

Social Economic Index Analysis of Palu Disaster Recovery

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Abstract The geographical condition makes Indonesia very vulnerable to natural disasters. Various natural disasters that have befallen Indonesia have claimed many lives and property losses. Some of them are the earthquake, tsunami, and liquefaction in Central Sulawesi, especially Palu City, on September 28 2018, which claimed thousands of lives and caused huge property losses. The socio-economic impacts caused by the disaster need to be repaired through rehabilitation and reconstruction in education, health, and the economy. To measure the level of recovery in the form of rehabilitation and reconstruction, a general measure in the form of an index number is needed, called the Indonesia Post-Disaster Recovery Index (Ina-PDRI), which consists of three aspects: the education aspect, the health aspect, and the economic aspect. All basic indicators use primary and secondary data. The basic data used is data for 2017 (100 percent) and it is compared with post-earthquake data, namely data for 2019. The higher the recovery index percentage obtained, the greater the socio-economic condition of recovery in Palu City. It is found that after one year of natural disasters in the form of earthquakes, tsunamis, and liquefaction, the results for the recovery of the new education sector were 54.67 percent, the health sector had only reached 77.78 percent, and the economic sector had only reached 19.84 percent. Total recovery only reached 44.20 percent. Therefore, the disaster recovery acceleration program in Palu City still needs to be improved so that the socio-economic conditions are recovered as before.

Keywords Natural Disaster, Earthquake, Tsunami, Liquefaction, Post-disaster Recovery Index, Social

Economic Index

1. Introduction

Indonesia is an archipelago located in the Pacific Ring of Fire, that is, under the Indonesian ocean, three large tectonic plates collide; namely the Eurasian, Indo-Australian, and Pacific Plates, which have caused and can cause some of the most dangerous volcanic explosions and earthquakes in human history on earth [1]. This condition makes Indonesia vulnerable to natural disasters. With a population of 267 million in 2019, the risks that will always arise in Indonesia are enormous [2]. Various natural disasters that have befallen Indonesia have claimed a lot of lives and property losses [3]. One of the major natural disaster events that occurred in Indonesia was an earthquake, tsunami, and liquefaction in Palu City, Sigi Regency, Donggala, and Parigi-Moutong Regency in 2018, which claimed more than four thousand lives and very large property losses.

According to Law No. 24 of 2007 Pemerintah Republik Indonesia [4], a disaster is an event or series of events that threatens and disrupts the life and livelihood of the community which is caused, either by natural factors and/or non-natural factors as well as human factors. Loss of human life, environmental damage, property loss, and psychological impact. Therefore, events that occurred in Palu City caused by nature, such as tsunamis, earthquakes, and liquefaction, were categorized as natural disasters [5]. If this event occurs in an uninhabited area and/or there are

no facilities and infrastructure, then the event will only be called an ordinary natural phenomenon.

The natural disaster that occurred in Palu City, Central Sulawesi Province, disrupted people's lives and damaged the environment, requiring an effort to restore them to a normal state [6]. According to the Disaster Management Law, recovery is a series of activities to restore the situation in communities and the environment affected by disasters by re-functioning institutions, infrastructure, and facilities by carrying out rehabilitation [7]. The length of time for the process and the amount of cost required to restore the condition of the community and the environment depend on the magnitude of the impact of the natural disaster on people's lives and environmental conditions. The greater the impact caused by a disaster, the more time and cost will be required for the recovery process.

The disaster recovery process in Palu City has been carried out in the form of rehabilitation and reconstruction activities. In order to measure the rate of recovery after rehabilitation and reconstruction, a general measure is needed in the form of an index number. This index will be called the Indonesian Post-Disaster Recovery Index, abbreviated as Ina-PDRI [7].

This study aims to determine a general measure of the post-disaster recovery rate of the rehabilitation and reconstruction that has been carried out by various parties in Palu City, both from the economic and social aspects (education and health). In addition, it is deemed necessary to measure the condition of the population's livelihood recovery in the situation before the disaster, after and after recovery, as well as to provide benchmarks for monitoring and evaluation of the results of post-disaster rehabilitation and reconstruction, providing information for decision making by the government and other stakeholders related to disasters, providing input for the level of adequacy of recovery, so that it can provide a warning to stakeholders in post-disaster recovery as well as to readjust the determination of the post-disaster (Rehabilitation and Reconstruction) implementation period in order to accelerate recovery and provide information to National Disaster Management Agency (Badan Nasional Penanggulangan Bencana [BNPB]) and other parties to develop an analysis of factors related to the disaster.

2. Literature Review

Post-disaster Recovery and Rehabilitation-reconstruction

Phillips [8] and Lindell [9] defined recovery as a predictable part of the post-disaster process, to return to normalcy. However, this definition is too simple, given that the recovery process does not always follow a clear/certain pattern due to several stages that are likely to overlap and the process is not always uniform across all community

sectors [10].

Based on Law No. 24 of 2007 Pemerintah Republik Indonesia [4] concerning Disaster Management, recovery is defined as a series of activities to restore the condition of communities and the environment affected by disasters by revitalizing institutions, infrastructure, and facilities by conducting business rehabilitation and reconstruction. This definition is in line with the National Disaster Management Authority Government of India [1], which states that post-disaster recovery is a very dynamic process and may not be linear. Therefore, until now, many researchers have stated that a successful recovery not only returns to pre-disaster conditions but should also increase disaster resilience in the future [11,12].

The recovery process involves activities carried out in the long term after a disaster occurs to stabilize and return things to normal, namely conditions like before the disaster [13]. The general principle used in the recovery process is to build back better and safer (building back better and safer)". Recovery is closely related to rehabilitation and reconstruction activities. Based on Law No. 24/2007 article 57 [4] and Regulation of the Head of the National Disaster Management Agency (BNPB) No. 17/2010 BNPB [14], it is stated that post-disaster recovery activities consist of two main activities, namely rehabilitation) and reconstruction. Rehabilitation is the repair and restoration of all aspects of public or community services to an adequate level in post-disaster areas with the main goal of normalizing or running fairly all aspects of government and community life in post-disaster areas [15].

Meanwhile, reconstruction is rebuilding of all infrastructure and facilities, institutions in post-disaster areas, both at the government and community levels, with the main target of growing and developing economic, social, and cultural activities, upholding law and order, and awakening community participation in all aspects of social life [6]. There are several targets for implementing rehabilitation and reconstruction, namely institutional, operational, and substantial targets. Institutional targets include all institutions, both at the central and regional levels, involved in implementing rehabilitation and reconstruction [16].

The operational targets are that the government and communities in the disaster area are able to carry out rehabilitation and reconstruction properly and correctly. Furthermore, the substantial targets for rehabilitation and reconstruction include six targets: humanitarian aspects, housing, habitation, development infrastructure, economic, social, and cross-sectoral aspects [1].

Post-disaster Recovery Indicators

The publication of articles in several journals that specialize in disasters shows that recovery indicators can be categorized into social, economic, environmental, and infrastructure categories. From that category, infrastructure, such as restoration of public facilities and life support (e.g.,

schools, water, and electricity systems) and repair (or rebuilding) housing, are categories that are frequently studied [17]. One reason is that social infrastructure indicators are generally measured at the output level, so they are easier to measure than social indicators, which are generally at the outcome level [18].

Watkinson and Hall [19] and Rasido and Patodo [3] have classified several indicators that are most widely used to measure the recovery process, summarized from several articles published in journals on the disaster. The housing recovery is the most widely used indicator to measure the recovery process due to the ease of obtaining data and measuring it. Furthermore, the recovery in the economic sector has also been widely studied, although the economic indicators used are more varied than in other fields [20]. These indicators can be compared with pre-disaster conditions to measure economic recovery [21].

Two approaches that are often used to measure recovery are (1) the inductive approach, which is done by creating a set of characteristics that are considered relevant to recovery and trying to measure these characteristics, and (2) the deductive approach, namely by using independent measurements, which means independent of household and community characteristics [22]. The advantage of using the inductive approach is that it has a specific context, while the disadvantage is circular logic (what is defined as what is measured) and depends on the availability of secondary data, which often reflects a specific discipline. One of the most significant weaknesses is circular logic; we previously defined characteristic variables that we think can measure the recovery process so that our conclusions will tend to be controlled or based on the selection of these initial variables [23].

On the other hand, the deductive approach with an independent or neutral measurement pattern has the advantage that it tends to be multidisciplinary and more persuasive towards logical relationships, and the disadvantage is that it does not have a specific context and cannot be immediately implemented [24]. Today the dominant approach taken to measure recovery is the inductive approach through categorizing a characteristic that can adapt to a specific context. However, paying attention to the risk of circular logic and dependence on secondary data is important.

In the inductive approach, to calculate Ina-PDRI, one characteristic that is considered relevant will be compiled to measure the success of implementing the post-disaster recovery program in Palu City. Given that the PDRI is a form of evaluation, in its calculation, indicators will be selected that reflect the benefits (outcomes) or functioning of the outputs of the rehabilitation and reconstruction programs that the government and other institutions have implemented and refer to the substantial targets of the rehabilitation program and reconstruction, namely aspects of humanity, housing and settlements, development infrastructure, economy, social and cross-sectoral [25].

An evaluation is needed to measure the success of a

post-disaster recovery process, especially the achievement of substantial targets for rehabilitation and reconstruction. Based on the Regulation of the Head of BNPB No. 17/2010 BNPB [14] and No. 7/2012 BNPB [26], evaluation is defined as a series of activities comparing the realization of inputs, outputs, and outcomes against plans and standards. Evaluation of the implementation of post-disaster rehabilitation and reconstruction is an effort to measure and evaluate objectively the results of the implementation of rehabilitation and reconstruction programs and activities that have been planned systematically and objectively, using appropriate evaluation methods [15,27,28]. It is done through analysis from the planning to implementation stages, and it is hoped that efforts will be obtained to complete the rehabilitation and reconstruction task and provide recommendations for post-implementation rehabilitation and reconstruction policies [29-31].

Thus, the evaluation aims to see the benefits of further planning [23]. Benefits of outcomes are defined as everything that reflects the functioning of the outputs of activities in one program, namely goods or services produced by activities carried out to support the achievement of program and policy goals and objectives [32]. Meanwhile, the impact is an assessment of the results carried out to show that they have been achieved based on indicators that reflect the function or benefits of the activity output. Evaluation feedback is used for planning the next year's development [21].

3. Methodology

Ina-PDRI is a composite index consisting of three indices to monitor health, education, and economic recovery, using a formula for each index [7]. All basic indicators use secondary data. To measure the impact of the disaster in Palu City, each recovery aspect index will be given a weight, namely the ratio of the area affected (n) to the total area (N). The smaller the affected area, the smaller the index value for this aspect of recovery. However, this has no effect on the Ina-PDRI value, which measures the overall performance level of the recovery process.

1. Educational Aspects

- a. *Elementary School Participation Rate (APM_{SD})* is the proportion of the total population in the elementary school age group (7-12 years) who are still in school to the total population in the 7-12 year age group.

$$APM_{SD} = \frac{7 \text{ years old} - 12 \text{ years old}}{\text{total ages } 7 - 12}$$

- b. *Junior Secondary School participation rate (APM_{SLTP})* is the proportion of the total population in the junior high school age group (13-15 years) who are still in school to the total population in the 13-15 years old of age group.

$$APM_{SLTP} = \frac{13 \text{ years old} - 15 \text{ years old}}{\text{total ages } 13 - 15}$$

- c. *Senior High School participation rate (APM_{SLTA})* - The proportion of the population in the senior high school age group (16-18 years) who are still in school to the total population in the 16-18 years old of age group.

$$APM_{SLTA} = \frac{16 \text{ years old} - 18 \text{ years old}}{\text{total ages } 16 - 18}$$

2. Healthy

$$MOR = \frac{\text{Number of populations with health complaints}}{\text{Number of populations}}$$

3. Economy

Labor Participation Rate: The proportion of the total population aged 15 years and over that is included in the labor force to the total working-age population.

$$TPAK = \frac{\text{Total labor}}{\text{Total Population up to 15 years old}}$$

1. IPPB Formula

IPPB is a composite index consisting of several indexes from the aspects of (1) education, (2) health, and (3) economy. The formula for calculating IPPB is in the equation is

$$IPPB_{it} = \frac{N_i}{n_i} = \left\{ \sqrt[3]{A_{Pit} \times A_{Sit} \times A_{Eit}} \right\}; n_i \neq 0$$

Furthermore, the formula for calculating the aspects of recovery in IPPB uses the following equations:

$$A_{Pit} = \frac{n_{it}}{N_{it}} = \left\{ \sqrt[3]{APM_{SDadj} \times APM_{SLTPadj} \times APM_{SLTAadj}} \right\}$$

$$A_{Sit} = \frac{n_{it}}{N_{it}} = [100\% - MOR_{adj}]$$

$$A_{Eit} = \frac{n_{it}}{N_{it}} = [TPAK_{it} - S_{Eit}]$$

information

- IPPB_{it} : Indonesia's Post-Disaster Recovery Index from area i at time t
- A_{Pit} : Recovery index from the education aspect of area i at time t
- A_{Sit} : Recovery index from the health aspect of area i at time t
- A_{Eit} : Recovery index from the economic aspect of area i at time t

information:

- IPPB : Indonesia's Post-Disaster Recovery Index from area i at time t
- A_{Pit} : Recovery index from the education aspect of area i at time t
- A_{Sit} : Recovery index from the health aspect of area i at time t
- A_{Eit} : Recovery index from the economic aspect of area i at time t
- n_i : Area of impact of area i (km²)
- N_i : Total area (administrative) i (km²)
- APM_{SDadj} : Elementary School Participation Rate (Adjusted)
- APM_{SLTPadj} : Junior High Participation Rate (Adjusted)
- APM_{SLTAadj} : High School Participation Rate (Adjusted)
- MOR_{Adjit} : Morbidity (Adjusted)
- TPAK_{it} : Labor Participation Rate from area i at time t
- S_{Eit} : Indicators for correction of economic facilities (damaged production facilities - shops, markets, malls, rice fields, fields, ponds, gardens etc.)
- S_{SDr}, S_{SLTPr}, S_{SLTA_r} : Number of schools (Elementary School [SD], Junior High School [SLTP], High school [SLTA]) that have been repaired
- S_{SDT}, S_{SLTPT}, S_{SLTAT} : Total number of schools (SD, SLTP, or SLTA) in an administrative area
- APM_{SD} : Elementary School Participation Rate (official statistics) from Central Bureau of Statistics (BPS)
- APM_{SLTP} : Junior High School Participation Rate (official statistics) from BPS
- APM_{SLTA} : High School Participation rate (official statistics) from BPS
- I_{SD}, I_{SLTP}, I_{SLTA} : Restoration of aspects of education that are valued between 0 and 1

Information:

- k_h : Health constant
 h_d : The number of damaged health facilities (severe + moderate)
 h_r : The number of health facilities that have been repaired
 h_T : Total health facilities in an administrative area
 I_h : The recovery rate for a health aspect that is between 0 and 1

2. Correction of Main Variables (Adjusted)

To correct the condition of infrastructure recovery in the education sector against the secondary data obtained, the equation will be calculated using the following formula:

$$APM_{SDadj} = [APM_{SDit} - k_{SD} \times APM_{SDit}]$$

While:

$$k_{SD} = \left[0,5 \left(\frac{S_{SDd} - S_{SDr}}{S_{SDT}} \right) + 0,5(1 - I_{SD}) \right]$$

$$APM_{SLTPadj} = [APM_{SLTPit} - k_{SLTP} \times APM_{SLTPit}]$$

while:

$$k_{SLTP} = \left[0,5 \left(\frac{S_{SLTPd} - S_{SLTPr}}{S_{SLTP_T}} \right) + 0,5(1 - I_{SLTP}) \right]$$

$$APM_{SLTAadj} = [APM_{SLTAit} - k_{SLTA} \times APM_{SLTAit}]$$

while:

$$k_{SLTA} = \left[0,5 \left(\frac{S_{SLTA_d} - S_{SLTA_r}}{S_{SLTA_T}} \right) + 0,5(1 - I_{SLTA}) \right]$$

Where:

The number 0 shows the education facility has not yet recovered and/or is functioning 100 percent, and the number 1 shows the education facility has recovered and is functioning 100 percent

Adjustment Variable Health

To accommodate and consider the condition of infrastructure recovery in disaster-affected areas, especially in the health sector, equation (3) is calculated using the following formula:

$$MOR_{adjit} = [APM_{it} - k_h \times MOR_{it}]$$

While:

$$k_h = \left[0,5 \left(\frac{h_d - h_r}{h_T} \right) + 0,5(1 - I_h) \right]$$

Where:

The number 0 indicates the health facility has not yet recovered and/or is functioning 100 percent and the number 1 indicates the health facility has recovered and is functioning 100%

Adjustment Economic Variables

To correct the condition of infrastructure recovery in the

economic sector, this is done by calculating the average economic infrastructure that has recovered and is functioning against damaged infrastructure. The economic infrastructure includes data on the area of rice fields, gardens, ponds, the number of shops, markets, shopping centers, gas stations, industry, and so on.

4. Results and Discussion**Result**

The earthquake, tsunami, and liquefaction disaster on September 28, 2018, caused a large part of Palu City to experience severe damage to various sectors, namely education, health, and the economy. Data released on December 20, 2018, states that the total area affected is 145.18 km² of the 395.06 km² area of Palu City. This condition causes various educational, health, and economical facilities to be damaged (see table 1). According to the results of field research, the number of schools in Palu City that suffered damage was 173 units out of 192 elementary schools, 44 damaged units out of 47 units, total junior high schools, 53 damaged units out of 57 units of SHS and 6 tertiary institutions all of which were damaged. The large number of education facilities that were damaged resulted in the teaching and learning process not running normally, so it needed renovation of various education facilities that were affected by the disaster.

Apart from the problem of education, the problem of health facilities, especially the Public Health Centre (Puskesmas), was also damaged. Of the 62 Puskesmas in Palu City, 34 were damaged due to the disaster on September 28, 2018. This problem was exacerbated by the many damaged economic facilities such as shops/stores/supermarkets/banks, as many as 42 damaged units out of 54 units in the City. Palu, there were 4 units of 10 damaged markets in Palu City, and 208 hectares of agricultural areas were damaged, out of 309 hectares. 6 agricultural areas and gas stations were damaged out of 12 in Palu City. Both the Education and Health facilities were functional after the earthquake after repairs were made, both with funds sourced from the Central Government, the Provincial Government of Central Sulawesi, and the City Government of Palu.

After the tabulation of education, health, and economic

facilities is carried out, the next step is to calculate the IPPB for Palu City 2019 based on the number of facilities available before the disaster, the amount of damage, and the number of which have been renovated from the three sectors. The calculation results show that by the end of 2019, the disaster recovery index for Palu City in the

education sector was 54,67 percent, the Health sector was 77,78 percent, and the economic sector had only reached 19,84 percent. In general, the disaster recovery index for Palu City has only reached 44,20 percent, as seen in Figure 1.

Table 1. Recapitulation of Damage to Education, Health, and Economic Facilities in Palu City After the Earthquake, Tsunami, and Liquefaction 2018

No.	Information	Number of units	No.	Information	Number of units
1.	Wide of Palu city (Km ²)	395,06	23.	Total of Public Health Centre [Puskesmas] (unit)	62
2.	Wide Affected Area (Km ²)	145,184	24.	Number of damaged Puskesmas (unit)	34
3.	APM elementary school (percent)	98,45	25.	Number of renovated puskesmas (unit)	19
4.	APM junior high school (percent)	82,75	26.	Number of 100% functional Puskesmas (unit)	15
5.	APM senior high school (percent)	85,78	27.	Number The population Feels Sick (number of people)	107.609
6.	APM University (percent)	50	28.	Number population (number of people)	385.619
7.	Total Elementary school (unit)	192	29.	MOR (percent)	27,91
8.	Total damaged elementary school (unit)	173	30.	Total market (unit)	10
9.	Total renovated elementary school (unit)	101	31.	Total damaged market (unit)	4
10.	Total functional 100% elementary school (unit)	90	32.	Total functioned 100% Puskesmas (unit)	3
11.	Total JHS (unit)	47	33.	Total store/market/bank (unit)	54
12.	Total damaged JHS (unit)	44	34.	Total damaged store/market/bank (unit)	42
13.	Total renovated JHS (unit)	25	35.	Total functional 100% Total store/market/bank (unit)	32
14.	Total function 100% JHS (unit)	24	36.	Total fields/farm (Hectare)	329
15.	Total SHS (unit)	57	37.	Total damaged fields/farm (Hectare)	208
16.	Total Damaged SHS (unit)	53	38.	Total functional 100% farm/fields (Hectare)	165
17.	Total Renovated SHS (unit)	36	39.	Total general refueling station SPBU (unit)	12
18.	Total functional 100% shs (unit)	30	40.	Total damaged of SPBU” (unit)	6
19.	Total University (unit)	10	41.	Total functional SPBU (unit)	4
20.	Total damaged University (unit)	6	42.	TPAK (percent)	94,19
21.	Total renovated University (unit)	6	43.	Total labor	181.079
22.	Total functional 100% University (unit)	1	44.	Total population up to 15 years (orang)	192.243

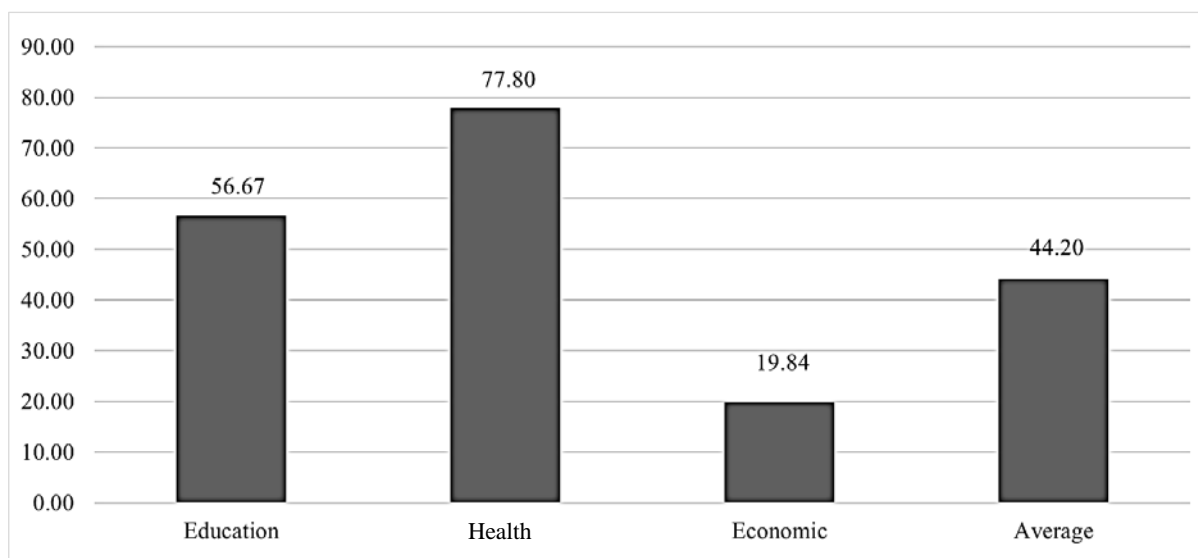


Figure 1. The Results of The Evaluation of The Recovery in The Education, Health, and Economy Sectors (percent)

Discussion

Post-disaster management is an important stage for the people of Palu City so that they can return to normal life. The high level of achievement in post-disaster recovery will be an opportunity for human resource development through restructuring the fields of education, health, and the economy in more inclusive development. The calculation results show that the disaster recovery index for Palu City up to 2019 has only reached 44,20 percent, which consists of the Education recovery index of 54,67 percent, the economic recovery index of 77,78 percent, and the new economic recovery index reaching 19,84 percent.

The results of the study on the calculations that have been carried out show that until the end of 2019, the disaster recovery index in the Education sector has only reached 54,67 percent. This condition has resulted in most of the children in Palu City, Central Sulawesi Province, being unable to carry out normal life activities. Schoolchildren pursuing their dreams by receiving education at the elementary, junior high, high, and tertiary levels have not been able to fully return to school because several educational facilities have not been renovated. Educational facilities and infrastructure that have been built have not been fully completed, even though the local government and international NGOs have worked together to help improve infrastructure facilities, especially for the education of school children.

Classrooms for some of the affected schools have indeed begun to be rebuilt, but it will still take a long time. It resulted in class activities not being able to recover, so students had to study in tents that the government had prepared. Many donations are obtained from various sources, but this takes time, especially in improving the study room. The students complained about the lessons that

were carried out in tents because the air was stuffy, so a fan was needed.

The cause of slow rehabilitation and reconstruction, especially school facilities, is quite complex. The transfer of deconcentrated funds expected from the central government is quite slow and has only been transferred a few months after the earthquake. It is because the central government had set a revised budget for 2018 before the disaster occurred. The next problem is a problem related to law. Criminalization is an important issue, especially in disaster management, due to differences in reference to the use of government funds. When compiling regional budgets, it refers to the Minister of Home Affairs Regulation No. 58 of 2015 and various other ministerial regulations whose structures are direct expenditure and indirect expenditure, but when reporting the use of the budget, the international Government Accounting Standards (SAP) are used by the Ministry of Finance and the Audit Agency Confusing officials in the regions because of inconsistent policies, especially in the use of disaster funds.

In facing this condition, the government apparatus will not force itself to accelerate the realization of the construction of school facilities, which will instead legally ensnare them. Field implementers hope that in the process of reconstruction of education in Palu City, law enforcers should first report and coordinate with the inspectorate in Palu City or Central Sulawesi Province if there are complaints about irregularities in the disaster budget. The inspectorate should follow up on the report and forward it to the Police/Prosecutor's Office if it is proven that there is abuse of authority.

Health services at Puskesmas and hospitals in Palu City after the earthquake and tsunami were still difficult to access. A number of health facility buildings are damaged

so that they are not functioning. Health workers seek health services in Palu City by enabling health facilities in tents, especially to help victims of earthquake and tsunami natural disasters. In an effort to increase access of people affected by disasters to health facilities in Central Sulawesi, the index for disaster recovery, especially in the health sector, has reached 77,78 percent. In fact, the capacity of patients in health services in Palu City is more than before the disaster. In addition to activating the function of health facilities, the government has also appealed to environmental health arrangements for the recovery of the health sector as an effort to reduce potential human losses in the health sector.

In terms of economic recovery, Palu City as one of the most severely damaged areas by the earthquake, tsunami, and liquefaction natural disasters on September 28, 2018, must be quickly restored considering that Palu City is the center of the economic pulse of the people of Central Sulawesi. Mapping of problems faced by the business world due to natural disasters, such as markets, shops/stores/supermarkets/banks, rice fields/gardens, gas stations, and labor issues, has been carried out but is running quite slowly.

The achievement of the recovery index in the economic sector is still 19,84 percent. The slowdown in the recovery of economic facilities is due to a lack of good coordination between the Palu City government, Central Sulawesi Province, and the central government. Up to now, improvements in economic facilities, such as assistance for repairing business premises, are still facing obstacles. The banking relief promised by the central government has yet to be realized. This has resulted in low recovery outcomes in the economic sector. It is hoped that the rehabilitation and reconstruction of economic facilities will be carried out as soon as possible to improve the economic sector's performance and reduce vulnerability in order to improve the functions and services of post-disaster economic facilities. The rehabilitation and reconstruction of the economic facilities mentioned above must be carried out in a disaster-safe zone.

5. Conclusions

In general, the recovery in economic aspects has been sluggish compared to other aspects. The economic aspect recovery until the end of 2019 was still 19,84 percent, very far behind compared to the recovery in the education aspect, which had reached 54,67 percent. Even the education aspect has reached 77,78 percent. The average recovery achievement in these three aspects has only reached 44.20 percent. Many factors caused the delay in the achievement of the recovery, especially the problem of coordination and the principle of prudence from project managers

Policy Implications

In terms of implementation issues, our recent experience underlines the importance of several things, the need for good coordination in policy decisions between the central government, provincial governments, and city governments, especially in accelerating the reconstruction of education, health, and economy, the importance of elaborating in detail about recovery priorities that need to be resolved in each field, the importance of fostering the unity of view and deeper partnerships between the government and the Regional People's Representative Council at the provincial level of Central Sulawesi and Palu City for policies that determine the process of accelerating reconstruction after natural disasters in Palu City and the need for effective socialization and information dimensions to the public about rehabilitation and reconstruction policies that will be implemented in the fields of education, health, and economy.

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