

2. Format of Disaster Reduction Technology List

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2.1 Disaster Reduction Technologies: Essential Focus Areas

The main purpose of the Disaster Reduction Technology List is information sharing for its wider application. Japan has learned substantive lessons from different disaster experiences, which are reflected into research and development of different technologies related to disaster reduction. Knowledge has been accumulated on different focus areas over past several years. However, two issues need further emphasis: 1) gaps between knowledge and practice, and 2) involvement of the end-users and other stakeholders in both development of the technologies and its application. A combination of these two factors defines implementation strategies, and is reflected to the development of current technology list. The list is the showcase of those different technologies, which are developed over several years, with specific emphasis to implementation, and stakeholder involvement.

2.2 Types of Hazards

Two types of major hazards are focused: earthquake-tsunami and flood-debris. A third category of multi-hazard is also mentioned with implication to both earthquake and floods. Japan's recent years experiences on natural disasters show that earthquake and flood are the two major and most frequent hazards, which have caused significant losses of lives and properties. These are associated to other collateral hazards like tsunami, landslide, debris/mud flow, and typhoons.

It is not our view that other types of hazards including volcanic eruptions, drought, etc. are not important. The reason for dealing only with a limited group of hazards is simply limitation of time and human resources in the preparation of the current list. Future developments of the Technology List should include more comprehensive group of hazard types.

2.3 Technology Types and Its Purposes

Technology is defined as “a set of rational means and knowledge, pertinent to realizing specific objectives that have solid logical bases and stability¹”. As reflected in this definition, technology should not be limited to hard or engineering technology, but should also include the soft or process technology, which includes community participation, stakeholders involvement, development planning, and so on. This is strongly reflected in the current technology listing.

In the current listing, Disaster Reduction Technologies are divided into two categories: A and B.

¹ Source: H. Kameda, 2001, Description of EqTAP Project.

Category A reflects the technologies developed under implementation strategies, incorporating experiences from different geographic locations, including Japan and wider international environments. These technologies are already applied to one or more countries outside Japan. The purpose of this category is to showcase the technologies, which has relevance to different countries and socio-economic scenario, and has potential development and application opportunities.

Category A is further divided into two parts: **Category A1**, which are developed and tested, and have specific plans for future development; and **Category A2**, which are in plan or proposal stage, and needs full scale development.

Category B reflects transferable technologies, which are developed and applied in Japan, but have relevance to the context of other nations. Thus, these technologies can and should be developed in future for its wider application.

2.4 Development Process

The process of development of this list include three specific steps:

Step 1: Development of Questionnaires: A first draft of the questionnaires was developed by a core team of experts, and was reviewed by a larger team of experts (Working Group), set up by the Ministry of Education, Sport, Culture, Science and technology (MEXT). The questionnaires were supplemented by several sheets of explanations, and samples. These questionnaires were distributed widely through the networks of universities, professional associations and research institutions. A review team was formed within the Working Group. The main selection criteria were: emphasis of the technology on implementation, stakeholder involvement, and regional perspective.

Step 2: First Screening of Questionnaires: Interested professionals submitted filled-up questionnaires, with supplementary documents to the review team, which were carefully scrutinized. Selected technologies were asked to provide updated information and supplementary documents.

Step 3: Finalization and Publication: After a second review, final selection was made, and the Technology List for Disaster Reduction was finalized and published.

2.5 Questionnaire Items and its Implication

Following is the full set of questions, which is divided into two parts: (a) *Features of developed technology*, which are related to existing technologies, and (b) *Next step development*, which are related to future development. Category A1 and B has 23 questions each, while Category A2 has 10 questions.

* **Category A1 questionnaire**

(a) Features of the Developed Technology

(hazard type)

1. Title of Technology
 2. Title of Project
 3. Name & Organization
 4. Contact Details (*Mailing address & e-mail*)
 5. Contents of Technology with relevance to disaster management
 6. Development process with specific focus on the implementation strategy
(*Mention how the implementation strategy was incorporated from the planning stage*)
 7. Regional Perspective (*Please mention the regional nature of the technology*)
 8. Specific stakeholders' involvement (*Please mention stakeholders and their involvement in both planning, and development stage*)
 9. Free or Cost-incurred (purchase cost, royalty, etc.) (*If not free, please mention in US\$*)
 10. Copyright and Ownership
 11. Cost incurred for application (*application cost except 9. in US\$*)
 12. Time and Human Resources required for Technology Application (*in terms of person-month*)
 13. Maintenance and upgrading of technology (*Cost, human resources, others*)
 14. Other requirements for introducing / application
 15. Application Examples (*In different context, location, stakeholders, and countries*)
 16. Other features (*Please add any other relevant documents, including homepage address*)
- (b) Next Step Developments
17. Proposed plan
 18. Effects of Technology Development with focus on implementation strategies
(*Please describe how the new technology will affect the implementation process and strategy*)
 19. Cost for Technology Development (*US\$*)
 20. Time and Human Resources for Development (*in terms of required person-month*)
 21. Regional Perspective of cooperative research
 22. Stakeholders' involvement (*Please mention which specific stakeholders will be involved from the planning stage*)
 23. Others

*** Category A2 questionnaire**

(hazard type)

1. Title of Technology
2. Title of Project
3. Name & Organization
4. Contact Details (*Mailing address & e-mail*)
5. Expected Contents and relevance to disaster management
6. Expected development process with specific focus on the implementation strategy (*Mention how the implementation strategy will be incorporated from the planning stage*)

7. Regional Perspective (*Please mention the possible regional nature of the technology*)
8. Specific stakeholders' involvement (*Specify how and which stakeholders will be involved in both planning & development stage*)
9. Expected Cost (in US\$), Human Resources, and Period required for Technology Development
10. Regional Perspective of cooperative research
11. Other features (*Please add any other relevant information*)

*** Category B questionnaire**

(a) Features of the Developed Technology

(hazard type)

1. Title of Technology
2. Title of Project
3. Name & Organization
4. Contact Details (*Mailing address & e-mail*)
5. Contents of Technology with relevance to disaster management
6. Background, purpose, Development process, its effects in Japan
7. Perspective of possible international contributions through technology transfer (*in relevance to the items in 1.(2) of the questionnaire guideline*)
8. Prospective regions for technology transfer with observations on consideration of socio-economic and cultural backgrounds
9. Free or Cost-incurred (purchase cost, royalty, etc.) (*If not free, please mention in US\$*)
10. Copyright and Ownership
11. Cost incurred for application (*application cost except 9. in US\$*)
12. Time and Human Resources required for Technology Application (*in terms of person-month*)
13. Maintenance and upgrading of technology (*Cost, human resources, others*)
14. Other requirements for introducing / application
15. Application Examples (*In different context, location, stakeholders, and countries*)
16. Other features (*Please add any other relevant documents, including homepage address*)

(b) Next Step Developments

1. Proposed plan
2. Effects of Technology Development with focus on implementation strategies (*Please describe how the new technology will affect the implementation process and strategy*)
3. Cost for Technology Development (US\$)
4. Time and Human Resources for Development (*in terms of required person-month*)
5. Regional Perspective of cooperative research
6. Stakeholders' involvement (*Please mention which specific stakeholders are to be involved from the planning stage*)
7. Others

For Category A1, Questions 1 to 4 are for the basic information on the technology and its contact details. Questions 5 to 8 which are underlined because of its importance focus on four important items: 1) Relevance of technology to disaster management, 2) Incorporation of implementation strategy in development process, 3) Regional perspective, and 4) Stakeholders' involvement. These are the four major pillars of the questionnaires set, which will describe the essential features of the technology on application and stakeholder involvement. Questions 9 to 15 describe financial issues related the technology, e.g., cost of technology development, man-power, cost of maintenance, cost of application and ownership etc. Questions 15 to 17 are application examples and other relevant features. Questions 17 to 23 focus on next step development, with specific emphasis on implementation strategies, cost, human resources for development, regional perspective, and stakeholder involvement. These parts can be used as seed ideas to develop new projects and research proposals.

For Category A2, the main emphasis is on future development strategies, and its relevance to disaster management, implementation, regional issues, and stakeholder involvement. The question items are basically same as those of Category A1.

For Category B, the major points are similar to Category A1, but the Questions 5 to 8, also underlined for their importance are focused on the transferability of the technology to developing countries.

Thus, the main essence of these questionnaires goes back to two basic issues, described in the first section: 1) whether implementation strategies are appropriately incorporated in the development stages of the technologies, and 2) whether the stakeholders are intensely involved from the development stage.

2.6 Volume Description

This compilation volume consists of three main parts. The first part provides a summary list (Chapter 3) under three categories: **A1** (Technologies developed under implementation strategies: Features of the developed technology and next step development), **A2** (Technologies developed under implementation strategies: feature technology, projects and on-going), and **B** (Transferable technologies (feature of the developed technology and next step development). The summary list describes the hazard types, serial number, title of technology, contact person, affiliation and contact details.

The second part is the main content of this volume (Chapter 4), which consists of detailed description of the technology under categories A1, A2 and B. For each technology, the filled-up questionnaire is followed by 3-4 pages description with illustrations and examples. In general, each set consists of 7-8 pages.

The third part of the volume (Chapter 5) describes selected research and development projects on disaster reduction, conducted by the MEXT. At the end, a roster of the working group responsible to develop the current list is provided.