

## 論文の内容の要旨

### 論文題目

Micro-level Analysis Framework for Disaster Recovery Process of Community  
(コミュニティの災害復興過程に関するミクロレベル分析フレームワーク)

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Disaster recovery involves stakeholders, not only government but also community and support groups such as NGO, NPO, and other organizations as the stakeholders of recovery process. Previous disaster recovery research has focusing mainly on the physical aspect of recovery, such as housing and infrastructure recovery, also quantitatively in various aspects of life variable, this research is aimed to evaluate recovery on a comprehensive aspects especially at community level, and to analyze at the entire process and the involved stakeholders, not only the outcome of recovery. Aim or objective of this research is to establish a framework of disaster recovery process analysis, with comprehensive viewpoint from the aspect of recovery result, recovery process, and recovery result. Also, it is aimed that this framework is enable to be used by community members in particular, also for other stakeholders and other experts and observers.

The development of Micro-level Analysis Framework for Disaster Recovery Process of Community is based on theoretical viewpoints and highly based-on case studies. The case studies selected here are earthquake and tsunami recovery in 2004 of Pande and Lampulo communities at Banda Aceh (Indonesia) and in 2011 of Nakase-cho community of Minami-sanriku and Ryoishi-cho community of Kamaishi City in Tohoku (Japan). For verification, this method is applied to earthquake recovery in 2008 of Heming Village community and Shang You Sub-district in Dujiangyan, Sichuan, (China). From the repeated observation on the case studies and verification of the theories at the case studies, the indices were categorized and selected. The final indices then described and parameters for scoring is decided based on theories and standard of disaster recovery at case studies area, and the modification of those.

Outcomes of this research are: 1) Indices and parameters of recovery in set of questionnaires, 2) Recovery analysis framework, and 3) Analysis of case studies in Aceh, Tohoku, and Sichuan. Additional outcome are: case studies information that is obtained from the questionnaires and interviews.

Indices used in this research are micro-level indices, which are observed at community level. These micro-level indices has long-term phase, continuity, and focuses on household recovery or community group. Afterwards, recovery results in micro level started to be elaborated into recovery process and the influential stakeholders. Recovery process consists of level of participation, consensus building analysis, and role of stakeholders. Next, the stakeholders' characteristics are obtained through stakeholder analysis, to understand potentials and challenge of each stakeholder. These micro-level indices are assessed in continuous timeline, i.e. before disaster, during recovery, and current situation after recovery. The parameters are divided into two parts, the absolute, and the relative parameter. Absolute parameters are fixed and could not be modified. The specific parameters could be adjusted according to the particular condition of the community and disaster type. All of the parameters scoring for each

indicator are based on related theories and actual situation on the case studies.

Indices of recovery results are divided into 3 aspects: 1) physical, 2) social, and 3) livelihood. In physical aspect are: village quality, housing quality, and utilities. In social aspect are education, health, and social preparedness for disaster. In livelihood aspects are: household livelihood recovery and economic activities in community.

Indices of stakeholders' characteristics are: 1) community, 2) government, and 3) support groups' characteristics. Community characteristics consist of community components, situation amongst community components, and community activity. Government characteristics are described through correlation between each level and governance style. Support group (NPOs, NGOs, INGOs') characteristics are explained in their role, approach, field of expertise, and aim.

Indices of recovery process consist of 3 parts: 1) aspiration of stakeholders, 2) Role sharing between stakeholders, and 3) Support group's level of involvement. Aspiration of stakeholders consists of shared idea and accepted ideas. Role sharing between stakeholders consists of intended role and actual role. Support group's level of involvement consists of involvement as facilitator and level of facilitation.

Analysis of the indices consists of 2 main sections, i.e.: 1) Visualization of each case and each components and 2) Correlation between factors. The visualization of each case consists of: a) Summary and detail parts in recovery results, b) Stakeholders' characteristics, c) Aspiration of stakeholders, and d) Change of role or role dynamics. Correlation between factors consists of correlation between a) Stakeholders characteristics and recovery results, b) Aspiration and role of stakeholders to recovery results, c) Shared aspiration and accepted aspiration of stakeholders, d) Stakeholders characteristics to aspiration and role, and e) Characteristics of NGOs/NPOs to involvement as facilitator and level of facilitation.

The advantage of this research is contribution to disaster recovery evaluation research for a comprehensive viewpoint. With its set of indices and its questionnaire, scoring method, and analysis method, this could be used to understand recovery at community level by community in particular, also by other stakeholders and researcher or observer. There is case study importance in preliminary study, in finding out the recovery indices at actual situation from case studies, and finally to verify the indices and parameters, also the frame of recovery analysis. Customization of general parameters according to local standard is necessary in the use of this method.

However, this method also has limitation on: a) level of objectivity, since questionnaire is used by individuals, also b) it needs certain condition of subject research in using this method, and c) limited numbers of case studies interviewees. The potentials of this method are: a) for community, it is useful to understand the situation and potentials of themselves in recovery, for support groups it is useful to understand the possible collaboration scheme for supporting recovery, for observer it is useful to understand a recovery case quickly and comprehensively, b) possibility for this frame to be developed for area dealing with disaster preparedness and countermeasures, and for area with various types of disaster cycle and disaster types.

## **Chapter 1. Introduction of Aceh 2004 tsunami recovery**

This chapter describes the basic stance of first investigation of recovery in actual situation. Indian Ocean 2004 tsunami recovery, with case studies in several kampongs at Aceh, Indonesia, as the first case studies of the writer in the field of recovery with community involvement. This chapter consists of several parts, first is the overview of recovery process in Aceh and Nias, then some legal documents and policy of reconstruction which were established by the national government of Indonesia. The extraordinary political situation at Aceh associated with national government interfered the tsunami recovery process. Less trust from Aceh citizens to the national government, and the unstable local government post disaster led national government to establish Rehabilitation and Recovery Agency (BRR).

During recovery process, as there are huge amount of NGOs (local and international), and donor agencies, the issue of community participation at the recovery process has emerged. And community involvement has been part with development in Indonesia. Therefore, the importance of community participation in field of recovery is explained here. The last part of this chapter gives insights of 4 selected case studies in Aceh, to grasp the current situation and condition during recovery process, and most importantly to find the important components of recovery results, process, and stakeholders' background.

## **Chapter 2. Background and research objective of disaster recovery evaluation method**

Chapter 2 explains the recovery theories from the earlier time consideration of physical results only, to the importance of other aspects such as social factors and community, as well as the necessary pre-event planning and post-event actions. It elaborates the significance of looking at recovery as a comprehensive process rather than a final result. From the existing recovery assessment method, the mainly used indicators are the physical (housing and infrastructure) measures, also other statistical data on population, employment, education, etc. There was lack of information on how the recovery process and how each stakeholders collaborate. And the interaction process was affected by the stakeholders characteristics. Therefore, it is necessary to create a comprehensive evaluation method with consideration of the result and process of recovery, and stakeholders' characteristics.

## **Chapter 3. Recovery indices development and categorization**

At this chapter, the development of indices are explained. First step is the findings on preliminary and first investigation, which was done in 2 case studies in Aceh. This is aimed to see the coherence between recovery theories and the actual situation at the field. Combined with the selected indices from research reviews and actual situation, the indices of recovery results were grouped into two parts, macro-level indices that covers the general or city-scale results, and micro level at the community level. Both macro and micro-level indices for recovery results consists of physical and non-physical (social and economy) aspects. While micro-level indices focus more on quality of recovery results, macro-level indices focus on quantity of recovery results.

Micro-level indices has long-term phase, continuity, and focuses on household recovery or community group. Afterwards, recovery results in micro level started to be elaborated into recovery process and the influential stakeholders. Recovery process consists of level of participation, consensus building analysis,

and role of stakeholders. Next, the stakeholders' characteristics are obtained through stakeholder analysis, to understand potentials and challenge of each stakeholder.

Indices of recovery results are divided into 3 aspects: 1) physical, 2) social, and 3) livelihood.

Indices of stakeholders' characteristics are: 1) community, 2) government, and 3) support groups characteristics.

Indices of recovery process consist of 3 parts: 1) aspiration of stakeholders, 2) Role sharing between stakeholders, and 3) Support group's level of involvement.

#### **Chapter 4. Micro-level indices parameter**

This chapter elaborates the micro-level indices' parameters. Various sustainability assessment tools, especially those that are used at community level, are used to find out how to assess various components in a comprehensive way. As this micro-level indices are assessed as process, so a certain continuous timeline is used, i.e. before disaster, during recovery, and current situation after recovery.

#### **Chapter 5. Scoring method and analysis**

This chapter explains the use of the questionnaire and the analysis framework for disaster recovery process of community. Data collection method is through the questionnaire filling, preferably followed by in-depth interview for the qualitative questions. Scoring method and score calibration are also mentioned at this chapter.

Analysis frame consists of 2 main parts. The first is visualization of each case, consists of: recovery results, stakeholders' characteristics change, stakeholders taking over each other's role, aspiration of stakeholders, and the change of role/role dynamics. And the second is correlation between factors. It consists of correlation between: a) stakeholders characteristics to recovery results, b) aspiration & role of stakeholders to recovery results, c) stakeholders characteristics to aspiration and role, and d) characteristics of NGOs/NPOs to involvement as facilitation and level of facilitation.

#### **Chapter 6. Case studies Analysis of Banda Aceh, Kamaishi and Minami-sanriku Town**

The 2 case studies of Banda Aceh (Pande Gampong and Lampulo Gampong), and Tohoku (Kamaishi City and Minami-sanriku Town), are used to form the indices, parameters, and analysis frame. The data and analysis here explained the findings on those 4 communities. The data obtained are the recovery results, recovery background, and recovery process.

The analysis of 4 case studies consists of visualization of each case and the correlation between factors.

#### **Chapter 7. Verification of Recovery Analysis Framework**

In order to verify the recovery analysis framework, other case studies is used, within different communities, country system, and disaster type. Sichuan Earthquake recovery was selected, and the framework was applied. This chapter explains the overview, adjustment of specific parameters and analysis of Sichuan Earthquake.

#### **Chapter 8. Conclusion, discussion and recommendation**

This chapter explains the recommendation and discussion part of this research, consists advantage and limitation of this recovery analysis method, also the possibilities to be developed further.