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ANALYSIS OF MATERIAL LOSS DUE TO FLOOD DISASTER IN THE SUB-DISTRICT OF SILAT HULU, KAPUAS HULU REGENCY

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ABSTRACT

A flood is a frequent disaster during the rainy season and causes many losses, good materials, treasure objects, and casualties. The study aims to know the loss of materials caused by disasters that flood Bandang in the Silat Hulu Sub-district. The method of research used is descriptive quantitative. Collected data is secondary data, including damaged buildings, facilities and infrastructure, and land. The method analysis used is descriptive. The study results show that The Silat Hulu Sub-district experienced twice the floods successively. The first occurred on 18-19 October 2021 and 22-23 October 2021. A total of 11 villages of 14 villages experience a flood. Consequently, the flood and loss of materials, including dozens of house inhabitants of Village Selangkai and Entebi, were damaged, collapsed, and swept away. A total of 1,813 families were evacuated, and the total loss consequence flood around Rp. 20,000,000.00-30,000,000.00.

Keywords: *Analysis; Floods; Material Losses*

INTRODUCTION

Flood is a frequent disaster that happens in the season of rain and causes much loss of good material, treasure objects, and casualties. The flood could occur if occur cycle disturbance hydrology. Disturbances generally originate from actions of the wrong human manage water sources (Somantri 2008; Supriyono 2014). A flood could define as the mass of water produced from water runoff on the surface relative to land high and not can be accommodated overflow by experience as well as cause puddle or Genre in an amount significant (Ka'u, Takumansang, dan Sembel 2021). Disaster floods often happen in the Unitary State Republic of Indonesia, ok seen from the intensity in a place and amount of location in one year, that is about 40% of natural disasters.

A natural disaster is caused by several natural factors resulting from the disturbance of balance components naturally without mixed hand humans. Factors in question include rainfall, heavy rain, elevation more land low

from the surface sea, or consequence embankment or Genre a river that cannot hold back rainwater (Batu dan Fibriani 2017; Somantri 2008). Natural disasters especially floods cause a lot of losses. The losses started from health, the economy, the difficulty of clean water, activities public hampered, and the emergence of casualties.

Naturally, flooding only occurs on paths that are only traversed by water, namely places that are easily inundated. But now the current conditions are different, it is precisely humans who deliberately occupy the flooded areas. So, it is not the flood that comes but the people who come for the flood (Sesunan 2014; Setiawan et al. 2020).

Flood is a problem faced by almost all countries in the world. Various studies have also been conducted to handle floods. However, the realization During this only conducted only part of the area. As a result, events, disasters, and occasional floods could result in the loss of life and property. Negative impact on the structure economy, structure society, and conditions possible environment not back to normal.

One loss direct from a disaster flood is enough to damage big from building the place stay, facilities public, and other infrastructure. Disaster nature also affects the availability of power, employment, capital stock, and level of productivity (Gumilar 2013; Sesunan 2014). Risk flood is a threat general for public cities, areas rivers, and coasts. The impact of risk of existing floods is estimated from the growing population, developing economy, and changing climate (Jongejan dan Maaskant 2015; Tanoue, Hirabayashi, dan Ikeuchi 2016).

The impact or loss the flood caused covers loss of life or wound, loss of treasure thing, damage to settlements, damage to area trade, damage to area industry, damage to area agriculture, damage to system drainage and irrigation, damage to road or road highway, damage bridges and airports, damage system telecommunications, and so on (Sholihah et al. 2020) because of that, to prevent happening floods and reduce the risks posed, it is necessary to conduct mitigation early.

Countermeasures to floods could be done by all elements nation, both by the government and the Public wide. With that, an effective way to countermeasures flood in a period short focused on overcoming flood annually

is by elevating the wall retainer bar and building retainer flooding on sections that have not been there on an embankment. Used wall retainer flood because limitations land on the edge river that, other than that, society bank river could do greening back to the classified area vulnerable disaster.

The impact of effort could feel directly by the community. One weakness in anticipating flood is the system forecast integrated and integrated flood. Condition this aggravated by the availability of on-site data or information about the flood periodically and continuously good, both temporally and spatial (Kadri 2007). Impact data collection and analysis of disaster could give an information base for making policy and decisions in subtraction risk disaster (Luu, von Meding, dan Mojtahedi 2019; UNISDR 2015).

In 2021, the West Kalimantan region had many hits by floods. Some areas include Kapuas Hulu Regency, namely Sub-district Boyan Tanjung, Downstream Silat, and Upstream Silat. Affected flood in Silat Hulu District is Nanga Dankan Village, Village Dankan Kota, Village Lebak Najah, Nanga Ngeri Village, Landau Badai Village, Nanga Lunggu Village, Desa Entebi, Landau Rantau Village, Nanga Luan Village, with high water level flood over there, not enough more 2-3 Meters (Majni 2021). The flood that hit the Silat Hulu sub- District caused many losses, especially material loss. Loss material covers building private, infrastructure public, infrastructure environment, facilities and infrastructure social, and land personnel.

There are not many studies that examine the impact of flooding on material losses and based on the review of the article, no one has studied it, especially in the West Kalimantan region, which incidentally is an area that is frequently hit by floods every year. This study as well as being a novelty in this research. Condition this cause the need something purposeful research for knowing material loss the total caused by the disaster flood, as well as vulnerable area disaster the floods that occurred. The study aims to know the loss of materials caused by Bandang flood disasters in the Silat Hulu Sub-district.

MATERIALS AND METHODS

Study Area

Research this is in Silat District Hulu,

Kapuas Hulu Regency, West Kalimantan Province, by astronomical Silat Hulu is located at 0°12'N - 0°28" N, 112°0'30" E - 112°9'0" E **(Figure 1)**. Geographical Silat Hulu District borders with Subdistrict Seberuang and Hulu Gurung District, next door South border with Regency Sintang, bordering on the West with Silat Hilir District, and next door East border with Subdistrict Pengkadan and District Sintang. The Silat Hulu Subdistrict has an area of 63,812 hectares, equivalent to 3.56% of the large Kapuas Hulu Regency. In general, Kapuas Hulu Regency is an area of plains low as well as an area of watery lakes and swamps.

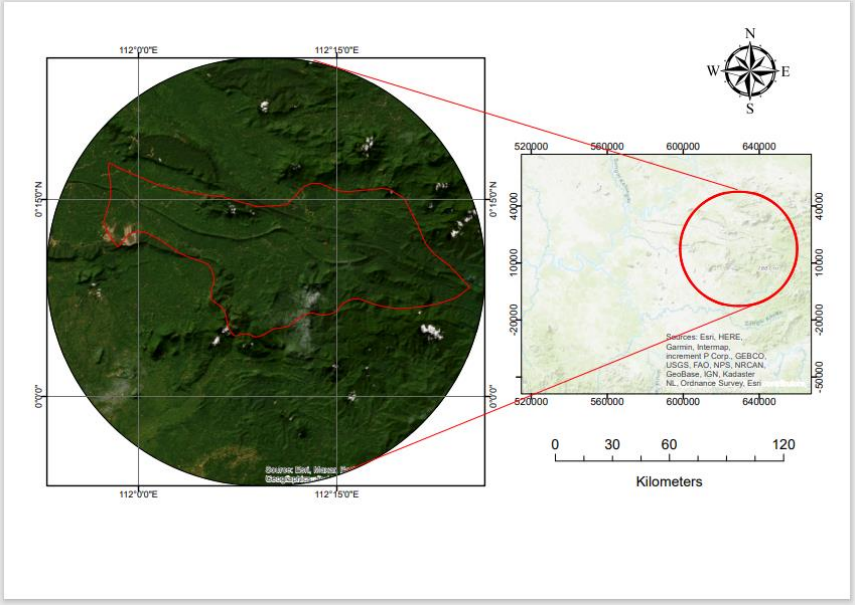

Figure 1. Study Area .

Method

The method used in the study is method descriptive quaoveritative. The type data used are primary and secondary data and the approach used is spatial. Use approach spatial could be used as a base analysis of descriptive material losses in several villages in the Silat Hulu District caused by natural disaster floods. Silat Hulu District experienced floods and landslides in a period of two years, namely in October 2021 and August 2022. Even in 2021 floods and landslides in Silat Hulu District, Kapuas Hulu Regency occurred twice in a row, first on 18 and October 19, 2021, it had receded, but three days later there was another flood on October 22 and 23, 2021. Collected data in the study is data

on material damage during the period of the flood **(Table 1)**, consist:

Table 1. Data and Data source Research

No.	Data	Data Type	Data Source
1	Disaster Hazard	Secundery data	Flood Disaster Prone Map in Silat Hulu sub-District
2	Submerged House number		
3	Water level		Silat Hulu sub-District data
4	Landslide on the Road	Primer and Secundery data	

RESULTS AND DISCUSSION

Based on research results and secondary analysis (Purwanto *et al*, 2022) the research area is a disaster-prone area, especially floods, and landslides. Morphologically, Silat Hulu District has various characteristics. The morphology of the Silat Hulu sub-district ranges from flat, and wavy to hilly. Most of the Silat Hulu sub-district is in the form of floodplains and basins as well as areas of watery lakes and swamps, so the area has several locations prone to flooding and landslides. Based on the results of research conducted by (Purwanto *et al*, 2022), the research area has three classes of flood vulnerability, namely low, medium, and high, as shown in **Figure 2.**

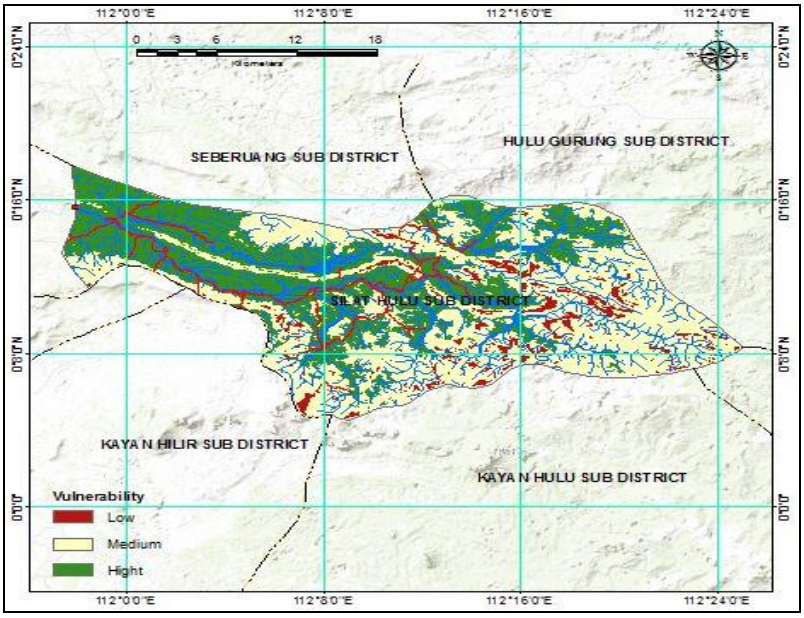

Figure 2. Flood Disaster Prone Map Silat Sub-district

Based on above the map, flood-prone areas which are classified as high, symbolized in green, are spread across Belimbing, Nanga Dankan, Dankan Kota, Nanga Ngeri, and Landau storm villages. The high vulnerability to

flooding in these villages is due to changes in land use, such as conversion to oil palm land, and the emergence of illegal gold mining areas in the upstream areas which causes siltation of rivers.

Flood Chronology

The Silat Hulu Sub-district experienced a disaster flood and land landslide in 2021 that hit the remote corner village. Precisely on the moon in October 2021, floods and landslides in the Silat Hulu Sub-district, Kapuas Hulu Regency, occurred twice consecutively, first on 18 and 19 October 2021, three days then flood occurred return on 22 and 23 October 2021. Of the 14 villages in the Silat Hulu Sub-district, 11 villages experienced floods, including Nanga Dankan Village, Dankan Kota Village, Lebak Najah Village, Nanga Ngeri Village, Landau Badai Village, Nanga Lungu Village, Entebi Village, Landau Rantau Village, Selangkai Village, Selimu Village, and Nanga Luan Village.

So as many as 78% of villages that experienced flood have formed land flat and elevation low be in the area bank river. The water level at the time was 2 to 7 Meters. The consequence of the impact of the flood influenced the whole field life affected community flood. Many losses experienced material several villages in Silat Hulu District due to disaster floods and land landslides. Condition flood and land landslide in the area study could see in **Figure 3**, **Figure 4, Figure 5 and Figure 6**.

Figure 3. Flood Conditions.

Figure 4. High Water Conditions.

Figure 5. Landslide on the Road.

Figure 6. House Affected Flood.

From **Figure 3** it can be seen that the flood conditions that occurred in the Silat Hulu sub-district were quite critical. The flood submerged the house and hampered community activities. The high water conditions in **Figure 4** also resulted in several houses being damaged by flooding. In **Figure 5**, the Silat Hulu sub-district also experienced a landslide, causing several roads and several bridges to the village to be damaged. Damage to roads and bridges directly affects population mobility. Figure 6 shows an empty house that was abandoned by the owner. The house was badly damaged by the flood. The condition of the houses, and the surrounding environment, is mostly covered in mud.

Flood Prone Danger

The hazardous flooding prone that occurred in Silat Hulu District was caused by the high water level which was quite dangerous in the riverbank area. Floods and landslides caused a lot of property loss. As a result of flooding, the community is affected physically, socially, and economically. Many material losses were experienced in the Silat Hulu sub-district. Material losses such as people's houses damaged by water inundation, crop failure, and the community's economic growth were reduced due to the flood. In addition to natural factors that influence the occurrence of floods, human activities also contribute to natural damage. Illegal gold mining, illegal logging of forests, clearing of large plantations, oil palm, and others are quite critical causes of natural damage.

Impact of natural floods disasters and Landslides

Flood Flashes and landslides in the Silat Hulu Sub-district occurred twice in a row, the first on 18-19 October 2021, between 3 days, flood the second

occurred on 22-23 October 2021. As a result, the flood-hit the whole field life Public as house inhabitants submerged, facilities public, and rice fields or rice fields submerged flood.

Data obtained from the local health department coordinated with some agencies related to the number of victims who can inform as many as 6,738. Consequently, as many as 1,751 units of house inhabitants submerged in water at 7 meters. Floods also cause damage facility common, such as roads and bridges. Street access was disconnected and activity inhabitants were disturbed. Meanwhile, the flood in Silat Hulu District caused material loss in buildings owned by the private, infrastructure environment, facilities and infrastructure social, land personal, and land private.

Based on monitoring the team carried out a combined flood control in Silat Hulu District and researchers. the flood caused dozens of houses in the villages of Selangkai and Entebi to be damaged and collapse. Nine houses in Entebi were swept away by the water. The floods that occurred in 2021, which hit Silat Hulu District, caused 1,813 heads of families (KK) to flee and community activities were paralyzed due to the high water level. The amount of losses due to flooding is around Rp. 20,000,000.00-30,000,000.00. Below is a graph showing the houses that were submerged in the flood **(see Figure 7).**

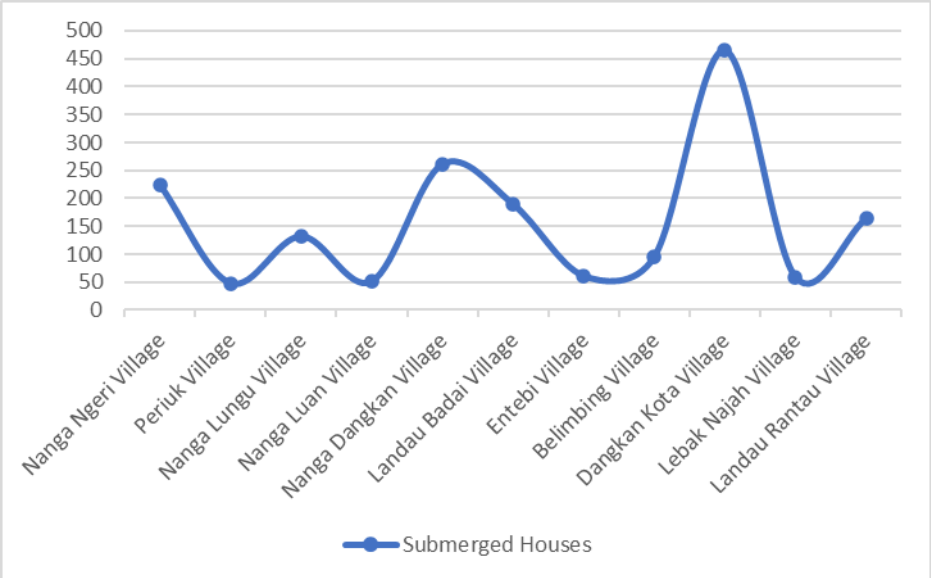

Figure 7. Submerged House Consequence Disaster Flood .

The flood that submerged Silat Hulu District occurred in several villages. Nanga Ngeri Village was submerged 225 houses, Periuk Village 48, Nanga

Lungu Village 132, Nanga Luan Village 51, Nanga Dankan Village 261, Landau Storm Village 190, Entebi Village 61, Belimbing Village 95, Dankan Kota Village 465, Lebak Nanjah Village 59, and Landau Rantau village 164 houses. So that the total number of houses submerged in the floods is 1,751 houses. This caused considerable loss, both property and life. Based on data on victims who died in Silat Hulu District, it can be seen in **Figure 8.**

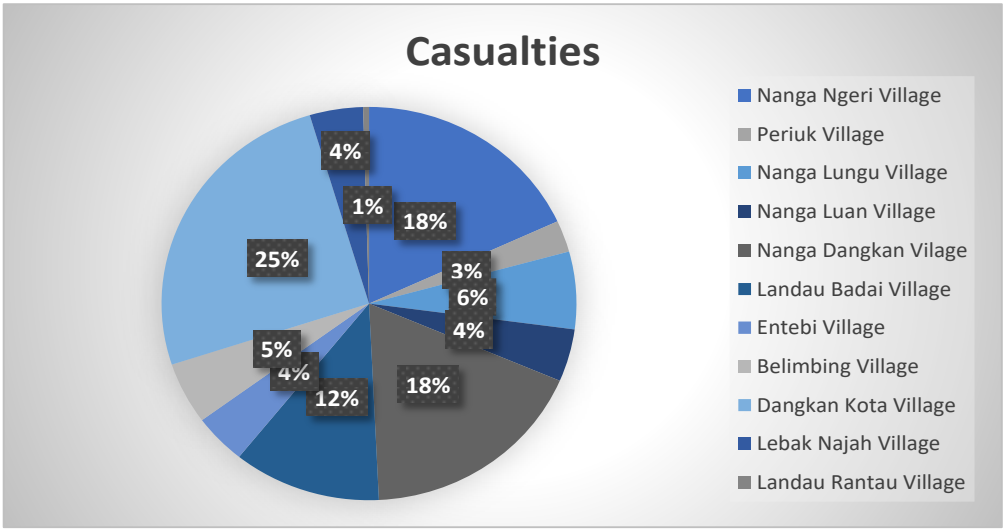

Figure 8. Flood Casualties Diagram

Based on the picture above, the most victims of the flood disaster were in the Dankan Kota Village area as much as 25%, followed by Nanga Ngeri Village and Nanga Dankan Village with 18%. The least number of fatalities was in the Landau Rantau Village area, as much as 1%. The impacts are natural, such as rising water levels, rainfall, and overflow of the Kapuas watershed. In addition, the human factor that influences it, including changes in land use and illegal gold mining in the Silat Hulu sub-district. Some material losses caused by the disaster flood at the time October 18-19, 2021, and October 22-23, 2021 are seen in **Figures 9**, **Figures 10** and **Figures 11.**

Figure 9. Before the Flood.

Figure 10. After the Flood.

Figure 11. Condition of Road Infrastructure Due to Flood.

Access to the Silat Hulu Sub-district is quite difficult due to the small road size, and at some points, there are damaged roads caused by the floods that hit the area.

Flood Risk Reduction Efforts

Efforts to reduce the risk of floods that can be carried out by local governments and their residents are planting trees on river banks. The aim is to make the land resistant to runoff and erosion when it rains. Another business is dredging a river which is experiencing siltation due to the existence of a gold mine in the upstream area of the river. The local government has also prepared several facilities and infrastructure that can be used to prevent flooding and evacuate flood-affected residents. Residents are expected to be able to maintain the balance of ecosystems in nature so that flooding does not occur in the future.

CONCLUSIONS

Many factors can cause flooding, one of which is natural factors. Silat Hulu District is an area that has experienced erosion, this is indicated by the existence of small river banks that meander on the banks of the Silat river. The morphology of Silat Hulu Regency in general consists of lowlands or submerged

basins and areas of watery lakes and swamps, so the area has several locations that are prone to flooding and landslides. Changes in land use are one of the causes of the Silat Hulu District experiencing a flood disaster.

The vulnerability to flooding that occurs in Silat Hulu District is caused by the river being unable to accommodate the overflow of water from the upper area. In addition to natural factors that affect flood disasters, humans also have a very big role. Human actions that affect the destruction of nature are gold mining, illegal logging on a large scale, clearing plantations, oil palm, and others.

The floods that occurred in 11 villages in Silat Hulu District caused quite large material losses, including buildings, personnel, facilities and infrastructure, and private land. In addition, the floods and landslides caused a lot of economic loss to the people affected by the floods, failed to harvest farmers' crops, as well as community economic growth, which was the impact of the decline as a result of the flood disaster. Local governments and residents can make efforts to reduce the risk of flooding by planting trees on riverbanks, so they are resistant to water and erosion when it rains. Dredging of rivers that are starting to experience silting needs to be done, so that the ecosystem is well maintained

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