Community satisfaction levels on the housing reconstruction project after Mentawai tsunami in 2010 – a case study at Sipora Island

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Abstract. An earthquake accompanied by tsunami that occurred in the Mentawai Islands on 25 October 2010 brought many casualties and damage on housing. As a result, people living on the coastline lost their homes and has to be relocated to safer places. The implementation of the housing reconstruction program was based on the relocation approach. Unsafe coastal locations require the communities to move to higher ground which unfortunately at the forest areas of Mentawai. The success of the reconstruction of the housing sector can be an indicator of success in the implementation of post-disaster reconstruction. The purpose of this research is to identify the community satisfaction levels on the housing reconstruction projects in Sipora island. This research was conducted in South Sipora by conducting structured interview on 20 respondents spread across four villages. Respondents were invited to rate the satisfaction levels from very dissatisfied until very satisfied with points values 1-5. The results show that the level of community satisfaction was 2.91. The main problem was caused by a long delay in the start of the reconstruction program. In addition, there are still problems after the house is completed, such as the lack of availability of clean water and public facilities.

1. Introduction
The tsunami along the coast of the Mentawai Islands triggered by the 7.7 Mw magnitude earthquake centered off the southwestern coast of Pagai Island, at 3,848 ° South latitude and 100,114 ° East Longitude with 20.6 km depth caused a tsunami [1]. Based on the damage and loss assessment, the number of damaged houses was 1,269 housing units, with details of damage including 879 heavily damaged, 116 moderately damaged, and 274 slightly damaged. The impact of the disaster also caused damage to roads, government offices, health facilities, educational facilities, trade facilities, and resorts [2]. Further, based on the assessment of rehabilitation and reconstruction needs and the acceleration of development in the Mentawai Islands region, taking into account the direction of the President of Indonesia and the sectoral recommendations, it is necessary to relocate community settlements in coastal areas to safer locations. Rehabilitation and Reconstruction with the planned Resettlement Relocation approach will be carried out in stages in the 2011 and 2012 fiscal years, in areas affected by the tsunami is North Pagai Island, South Pagai Island and Sipora Island [2]. Basically, any form of reconstruction activities or programs that have been planned and organized should have benefited the community, especially the housing sector. However, if the survivors did not satisfy, sooner or later they clearly want to return to their original lives. Therefore, this paper aims to identify the community satisfaction levels on the housing reconstruction projects at Sipora island of Mentawai.
2. Literature review

2.1. Tsunami impact
The 2010 Mentawai Islands earthquake occurred on October 25th, 2010 with a 7.2 magnitude earthquake at 21:42:20 local time, located 78 km southwest of South Pagai Island. Followed by tsunami waves within only 5-10 minutes [3]. Damage and loss assessment results are based on data as of November 22, 2010, showing that the earthquake and tsunami disasters have caused damage and losses of Rp. 348.92 billion. The greatest damage and loss occurred in the productive economy sector with estimated damage and losses reaching Rp. 117.82 billion (33.9% of the total value of damage and losses), where almost 80% of the damages and losses has occurred in the plantation sub-sector and fisheries sub-sector. Then, followed by damage and losses in the housing sector amounting to Rp. 115.82 billion (33.2%), infrastructure sector Rp. 19.16 billion (5.50%), social sector Rp. 16.03 billion (4.60%) and cross-sector Rp. 79.44 billion (22.81%) [2].

2.2. Principles of mentawai post-disaster recovery
During the post-tsunami emergency response in the Mentawai Islands District, options regarding the rehabilitation and reconstruction strategy were reviewed and consulted with the Vice President of the Republic of Indonesia on November 8th, 2010 [2]. The Mentawai Islands District Government supports the concept of Resettlement of Settlements from tsunami-affected coastal areas to safer areas at an altitude of ± 25 ASL, which is currently a forestry area, which is then followed up with the determination of new locations for housing relocation and the construction of residential environmental infrastructure. To accelerate the development of the Mentawai Islands Regency which is currently an undeveloped region, it is proposed to develop vital infrastructure in the form of interisland shaft roads, construction of air transportation infrastructure (airstrip) and sea transportation (docks) and construction of environmental roads including evacuation routes [2].

2.3. Community satisfaction indicator
Indicators of the community satisfaction toward the reconstruction program used as a reference in this study consisted of 19 indicators, during the reconstruction (14 variables) and to the results of reconstruction (5 variables) referring to Ophiyandri, et al., [4]. The detail of satisfaction level indicator can be seen at table 1.

| No | Satisfaction Indicator                                      |
|----|-------------------------------------------------------------|
| A. | Before the Reconstruction                                  |
| 1  | Information and socialization about reconstruction           |
| 2  | The time the reconstruction program began                   |
| 3  | Home damage identification process                          |
| 4  | Home recipient identification process                        |
| 5  | Involvement / participation in reconstruction                |
| 6  | Right aimed target recipient of aid                         |
| 7  | Participation in the reconstruction process                  |
| 8  | Collaboration between local communities in reconstruction    |
| 9  | The wishes of the people are fulfilled by the reconstruction |
| 10 | Amount of aid funds received                                |
| 11 | Easy administration / disbursement process                   |
| 12 | The role of government in the reconstruction process         |
| B. | During the Reconstruction                                   |
| 1  | The Role of Community Assistance Team (TPM)                 |
| 2  | The Role of the Facilitator in the reconstruction process    |
| 3  | Labor availability (craftsmen)                              |
| 4  | Work experience and skills (craftsmen)                      |

Table 1. Indicator of community satisfaction level.
3. Research methodology

In this study, the data collection method used in this study is by conducting a structured interview. The interview guideline was based on table 1 which divided based on the time of implementation: before and after the reconstruction process. The respondents were invited to indicate their satisfaction and provided their reason. The interview targeted the surrounding communities who experienced the earthquake and tsunami disaster who participated in the rehabilitation and reconstruction program after the 2010 earthquake and tsunami disaster in Mentawai Islands, especially in South Sipora. The respondents in this study were the community consisting of village heads and members of the local community. Since the limitations of the researchers, it was not possible for researchers to conduct a survey of all populations, so the sampling method was based on the cluster random sampling type. Interviews were conducted with 20 respondents on June 2019 in South Sipora, Mentawai Islands. The majority of respondents aged 41-50 with a percentage of 45%, followed by aged 31-40 with a percentage of 25%. The jobs of the interviewees are mostly farmers with a percentage of 70%.

Data are collected in Bosua Utara Village six respondents, Gobik Village five respondents, Katiet Village five respondents, and Masokut Village four respondents. In addition, interviews were also conducted with one of the local government parties who had served as Head of Rehabilitation and Reconstruction in the BPBD agency involved in the reconstruction program. The interview guideline consisted of two main parts, the first was the description of the interviewee data and the second was the question of the level of satisfaction. The assessment for the level of satisfaction on the guideline using the Likert Scale method which can be seen in table 2.

| No  | Satisfaction Indicator                                      |
|-----|------------------------------------------------------------|
| 5   | Availability of material for housing reconstruction       |
| 6   | Quality material available for housing reconstruction     |
| C.  | After Reconstruction                                       |
| 1   | With the results of existing assistance                   |
| 2   | The current state of the house is compared to the past     |
| 3   | The house become more earthquake resistant                 |
| 4   | The comfort of home compared to before                     |
| 5   | The quality of the house now compared to before            |
| 6   | The house was had been as community wish                   |
| 7   | Satisfaction with the current design                       |
| 8   | Election of relocation area                                |
| 9   | Security after relocation                                  |
| 10  | Access road to residence compared to before the relocation |
| 11  | Current availability of street / environment lighting      |
| 12  | Availability of clean water                               |
| 13  | The current condition of the surrounding community        |
| 14  | Availability of places of worship (Mosques, Churches, etc.) |
| 15  | Availability of educational facilities                    |
Table 2. Satisfaction level.

| Code | Level               | Weigh |
|------|---------------------|-------|
| VD   | Very Dissatisfied   | 1     |
| NS   | Not Satisfied       | 2     |
| QS   | Quite Satisfied     | 3     |
| S    | Satisfied           | 4     |
| VS   | Very Satisfied      | 5     |

With each level of satisfaction converted into points in numbers range 1-5. Then, the community satisfaction level data on the guideline will be averaged per each indicator to obtain the level of community satisfaction for each indicator using Microsoft Excel software.

The conversation, during the interview will be recorded. The result of the recorded interview will be written into a copy of a conversation dialogue. The data analysis method used in this research is content analysis. Content analysis is research that is in-depth discussion of the contents of written or printed information in a media. This analysis is usually used in qualitative research. The content analysis method in this study was carried out using Nvivo software. Recorded data that has been copied will be analyzed using Nvivo software. Statements of problems stated by the respondents will be grouped into several groups. Based on data processing with Nvivo, conclusions can be drawn from the problem factors that exist in the reconstruction.

4. Analysis and discussion

In the pre-reconstruction section, the level of community satisfaction at the location was an average of 2.84 (range dissatisfied - quite satisfied). From these questions, there are a number of questions below the average of three point, including the following : the length of time to start the reconstruction program, transparency in the delivery of aid, the disbursement process, the amount of aid funds, the identification of damage to houses, the process of identifying beneficiaries, and the role of government.

Table 3. Average level of community satisfaction before the reconstruction.

| A.   | Before the Reconstruction                                      | Average |
|------|---------------------------------------------------------------|---------|
| 1.   | Information and socialization about reconstruction            | 2.50    |
| 2.   | The time the reconstruction program began                     | 1.90    |
| 3.   | Home damage identification process                            | 2.75    |
| 4.   | Home recipient identification process                          | 2.85    |
| 5.   | Involvement / participation in reconstruction                 | 2.80    |
| 6.   | Right aimed target recipient of aid                           | 3.35    |
| 7.   | Participation in the reconstruction process                   | 3.75    |
| 8.   | Collaboration between local communities in reconstruction     | 3.50    |
| 9.   | The wishes of the people are fulfilled by the reconstruction  | 2.95    |
| 10.  | Amount of aid funds received                                  | 2.65    |
| 11.  | Easy administration / disbursement process                    | 2.45    |
| 12.  | The role of government in the reconstruction process          | 2.60    |

As the causes of dissatisfaction based on community complaints that have been processed using qualitative data processing. Problem about information are the lack of information from the facilitator, material information from suppliers that are lacking, the government that does not directly come down to provide information. Regarding the reconstruction starting time, the reconstruction began in 2013-2015. The problem about the data collections are there is no data collection damage to houses from the government, the absence of data collection of recipients of assistance from the government and there are people who do not get housing assistance. As for the funds, lack of openness of funds, insufficient amount of aid funds, cuts in funds, funds not managed by the community, disbursement of funds a
gradual, long-term disbursement process. The other problems are the relocation sites prone to landslides, and the absence of government oversight.

Based on information obtained from the government, the cause of this delay is because the housing land is located in the forest, so it takes time from 2012-2013 for the permit of the forest land, in March 2014 only began to be built. So that caused the start of the reconstruction of housing being delayed.

At the time of reconstruction, the level of community satisfaction at the location gained an average final point of 2.88 (Within the range of dissatisfied–quite satisfied). From these questions, there are four questions that average below 3, including the following: the role of the community facilitating team, the role of the facilitator, the taking and far-reaching materials, the quality of material.

Table 4. Average level of community satisfaction during the reconstruction.

| B. | During the Reconstruction | Average |
|----|---------------------------|---------|
| 1. | The Role of Community Assistance Team (TPM) | 2.75 |
| 2. | The Role of the Facilitator in the reconstruction process | 2.50 |
| 3. | Labor availability (craftsmen) | 3.15 |
| 4. | Work experience and skills (craftsmen) | 3.20 |
| 5. | Availability of material for housing reconstruction | 2.80 |
| 6. | Quality material available for housing reconstruction | 2.85 |

Problems found in this section include, for TPM, lack of TPM cooperation with the community, the existence of fund cuts by TPM and the absence of TPM assistance for the community. The role of the facilitator, the deduction of funds by the facilitator and the absence of assistance provided by the facilitator to the community. Regarding the availability of workers, the availability of workers is lacking. For the availability of material materials, among others, the price of expensive wood shaving, material taken from the river, remote location of material taking, inadequate equipment, and the absence of pavement. As for the quality of the material, the quality of the sand material that is lacking is due to the beach. Based on information obtained from the government, it was admitted that there was negligence, such as deduction of money from the facilitator, which of course should not have happened.

In the post-reconstruction section, the community satisfaction level gets an average end point of 2.95 (Being in the dissatisfaction range – quite satisfied). From these questions, there are some questions whose index is below three point, including the following: availability of clean water, availability of religious facilities, availability of economic facilities, homes that are as desired, the distance from house to workplace, the checking from the government, periodic assistance, and the government promises have been fulfilled.

Table 5. Average level of community satisfaction after reconstruction.

| C. | After Reconstruction | Average |
|----|---------------------|---------|
| 1. | With the results of existing assistance | 3.10 |
| 2. | The current state of the house is compared to the past | 3.25 |
| 3. | The house become more earthquake resistant | 3.80 |
| 4. | The comfort of home compared to before | 3.60 |
| 5. | The quality of the house now compared to before | 3.65 |
| 6. | The house was had been as community wish | 2.90 |
| 7. | Satisfaction with the current design | 3.05 |
| 8. | Election of relocation area | 3.85 |
| 9. | Security after relocation | 3.95 |
| 10. | Access road to residence compared to before the relocation | 3.90 |
| 11. | Current availability of street / environment lighting | 3.60 |
| 12. | Availability of clean water | 1.65 |
| 13. | The current condition of the surrounding community | 3.60 |
| 14. | Availability of places of worship (Mosques, Churches, etc.) | 2.75 |
| 15. | Availability of educational facilities | 3.55 |
Problems found in the post-reconstruction period include the absence of a kitchen, the absence of a bathroom, the small size of the house, which is the cause of dissatisfaction with the results of existing house. The small size of the house and the design of houses that use wood boards cause dissatisfaction with existing homes compared to the past house. For clean water facilities, most people rely on rainwater and well water. For places of worship are still in the old location and are still promised by the government. For market availability, inadequate roads and remote locations are the cause of dissatisfaction. For the availability of electricity, it still uses PLTS (Solar Power Plants). In case the distance from home access to work, including lack of access to roads, long distances and the absence of transportation advice are causes of dissatisfaction. For checks from the government, the absence of checks is the cause of dissatisfaction. The absence of periodic assistance, assistance that is only given during the emergency response, and providing assistance that is not too frequent. Regarding government promises, there are still government promises that have not been fulfilled such as, kitchen pledges, land certificates, places of worship, clean water, and economic recovery of farmers.

Based on information obtained from the government, the government has never promised to increase kitchen money, and public facilities at the housing site. Lack of information from the government and the circulation of incorrect issues can be a misunderstanding for the community. This problem should be immediately followed up by the government before causing other problems such as lack of public trust toward the government.

5. Conclusion
It can be concluded that the level of satisfaction of people who get house assistance in the reconstruction program are as follows: Before the reconstruction program 2.84, during the reconstruction program 2.88 and after the reconstruction program 2.95. The average level of community satisfaction was 2.91, meaning that it was close to the "quite satisfied" criteria. From 39 indicators used, 21 indicators show that the satisfaction level of beneficiaries are lower than three. The three indicators with the lowest level of satisfaction are the availability of economic facilities, the absence of checking from the government to housing locations, and government promises that still have not been fulfilled completely.

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