(Executive Paper)

Networking Disaster Risk Reduction Technology and Knowledge through Disaster Reduction Hyperbase (DRH)

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Abstract

The paper presents key issues in the Disaster Reduction Hyperbase - Asian Application (DRH-Asia) Project. It was prepared as an executive paper for the Proceedings of the Disaster Reduction Hyperbase (DRH) Contents Meeting, Kobe, 12-13 March 2007. The paper covers a historical sketch (a roadway to DRH), conceptual development of implementation technology and criteria for its substantiation, the DRH-Asia project activities, and finally the purpose of the DRH Contents Meeting and the significance of its outcomes and the Proceedings. This paper is intended to clarify important backgrounds of the Proceedings.

Keywords*: Disaster Reduction Hyperbase (DRH), Implementation technology, IOT- PT- TIK, DRH Database-Forum-Links, DRH Contents Meeting*

1. INTRODUCTION - A Roadway to DRH

An international movement of Disaster Reduction Hyperbase is progressing under a project entitled "Disaster Reduction Hyperbase - Asian Application (DRH-Asia)[*]" (project period: July 2006-March 2009). The DRH-Asia will be a web-based facility to disseminate information on appropriate disaster reduction technology and knowledge to aid disaster reduction policy in Asian countries. It will be a resource of “knowledge & wisdom” in that they will incorporate not only products from modern research and development but also time-tested indigenous knowledge. It will be a two-way communication tool among developing and industrial countries, not be a one-sided technology transfer.

"What is useful technology and knowledge for disaster reduction ?" This simple question was a basic motivation to the DRH-Asia project. Of course, the question was not a simplistic chatter. It has a background of many international activities and earnest efforts in research and development for disaster reduction. The roadway includes EqTAP Project (April 1999-March 2004), A "Pilot Project" conducted for to the World Conference on Disaster Reduction (WCDR: January 2005), and International Framework for Development of Disaster Reduction Technology List on Implementation Strategies (DRH Project - Phase I: April 2005-March 2006).

The EqTAP project (Development of Earthquake and Tsunami Disaster Mitigation Technologies and Their Integration for the Asia-Pacific Region: multilateral, multi-disciplinary research project) clarified a concept of "Implementation Strategy in research and development" through individual research subjects [1, 2] (see also http://eqtap.edm.bosai.go.jp/). The next step was a set of 42 disaster reduction technologies with implementation strategy that were compiled in a catalogue document [3]. It was incorporated in the Japanese government's proposal of "Portfolios for Disaster Reduction" at WCDR. The document has served as a pilot project toward "Disaster Reduction

[*] MEXT-NIED Project on Special Coordination Fund, Government of Japan

Hyperbase (DRH)." A one-year project, DRH Project Phase-I, was an occasion for establishing an international network that clearly defined the mission, proposed attributes of DRH, and a scheme of international collaboration [4]. All these efforts converged to the there-year DRH-Asia project, or DRH Project Phase-II, where we are working for actually realizing the DRH, making it useful, and disseminate it.

It may be noted that the starting point of this trend for the Japanese research community was the Great Hanshin-Awaji (Kobe) Earthquake Disaster of 1995, which devastated a modern urban region of western Japan with death of over 6,400 people. The most serious lesson the research community had to learn from Kobe 1995 was that "Having good technology does not immediately equal safe society". We need a more generic mechanism of implementation. It should be an integration of "physical issues" (natural world), "societal issues" (social world), and "information issues" (interface and logistics between the natural and social worlds) [5]**.** We should recognize that unless a disaster reduction study is directed to fill this gap, the study can not be said to contribute to its mission, Disaster Reduction.

This notion has been shared with international DRH members. They have their own critical experiences such as many tropical cyclone and flood disasters in Bangladesh, catastrophic earthquake disasters including Gujarat (India) 2001, Bam (Iran) 2003, Kashmir (Pakistan) 2005, Sumatra (Indonesia) earthquake and Indian Ocean tsunami 2004, etc. In-depth discussion among the DRH members led to a consensus on the importance of multi-disciplinary aspects in defining useful disaster reduction technology and knowledge. It has led to establishment of criteria for "Implementation technology", a key concept in the DRH activity.

2. "IMPLEMENTATION TECHNOLOGY" AND THEIR COMPONENTS

2.1 Conceptual Development

Efforts in the EqTAP project for pursuing research and developments of useful disaster reduction technology led to a proposition to re-define the concept of "technology" the context of implementation strategy, particularly in terms of regional perspective and stakeholder involvements.

The EqTAP outputs include enhancement of masonry building design and practice. It does not involve expensive technologies like dynamic structural control devices. Yet the outputs for low-cost buildings dealt with herein have been produced as results of highly qualified research processes based on advanced research methodologies with well controlled cyclic and pseudo-dynamic testing, development of reliable mechanical models, and thorough review of design and construction procedures.

It should also be emphasized that the technologies incorporated are not confined to engineering products. Disaster reduction technologies must cover wide methodological areas including (1) structural and geotechnical mitigation, (2) crisis management, and (3) systems approach for sustainable developments. They should contain a comprehensive spectrum of "hard" and "soft" technologies. Indeed, some of the methodologies developed in the EqTAP include what we may call "process technology", that include, for example, disaster reduction planning process for local governments.

On this basis, it has been proposed [2, 6] that:

> ***Technology*** = "A set of rational means and knowledge pertinent to realizing specific objectives that have solid logical bases and stability"

In a conventional recognition, technology meant just engineering products. But when we consider implementation strategies, technologies should involve not only products but processes as well. This requires innovation of research community to reform from "product focused research" to "process oriented research", or "product-process linked research".

These notions of a paradigm shift in disaster reduction research and development were discussed as the main subject of Thematic Session 3.6 "Implementation Strategies for Application of Research and Development on Disaster Reduction" at the UN World Conference on Disaster Reduction (WCDR), 18-22 January 2005, Hyogo-Kobe, Japan [7].

Through the DRH Phase-I project, this concept was elaborated in a wider scope with multi-hazard issues and with a longer time span and cultural backgrounds. The three Core Member Meetings [8]

provided valuable opportunities for elaboration based on various real-world information. It is important to note that the DRH project members are comprised of not only researchers but also NGO practitioners who stand on links to connect research and practice.

Particularly, in-depth discussion on implementation process issues have led us to distinguish between Implementation Oriented Technology (IOT: product) and Process Technology (PT: procedure). It was also recognized that various time-tested indigenous knowledge or wisdom play important roles in disaster reduction in specific localities that can be transferred to other regions, which may be referred to as Transferable Indigenous Knowledge (TIK). Then the terminology **"*Implementation Technology*"** emerged to mean a comprehensive set of IOT, PT and TIK, and it was endorsed in the final workshop of the DRH Phase-I project and was incorporated in the Tsukuba Resolution 2006 [4].

2.2 Components of Implementation Technology

Efforts for conceptual enhancement of implementation technology have been and are being pursued in the DRH Project Phase-II, namely, DRH-Asia. Elaboration is possible with ample practical examples. Such occasions include Idea Workshop on Indigenous Technology For the Contents Development of Disaster Reduction Hyperbase (DRH) <Conceptual enhancement and case clarification of "Transferable Indigenous Knowledge">, Delhi, 19-20 February 2007, Disaster Reduction Hyperbase (DRH) Contents Meeting, Kobe, 12-13 March 2007, Mini Workshop on School Safety for DRH-Asia Contents Development, Kobe, 4 July 2007 [9]. Based on these experiences that were shared by many DRH members, conceptualization of implementation technology has been concluded as follows:

Implementation Technology to be compiled in DRH-Asia, consisting of
+***Implementation oriented technology*** **(IOT)**: Products from modern research and development that are practiced under clear implementation strategies
+***Process technology*** **(PT)**: Know-how for implementation and practice, capacity building and social development for knowledge ownership
+***Transferable indigenous knowledge*** **(TIK)**: Traditional art of disaster reduction that is indigenous to specific region (s) but having potential to be applied to other regions and having time-tested reliability

2.3 Criteria for Implementation Technology

Besides generic features of implementation technology as discussed in the previous section, more specific criteria for each of its three components were discussed. While a baseline for characterizing the IOT had been laid in the activities of the EqTAP Project [2], extensive discussion was needed for the PT and the TIK, and then to look at all of the three comprehensively. The Disaster Reduction Hyperbase First Facilitators Meeting (DRH-Asia FM1), Kobe, 2-3 July 2007 was the first trial for a holistic view conducted by the DRH Facilitators and other leading DRH members from EDM-NIED and Kyoto University, which generated the first version of the criteria for IOT, PT and TIK together. The document was elaborated at DRH-CASiFiCA Coordination Session, Stresa, Italy, Sep. 2007 and other occasions when the DRH Facilitators met. These discussions converged to the following set of criteria, and was announced on the DRH project web-site [9]:

Criteria for Implementation Oriented Technology **(IOT)**

- Technically or scientifically acceptable
- Problem identification and methodology development practiced in direct communication with stakeholders and end-users to create incentive for their participation and ownership
- Regional characteristics properly incorporated in terms of local context including available materials, cost, and workmanship
- Most advanced research methodologies mobilized to generate high-quality products and meet the actual demands of the region

Criteria for Process Technology **(PT)**

- With emphasis on “practical use” of research
- A tested methodology with social, cultural, economic, ecological, and technical feasibilities, developed through an implementation/ testing process ensuring results in disaster reduction
- Demonstrated stakeholders’ participation and enhanced ownership

- of the process
- of results and lessons

- Amenable/adaptable to local context, and with institutionalization potential
- In-depth knowledge and insight gained through experience with disasters and mitigation

***Criteria for Transferable Indigenous Knowledge* (TIK)**

- Originated within communities, based on local needs, and specific to culture and context (environment and economy)
- Provides core knowledge with flexibility for local adaptation for implementation
- Uses local knowledge and skills, and materials based on local ecology
- Has been proven to be time tested and useful in disasters
- Is applied or applicable in other communities or generations

These criteria will be an important guideline in compilation of the DRH contents.

Fig. 1 Illustrative examples of implementation technology (source: EqTAP, DRH)

Illustrative examples of implementation technology are shown in **Fig. 1**. Some are from the EqTAP Project, while the others are from the DRH activities. Besides these examples, we see an ample set of implementation technologies in the Proceedings of the DRH Contents Meeting, the present volume.

3. DEVELOPMENT OF DISASTER REDUCTION HYPERBASE - ASIAN APPLICATION (DRH-ASIA)

The previous chapter presented conceptual developments of implementation technology that lays a foundation of the Disaster Reduction Hyperbase. This chapter will describe actions taken in the DRH-Asia Project. The major tasks of the Project are:

(1) Context clarification, elaboration and dissemination of DRH,
(2) Compilation of DRH contents, and
(3) Construction of DRH web-site

Chapter **2.** already dealt with a major component of discussion on the item (1). Besides, there are other context aspects as we see in Sections, **3.1** and **3.2.** As to the item (2), the present volume, Proceedings of the DRH Contents Meeting, is truly an essential milestone in the DRH contents development. In addition, Sections 3.2 and 3.3 will cover basic tools designed for DRH contents development. Activities related to the item (3) are described in Chapter **3**. Sections **3.5** and **3.6**.

3.1 Attributes of the DRH system

By incorporating "implementation technology", a set of IOT, PT and TIK, the Disaster Reduction Hyperbase-Asian Application (DRH-Asia) will be a resource of knowledge and wisdom that will benefit two-way communications among developing countries and industrial countries. It will deal with multi-hazard disaster risk reduction.

The issue was discussed extensively throughout the DRH Project Phase-I. The conclusion was consolidated in the Tsukuba Resolution 2006 [4] that consists of Mission, Proposed DRH Attributes, and Resolution for international collaboration. The Tsukuba Resolution is a solid guideline to the DRH Project Phase-II, DRH-Asia. All activities in DRH-Asia development are being conducted on this basis.

Among them, the Proposed DRH Attributes, which specifies the DRH-Asia system development states that:

***Proposed DRH Attributes* (from Tsukuba Resolution 2006) :**

- *Open and Interactive* access and participation
- access to tested *implementation technology database*, such as implementation oriented technology, process technology, transferable indigenous knowledge (DRH Database)
- *Forum* for facilitating collation, testing and dissemination of mitigation models (DRH Forum)
- Link with *relevant initiatives* (DRH Links)

Thus, ***DRH Database***, ***DRH Forum***, and ***DRH Links*** are the three major functional components of the DRH-Asia system.

(N. Ikeda)

* direct users of the technologies/knowledge
* users of information in DRH

Fig. 2 Expected users of DRH

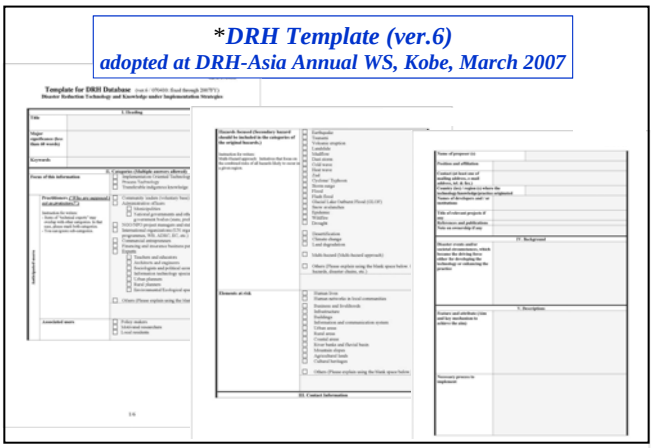

Fig.3 DRH Template (ver.6)

3.2 Expected users of DRH

The expected users of DRH have been proposed as

(1) Practitioners,
(2) Community leaders,
(3) Policy makers, and
(4) Motivated researchers

The implications of the expected DRH users are illustrated in **Fig. 2** (Ikeda and Kameda, 2007). They may be categorized as i) direct users of the technology/knowledge provided by the DRH, and ii) users of information in the DRH. The terminology *motivated researchers* is used to mean those researchers who clearly recognize implementation strategy in their research activities.

The relations with DRH users should be cultivated further in the course of development as well as in the course of efforts for dissemination.

3.3 DRH Template

The DRH contents are compiled according to the DRH Template, a format that was established through ample discussion among DRH members. The final version (ver.6) which was endorsed at the DRH-Asia Annual Workshop, Kobe, March 2007, **Fig. 3**, incorporates the following items:

I. Heading,
II Categories,
III. Contact Information,
IV. Background,
V. Descriptions,
VI. Resources Required,
VII Self evaluation in relation to applicability,
VIII Application examples,
IX. Other related parallel initiatives (if any), and

X. Remarks for version upgrade

Drafting the DRH Template began in August 2006. The prototype for the template was found in the Pilot Project book [3]. But it was necessary to re-organize all the items as the concept of implementation technology in the DRH-Asia is now much wider than in the Pilot Project or its underlying activities, EqTAP project.

While there was an argument that the DRH Template should be developed separately for IOT, PT and TIK because of their different natures, our policy was to maintain a single unified template. It was important to do so in order to make the DRH an integrated set of implementation technology, not a set of segmented collection of individual categories.

The draft versions were enhanced through various occasions with participation of DRH members. A thorough discussion was conducted at the DRH Contents Meeting, Kobe, 12-13 March 2007, and finalized as DRH Template (ver.6) at the First Annual Workshop on DRH-Asia, Kobe, 14 March 2007. It was agreed that the Proceedings of the DRH Contents Meeting be edited upon the updated version 6 of the DRH Template, which has been realized in this volume.

There still is a room for further revision of the DRH Template in the forthcoming Second DRH-Asia Annual Workshop, Beijing, February 2008. But a possible revision will be limited to minor changes in order to maintain stability of the context: we have already had enough discussion. Yet, the experiences of using the DRH Template for the Proceedings would give us valuable suggestions for its enhancement. This issue is discussed again by clarifying more specific points [13].

3.4 Facilitation of DRH contents development, discussion and registration

A mechanism for compiling the DRH contents is an important subject. For this purpose, DRH-Asia Facilitators were nominated, general criteria for DRH contents were decided, and discussion mechanism incorporated in the DRH Forum.

The DRH Facilitators who were nominated st the First DRH-Asia Annual Workshop, Kobe, March 2007, will be in charge of facilitating proposed DRH contents for discussion and elaboration by the DRH members, enhancement to be done by the proposers, and registration in DRH Database. Currently, the roster of the Facilitators is:

(IOT) Mohsen Ghafory-Ashtiany (IIEES) and Hiroyuki Kameda (NIED)
(PT) Amod Dixit (NSET Nepal) and Norio Okada (Kyoto Univ.)
(TIK) Anshu Sharma (SEEDS India) and Rajib Shaw (Kyoto Univ.)

The Facilitators constitute a group of academics and NGO practitioners. In this way, it is intended that the realized DRH contents will conform with the criteria for the DRH contents developed on the basis of discussion at the Workshop:

General Criteria for DRH Contents Acceptance

- Understandable to users
- Implementable (Usable, Doable)
- Shown to be useful

Plus

- Criteria for each category (IOT, PT, TIK)

A platform for discussion and management for proposed DRH contents will be incorporated in DRH Forum on the web-site.

3.5 Web-site developments

The web-site development began with construction of a work-site by means of outsourcing, **Fig. 4**, which opened in September 2007. shows its top page (http://eqtap.edm.bosai.go.jp/DRH/). On this site, DRH Forum is functional, but DRH Database is still in the state of a moch-up demonstration developed in the DRH Project Phase-I [11]. Currently, the major function of the work-site is found in its entrance to "Project documents" that provides all documents produced in the DRH and related activities, downloadable in pdf files.

The experience of the work-site development led to a change in our policy of web developments. In order to make it adaptive to future enhancements, it should be constructed on open systems. In order to maintain sustainable system improvements, all system documents should be prepared in a satisfactory form. Multi-lingual search function was judged to be indispensable at the DRH.

On this basis, it was decided to have the production system of the DRH-Asia web-site be developed in-house at EDM-NIED. **Fig.5** illustrates the scheme of development. Along with the budget arrangements, the orientation and specification clarification were made at IT group meeting following the First DRH-Asia Annual Workshop, March 2007 as well as at the First DRH-Asia Facilitators' Meeting, July 2007. The web-site is due open in November 2007, and be ready for accommodation of DRH contents.

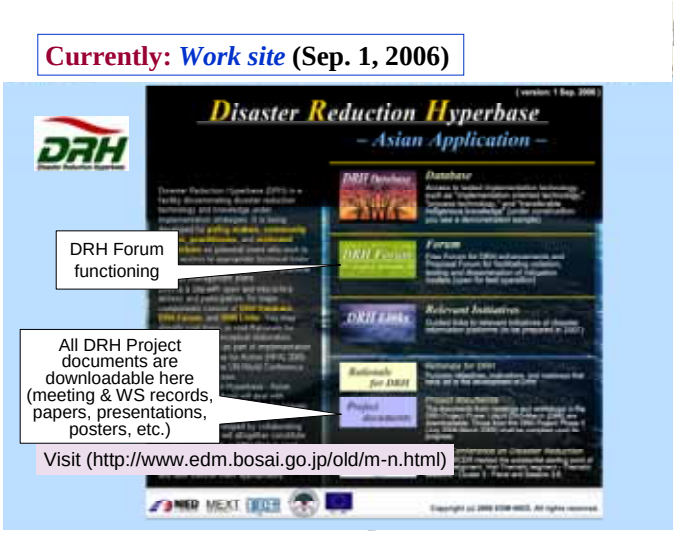

Fig.4 Work site for DRH (opened in Sep. 2006)

***DRH-Asia Web-site (production system): under construction**
***In-house development, Open source, Multi-lingual search**
***Due November 2007**

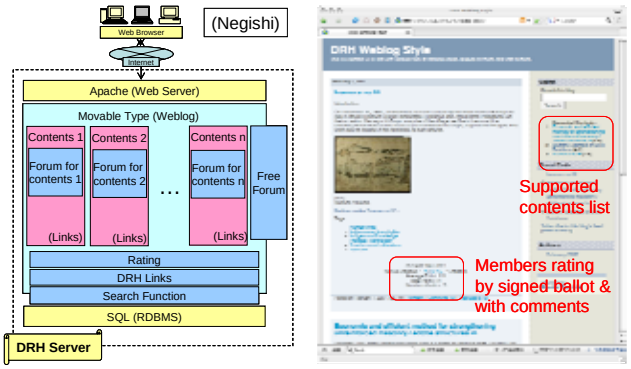

Fig. 5 In-house construction of DRH-Asia web-site (production system)

3.6 Networking in DRH Links

The DRH Links is planned as a component of DRH-Asia system in order to realize effective links to other relevant initiatives. While DRH-Asia will serve as a resource base on implementation technology for disaster reduction, we should recognize that DRH does not solve everything. There are various initiatives in information platforms for disaster reduction, including many excellent fore-runners as well as some emerging initiatives. It is important for us to establish links to such platforms in a systematic way so that users can make their judgments regarding which sites to access depending on their purposes. To realize such conditions, the links should be organized in a synergetic manner among the initiatives.

This notion motivated us to plan an event International Workshop on Information Platforms for Disaster Reduction (IPDR-WS) under the framework of Asian Science and Technology Forum, sponsored by NIED and JST (Japan Science and Technology Agency). The IPDR-WS was held on 3-4 October 2007 at NIED, Tsukuba. Their details are available on the documents downloadable at http://www.edm.bosai.go.jp/old/071003-04/071003-04.htm . They include IPDR ― WS plans, submitted abstracts, all presentation materials, and all output documents developed in the Workshop.

Major outputs of the IPDR-WS are:

1) Mutual understanding and commitment of collaboration and cooperation among disaster information platforms and partners,
2) Tsukuba IPDR Report 2007: Summary record of the IPDR Workshop describing the context, policy and technical enhancement of information platforms for disaster reduction;
3) Guided IPDR Links 2007: A summary document introducing participating information platforms; and
4) The Tsukuba IPDR Resolution 2007: Emphasizing the importance of information platforms in disaster risk reduction, needs for their openness, supports by resources, serving users' needs, etc.

Among these outputs, the Guided IPDR Links 2007, illustrated in **Fig. 6**, is particularly important. It incorporates the summary tables developed by the representatives of the initiatives who participated in the IPDR-WS. They have been developed in a uniform format, contributed to the Workshop, and had chances to modify them during the Workshop depending on the discussion for creating a

collaborative environment among them. This version is a starting point. It can be extended flexibly by having other initiatives join it. On this basis, the Guided IPDR Links is expected to play an important role in establishing the DRH Links.

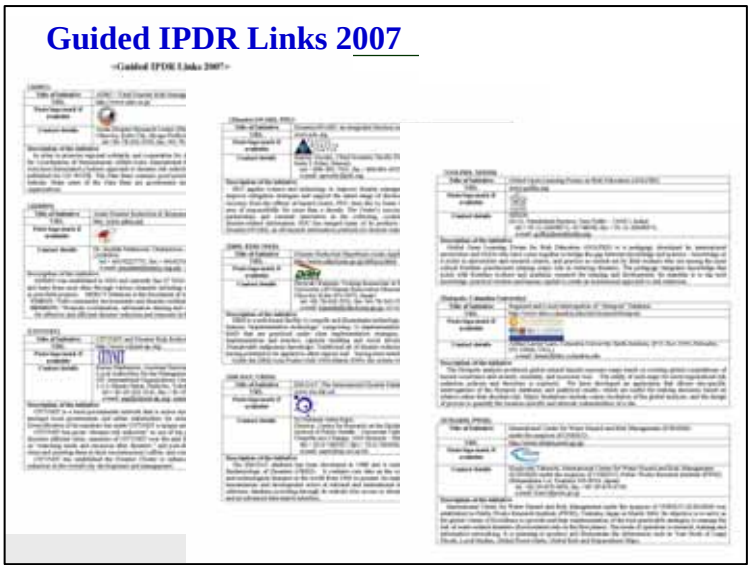

Fig.6 Guided IPDR Links (output from the IPDR Workshop)

4. DRH CONTENTS MEETING, KOBE, 12-13 MARCH 2007: A LAND MARK EVENT IN DRH CONTENTS DEVELOPMENT

The DRH Contents Meeting, Kobe, 12-13 March 2007 was an extremely important event for the development of DRH contents. The meeting made it possible for all DRH members get together and discuss conceptual as well as practical issues on what and how best to do for realizing DRH. As the actual contents of the presentations in the Meeting are contained in the main body of this proceedings, this chapter will discuss the significance of the Meeting and confirm its accomplishments.

4.1 Purpose of the DRH Contents Meeting

The purpose of the DRH Contents Meeting was to:

(1) Substantiate "Implementation technology": Presentation of proposals for the contents of DRH by the participants, elaboration of proposed contents through discussion, especially to conform with the Tsukuba Resolution 2006 as our constitutional document,

(2) Enhance implementation technology context: In-depth discussion on the Implementation oriented technology (IOT), Process technology (PT), and Transferable indigenous knowledge (TIK) as a feed-back from real-world information in the proposed DRH contents contributed by the participants, and

(3) Elaborate proposed DRH Template: To develop the final version of the draft DRH Template.

It should be emphasized that all these objectives were fully realized, and many substantial progresses were made to go ahead with the establishment of DRH-Asia. Thus, the DRH Contents Meeting can be called a "land-mark event" in the DRH contents development.

The program consisted of:

Day 1 / 12th March 2007

Session 1: Overview/ Chair: MohsenAshtiany

Session 2: Transferable indigenous knowledge, Chair: DinarIstiyanto

Session 3: Implementation-oriented technology (1),Chair: Etsuko Tsunozaki

Day 2 / 13th March 2007

Session 4: Implementation-oriented technology (2), Chair: PeijunShi

Session 5: Process technology (1), Chair: RenatoSolidum

Session 6: Process technology (2),Chair: DillaliBenouar

Session 7: Discussion and conclusion, Co-Chair: Hiroyuki Kameda and Krishna Pribadi

All records of the DRH Contents Meeting are posted on the web-site (EDM-NIED, 2007). The outcome of the DRH Contents Meeting was reported (Pribadi, 2007) to the First DRH-Asia Annual Workshop which took place immediately following it.

4.2 Accomplishment 1: Substantiation of implementation technology and conceptual enhancement through proposed DRH contents

We had a total of 28 presentations on proposed DRH contents: 12 on IOT, 9 on PT, and 7 on TIK. Two contributions were added later, and you see 30 proposals on the web-site.

There were many constructive discussions toward these presentations. The comments offered by the participants may be summarized as (Pribadi, 2007): Interesting and original presentations/ Raising lively discussions on definitions, approaches, and suggestion for improvements and ways of working/ Opportunity to link up different initiatives (e.g. CASIFICA-DRH, DRH Asia-DRH China,etc.)/ 14 presentations already use the DRH template (ver.2-2) systematic, facilitate understanding and communication/ Some themes broadening the context, such as Islamic principle, IT strategies, /Addressing multi-hazard approach as well as specific hazard and tools.

4.3 Accomplishment 2: DRH Template final version proposal

A major subject in the discussion session (Session 7) was a thorough discussion on the proposed draft of the DRH Template. Excellent proposals and suggestions were offered by the participants on overall frameworks as well as detailing items and categorization including the template form, hazard classification, required simplicity, user friendly, end users, etc.

While general developments of the DRH Template were explained about in Section **3.3**, the DRH Contents Meeting was especially important for two reasons. Firstly, the Meeting was the first chance to discuss the subject matter with participation of most of major DRH members. A consensus accomplished here, therefore, would represent the judgment of the entire DRH group. Secondly, Fourteen presentations at the DRH Contents Meeting were accompanied by DRH Template (ver2-2) filled by the authors: these efforts are highly appreciated. This was a tremendous contribution to elaboration of the DRH Template, as it made experience-based discussions possible.

The discussion was consolidated in the DRH Template draft version 5 and reported to the First DRH-Asia Annual Workshop [10]. Further minor changes were incorporated, and on this basis, the final version of the DRH Template (ver.6) was settled. It was agreed that we would freeze the DRH Template here at least until the Second DRH-Asia Annual Workshop (February 2008) and that we will continue our tasks for DRH contents development based on this final version.

4.4 Accomplishment 3: Template write-up and publication of the Proceedings

Another important subject of the discussion session (Session 7) was on actions ahead. A key question was how to elaborate the documents presented in the DRH Contents Meeting.

In the presence of the updated version of the DRH Template (ver.6), and to maximize the significance of the information presented at the DRH Contents Meeting, it was decided that:

(1) The Proceedings of the DRH Contents Meeting shall be published by an editorial team at EDM-NIED.

(2) The Proceedings will not be a simple duplication of the documents presented at the DRH Contents Meeting. All presentations will be rewritten using the DRH Template (ver.6). In this way, it will be far more enhanced version of the DRH Contents Meeting.

(3) The Proceedings will be published in hard copy and distributed to DRH members, DRH Contents Meeting participants and relevant institutions. It will also be posted on the web-site.

For the participants of the DRH Contents Meeting, it was not an easy task to accomplish this. Especially, the item (2) required them to reorganize their materials used at the meeting and update them in accordance with the new version of the DRH Template. Thanks to the tremendous efforts by the contributors, the manuscripts were completed in the planned form and with excellent quality.

The Proceedings now completed consists of Foreword and Acknowledgments, Executive paper and Context papers, an ample set of proposed DRH contents all written in the DRH Template (ver.6) some with accompanying papers, A note on DRH Template development, Editors not, and Appendices. It is believed that this unique book will serve not only as an appropriate guide book for the DRH contents development but also as a document for a discussion material in the area of disaster information platform.

5. CONCLUDING REMARKS

This article was prepared as Executive Paper to the Proceedings of the Disaster Reduction Hyperbase (DRH) Contents Meeting, Kobe, 12-13 March 2007. The issues addressed include a roadway to DRH, proposal and conceptual development of "implementation technology", outline of the scheme for the development of Disaster Reduction Hyperbase - Asian Application (DRH-Asia), and the significance of the DRH Contents Meeting. Not only generic descriptions, practical aspects of

the project progress and management were also described, such as criteria for implementation technology, attributes of DRH, DRH Template developments, DRH web-site development, efforts for networking information platforms, and what was discussed and decided at the DRH Contents Meeting.

It is hoped that the paper will serve as a guide to the readers of the Proceedings and also as a document for having the DRH-Asia project scheme and practice be understood among wider groups of those who are interested in disaster information compilation and dissemination as well as the leaders of various initiatives in the area.

Acknowledgments

This paper was made possible because of the tremendous contributions by many DRH members. I, as the author and the PI for the DRH-Asia project, wish to express deep appreciation for their time and efforts dedicated to the conceptual development of DRH and its substantiation.

I would need another several pages if I try to name all of the individual contributors. Please visit the list of contributors in Appendix II of this Proceedings. They are all equally thanked.

Here, I would like to acknowledge major contributions by some groups and highlight specific aspects of their works:

+DRH-Asia Facilitators: development of DRH criteria, specialization of DRH contents registration procedure, leadership in implementation oriented technology (IOT), process technology (PT), and transferable indigenous knowledge (TIK), etc.

+International contributors at the DRH Contents Meeting and the Proceedings: visualization of real-world information for DRH contents, feed back to discussion on conceptual enhancement of DRH scheme, DRH contents development efforts, etc.

+CASiFiCA leaders: DRH contents development efforts, leadership in process technology (PT) and for establishment of "implementation science", etc.

+Coordinator for DRH contents compilation from Japan: efforts for institutionalization of DRH mechanism, leadership in implementation oriented technology (IOT), etc.

+ DRH China group: incorporation of DRH concepts for regional application, hosting the second WS, etc.

+International Team and IT Team at EDM-NIED: DRH contents development efforts, DRH Template development efforts, in-house web-site development for DRH-Asia, etc.

Finally, supports from disaster reduction policy and international coordination agencies (UN-ISDR, MEXT, CAO), the funding agency (MEXT-JST), and project management administration (NIED Headquarter and EDM-NIED) are gratefully acknowledged.

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