



EARTHQUAKE AND TSUNAMI DISASTER MITIGATION FOR THE ASIA-PACIFIC REGIONS

EqTAP - Research Innovation under Implementation Strategies

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ABSTRACT: The framework and major outputs from a multi-disciplinary, multi-lateral research project EqTAP are presented. Descriptions include motivations for the project, organizational scheme, objectives and research framework, outputs of the project, and innovative features of the EqTAP project. The outputs of the project are presented in terms of EqTAP Digital City/Tool Box, EqTAP risk management framework, and EqTAP case studies. The operating principles of EqTAP are also addressed where the "implementation strategies" is emphasized as their key concept.

Key Words: Asia-Pacific regions, earthquake-tsunami disaster, risk management framework, integrated technologies, communication tools, implementation strategies

INTRODUCTION

The EqTAP Project was conducted as a multi-lateral research project for earthquake and tsunami disaster mitigation in the Asia-Pacific region. The abbreviation EqTAP stands for "Development of Earthquake and Tsunami Disaster Mitigation Technologies and Their Integration for the Asia-Pacific Region."

The primary motivation for launching the EqTAP Project was a need for a new paradigm for disaster reduction research that has stemmed from the lessons of the Great Hanshin-Awaji (Kobe) Earthquake Disaster of 1995. The complex urban disaster experienced in this event demonstrated the need for multi-disciplinary integration incorporating "physical agenda," "societal agenda," and "information agenda."

Another motivator for the project relates to the effect the Kobe disaster had on other parts of Asia, including areas with high seismicity like China, Philippines and Taiwan as well as those with moderate seismicity such as Korea, Singapore and Thailand. The notion of "low probability - high impact disaster" was particularly noted. It was therefore believed to be important to share information from the disaster in Kobe to the international community.

A policy background of the EqTAP project is based on a series of discussion in APEC (Asia-Pacific Economic Cooperation) meetings to promote multi-lateral projects for disaster mitigation. Such agenda were raised in the APEC Ministers Conference on Regional Science and Technology Cooperation, Beijing, 1995, Informal APEC Economic Leaders' Meeting, Osaka, 1996, APEC

Ministerial Meeting and the Economic Leaders' Meeting, Vancouver, 1997, and many other occasions of APEC activities. The project is thus recognized as part of Japan's contribution to the continuing efforts on the subject matter within the APEC framework, coordination of which is undertaken by its Industrial Science and Technology Working Group. The project status has been forwarded to APEC Ministerial Conferences on Regional Science and Technology Cooperation.

With this background, the geographical areas to be covered by the project was focused on the APEC member economies. The major research counterparts were arranged with an emphasis on East Asia with a recognition that the Asian portion of the Asia-Pacific region is where the Japanese research community is primarily responsible in their efforts for developing multi-lateral collaboration. The APEC economies in the Asian sector who joined the Phase II of EqTAP were China, Chinese Taipei, Indonesia, Korea, Papua New Guinea, Peru, Philippines, Singapore, Thailand, and Japan. It was, however, decided that some economies on the eastern rim of APEC were incorporated such as USA, Mexico, Peru and Chile, because of long history of bilateral collaboration between these countries in various ways.

All major outputs from the EqTAP Project is accessible through its web site called EqTAP Digital City/Tool Box (EDM-NIED, 2004). A detailed description of the project was presented in Kameda (2004b).

ORGANIZATIONAL SCHEME

EqTAP was funded under the framework of Special Coordination Funds (SCF) for Promoting Science and Technology and its category Multilateral International Joint Research. The major sponsor for the project is the Ministry of Education, Culture, Sport, Science and Technology (MEXT), Government of Japan.

It was a five year project, preceded by a preparatory phase:

- * Preparatory Phase¹ = 1998
- * Full Budget Phase = 1999~2003
 - +Phase I = 1999~2001
 - +Phase II = 2002~2003

The budget size was roughly JP¥50 million for the Preparatory Phase and JP¥200 million/year for the Full Budget Phase.

The project was participated by:

- * Phase I = 17 Japanese institutions and counterparts from 14 APEC economies
- * Phase II = 13 Japanese institutions and counterparts from 14 APEC economies

The Earthquake Disaster Mitigation Research Center, National Research Institute for Earth Science and Disaster Prevention (EDM-NIED) has acted as the leading institution in project management.

OBJECTIVES AND RESEARCH FRAMEWORK

The objectives of EqTAP have the following two distinct components:

- 1) Individual technological developments: Developing individual disaster reduction technologies reflecting Asia-Pacific regional characteristics by mobilizing Japanese advanced disaster reduction technologies and research potential in collaboration with counterpart researchers.
- 2) Integration for "EqTAP Master Plan" development: Integrating individual research outputs through risk-management framework whereby to define their implementation strategies.

In order to realize these objectives, under the context of the mission statement, the following research framework was developed for Phase II of the project.

Research Framework (EqTAP Phase II) (positions are as of the time of appointment)

¹ Years cited herein stand for Japanese fiscal years, which begin in April and end in March.

- Principal Investigator: H. Kameda, EDM-Director
- Chief Coordinator: N. Britton, EDM-Team Leader
- Section 1 Development of vulnerability assessment methods (F. Yamazaki, EDM-Team Leader)
- Section 2 Hazard assessment & structural mitigation (T. Kubo, EDM-Team Leader)
- Section 3 Disaster risk assessment, management & urban planning (N. Okada, Kyoto Univ.)
- Section 4 Tsunami risk & mitigation (Y. Kawata, Kyoto Univ.)
- Section 5 Master Plan development (H. Kameda, EDM)
 - *Section 5-1 Risk management framework (N. Britton, EDM; H. Higashihara, Univ. Tokyo)
 - *Section 5-2 Metro Manila Case Study (N. Britton, EDM)
 - *Section 5-3 Digital City / Tool Box (H. Hayashi, EDM-Team Leader; H. Kameda, EDM; J. Kiyono, Kyoto Univ.)
 - *Section 5-4 Ethnological integration (N. Hata, Tachibana U.)

The roles of the Sections and their subjects are illustrated in Figure 1. Along with individual technology developments and synthetic disaster management technologies developed in Sections 1~4, integration is conducted in Section 5. Herein multi-disciplinary collaboration among engineers and social scientists as well as among various fields of engineering was essential.

EqTAP Framework for Phase II

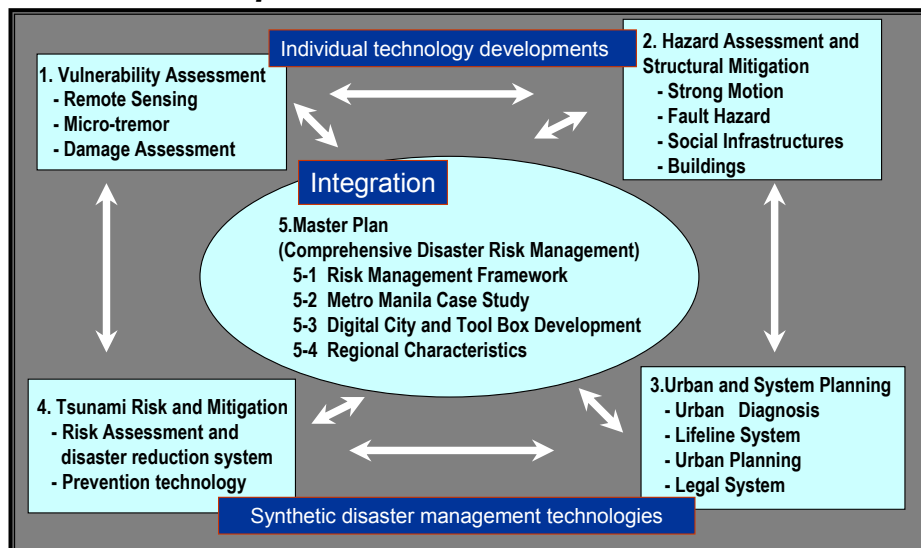


Figure 1 Scheme of Research for EqTAP Phase II

OUTPUTS OF THE EQTAP PROJECT

The final results of the EqTAP project have been formatted in the following three forms, which is all together called EqTAP Master Plan.

"EqTAP Master Plan"

- 1) *EqTAP DIGITAL CITY/TOOL BOX*- a mechanism for stakeholders from many areas to gain information and insights for risk management, and to learn from the experiences relating to hazard reduction (communication tool using web technologies)
- 2) *EqTAP RISK MANAGEMENT FRAMEWORK* - Document of experiences gained from the EqTAP project in terms of conducting large-scale inter-disciplinary and multi-national research. It presents working process for integration, implementation, regional perspectives and risk management applications (context integration).
- 3) *EqTAP CASE STUDIES* - Integrated disaster reduction technologies based on the outputs from

individual EqTAP subjects and Metro Manila Case Study (technical integration)

The EqTAP Digital City / Tool Box is a web site where you can make access to all kinds of EqTAP outputs including the other two components of the Master Plan; i.e., EqTAP Risk management Framework and EqTAP Case Studies. One may access to the site through the address indicated in the reference list (EDM-NIED, 2004).

The risk management framework was used as common basis of integration for Master Plan development. Figure 2 shows the risk management framework adopted in EqTAP. It is used as our common theoretical vehicle through which individual developments achieved in the project are correlated and integrated in order to make them useful for end users. This has laid a basis for the EqTAP Operating Principles, which is a way to translate the risk management framework into a substantial form that is indigenous to EqTAP.

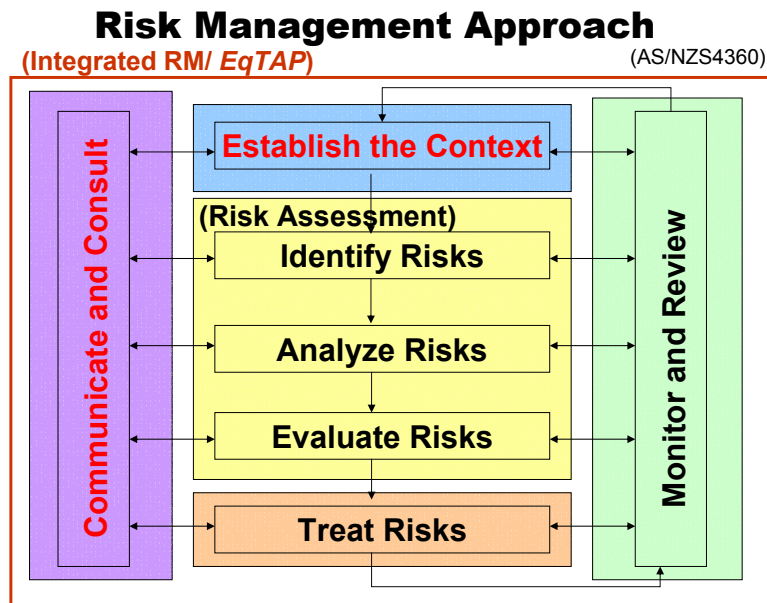


Figure 2 Risk Management Framework Adopted in EqTAP

The outputs of the EqTAP include a large group of research results from the individual subjects. They are by themselves valuable results for their technical expertise. It should, however, be emphasized that all the results have been designed and conducted in order to realize the goals of EqTAP; i.e., they are based on the regional characteristics of the Asia-Pacific regions. Many of them reflect the characteristics of the areas with which the counterpart researchers and organizations are familiar. In this way, it has been pursued to make these outputs be of high academic caliber as well as be oriented to actual fields of application. For this reason, the outputs of the individual subjects are called herein "EqTAP Case Studies." They constitute the largest group of the EqTAP outputs. They are the results of the efforts of all EqTAP Subject Leaders and their counterpart researchers. All of these results are accessible through the EqTAP Digital City/Tool Box.

**MULTI-DISCIPLINARY INNOVATION OF
DISASTER REDUCTION RESEARCH THROUGH EQTAP**

EqTAP Operating Principles

EqTAP is not a disconnected group of individual research achievements. Outputs from individual subjects were to be integrated in the framework of risk management. Extensive discussion for establishing the context has led to the following five items of the operating principles for EqTAP, which played key concepts in the project management in the Phase II.

EqTAP Operating Principles

- * Regional Perspective; (common views and specific features of regions dealt with)
- * Integration; (among individual subjects and sections)
- * Risk-Management Framework; (recognition as working process)
- * Inter-Disciplinary Approach; (solution-oriented research)
- * Implementation Strategy; (stakeholder involvement)

These items are mutually related. It is emphasized that "Implementation Strategy" is the key agenda in the EqTAP activities. This is the area that needs far more attention in the research community. This is the way to resolve the existing gap between research and practice.

Intensive efforts were taken among Principal Investigator, Chief Coordinator and individual Subject Leaders to conduct discussion sessions on how to manage their projects according to the EqATP Operating Principles, particularly upon Implementation Strategies. While their technical expertise was pursued to its highest caliber, implementation strategies were being incorporated in various ways (Kameda 2004a).

Elements of Innovation

Through the experiences of EqTAP Project, conceptual innovation of research community has been pursued. The innovation may be characterized by the following features.

- 1) From "product-focused research" to "process oriented research"
- 2) Multi-disciplinary research efforts motivated by demands in the real world
- 3) Research focused on regional perspective

These notions are not necessarily new realms. But there have been many barriers such as too rigid established disciplines which often let researchers stay within their realms and make it difficult to realize other means to achieve research and societal goals.

ACKNOWLEDGMENT

The accomplishments of the EqTAP Project would have never been achieved without efforts of many Japanese and international group of researchers and practitioners who participated in the EqTAP activities. They include: -All EqTAP Researchers (13 Japanese Institutions), -Counterpart Researchers (14 APEC Economies), -Participating Stakeholders, -Section Managers / Executive Group Members, -Chief Coordinator, -International Guidance and Oversight Team (IGOT), -IGOT - Monitoring and Assessment Panel (MAP), -EqTAP Master Plan Task Force (Phase I), -MEXT: Funding Agency, -MEXT Steering Committee, -EDM Administration, -NIED Headquarter Administration, Acknowledgment should follow Conclusions.

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(Submitted: March 19, 2004)
(Accepted: June 18, 2004)
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