Assessment of post-tsunami disaster recovery of Banda Aceh city of Indonesia as window of opportunities for sustainable development

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Abstract. Post-tsunami recovery process at Banda Aceh city of Indonesia were assessed in this study. Several actions and programs implemented during the recovery process were exercised and examined through several FGDs, to identify any windows of opportunities to change were captured in the aspects of infrastructure and housing, economic revitalization of the affected community, mental health and psychosocial condition and development, establishment and implementation of disaster risk reduction programs and community preparedness. Subsequently, whether or not those changes fit into the principle criteria of sustainability were examined. The results give insights on the dynamics of recovery process after more than a decade since the tsunami was affected the area. Some success and not-so-success stories of actions and program implementations during the recovery process were captured. On the aspect of livelihoods and public finance, the local government seems to have seen a window of opportunity and subsequently seize the opportunity to revitalize the administrative system of micro-finance for communities. In contrast, on the aspect of socio-ecological systems integrity toward preserving the natural environment, the case of housing development at the coastal areas against the blueprint city masterplan exemplifies the failure in seizing the window of opportunity to “build back better”.
1. Introduction
A natural disaster may be seen as windows of opportunity for change, with or without one realizing it. It may change people’s perspective to see life with respect to the way of thinking and acting. To some extent, disaster can immediately be seen as a window of opportunity to create a better life. Although it may start from individual and communal actions, which is rather informal, it can be elevated into the level of institutional policies. Some of the actions are sustain, some are not, dependent to the internalization and commitment of those who involved in the process.

Postulated by [1] that separate streams of problems, policies, and politics come together at certain critical times, then solutions become joined to problems, and both of them are joined to favourable political forces. According to [2], windows of opportunity enabled institutions not previously engaged to become involved in the issue and often precipitated renegotiation of leadership on the issue within already engaged institutions. It is also an opportunity to an opening for new institutions to develop and become engaged, and shifting the network of actors involved. In the international community, the Action Learning Network of Accountability and Performance (ALNAP) in Humanitarian Action is predominant and undertakes annual reviews of response and relief work to encourage learning in the humanitarian sector. But again, focused on technical efficiency rather than the possibility that the political systems of impacted societies might themselves undergo formal and informal changes post-disaster [3].

The study aims at assessing important achievements of recovery in different aspects in life and to identify windows of opportunities and postulates a model of recovery from one of the largest disaster events in the modern human lifetime history. It seeks for lessons learnt that ultimately deliver recommendations for local and national level of government in implementing Disaster Risk Reduction programs in the future toward sustainable development. The assessment constitutes four aspects in life, which includes: 1) infrastructure and housing, 2) economic revitalization of the affected community, 3) mental health and psychosocial condition and development, and 4) establishment and implementation of disaster risk reduction programs and community preparedness towards disaster.

2. Data and Methods

2.1. Data Collection
The method of data collection in this study is a combination of qualitative analysis of data and information collected from several dedicated Focus Group Discussions (FGDs). A number of groups of beneficiaries and actors involved during the rehabilitation and reconstruction of Banda Aceh City, the capital city of Aceh Province of Indonesia, were invited during five sessions of FGDs, which further refined with in-depth interviews whenever necessary. Four working groups facilitating the focused discussions related to reconstruction of school infrastructure (WG1), community’s economic revitalization (WG2), mental health & psychosocial (WG3) and disaster risk reduction program (WG4).

Five FGD sessions were conducted inviting no less than 80 participants representing different stakeholders, for instance, the 1st session were participated by school principals, teachers and school pupils from elementary, junior high school and highschools which schools are located at the tsunami-affected areas. The subsequent session were participated by representatives of communities located both inside and outside of the tsunami-affected areas. In the third session, governmental officers from several departments were invited, the fourth session was participated by academicians and the fifth session were participated by the media and NGOs representatives.

In each session of FGD, some general questions related to the topics of each working groups (WG) were delivered and discussed among group participants to capture different perspectives on seeing the recovery process. Conclusive remarks were made when information or data received most confirmations among groups were taken as the valid data, while those which remains inconclusive,
would be further considered to be the focused questions set in the in depth interviews and/or questionnaire surveys following the FGDs. Figure 1 reveals the situation during one of the FGD sessions.

![Figure 1](image.png)

**Figure 1.** Situation during one of the FGD sessions to discuss the post-tsunami recovery in Banda Aceh from different perspectives.

2.2 Data Analysis Methods

Since the nature of the data is expected to be rather qualitative, data analysis were done through mind-mapping method formulated during the FGD in which statements or remarks delivered by the focused discussion participants were captured. The mind mapping were formulated by identification of several parameters including process leads to windows of opportunities for sustainability, output, outcomes and success factors.

The first parameter is output, which identifies what have been done in the effort of recovery since the tsunami occurred in 2004. This includes the aspects of infrastructure, product, services, networks, knowledge skills, rules be it formal or informal. Subsequently, we look into the process of how things were done and who was involved during the process. This may consist of government, International Organizations, Non-Government Organizations, Civil Society Organizations, private sector, individual actions, projects, programs, resources and skills and barriers and tactics. Part of the process, which is the main subject of interest in this article, is to whether such process, the way things done, would lead to windows of opportunity for sustainable development. How much attention have been put by all stakeholders involved during the recovery, how influential the political support gained during the process, resource support (money, knowledge, skills, networks, etc), creating new allies, openness, awareness and how much portion of the process ensure sustainability and seen as an opportunity by identifying those processes categories into the one that leads to sustainable development. This will be validated by justification of the outcomes from the beneficiaries which emerged and identified during the FGDs.
From those analyses, the success factor would be naturally identified as well. The success factors identify which of the factors involved in the process of recovery are critical leading to success. For instance, it can be from collaboration, vision/role model, perseverance, innovation in institutions, social learning & hands-on, and communication. From those analyses of parameters, we further categorize all the identifiable elements of each parameter which hold the principles of sustainable development.

Following the data collection from the FGDs, further analysis of data were done by individual working group facilitators to identify cases, implementation of programs or interventions that were seen as windows of opportunities for change toward sustainable development. This method was adopted from combination of work from [4] and [5] which established as a framework to map those cases, implementation of programs or interventions occurred during the recovery process into the principle criteria of sustainability. This includes all processes leads to recovering or even building back better environment, well-being, resources, citizenship which potential create equity and adaptability for not only the current generation but also for the next generation.

3. Results and Discussions

3.1. Recovery status of Banda Aceh City

Lessons learnt came out of the assessment are divided into two categories: 1) the success or potentially success stories; and 2) the not-so success stories of the Banda Aceh city’s recovery progress which has been lasting for the last twelve years since the Indian Ocean tsunami of 2004. Table 1 describes the excerpts of success stories of the status of several aspects of life in Banda Aceh city of Indonesia after 12 years recovering from the mega tsunami disaster which struck the city on 26 December 2004.

| Aspects                        | Outputs                                      | Process (WOOFS)                                      | Outcomes                                                      | Success factors                                                                 |
|--------------------------------|----------------------------------------------|----------------------------------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------|
| School Infrastructure          | Several disaster-prepared schools established| Introduction of school-based disaster preparedness program | Integrated effort for disaster preparedness in schools       | School committee to involve parents, community and local government            |
| Micro-economic Revitalization  | Micro-finance institution for start-up and small businesses | Start-up financial support donated by foreign donors, continued by government | continued micro-economic revitalization | Continuous local government’s attention for small-businesses micro-finance |
| Mental health and psychosocial problems | Improved mental health infrastructure and program | Collection and updates of mental health data          | Increasing accessibility to mental health treatment, better understanding on psychosocial problems | Government’s attention to improve infrastructure and programs                  |
| DRR Program implementation    | National Disaster Management Agency down to district level established | Capacity building for local government in DRR        | Increasing capacity and better coordination among stakeholders on disaster management | National government attention to support disaster risk reduction programs      |
On the aspect of school infrastructure recovery, several disaster-prepared schools have been established as the integrated effort for disaster preparedness in schools were the key factor of success. The effort came from the school committee who engaged the free-willing parents, the school-surrounding community and local government. All the evolving process for the past twelve years have seized the window of opportunity to establish potentially sustainable school-based disaster preparedness program in several schools in Banda Aceh. Nevertheless, such opportunity would soon be diminished if commitments from the local or central government was not strong enough to maintain or even better to formalize the program into, for instance, local-content-disaster-based school curriculum.

On the sector of community-economic revitalization, the initiation on incentives provided for start-up or small business donated by foreign donors, has surprisingly turned out into a beneficial micro-economic development in post-tsunami era. This was because the local government has increased its capacity in organizing typical micro-finance institution for start-up and small businesses, rather than investing to major business sectors in Banda Aceh. As a result, it provide the opportunity for the tsunami survivors to quickly start their new lives with their own start-up or small businesses. Such micro-economic revitalization model has been gradually increases as the government continuously supports the program up till now.

A rather special attention has be given for the recovery of mental health and psychosocial problems in this assessment. It was not so common such topic has ever been assessed thoroughly in cases of post-disaster event at the other places. Almost immediately after the tsunami event, the mental health institute started to realize that institutionally, the records and data of mental health as well as infrastructure are the upmost essential matters in creating programs for mental health and psychosocial recovery. However, those data and records had almost never been updated in the past. Embarking from this condition, an effort was done with support from the central government and foreign assistance to improve updating mental health data collection, infrastructure and programs. The outcome of the effort is that there has been increasing accessibility for the community to get mental health treatment, and at the same time to have better understanding on psychosocial problems as the excess of the mega disaster.

The local government has paid good attention on improvement of mental health institution and programs. Even more, currently the Aceh model for mental health program has become the reference at the national level. One of the most important success story from the post-tsunami recovery case of Indonesia is the realization and implementation of Disaster Risk Reduction Program. This is denoted by the establishment of the National Disaster Management Agency at the central government level down to district level in all provinces in Indonesia, including in Aceh Province. This is such a phenomenal governmental decision for the sake of increasing the capacity of all stakeholders to take part in disaster risk reduction program in good coordination. The remaining tasks are to take this opportunity to enhance the performance of the coordinating agency to develop sustainable programs which eventually increase the resilience of the community.

On the other hand, there were also some not so successful story of the recovery process at Banda Aceh city for the past 12 years. Table 2 summarized the implications of the recovery process on several aspects in life which have not yet so far indicating any changes leading to sustainability. For instance, on the aspect of school infrastructure, the building code regulation (e.g. earthquake resistance building standarization) were intensively introduced during the reconstruction process, either by national government or by foreign NGOs. However, not all new school buildings would eventually apply such code in their design and construction. The failing factor seems to be sourced from the loose control on building code regulation implementation and the inconsistency in construction supervision.

Another side of the micro-economic revitalization is that the development job by UN standard emerged during the rehab/recon process. This either attracted short-term or non-permanent profession
changes, or creating sky-rocketed inflation, disproportionate work forces and eventually lack of job creation. Such instantaneous and temporary revitalization may sometime followed by no exit strategy after temporary development job, and more importantly, lack of self-dependency in business (entrepreneurship). On the case of implementing the Disaster Risk Reduction Program, one of the main agenda of the city development plan was to create disaster-based city masterplan. However, in practice, coordination among stakeholders seem to fail to put the city masterplan forward. Rather, whereas the coastal low-lying areas supposed to be restored as the ‘green-belt’ area up to a few kilometers inland, instead, the reality was that more houses were rebuilt towards the coastline.

### Table 2. Case study of Banda Aceh City: Not So Success Stories

| Aspects                      | Process (WOOFS)                                                                 | Outputs                                                                 | Outcomes                                                                 | Failure factors                                                                 |
|------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------------------------------------------------|
| School Infrastructure        | Introducing building code regulation by foreign NGOs to government and construction company | Not all new school buildings applying quake-resistant building code      | Increasing awareness of building code application, but not strictly applied | inconsistency in supervision and loose regulation on building code               |
| Micro-economic Revitalization | Development job by UN standard for rehab recon emerged, attractive for profession changes | Increasing unemployment vs new start-up and small businesses            | Inflation, disproportionate work forces, lack of job creation            | No exit strategy after temporary development job, lack of self-dependency in business |
| Mental health and psychosocial problems | Introduction to different methods of trauma healing | Undetectable early PTSD symptom                                        | Emerging different future mental illness manifestation                  | Sporadic and unsystematic trauma healing program                               |
| DRR Program implementation   | Introduction of disaster-based city masterplan                                  | Rehab and recon of the coastal areas not entirely done according to the city masterplan | Failure in implementing city development according to masterplan        | Loose implementation of city masterplan                                         |

3.2. Windows of Opportunities towards Sustainable Development

There are ways of defining sustainability under different contexts. One would consider sustainability as the continuity of project over time, in which multi-faceted into economic viability to achieve social equity within the environmental integrity. While in a larger aspect of life, sustainability should be considered in a holistic way as an action that equally account for planet, people and profit. The latter would put forward the safe and just space for humanity which includes sustainable economic development. Overall, sustainable actions strive to enable economic and social welfare in an equitable manner (worldwide) without compromising the viability and integrity of the supporting social and ecological systems in the long term [6].

Accordingly, this article tries to map the recovery of Banda Aceh City based on key parameters which constitutes the principles of sustainable development. Four parameters proposed by [6] were considered herein as the criteria for sustainability: 1) environment, 2) resources, 3) livelihoods and public finance, and 4) citizenship and governance. Those criteria were subsequently cross-cut by another two parameters which promote sustainability in public goods: 5) equity, and 6) adaptability to change.
The results of the mapping of the recovery actions which have been progressing during the recovery process of Banda Aceh city revealed in Table 3. Qualitative data gained from the discussions regarding how far has the recovery process in different life aspects fulfilled the four criteria for sustainability and whether those are seen as opportunities to be sustained in a long run for the current and the future generation, as well as adaptation to the current situation in order to seize the opportunities for change toward sustainability.

Table 3. Identification of Windows of opportunities for sustainable development in Banda Aceh City.

| Enhancing the public goods | Equity | Adaptation |
|----------------------------|--------|------------|
| Natural Environment        |        |            |
| Ensuring socio-ecological   | Failure in implementing city development according to masterplan (-) | To continue socialization on the use of vertical evacuation facilities in the neighborhood | Revitalization of disaster-based coastal city development |
| Natural Resources          | Increasing awareness of building code application, but not strictly applied (+) | To conduct consistent supervision and strict regulation on building code | Construction program for reinforcing existing buildings |
| Livelihoods & Public Finance | Emerging different future mental illness manifestation (-) | To provide access to mental health services | Systematic trauma healing program |
| Livelihoods & Public Finance | continued government support for micro-economic revitalization (+) | To continue program of micro-finance for small-businesses | Increasing self-dependent economy |
| Citizenship & Governance   | Inflation, disproportionate work forces, lack of job creation (-) | Government to support creating new jobs | Returning to previous jobs |
| Citizenship & Governance   | Integrated effort for disaster preparedness in schools (+) | Proportionate participation of school committee, surrounding community and local government | To complete the disaster-prepared school program for the ‘danger’ zone |
| Citizenship & Governance   | Increasing accessibility to mental health treatment, better understanding on psychosocial problems (+) | To make a model for post-disaster mental health program | To change the old to new system for mental health |
| Citizenship & Governance   | Increasing capacity and better | To implement contingency plans for stakeholders | To improve Disaster Management Plan |
In Table 3, the findings from the post-tsunami recovery assessment in Banda Aceh City were exercised and examined, by fitting the identifiable changing situations which may be seen as the window of opportunities, into either of the four principle criteria of sustainability [6]. Taking into account for the recovery process that has been lasting for more than a decade, analysis were made to identify which actions or programs implemented during the recovery seen as the window of opportunities and how the recovery process within more than a decade has or has not seized those opportunities (e.g. “+” denotes for a seized opportunity, “-” denotes for a missed opportunity). Those orderly identifiable actions would subsequently encountered with further actions during the recovery process which would lead to sustainable development, underlying the importance of the equity to be benefited from the recovery intervention for the current and future generation, as well as to identify adaptation being done to maintain the sustainability in a long run. The followings are the samples of cases of three different situations can be identified during the post-tsunami recovery process in Banda Aceh city.

On the aspect of livelihoods and public finance, in the former time before the tsunami, micro-financing from the government was not administratively easy to access, particularly for the communities like farmers and fishermen. During the post-tsunami recovery, to ensure the livelihood opportunities and local investments after the tsunami hit Banda Aceh city, several donors both from national and international organizations delivered micro-finance schemes for the tsunami-affected communities along the coastline to revitalize the economy of the communities amid recovering from the mega disaster. For some practical reason, the financial distribution in the beginning was not coordinated with the local government, instead each organization would get in contact with the communities leaders for direct distribution. At a later stage during the recovery, as the local government resume to be operational, all finance assistance were well-coordinated. At this point, the local government seems to have seen a window of opportunity to revitalized the administrative system of financing the micro-finance for communities. This was shown by the continuation of the government support for micro-finance and micro-economic revitalization programs for small businesses until present.

In contrast with the aspect of livelihoods and public finance, on aspect of socio-ecological systems integrity toward preserving the natural environment, during the early stage of post-tsunami recovery, a new masterplan blueprint of the Banda Aceh city was made with the help from Japanese government. The masterplan set to have a green-belt area along the coastline with belt reached up to 200 m inland, at which location public infrastructure and housing were not supposed to be reconstructed. Low density housing area with elevated floors design should have been located at the landward of the green belt, and more dense housing areas and public facilities further inland. This is obviously a window of opportunity to build back the tsunami-affected area better than the former situation (e.g. before the tsunami). Nevertheless, the reality is that after a decade more houses were built than ever before just next to the coastline, ignoring the renewed masterplan. Apparently, the masterplan were not strictly followed during the rehabilitation and reconstruction process during which most of the houses were rebuilt. This exemplifies the failure in seizing the window of opportunity to build back better.

On the side not, not all the “negative” situations would necessarily lead to further negative outcome during the recovery process. For instance, in the case of enhancing public goods in the area of natural resources, there has been emerging mental health situation, where the untreated mental conditions of the surviving tsunami victims had not been detected and therefore not being properly treated much
earlier. In addition, during that early stage and continued at a later stage during post-tsunami recovery, several trauma healing programs were implemented rather sporadically by different health-related humanitarian organizations. Along the line, new methods of mental health interventions were also found, introduced and tested. It was learnt that after more than a decade since the tsunami disaster, several mental illness had emerged among the survivors, which were actually the manifestation of the undetectable or untreated mental conditions (e.g. Post-Traumatic Stress Disorder / PTSD) at the early stage after the tsunami event. Inspite of that, by now access to mental health services has been relatively good, as the provincial government has invested a long-term program of mental health revitalization since the early stage of the post-tsunami recovery. Although it might have been late for the early-treatment of the trauma, nevertheless, with the current better access to mental health services, better non-sporadic formulated interventions can be readily available for those in need.

4. Conclusions
The article aims at assessing important achievements of recovery in different aspects of life and to identify windows of opportunities and postulates a model of recovery from one of the largest disaster events in the modern human lifetime history, the Indian Ocean’s tsunami in 2004. It seeks for lessons learnt from Banda Aceh city of Indonesia as one of the most devastated area hit by the Indian Ocean tsunami.

The qualitative methods of the assessment fitting the identifiable actions and programs during the post-tsunami recovery process that were seen as the windows of opportunities to change toward sustainability were put into perspective of the theoretical critical principle criteria of sustainability. Those includes the aspects of infrastructure and housing, economic revitalization of the affected community, mental health and psychosocial condition and development, establishment and implementation of disaster risk reduction programs and community preparedness.

The results give insights on the dynamics of recovery process after more than a decade since the tsunami-affected area. Some success and not-so-success stories of actions and program implementations during the recovery process in the last decade post-tsunami were captured. There were changes which can be identified to have potential on sustainability since the beginning of the post-recovery process. There were also programs or actions which did not seem to work at first, but after intervention or continuation of programs throughout the recovery period they became sustainable. On the other hand, not all the “negative” situations would necessarily lead to further negative outcome during the recovery process.

The implication of this post-tsunami recovery assessment are that communities recovering from natural disasters have an important choice: rebuild damaged areas as they were, or to “Build Back Better”. This decision should be able to improve communities’s capacity to recover from future disasters, and also ensure that investments made today withstand the impacts that may come with natural hazards such as earthquakes and tsunamis.

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