Research on Response to Diverse Environmental Needs

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1. Introduction

A review of the history of environmental research by the Ministry of Land, Infrastructure, Transport and Tourism shows that the Environment Division was established in the former Public Works Research Institute of the former Ministry of Construction in 1993, about 20 years ago. Soon thereafter, the Fundamental Environmental Principles were enacted in 1994, clearly stipulating that creating a high-quality environment is a core mission of construction administration, in other words, that it is an internalized goal. Since then, improvements and policies have been implemented to create national land with a high-quality environment as specified by this policy.

However, the purposes of providing public infrastructure are changing as investment capacity declines and the emphasis shifts from provision to management. Through this process, the environment has become increasingly important in providing higher quality social infrastructure.

As Japan's social and economic conditions change, people's lives have changed accordingly. Lifestyles have been transformed through information communication and rapid progress of contents, and people's views of the environment have diversified as their values have become more diverse. Under such circumstances, the future direction of public infrastructure and the environment is debated. The challenges related to these discussions are described below.

2. Target directions of environmental research

Various factors related to the provision of public infrastructure have created challenges to achieving the goals needed to form environments. Typical examples are outlined below.

[1] Response to the changing environment and evaluation criteria

Between 1965 and 1975, the target of environmental concepts was improving the familiar issues of health or the living environment such as the atmosphere, noise, and water contamination, centered on pollution policies. Later, emphasis shifted to improving the formation of natural environments, etc. in and around cities. Today, the priority is on resolving global-scale environmental challenges, including climate change. The range of environmental concerns is not only expanding, but also encompassing smaller scale issues such as environmental hormones, viruses, etc., and so the environmental scope to be considered has increased dramatically. It is necessary to follow the expanding range and complexity of environmental issues, by considering problems with complex systems, such as the challenge of preserving biodiversity.

[2] Establishment of methods of evaluating the environment

The foundation of environmental research is evaluation, such as quantifying the state of the environment to be conserved. Just as digital methods for measuring water quality, atmosphere, noise, etc. have been established, some related causal factors cannot be objectively evaluated, because the analysis of factors related to biodiversity has not been completed. Regarding the effectiveness of implementing environmental projects, it is necessary to quantitatively evaluate their cost-benefits and effects on improving the environment. It is also necessary to quantify the state of the environment in monetary terms.

[3] Accurate calculation of impact and response

A big step in environmental research is objectively predicting the load on the environment of actions such as providing public infrastructure (impact) and the effects of the response (response). Accurately evaluating this impact and response is the next step. It is necessary to predict environmental problems before they occur in order to respond appropriately. This is an important challenge to forming national land which is sustainable and in harmony with nature.

[4] Publishing accurate information concerning the environment

Because environmental problems change as new problems emerge, it is difficult for scientific reasoning and quantitative analysis to keep pace with these changes. As a result, various discussions tend to lead to rumors and hearsay based on inference. Quantitative judgments concerning a matter which is qualitatively correct may appear to be incorrect. To make appropriate judgments and take countermeasures, people need a correct understanding of the principles.

3. Future research

In environmental research, we wish to aim at the following three points.

[1] Resolving diverse environmental problems

We set research themes in order to resolve and predict environmental problems which are related to the provision of public infrastructure. In addition to continuing existing long-term research on environmental problems such as the atmosphere, water quality, noise, vibration, etc., we are tackling two research themes: those intended to improve the living environment, and those concerning the global challenges of global warming, sustainability, and biodiversity, as well as familiar challenges summed up as, “beautiful, abundant, and lively daily life”. The “Development of Environmental Evaluation Technology for the Life Cycle of Public Infrastructure”, which aims to lower carbon dioxide emissions during the provision of public infrastructure, is an important research theme for the global environment and sustainability. We therefore intend to conduct new technology development permitting more people to participate in this field.

[2] Publishing correct environment related information

Various troubles often arise because of a lack of environment-related information. For this reason, it is important to survey the environment, which is our particular concern, using public funds in public areas, and to distribute and correctly control information to gain understanding. The primary requirement is to collect information by appropriate methods, comment appropriately on this information, and release it to the public.

Regarding river environments in particular, a database has begun to be built, and it has been designed so that data concerning river environments is collected and can be browsed and used to analyze impacts and responses, etc. These efforts will ensure the release of accurate environmental information.

[3] Ensuring interdisciplinary collection of intelligence from various fields

In order to conduct research on the environment, we must establish a research system allowing an interdisciplinary approach by including not only civil engineering, but also the natural sciences and social sciences as necessary, because such research involves resolving problems in complex systems.

Resolving research problems with researchers in other academic fields also causes difficulties due to differences in histories and values. Nevertheless, it is necessary to do so by connecting independent administrative agencies, the private sector, universities and research institutes inside and outside Japan and coordinating them in various ways.

4. Conclusions

Concern with safety and security increased dramatically following last year’s Great East Japan Earthquake, but concern about the environment seems to have weakened. Even among environment related measures, climate change was a dominant issue before the earthquake, but as a result of the Fukushima Daiichi Nuclear Power Plant accident, public concern about pollution by radioactive substances and energy conservation has rapidly increased.

Accordingly, in order to practice national land management based on the natural and social characteristics of Japan, it remains important to harmonize the provision and management of public infrastructure with the environment. In order to create splendid national land and urban environments which are in harmony with nature for future generations, we wish to perform research and development concerning conservation, reuse, and creation.