

# Researching Technology Policy Comprehensively

KIMURA Yoshitomi, Director-General, National  
Institute for Land and Infrastructure Management

## 1. Perspectives for Coordination between Fields with the National Institute

When the National Institute for Land and Infrastructure Management (NILIM) was launched on April 1, 2001, I took up a position as the head of the Research Planning Department in the Public Works Research Institute, which had been re-established as an incorporated administrative agency. At the time, we were fully occupied with how to make the best use of the new organizational form of the incorporated administrative agency, and I recall that my sole impression of NILIM was its long name and that it was a research institute newly created by unifying the Public Works Research Institute, the Building Research Institute, and the Port and Airport Research Institute.

A symposium commemorating NILIM's establishment in June 2001 discussed the direction that it should aim for and what could be expected of it.<sup>1)</sup> The debate included opinions like, "NILIM can do so many things because it is an institute bearing the 'national' banner. It will determine policy concerning technology, such as creating technical standards. When doing so, it is important that the institute takes the slightly broader perspective of determining policy for improving land and infrastructure management, rather than determining technical standards strictly, as has conventionally been done." Moreover, it was also considered necessary for NILIM to play the role of horizontally linking the three research institutes that it was formed from and to work comprehensively on broad fields, not just particular ones, in order to resolve issues we will face in the future.

In response, NILIM has created and has been working on project-based research, which is coordinated between different fields. In addition, we have established five interdepartmental organizations, such as the Disaster Prevention and Reduction Research Committee, as organizations covering multiple fields.

The three key points for generating outcomes that exhibit the connecting strengths of activities covering multiple fields were described as follows by Fujita Kōichi when he was executive director for research affairs:<sup>2)</sup>

(1) Depict the overall view or structure of the subject, and identify issues and evaluate initiatives while

clarifying the positioning of each element.

(2) Work backwards from what you want to achieve and then arrange various initiatives.

(3) Taking the horizontal axis as the major assumption for producing outcomes, ensure that the vertical axis, i.e., the technology in each field, is firmly rooted in the earth (the work site).

At present, one topic that NILIM is working on through collaboration between several fields is flood control in river basins. The table is an excerpt of materials submitted to the Research Evaluation Committee in FY2021.<sup>3)</sup> Achieving a transformation to river basin flood control requires all kinds of relevant people to cooperate and put in efforts throughout the river basin, based on the effects of climate change, changes in social conditions, and other factors. NILIM is also conducting research and development to support the advancement of policy and its implementation in the field.

Table: NILIM's research and development on river basin flood control

|   | Tangible   | Intangible  |
|---|--|---|
| (1) Measures to prevent/reduce flooding as much as possible                 | <ul style="list-style-type: none"> <li>Establishment of levee reinforcement technology (River) (p. 20)</li> <li>Support for maintaining/improving channel flow capacity (River) (p. 24)</li> <li>Research on upgrading maintenance methods contributing to dam rehabilitation (River)</li> <li>Research on measures against sediment and flood damage and debris flow, which have become more marked due to climate change (Sdral) (p. 28)</li> </ul>  | <ul style="list-style-type: none"> <li>Establishing techniques to draft river improvement plans consistent with runoff limitation measures (River) (p. 26)</li> <li>Surveys on upgrading dam operations (River)</li> </ul>  |
| (2) Measures to reduce the scope of damage                                  | <ul style="list-style-type: none"> <li>Research on techniques to evaluate, improve, and manage greenery as green infrastructure (Infrastructure Management)</li> </ul>   | <ul style="list-style-type: none"> <li>Research on establishing techniques to create flood-risk information (River) (p. 25)</li> <li>Research on ensuring safety of port construction against storm surge disasters (Coastal, Marine &amp; Disaster Prevention)</li> </ul>  |
| (3) Measures to ameliorate damage and enable early recovery and restoration | <ul style="list-style-type: none"> <li>Research and study on making road structures more resilient against flooding and torrential rain (Road Structures) (p. 27)</li> <li>Fact-finding surveys on development of disaster prevention and reduction technologies for sewer pipe routes (Water Quality Control)</li> <li>Research on preventive renovation methods for existing standards in order to reduce damage risk in the event of flood damage (Hoating) (p. 22)</li> <li>Research on facility design, etc. in ports based on effects of climate change (Coastal, Marine &amp; Disaster Prevention) (p. 21)</li> </ul> | <ul style="list-style-type: none"> <li>Development/improvement of flood damage risk lines (River) (p. 20)</li> <li>Research on establishing techniques to create flood damage risk information (River) (p. 25) (repeated)</li> <li>Upgrading event detection using AI on river management camera imagery (Infrastructure Management)</li> <li>Development of support technology for flood prevention activities (River) (p. 28)</li> <li>Development of flood visualization technology (River)</li> </ul> |

As the table shows, we have organized the measures into three perspectives in line with the perspectives of the measures and the viewpoint of what we are seeking to realize: measures to prevent or reduce flooding as much as possible; measures to reduce the scope of damage; and measures to ameliorate damage and enable early recovery and restoration. This shows that the relevant research departments are dividing and coordinating work in their efforts for the tangible technologies and intangible skills needed in order to achieve these measures.

## 2. Perspectives on Technology Policy

Technical standards are important tools for resolving the issues we face or realizing what we find desirable, but they are not enough on their own. What is more, we cannot achieve these with a single technical development or specific research, and it is essential to create the technical skills to use it fully, as well as mechanisms for a variety of relevant people to participate. This requires efforts from the perspectives of many different concerned parties. This can be called technology policy.

The figure shows a road map to improve preservation systems in the road structures field (draft). It has been debated from shortly after the launch of NILIM, mainly by people in charge of bridges at NILIM but also incorporating Road Bureau officials, and this is the current version. Technology relating to structure conservation brings to mind UAV and other inspection and non-destructive testing technologies, diagnostic technologies to evaluate soundness, and repair and reinforcement technologies according to the cause of damage and its progress. These are all important technologies, but they are not enough to reach a resolution on their own, and it is necessary to work comprehensively, involving asset management to establish maintenance cycles by systematizing inspections, etc., and to rationally manage enormous structures, necessary technical development support and mechanisms to introduce that technology into the field, and more than anything else, technical abilities that enable engineers to use these fully.

For this reason, we have created six axes for resolving problems, as shown in the figure, and have worked to deepen this initiative over time axes and phases. Besides the matters under NILIM's purview, they also show initiatives of the Ministry of Land, Infrastructure, Transport and Tourism (MLIT) and local technical hubs. This demonstrates NILIM's stance of being conscious of

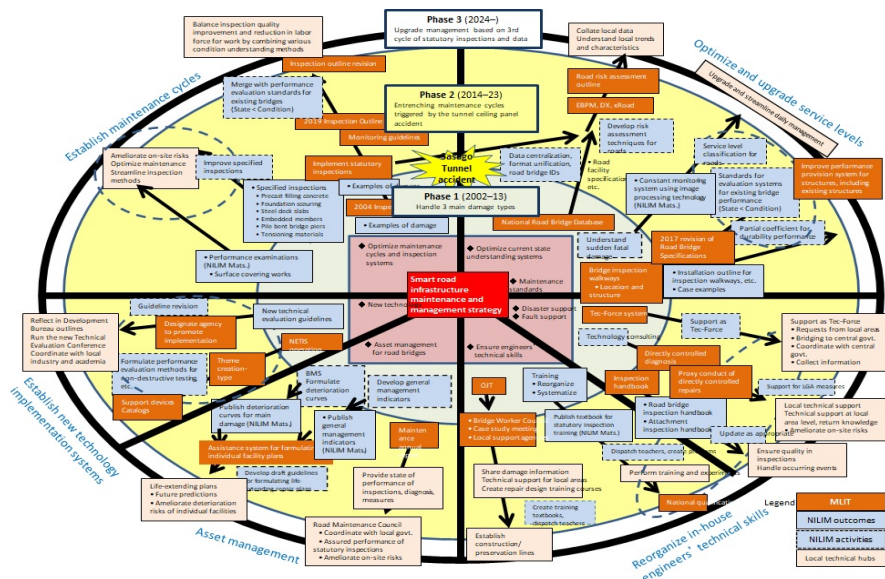


Figure: Road map to improving preservation systems in the road structures field (draft)

comprehensive measures to resolve issues and taking charge of the technical development that lies at their core in the first place, rather than simply engaging in research and development into technology for specific elements.

In addition to working on research from a broad perspective in collaboration with experts in various fields, NILIM is engaged in comprehensive efforts with relevant organs to implement the outcomes of the research in order to resolve social issues and realize what we are aiming for. On our pride as a national institute, we intend to be a place for researching technology policy comprehensively.

See here for detailed information

- 1) *Report of the National Institute for Land and Infrastructure Management Symposium*, NILIM Materials, vol. 1, Jun. 2001.
- 2) Fujita Kōichi, "Expanding the fruition of disaster prevention, maintenance, and environmental research by reinforcing the interweaving of horizontal and vertical axes," *NILIM Report 2014*.
- 3) *Report of the Research Evaluation Committee, National Institute for Land and Infrastructure Management, FY2021*, NILIM Materials, vol. 1187, Jan. 2022.