is in a position to take a leading role in protecting and restoring the global environment. To meet this challenge, the civil engineering community in Japan recognizes the following requirements for its future actions.

We need to change the direction of technological development and public works toward forming a sustainable society with less pressure on the environment, the direction indicated in the Basic Environment Law. One of the aims of reducing environmental pressure is to create a world in which the natural environment and bio-diversity are preserved. We have to develop a new framework of civil engineering to preserve and create an environment which will enable human beings to coexist with other organisms.

A sustainable society will require a system of recycling resources and saving energy. Since raw woods imported from foreign countries and other slowly renewable or non-renewable materials are

used extensively in construction work, we need to promote research on resource-recycling systems to reduce the consumption of, and to reuse raw materials such as wood, concrete, asphalt and so on.

The Japanese Government decided, in the Action Plan to Arrest Global Warming, to reform urban planing, transportation systems, the structure of energy supply, and people's life styles to reduce the emission of carbon dioxide and other greenhouse gases. Promotion of the development and distribution of related technologies were also emphasized in the Action Plan. Furthermore, in order to realize an environmentally symbiotic city imposing less environmental pressure, environmentally sound technologies and green planting are necessary to save resources and energy, to recycle water and construction materials, and to utilize renewable clean energy. In addition, small-scale and decentralized technologies are required for the treatment and recycling of waste materials, water, and heat. Participation of the civil engineering community is vital in any of such developments.

Civil engineering also plays a very important role with regard to economic and technological cooperation with developing countries. The Japanese civil engineering community has responsibility not only in implementing such cooperation effectively, but also in making it appropriate for the protection of the global environment.

In order to meet such requirements, the civil engineering community is requested to strengthen its efforts both domestically and internationally. Within Japan, we will focus our efforts on the development of technologies to preserve resources, such as the by-products of construction and woods imported from tropical forests, to conserve nature and national land, and to build resource-recycling systems. Internationally, in turn, we should direct our attention to better cooperation with the developing countries, and the transfer of new civil engineering technologies with the aim of solving global environmental problems.

Chapter 2

Action Program of JSCE

1. Objectives of JSCE

JSCE is an academic organization established to promote research, development, and dissemination of civil engineering knowledge by the participation of the individual and corporate members from universities, technical colleges, high schools, research institutes, national and local governments, electric power and energy corporations, general contractors, consultants and others. JSCE has responsibility to investigate global environmental issues from a wide, free, and long-term perspective, and to develop and transfer necessary new technologies. To achieve these objectives JSCE cooperates with a variety of academic organizations and international bodies.

2. Tasks of JSCE

JSCE will carry out the following tasks concerning the global environment, in accordance with the principle of sustainable development:

(1) Formation of a new concept of civil engineering to contribute to improvement in the global environment

JSCE will investigate relationships between civil engineering works and the global environment, and also investigate systems of infrastructure suitable for a new society and culture toward preservation of the global environment.

Existing civil engineering has depended heavily on resources and energy supplied from overseas and has focused mainly on protection of the domestic environment. We will therefore review the concept of civil engineering from the viewpoint of the protection of global environment and sustainable development, and try to form a new framework.

(2) Development of new fields of civil engineering for coexistence between human beings and other beings

JSCE will develop new fields of civil engineering that incorporate management of ecosystems to protect bio-diversity. We will also address the creation of desirable environments including mitigation measures to compensate for damage to natural resources resulting from economic development.

(3) Analysis of the implications of global warming and climate change, and development of technologies to respond to them

JSCE will investigate, in cooperation with experts in the geoscience, the mechanisms and impacts of sea-level rise, melting of permafrost, changes in the hydrologic cycle, and desertification caused by global warming and climate change. In addition, we will develop technologies and systems to respond to these effects in the fields of disaster prevention, soil erosion prevention, water resource development, and coastal environmental protection.

(4) Technological development for resource-recycling and energy-saving systems

JSCE will develop national and regional planning methodologies for resource-recycling and en-

ergy-saving systems. It is also important to develop new technologies for structures and materials which are required for implementation of the new planning approaches.

(5) Technological development in civil engineering contributing to the solution of global environmental problems, such as acid rain and marine pollution

JSCE will develop new fields of civil engineering and relevant technologies to contribute to the solution of the global environmental problems, such as acid rain, marine pollution, population growth and food shortage.

(6) Guidelines and relevant technologies for international civil engineering works

JSCE will establish guidelines for international civil engineering projects, and modify Japanese technologies to apply to the specific natural, climatic, social and economic conditions of developing countries.

(7) Support development and capacity building in civil engineering in developing countries

JSCE will support the development of civil engineering in the developing countries, which would provide a basis for economic growth, environmental pollution control, and solution of global environmental problems. At the same time, we will also support education of civil engineers and researchers in those countries.

(8) International cooperation with developing countries

JSCE will support developing countries through the investigation of the impacts and the development of technologies to respond to the subjects listed in (3), (4) and (5).

3. Structure and Actions Required for JSCE

JSCE has the necessary scientific foundation to contribute to the solution of global environmental issues. Building upon this foundation, it is now necessary to create the organizational structure required to systematically tackle these problems.

(1) Creating a structure to review accumulated technologies and future development

JSCE will establish firm cooperation, within itself, between the Committee on Global Environment and committees in the following specific fields, to conduct a systematic review of accumulated technologies.

a. Development and utilization of water resources, such as hydrology, river, coastal, and ocean engineering.
b. Energy-related civil engineering
c. Fundamental technologies, such as geotechnical and foundation engineering and surveying
d. Environmental systems and environmental engineering
e. Planning fields, such as national land plan-

ning, transportation and urban planning.

f. Transportation infrastructure, such as roads, railways, ports and airports

g. Natural disaster prevention related to sea-level rise and climate change

(2) Organizing a system for the collection, accumulation and distribution of information

It is necessary to strengthen the capacity of JSCE to collect, accumulate, and disseminate information on global environment issues. JSCE will organize such a system together with extending the functions of the JSCE library.

(3) Establishing cooperation with national and local governments, construction companies, and consultants

In order to implement the Action Plans for Global Environmental Protection proposed by the national and local governments, JSCE will determine the tasks set out for construction companies and consultants, and establish a support system for them.

(4) International cooperation

JSCE must respond to global environmental issues in close cooperation with governments, universities, civil engineering societies of foreign countries, United Nations' organizations, and international academic bodies related to civil engineering. To develop guidelines and technologies for overseas projects, JSCE will accumulate knowledge and experience of civil engineering projects performed in the developing countries through cooperation with consultants and construction and energy industries in those countries as well as the above-mentioned organizations. For this purpose, JSCE will take the initiative in promoting the international exchange of academic expertise. It will also promote the analysis and accumulation of the results of international projects.

(5) Establishing cooperation with educational organizations

In order to develop new generation of civil engineers who can cope with global environmental problems, JSCE will make recommendations regarding inclusion of global environmental issues into educational programs in universities, junior colleges, and technological high schools.

(6) Establishing cooperation with related scientific societies

An important component of the JSCE's action for the global environmental problems is cooperation with other scientific fields, in particular, geoscience, biology, ecology, agriculture, forestry, architecture, medical sciences, economics, social psychology and cultural anthropology. In parallel with such cooperation, JSCE will propose subjects and methodologies for specific research.

Chapter 3

Principles of Action Expected to JSCE Members

In recognizing the role of civil engineering and tasks of JSCE and in order to contribute to the solution of the global environmental problems, every individual member of JSCE should take relevant action in his or her own capacity.

Civil engineers must correctly explain technical data and information, and take action consistent with the social good. In implementing construction projects, civil engineers should also promote understanding of the projects among all people affected by them, and give careful consideration to the natural ecosystem and historical heritages. In addition to the above-mentioned fundamental attitudes, every member of JSCE is expected to follow the following principles, which are based upon concern for the global environment.

1. Recognition of Global Environmental Issues and Self-Development

First of all, we will respect interdependence and diversity in the earth's ecosystems, as a foundation for human life. In order to ensure the right of future generations and to share the earth's environment, we have to undertake development in keeping with the concept of sustainability. This means that we must switch from development based solely on short-term objectives, and must stop wasting resources and energy. It is also important to search for a new and more appropriate sense of value and lifestyle by understanding the need to change them.

Civil engineering projects can contribute greatly to the welfare of human beings and the global environment over generations. If the direction is inappropriate, however, they will result in destructive effects to the environment. Therefore, we have to recognize that civil engineers bear a great responsibility to contribute to global environmental issues. For large-scale civil engineering projects, in particular, it is necessary to understand that projects often have complex environmental and social consequences, and that, if short-term economic merits are pursued by ignoring the degradation of environmental quality, it will result in severe economic losses in the longer term.

With such understanding in mind, we have to pay attention to global environmental issues, collect the required data, support environmental education at various levels and promote our own enlightenment. In addition, we must understand that global environmental issues have complex relationships with a variety of fields. This should lead us to exchange opinions and collaborate with people from other fields and disciplines in order to achieve sustainable development.

2. Principles of Action for "Sustainable Development"

The members of JSCE are expected to follow the principles shown below in undertaking civil engineering works:

We have to make efforts to minimize the consumption of non-renewable energy, and, at the same time, to recycle and reuse renewable resources such as wood. Furthermore, it is desirable to assess the environmental effects throughout all the stages of a project, from planning to maintenance, and to use the results as a basis to judge for the appropriateness of the project.

We should incorporate into the economic evaluation of projects, both losses due to the deterioration of the environment and the benefits produced by environmental improvements. Further, we should evaluate both sides of the effects of construction works on our society and historical heritage, and, if adverse effects are predicted, we will try to implement mitigative measures.

We will be honest in recognizing the environmental problems caused by construction works, and be serious in taking the relevant measures to prevent them. In addition to providing related information to the public, we will try to enhance the understanding, participation, and support of citizens with regard to civil engineering projects.

When participating in construction works in developing countries where the environment is particularly vulnerable, we will encourage the use of measures that are appropriate for the specific conditions of those countries, even though the existing environmental regulations are looser than those in Japan.

Summary


UNITED NATIONS CONFERENCE ON
ENVIRONMENT AND DEVELOPMENT
Rio de Janeiro 3-14 June 1992

"The Action Plan for the Global Environment-Agenda 21/JSCE" clearly indicates the relationship of Japanese civil engineers to global environmental issues, summarizes the action plan of JSCE, and proposes the principles of action expected to be followed by members of JSCE. We believe that JSCE and its members possess the ability and will to contribute to the solution of global environmental problems, and to create a better global environment. It is of deep significance that JSCE, in this memorable year, the 80th anniversary of its founding, has developed an action plan to contribute to the global environment in the 21st century. We hope that Agenda 21/JSCE will always be referred to and used as a guide for the actions of JSCE and its members.

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Special thanks to Yoshio Takeuchi Office for financial support of printing, and to Japan Environment Association and INA Corporation for photographs.