

**ASPECTS of DISASTER RISK REDUCTION in**

**DISASTER-RESILIENCE VILLAGE (DRV)**

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| ***Article history:*** |  | **Abstract** |
| Submitted: 12.012.2021  Revised: 03.02.2022  Accepted: 29.02.2022 |  | Indonesia is a prone country to natural disasters. This study aimed to evaluate disaster risk reduction efforts in the resilience village of Bonto Tallasa District Maros. The research design used an analytic descriptive, with several samples that met the criteria of 22 respondents in Bonto Tallasa Village, Maros Regency. Data were obtained from interviews and direct observation. Evaluation of disaster risk reduction efforts uses six aspects of assessment: legal aspects, planning factors, institutional elements, funding aspects, capacity development aspects, and aspects of disaster management according to the study's findings, which used a questionnaire with 60 questions and six domains of assessment aspects. Three respondents stated that Bonto Tallasa village was included in the resilient disaster village category. Nineteen respondents stated that Bonto Tallasa village was included in the primary resilient village category before the research commenced. |
| ***Keywords:***  *Aspects*  *Disaster risk reduction*  *Resilience*  *Assessment*  *Village* |
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**1 Introduction**

Indonesia is covered by three tectonic plates, Indo-Australia, Eurasia, and the Pacific. As a result, the country is regularly subjected to severe seismic activity, including earthquakes, volcanic eruptions, and other natural hazards (Fahlevi, Indriani & Oktari 2019; Kusumastuti et al. 2014). According to Statista, a tsunami is the most severe threat to Indonesia, with a risk index score of 9.7 out of 10. Meanwhile, drought is the least dangerous hazard, scoring 3.4 out of 10 on the risk scale. In addition, earthquake and flood risk indexes were ranked second and third, respectively, with scores of 8.9 and 8.1, while epidemic and tropical Cyclone risk indexes were ranked sixth and seventh, with scores of 6.9 and 6.1, respectively (Statista 2020).

Disaster management requires the public and private sectors' participation (Chen et al., 2007). The central government and local governments are responsible for implementing disaster management, following Law No. 24 of 2007, concerning disaster management through the development of disaster-responsible villages, a form of government protection to the community from disaster threats. This program is also in line with the strategy that has become a priority in the 2010-2014 National Disaster Management Plan (Renas PB) (BNPB, 2012).

A Disaster-Resilient Village is a village that has the independent ability to adapt and deal with disaster threats and recover quickly from the adverse effects of a disaster if a disaster hits it, and re-imagining International Communities post Pandemic times. Disaster-Resilient Village can recognize threats in its area and can organize community resources to reduce vulnerability and at the same time increase capacity to reduce disaster risk (BNPB, 2012).

The Participatory Disaster Resilient Village activity results in September 2019 is an approach method for empowering and increasing community participation. The emphasis is on the community involvement in the overall development activities and disaster information in Bonto Tallasa by tracking disaster locations by POKJA DESTANA. There are 6 (six) types of disasters that threaten Bonto Tallasa Village, namely floods, drought, fire, tornado, erosion, and dengue fever, and the highest level of danger is flooding.

Floods cause damage and losses in the form of human and property casualties, thus disrupting and even crippling the socio-economic activities of the population (6). The flood disaster has also caused much environmental damage, both to the natural environment (cliff erosion, sedimentation, river silting) and the artificial environment (damage/loss to the agricultural sector, settlements, public facilities) (7).

Flood disaster needs particular attention because the disaster claimes the most significant number of lives and losses (40%) of all-natural disaster losses(8).

One of the disaster-resilient villages in South Sulawesi is Bonto Tallasa Village, where this village has the potential for natural disasters, especially floods. Floods in Bonto Tallasa originate from the flow of the Maros River, which, when there are heavy rains, overflows, inundated some settlements and rice fields. This river flow comes from the eastern region, the Lekopancing Dam, with a higher topology. Alternatively, it can be a flood originating from higher areas (DESTANA, 2016).

The structural approach (technical building) still dominates efforts to control the government's flood disaster plan and is still dominated by the Structural System (technical structure). At the same time, the non-structural process is rarely carried out. According to the National Disaster Management Agency (BNPB), the new paradigm of disaster control emphasizes disaster risk reduction (mitigation). Mitigation is a series of efforts to reduce disaster risk through physical development, awareness, and capacity building to face disaster threats (1). The community is the first party to deal with disaster risk, so disaster mitigation capacity is more effective with community participation. One of the things that must be considered in mitigation efforts is the availability of information and maps of disaster-prone areas and socialization to increase public awareness in dealing with disasters(9).

Flood disaster mitigation efforts that can be carried out with a disaster-resilient community, development activities can be through the preparation of infrastructure in the form of permanent embankment repairs, environmental improvements in the form of planting "Bamboo" conservation plants in all river bodies. Institutional practice and preparedness of both the relevant government and disaster-prone communities. Through the development of disaster-resilient communities, the potential for flood vulnerability and the impact of disaster risks can be minimized (Budiarti, Gravitiani, & Mujiyo, 2017).

Bonito Tallasa Village began to prepare a disaster risk assessment map in 2016 and has been selected as a disaster-resilient village. However, no evaluation has been carried out on the disaster mitigation program that has been carried out, so based on the 2012 BNPB PERKA, evaluations can be carried out several times during the program implementation period, at least once every year. At the end of the program, a final evaluation is carried out to seek lessons learned from the program's implementation.

**2 Materials and Methods**

Research Design and Variables

This study uses a descriptive-analytic research design. The research variables consist of: independent variables, namely aspects of disaster risk reduction HVCA (Hazard, Vulnerability and Capacity Assessment), and the dependent variable is BNPB (Disaster Resilient Village).

**Research Location and Time**

This research was conducted in the village of Bonto Tallasa Kab. Maros in December 2020.

**Population and Research Sample**

The population in this study is the community in the disaster-resilient village of Bonto Tallasa, Kab. Maros. The sample in this study is part of the community selected based on the sampling technique. In this study, the piece amounted to 22 people.

**Method of collecting data**

The research data were collected using the following techniques: structured interviews, document studies, and questionnaires.

**Data analysis technique**

Demographic data consisting of age, education, gender, occupation, position in society were analyzed using descriptive statistics, namely univariate analysis. Qualitative data processing in this study uses the Miles and Huberman model, which consists of (Data Reduction), Data Display (Data Presentation), and Conclusion (Conclusion).

Table 1

Distribution of Respondents Based on Characteristic Data

|  |  |  |
| --- | --- | --- |
| Characteristics | Median | Max/Min |
| Age | 40 | 55/27 years |
|  | N | % |
| Sex  Male  Female | 15  7 | 68.2  31.8 |
| Education  Elementry  Junior School  Senior School  Diploma  Bachelor | 1  3  13  1  4 | 4.5  13.6  59.1  4.5  18.2 |
| Occupation  Housewife  Private sector employee  Farmer  Civil Servant  Entrepreneur | 5  1  5  4  7 | 22.7  4.5  22.7  18.2  31.8 |
| Job Position  Head of the Village  Hamlet chief  village secretary  denizen | 1  6  1  14 | 4.5  27.3  4.5  59.1 |
| Total | 22 |  |

Table 2

Distribution of Expert Respondents Based on Assessment Aspect Data

|  |  |  |
| --- | --- | --- |
| Characteristics | N | % |
| Legality  Legal  IlLegal | 18  4 | 81.8  18.2 |
| Scheming  Planned | 22 | 100 |
| Institutional  There is an Institution  There is no an Institution | 19  3 | 86.4  13.6 |
| Funding  Funded  Not funded | 10  12 | 45.5  54.5 |
| Capacity Development  Develop  Undeveloped | 19  3 | 86.4  13.6 |
| Disaster Management Implementation  Organized  Not held yet | 11  11 | 50  50 |
| TOTAL | 22 | 100 |

Tabel 3

Distribution of Disaster Resilience Village Evaluation

|  |  |  |
| --- | --- | --- |
| Disaster Resilience Village Evaluation | N | % |
| Intermediate Disaster Resilience Village  Primary Disaster Resilience Village | 3  19 | 13.6  86.4 |
| Total | 22 | 100 |

**3 Results and Discussions**

An analytical descriptive study has been conducted to evaluate disaster risk reduction efforts in the disaster-resilient village of Bonto Tallasa, Maros Regency. The research was born in the town of Bonto Tallasa, Kab. Maros in December 2020.

The area of ​​Bonto Tallasa Village has an area of ​​12 Km2 consisting of ± 900 Ha of agricultural land that is spread across every hamlet and ± 400 Ha of residential land; besides that, there is a Maros river flow in the eastern part of Bonto Tallasa Village which is directly adjacent to Tanete Village.

The disaster analysis carried out by residents through the DRR forum of Bonto Tallasa village indicated that Bonto Tallasa Village has five threats, both natural disasters and non-natural and social disasters. The main danger is flooding. The overflow of water when it rains every year causes floods that occur almost every year, resulting in many losses. Floods that occur are influenced by several natural and non-natural factors: the area's height, the water flow structure, the lack of public awareness, and others.

The majority of the residents were questioned during the research, amounting to 14 respondents (63.6%); most were self-employed, most respondents were male (68.2%) and (59, 1%).) and had high school education. The average age of the respondents studied is 40 years old, and they are still of productive age (attachment, Table 1).

Based on the characteristics of the assessment aspect in the resilient disaster village, respondents who think that the disaster-resilient village is considered legal when viewed from the legal aspect are 18 respondents (81.8%), and overall believe that it has planed as many as 22 respondents (100%). There were 19 respondents (86.4%) who viewed the institution appropriately funded, as many as 12 respondents (54.4%), who considered that capacity development had developed as many as 19 respondents (86.4%). The implementation of disaster management was still lacking. Consider it has not been implemented, and some consider it has been implemented (attachment, Table 2).

Informants in this study were informants who met the research criteria, namely the Bontotallasa village apparatus, who knew for sure about implementing the disaster-resilient village program. The identities of the informants are as follows: 1) Informant one (01), with the initials S, a man who belongs to the village of Bontotallasa aged 43 years, works as a Civil Servant (PNS), 2) Informant two (02), with the initials SH, a 45-year-old male, the latest education is Strata 1 (S1), works as a civil servant, currently holds the position of Secretary of the village of Bonto Tallasa, and 3) Informant three (03), with the initials M, a 31-year-old male, with an undergraduate education background, works as an honorary and serves as an employee at the village office who is responsible for the Tangguh disaster village program in Bontotallasa village.

The distribution of the evaluation of disaster-resilient villages shows that most of the respondents given a questionnaire consisting of 60 questions and six domains stated that Bonto Tallasa village was still included in the Primary Disaster Resilient village (appendix, Table 3).

The results showed that Bonto Tallasa, from the beginning until the research was carried out, was still in the same category, namely the primary disaster-resilient village.

For the Disaster Resilient Village/Village Program to be implemented successfully, it needs to be equipped with good monitoring, evaluation, and reporting system. These activities need to be carried out from the beginning of program implementation at various levels, from the district/city level to the community level. Monitoring and evaluation tools need to be made following the capabilities of local governments, existing resources, and citizens' capacity. They can provide the evidence required to make an assessment. In general, monitoring activities aim to observe whether program activities have been carried out following the plan.

Evaluation activities aim to assess the overall achievement of program goals/outcomes by the planned indicators or targets. Evaluation can be done several times during the program implementation period, at least once a year. At the end of the program, a final evaluation is carried out to seek lessons learned from the program's implementation.

Several village officials stated that the results of an evaluation of research conducted on 22 community members stated that the Bonto Tallasa disaster-resilient village was included in primary disaster-resilient villages. Seen from statistical data of the average number of respondents' answers (19 people), it has remained in the same resilient village, from the time it was formed until the evaluation was carried out.

Data analysis based on frequency showed that three respondents stated that the village of Bontotallasa had been included in the middle disaster resilient village. However, 19 other respondents said primary, and the three different results were probably caused by boredom from the respondents reading the questionnaire given, which consisted of 60 questions. The answers of 19 respondents who stated that Bontotallasa village is a primary disaster-resilient village were supported by qualitative data obtained from interviews with village officials responsible for the disaster-resilient village program.

Based on the observation sheets given to several informants consisting of village officials responsible for the disaster-resilient program in Bontotallasa village, the informants stated that Bontotallasa village was a primary disaster resilient village.

The evaluation carried out by the disaster-resilient village, Bonto Tallasa village did not experience an increase. In contrast, interviews with local village officials, several efforts had been made, and the provision of community understanding influenced this. Awareness to form networks and strengthen social interaction among villagers, organize, ensure continuity, optimize potential and resources to improve community-based disaster management (Habibullah, 2013).

Disaster risk consists of four elements: hazard, exposure, vulnerability, and consequences. Hazard refers to the likelihood and characteristic of the occurrence of a natural process or phenomenon that could produce a harmful impact (earthquake, wind, or severe flooding) on ​​a community. Exposure refers to community assets (people, property, and infrastructure) affected by a dangerous hazard. Exposure is calculated from the value, location, and physical dimensions of an investment, the type of construction, and the quality and age of the particular structure. The spatial distribution of those occupying the network and characteristics of the natural environment, such as wetlands, ecosystems, flora, and fauna, can reduce the effects of or be affected by hazards (Cutter et al., 2012).

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The spatial distribution of those occupying the village; and characteristics of the natural environment such as wetlands, ecosystems, flora, and fauna can reduce the effects of or be affected by hazards (Cutter et al., 2012).

The fact that disasters impact construction (e.g., a school is washed away in flood) and construction increases or reduces disaster risk (e.g., introducing earthquake-resistant building techniques) is widely accepted. However, every year suffer losses due to disasters that hinder development and people who live in the shadow of disaster risk (Nguyen et al., 2014).

The disaster-resilient village of Bonto Tallasa that increases the capacity of disaster response preparedness has not been tested and systematic and is still being trained by the Destana working group under Munir's research. Which states that establishing a disaster-resilient village should make the community members of the disaster-resilient village volunteers through training provided.

When implemented, the community can better understand the roles and responsibilities of disasters. In addition, it can add insight and knowledge about disasters and can reduce risks that will occur (Munir, 2016).

Bontotallasa Village has a village apparatus open to all residents' inputs. It can affect the coordination process in the event of a disaster. The level of community cooperation is also still high so that things of common interest can be carried out together and are voluntary. It can support implementing the disaster-resilient village program, for example, in Cleaning water canals as a community service (sewers/irrigation) once a month, making culverts for water flow, and increasing public awareness so as not to throw garbage in waterways and the Maros river.

The problem that causes flooding must be a concern is the flow of the Maros river from upstream, middle, and downstream. The main problem in the upstream area is the catchment area or rain catchment area, which has been damaged due to clearing agricultural land and illegal logging of trees. Therefore, a reforestation movement in the upstream region is needed to restore its function as a rain catchment area, even though it is long term. Meanwhile, a quick step can be to make dew around the upstream that collects rainwater and releases it in the rainy season.

Epidemiological studies of the effects of flooding on health are often limited because they are based on small, unrepresentative samples. Good baseline data are often difficult to obtain because they were not collected before the flood. In addition, health outcomes caused by floods are not always recorded in medical records, so the relationship between health complaints and their causes is not established (Menne & Murray, 2013).

In the middle of the Maros river flow, it is necessary to normalize the river and maintain the Lekopancing dam in Tompobulu District. Based on direct observations, researchers in the Lekopancing dam area found that fallen tree debris carried by river currents during the flood was still in the dam area. It needs to be a severe concern for those responsible for the Lekopancing dam.

**4 Conclusion**

The researcher concludes that the resilient village of Bonto Tallasa is still in the category of Primary disaster resilient village. The researcher suggests collaborating with related parties to carry out normalization in dredging at the Maros river estuary located in Turikale District, which is experiencing silting due to the accumulation of soil material carried by water currents. Coordinate with the Department of Public Works and Spatial Planning of Maros Regency to construct gabions along the banks of the Maros River to prevent scouring/erosion due to heavy river currents. The movement of reforestation in the upstream area of ​​the river to restore the function of the rain catchment area. They have held routine training activities two times a year in collaboration with BPBD for capacity building of village government, volunteer teams, and residents in Bonto Tallasa village. Build a community-based early warning system to detect water levels at risk of flooding and provide time to save themselves and community assets.

*Conflict of interest statement*

The authors declare that no competing interests exist.

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