

SOCIO-ECONOMIC ADAPTATION AFTER NATURAL DISASTERS IN LANGALESO VILLAGE

Ragil Cahya Ningrum¹, Rifai Mardin^{2*}, Dita Septyana², Deltri Dikwardi Eisenring²

¹Student Of Urban And Regional Planning Study Program, Department Of Architecture, Faculty Of Engineering, Tadulako University

²Lecturer Of Urban And Regional Planning Study Program, Department Of Architecture, Faculty Of Engineering, Tadulako University
Soekarno-Hatta Km 9, Tondo-Palu 94118, Sulawesi Tengah, Telp. 0451-429738

*Corresponding Author, Email: rifaimardin@gmail.com

Article Info	Abstract
Article history: Received: October 10, 2022 Accepted: November 20, 2022	On September 28, 2018, the earthquake and liquefaction disaster in Langaleso Village, Dolo District, Sigi Regency severely damaged several areas. In addition, other impacts of natural disasters that occur are resulting in changes in the social and economic conditions of the community. This is because the state of their agricultural land was wiped out due to the impact of liquefaction that occurred in Jono Oge village. The damage to the Gumbasa irrigation channel resulted in a decline in the community's economy. The purpose of this study is to determine the form of adaptation of the Langaleso village community based on social and economic aspects both from before natural disasters, after natural disasters, and current conditions. The research method used is descriptive qualitative data analysis techniques, where data is obtained by observation techniques and interviews conducted in the field. And then, the information that has been received is then processed to get the results of the research objectives. The results of this study are that the community is still trying to adapt to existing needs at present conditions. The main problem that the village community experiences are in the economic sector. The majority of the main work of the community is farmers. Still, with the damage to the irrigation system, the district has not been able to carry out agricultural or plantation activities. Keywords: Adaptation, Natural Disasters, Social, Economy, Post Natural Disasters

I. Introduction

On September 28, 2018, A natural catastrophe happened because of the Palu Koro Fault plate under the subsoil of Palu City, Sigi Regency, Donggala Regency, and Parigi Moutong Regency. Langaleso Village is one of the villages in the Sigi regency that was affected by earthquakes and liquefaction. Before the natural disaster happens, the community of Langaleso village relies on the agricultural and livestock sectors to meet their daily needs. However, natural disasters such as earthquakes and liquefaction occurred. Therefore, the community makes adjustments to the existing environmental conditions to fulfil the community's daily needs.

Based on the description that has been described, researchers are interested in conducting research on how changes and adjustments in socio-economic conditions in the Langaleso village community. This research will explore and identify the socio-economic changes that occurred before and after the natural disaster and the adaptation efforts after the natural disaster. Therefore, it can be concluded that the author will research with the title "forms of adaptation to the socio-economic conditions of the community after natural disasters in Langaleso Village."

II. Methods

This research will be carried out at the research location in Langaleso Village, Dolo District. The researcher using observation research techniques, interviews with villagers, and also documentation. This research is also based on theories about community adaptation, viewed from rural communities' social and economic aspects. The data analysis technique used is the descriptive qualitative data analysis technique, in which the researcher will explain how the condition of the Langaleso Village community. After getting the data needed while at the research location, the author will develop a theory according to the data obtained. The theory that the author uses is the theory of community adaptation to social and economic conditions after natural disasters. each view that the authors get there are several indicators, namely:

1. Social Adaptations

Human adaptation is defined as human activities interfering with the environment to maintain life with culture. (Sutigno, Aditya Listiyan; Pigawati, 2015).

Furthermore, it is also explained that the social environment that is very influential on the process and outcome of education is friends, neighbours, and activities in the community (Dalyono, 2005). The social conditions of the community have five indicators, namely:

1. Age and gender
2. Work
3. Prestige
4. Family or household group
5. Membership in union groups

2. Economic Adaptations

According to (Mulyanto 2001), the economic situation is a position that rationally assigns a person to a particular societal role. The granting of that position is accompanied by a set of rights and obligations that the status bearer must play. According to him, there are characteristics of socio-economic conditions, namely:

- a. More educated
- b. Have a social status that is characterized by the level of life, health, prestige, occupation, and self-knowledge of the environment
- c. Have a greater level of upward mobility
- d. Have large fields
- e. More oriented to the commercial economy of the product
- f. Have a more favourable attitude towards credit; and
- g. More specific jobs

The economic aspects of the village and job opportunities are closely related to the welfare of the village community. Food sufficiency and financial needs for the community can only be reached if household income is sufficient to cover household needs and the development of their businesses.

3. Theory Synthesis

Based on theories that the author has described, the indicators of adaptation to the socio-economic conditions of the community are combined to produce an idea that is appropriate and also has relevance to existing conditions, including:

- Community efforts in finding an occupation
- Group/membership in the household business
- Public Health
- Daily community activities

4. Sampling Technique

To this Technique, the author using random sampling. Random sampling was used to know how many respondents were needed to interview in Langaleso Village. The selection was carried out randomly, namely the head of the family from each house in Langaleso Village, Dolo District. For the number of samples needed in this study, researchers used models using the Slovin formula (Riduwan, 2005) which:

$$n = N/N(d)^2 + 1$$

n = sample

N = population

d = precision value 90% or sig. = 0,1.

According to BPS Sigi Regency, Dolo District in Figures (2019) For the total population in Langaleso Village, which is 2,495 people and the desired error rate is 10%, the number of samples used are:

$$N = 2495 / 2495 (0,1)^2 + 1 = 96.14 \text{ rounded up to } 96.$$

III. Results

1. Research Sites

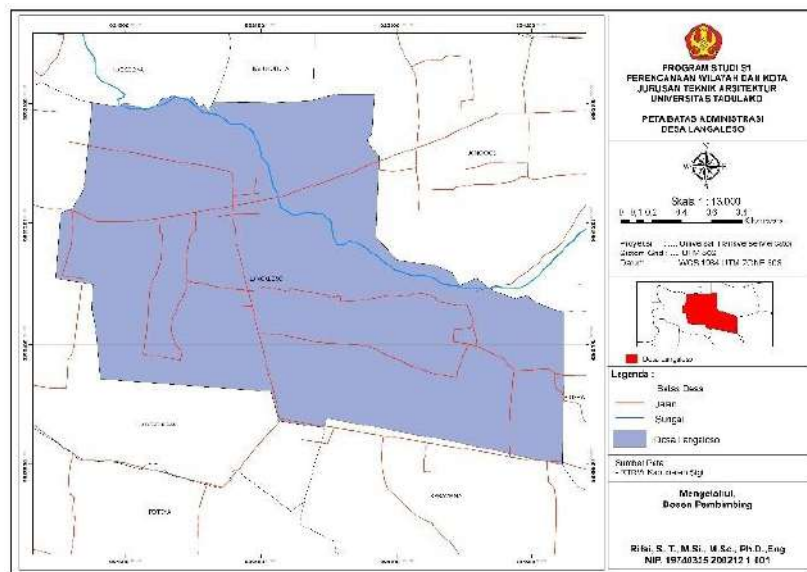


Figure 1. Administration Maps in Langaleso Village

Langaleso village is one of the villages on Dolo Regency. Based on Badan Pusat Statistik or Central Bureau of Statistics, the area of Langaleso Village is 33400 Ha. Langaleso Village was affected by liquefaction from Jono Oge Village, which is located side by side. The liquefaction of mud makes the villager's houses badly destroyed and also covered by the soil.

2. Before Natural Disasters.

a. Community Efforts In Finding An Occupation

Langaleso Village is one of the Dolo District villages, the largest rice producer in the Sigi Regency. With an agricultural land area of agricultural land of ± 161.39 Ha where rice yield is the main agricultural product that is mainly produced by Langaleso Village, especially in Hamlet III.

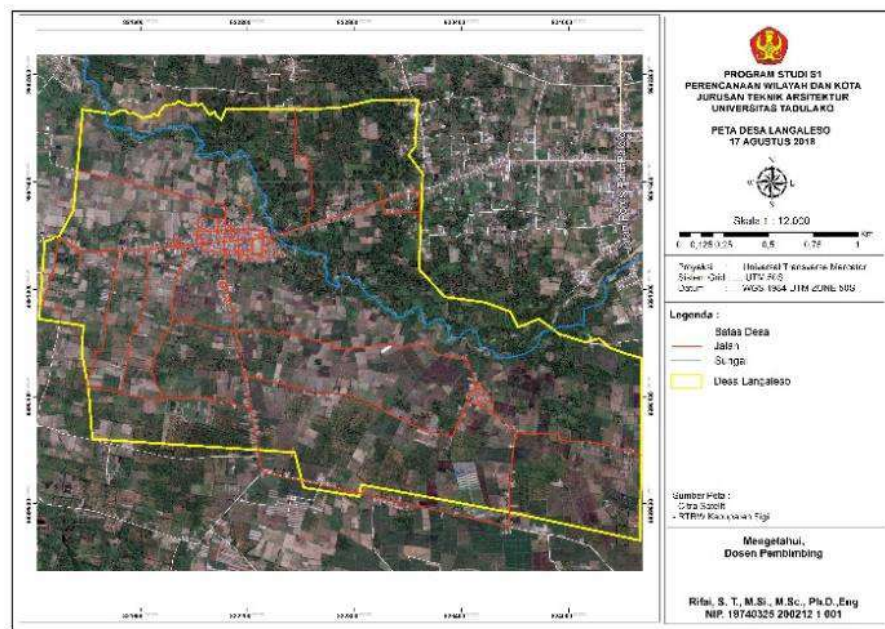


Figure 2. Langaleso Village Before Natural Disasters

Almost 100% of the villagers have jobs as farmers and farm labourers; it has been hereditary that the people of Langaleso Village work as farmers. The lack of education level causes the community to have no other skills.

Furthermore, the people of Langaleso Village have jobs in the livestock sector such as cattle breeding, goats and broilers, and laying hens. And also, some of the community work as casual daily labourers, civil servants, honorary, private-sector jobs, and some even do not work. In terms of average income, the needs of the village community are still fairly adequate and can still meet their daily needs. The following is a graph of the livelihoods of the Langaleso Village community before the natural disaster occurred:

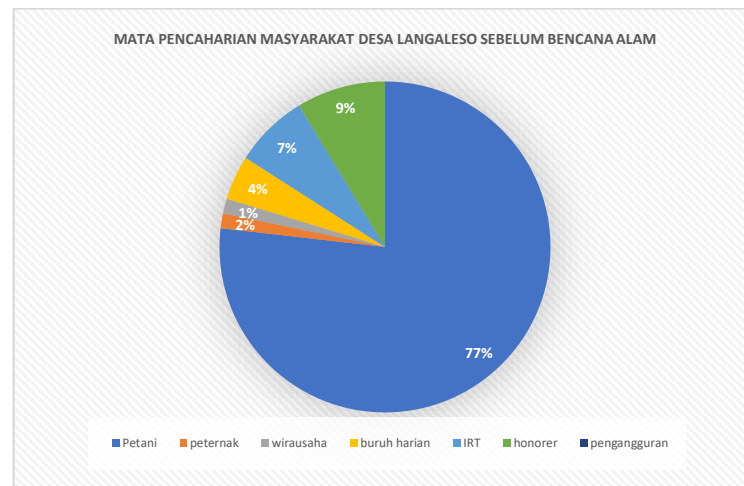


Figure 3. The Occupations graph of the Langaleso Village Community Before the Natural Disaster

In the picture above, it can be seen that most of the respondents who were interviewed for their jobs before the natural disaster occurred, namely 77% of farmers, 9% of temporary workers, 7% of household workers, 4% of daily workers, 2% of livestock and the last one is entrepreneur 1%.

b. Group/Membership In The Household Business

The majority of the livelihoods of the Langaleso Village community are in the agricultural sector in rice fields, secondary crops, and plantations, and livestock. Therefore these farmers have several farmer groups with a total of 14 groups.

c. Public Health

For the field of public health, according to information from the Head of Langaleso Village, Mr Nurlin, for the health conditions of the community before the natural disaster, there were no serious diseases.

d. Daily Community Activities

The people of Langaleso Village always work together to help each other if they have difficulty or need help. In addition, the people of Langaleso Village, who generally work as farmers, work in the fields and gardens from morning to evening. For their daily activities in their intervals, several other communities also trade in several places to sell the crops they produce.

3. After Natural Disasters.

On September 28, 2018, Langaleso Village became one of the areas affected by liquefaction following an earthquake measuring 7.4 magnitudes. A few minutes after the quake occurred, suddenly, a rumbling sound came from the next village, namely Jono Oge Village. According to residents, the mud from Jono Oge Village swept away houses and facilities in Langaleso Village. However, several homes of Langaleso Village residents were destroyed not because of the dirt from Liquefactions but the big earthquake that destroyed their houses at that time.

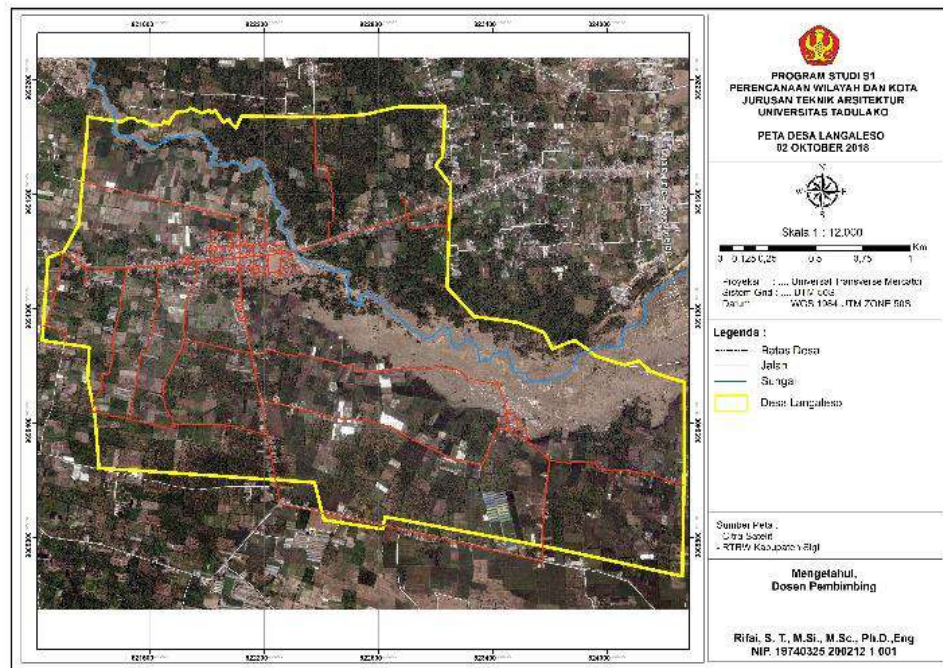


Figure 4. Llangaleso Village Map After Natural Disaster Happened

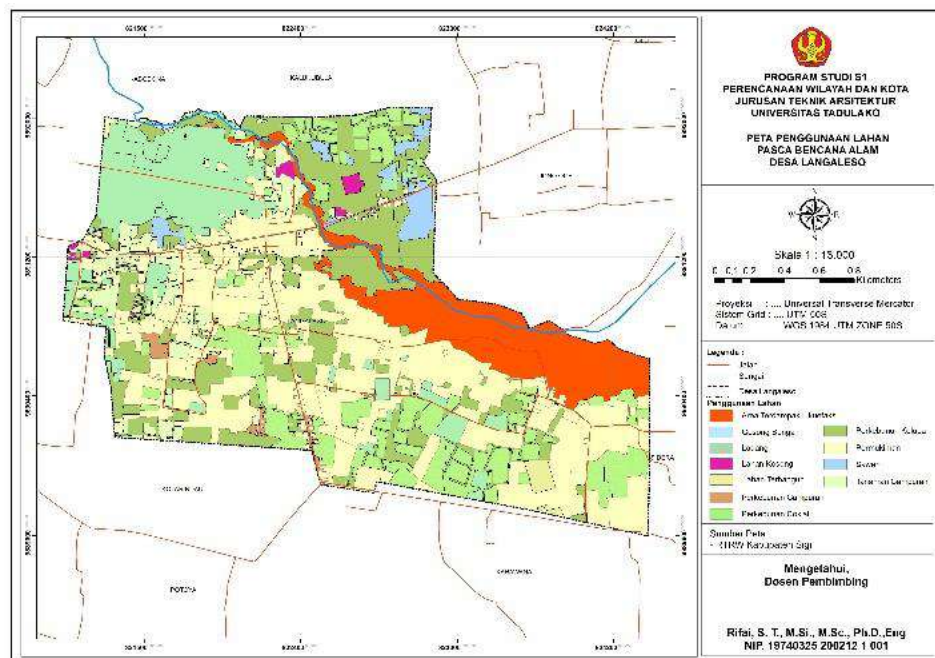


Figure 5. Llangaleso Village Land Use Map

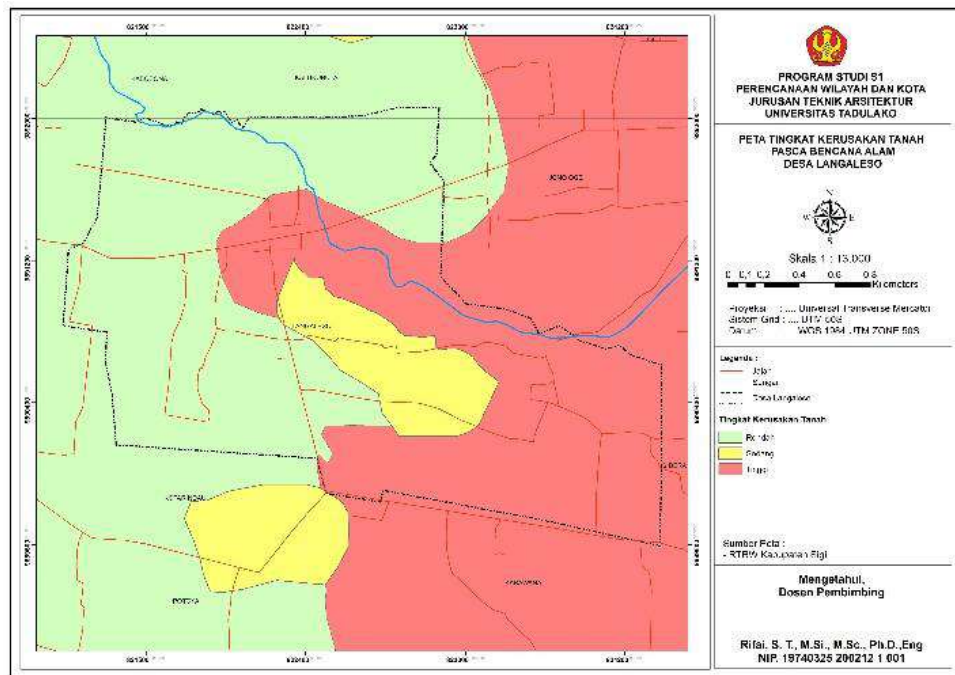


Figure 6. Map Of The Level Of Soil Damage After Natural Disasters

Based on the results of data analysis and processing, the area affected by liquefaction is ± 57.73 Ha, which is in the Dusun III area of Langaleso Village, and there are also several fields and rice fields belonging to the people of Langaleso Village.

a. Community Efforts In Finding An Occupation

According to the head of Langaleso Village, Mr Nurlin, their agricultural, plantation, and irrigation systems were also damaged due to natural disasters during the incident two years ago. As a result of these losses, the economic condition of Langaleso Village has decreased.



Figure 7. The Current Condition Of Rice Fields Has Turned Into Areas After Natural Disasters.

Based on the interview with one of the villagers in Langaleso Village, Mr Aziz, most people in Langaleso Village are primarily farmers. Agricultural land belonging to villagers is buried in mud. "Approximately only 5-10% still working as farmers but they work on what belongs to other villagers. Except that which is not passed and even then only secondary crops. But for soil conditions like this, it is rather difficult to plant because the flow of the Gumbasa river is damaged."

The direct impact of this natural disaster is the financial loss of the people of Langaleso Village. Damage to buildings such as residences, places of business, and other infrastructure.

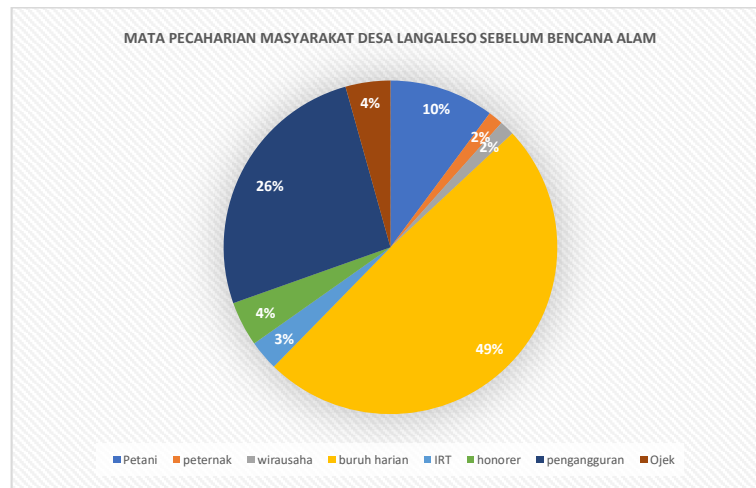


Figure 8. The Occupations Graph Of The Langaleso Village Community After The Natural Disaster

There is a change in the graph above that village community's livelihoods due to the damage to the existing irrigation system and the loss of agricultural land that the community used to own. Therefore, indirectly they must continue to meet their daily needs by adjusting or adapting to the existing conditions in Langaleso Village. The graph shows that 49% of the total respondents interviewed work as daily labourers, 26% are unemployed, 10% remain as farmers, 4% are motorcycle taxis and honorary, 3% are household workers, and 2% are entrepreneurs and breeders.

b. Group/Membership In The Household Business

According to information from respondents that there were no activities after the natural disaster. Because at that time, the members of each farmer group and household business only focused on surviving in very different conditions from before.

c. Public Health

After a few weeks, the natural disaster happened, the community's health conditions of Langaleso Village are decreasing. People sleep in uncomfortable refugee camps, consume food and drinks that are not clean, causing the body's metabolism to fall. According to information obtained from Mr Aziz as the Coordinator of Langaleso Village in Dusun III, villagers often complain of itching on their bodies. This disease most likely arises from bathing and washing clothes, where the water comes from new water sources that appear after liquefaction.



Figure 9. Health Service Process in Langaleso Village

Villagers also experience muscle pain and headaches resulting from the tent's uncomfortable conditions. at night, the villagers also don't get enough rest because they are always alert for aftershocks. According to other information, some people also experience respiratory problems due to dusty environmental conditions. Some children also experience allergies and diarrhoea due to instant food and formula milk that is not suitable for their bodies.



Figure 10. The Interview Process with Mrs Anti

Also, there is a *Non-Governmental Organization* that came and helping the community of *Langaleso Village* and provide psychosocial services. They monitor the trauma experienced by the people of *Langaleso Village* psychologically. The activities they carry out are providing questionnaires or giving individual and group counselling.

Children are also given some therapy, such as playing, praying, singing together, drawing, etc. Even today, several communities from Palu City continue to provide psychosocial services in elementary schools in *Langaleso Village* every two weeks to entertain and relieve trauma from children who are victims of the earthquake and liquefaction natural disasters. 2 years ago.

d. Daily Community Activities

During the 2 or 3 days after the disaster, the people of Langaleso Village only took the leftovers that were still clean in their homes and took the agricultural products they got in the fields and other people's fields.

According to information from the Head of Langaleso Village, Mr Nurlin, they also received rice washed away by the mud from Jono Oge Village for food.

"A few days after the disaster, we got several sacks of rice that were carried away by the mud. We can't help but take it because we also have a shortage of food, but we only take the parts that are not wet with mud."



Figure 11. Conditions of Locations Affected by Liquefaction On September 28, 2018

Mr Aziz, the coordinator of Dusun III, Langaleso Village, took the initiative to seek assistance in the form of necessities. At that time, the aid had not arrived in their hamlet, while the food supply from each family member was running low. Mr Aziz and his wife went to an NGO ACT (Aksi Cepat Tanggap) that in the village, they needed essential food assistance and daily supplies.

"If we do the calculations, there are approximately 40 NGOs that have helped us, including food assistance, daily necessities, tents, public facilities, and so on. Not to mention that there was personal assistance from several countries that came directly to Langaleso Village."

At that time, Mrs Aziz took the initiative to open a public kitchen in Dusun III for approximately one month with ± 130 families or ± 500 dependents. Meanwhile, the food ingredients were brought directly by the volunteers who came at that time.

"There are also those who assist in the form of money, but we refuse because it is better if we are given food directly."

Mrs Aziz and five other residents of Dusun III Langaleso Village make a different food menu every day. According to information obtained, the kitchen team makes a menu made from 30 kg beef cooked for ± 500 people every Friday. And for the distribution of food, each

person queued to take their food by carrying a large container which was then brought back to the emergency tent to be eaten with their respective families.



Figure 12. Documentation of Mr and Mrs Aziz as Dusun III Coordinator and Public Kitchen Coordinator in Dusun III Langaleso Village

4. Current Condition

Few years after the natural disaster happened, the community slowly started to adapt and get used to the existing conditions, from the social conditions that are currently beginning to help each other. However, the current economic situation is still experiencing a bit of difficulty.

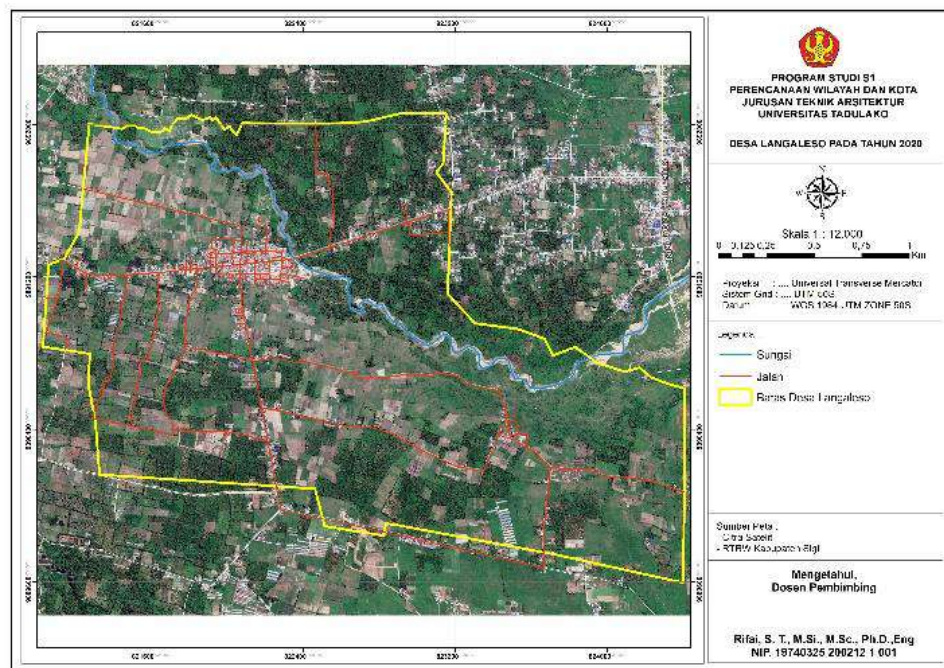


Figure 13. Langaleso Village Image Map in Current Conditions

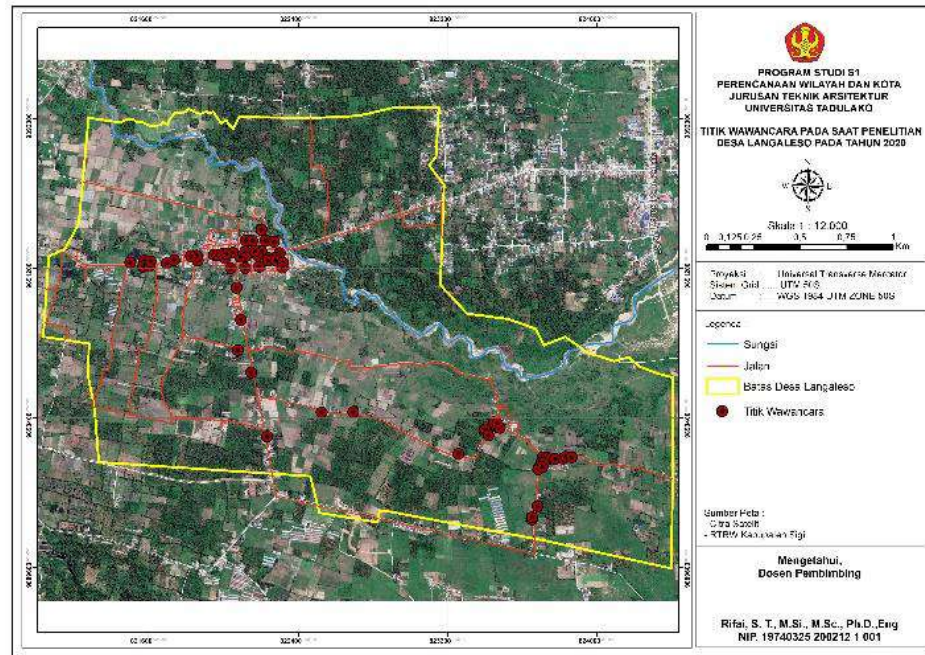


Figure 14. Interview Point During Research

At the existing conditions, several buildings have begun to be rebuilt thanks to the assistance given by several NGOs and the local government. Also, people used to live in tents, some of them are living in their respective homes, some also living in HUNTARA (Temporary Shelters)



Figure 15. Condition of the Shelter in Dusun III, Langaeso Village

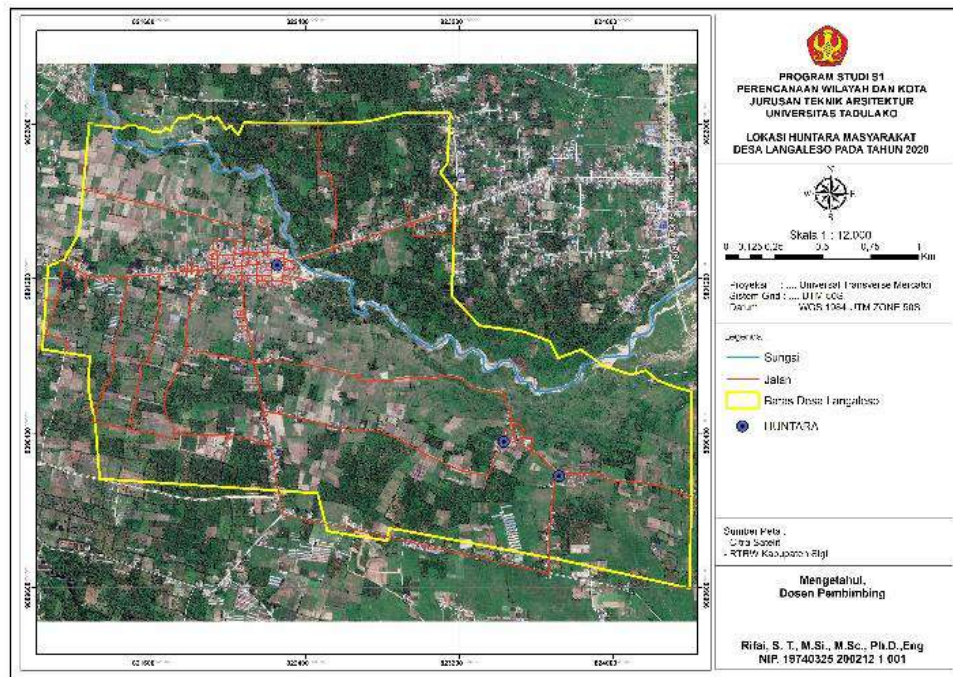


Figure 16. Location of HUNTARA Langaleso Village Community in 2020

An NGO also gives another help to the community of Langaleso Village, a School, a temporary mosque, a Public toilet, and new technology, a water filter. Which helps filter existing water sources into hygienic, healthy, and clean water, and of course, suitable for drinking and use for daily activities.



Figure 17. SDN Inpres 2 Langaleso, which was rebuilt with the assistance of an NGO



Figure 18. Temporary Mosque in Dusun III, Langaleso Village



Figure 19. Public WC Which is Still Often Used by Village People



Figure. 20 Water Filter

a. Community Efforts In Finding An Occupation

Table 1. Occupation Before A Natural Disaster

Occupation Before A Natural Disaster	Total
Farmer	53
Livestock	1
Entrepreneur	1
Day laborer	3
Housewife	5
Honorary employee	6

Table 2. Occupation After A Natural Disaster

Occupation After A Natural Disaster	Total
Farmer	7
Livestock	1
Entrepreneur	1
Day laborer	34
Housewife	2
Honorary employee	3
Unemployment	18
Taxi bike	3

From the table above, we can see the different occupations before and after a natural disaster. This difference has happened because their farm field was swept away because of the liquefaction. At the same time, the community needs to find work so that their daily needs can be met.

Mr Jonas, one of the farmers in Langaleso Village, said that after two years the natural disaster happens, everything has been done to support their families needs.

“We have to do whatever it is, even with conditions like this. We need to adjust to the existing circumstances. It’s the path that God has given.”

Some people in Langaleso village work as day labourers, they go to the city to look for work, and also some are learning how to become a handyman. And for the women of Langaleso Village, most of them work as daily labourers, such as picking soup leaves. Some start selling in front of their homes. So to support their daily needs, these mothers work as day labourers. For the irrigation system, the community relies only on rainwater and shallow wells using Alkon in the current condition. Still, some farmers do not have it evenly. The farmers still have to borrow or rent from other farmer groups.



Figure 21. Dry irrigation in Langaleso Village



Figure 22. Condition of the Sluice in Langaleso Village

At the same time, on December 21, 2019, the KKN-PPM (Real Work Lecture-Learning Community Empowerment) team from Gadjah Mada University came to Langaleso Village to run their KKN-PPM program with the theme "Educational Assistance and Increased Agricultural Production" in Langaleso Village. With this theme, students from KKN-PPM UGM came to help the community lighten their agricultural burden. One of the assistance they provided was the provision of 10 units, which at that time students/I KKN-PPM UGM were assisted by the local, regional pawn shop. And this assistance was given directly to several farmer groups in Langaleso Village through the Langaleso Village Head, Mr Nurlin.



Figure 23. Handover of Alkon from KKN-PPM UGM to Langaleso Village Head

In addition, UGM KKN-PPM students also help the community by making a drip irrigation system. Due to the damage to the dam in Langaleso Village, which resulted in a lack of water supply entering Langaleso Village for their agricultural system. Drip irrigation is a suitable method for deplorable irrigation conditions in Langaleso Village.

“We know that in some sectors, after the earthquake, we have not been able to move much. For example, the agricultural sector was the main source of livelihood. Making some farmers switch professions whose income cannot guarantee the family economy. Our job as a KKN team can at least alleviate such problems. With the assistance provided (Alkon), I think it becomes a real action that can be directly felt by the community, not just a theory.”

b. Group/Membership In The Household Business

Langaleso Village also received assistance to meet their daily needs with help from NGOs through related agencies, namely the MSME (Micro, Small, and Medium Enterprises) program, which was given directly to mothers in Langaleso Village. The farmer group have marketed their oyster mushroom cultivation in several places in Central Sulawesi.



Figure 24. One of the Oyster Mushroom Cultivation Farmers' Group, the Jasmine Group

In addition to oyster mushrooms, there are several women in Langaleso Village in Dusun II who have women workers in the sewing sector. There is also a group of women who started their business by producing fried onions. This program is a community empowerment program carried out by one of the NGOs, namely ACT (Aksi Cepat Tanggap). Fried onions will be market to all regions in Central Sulawesi, even outside Central Sulawesi.



Figure 25. Fried Onion Production Process by Mothers in Langaleso Village

These programs aim to meet the needs of the village community. This community empowerment assistance program is helpful for the long term so that the community can be independent in producing the processed products they make.

Fortunately, many people feel helped by this program. Even though it is only a simple job, at least the community can get income for food and school needs for their children.

c. Public Health

After two years after the natural disaster that occurred in Langaleso Village, for the current condition, the health of the community has begun to improve gradually. The state of the community's body has started to adapt to water conditions which are certainly different because of the former liquefaction that occurred about two years ago.

d. Daily Community Activities

Of course, the daily activities carried out by the people of Langaleso Village it is very different. "In the past, I rarely interacted with the residents of Langaleso Village because of my busyness. But for now, I am more and more at home because, thank God for my cage in Langaleso does not collapse, so I interact with residents more often."

According to some information obtained, several residents used to sell grocery items, but they have stopped selling again in their current condition. And also, the people in Langaleso Village stay home due to the loss of their cultivated land.

Apart from work, other activities carried out by mothers in Langaleso Village carry out religious activities such as recitations, which are carried out routinely every two times a week until now.

IV. Conclusions and suggestion

Conclusions

1. The people of Langaleso Village, before the disaster, still had permanent jobs and stable economic conditions had several farmer groups. The community's health condition was still regular. There were no indications of serious illness, and the community's activities were not much different from the activities of the village community. Generally, i.e. going to work and the children going to school.
2. After a few days after the natural disaster occurred, the villagers lost their agricultural land. Also, they damaged the dams and irrigation that the villagers used to use for their farming system so that the community did not carry out rice field activities. At that time, they only focused on how to survive. The health conditions of many village communities decreased due to lifestyle changes. For their daily activities, the community focused on how they could survive. Some of the community took the leftover food by liquefaction in their fields.
3. After two years after the natural disaster, the community is quite many people who change professions because their agricultural land is affected by liquefaction mud. Some people do not work at all, and then some women from the Langaleso Village community switch jobs as day labourers. Therefore, to ease the burden on the village community, the village community received assistance from several parties, one of which was assistance from the UGM PPM KKN team. In addition, the district also received help in the form of an MSME program to meet the community's daily needs. They also had additional women's farmer groups focused on oyster mushroom breeding, fried onion making and tailoring. The community's health condition has begun to improve gradually, where the body's condition has started to adapt to the needs that exist at this time. Some people go to work for the community's daily activities and stay at home because of the loss of their jobs. The social condition of the community is getting better.

Suggestion

The main problem faced by the people of Langaleso Village is in the economic field. The Sigi Regency Government will prioritize rebuilding or repairing the dam and the irrigation system in Langaleso Village because most of the community's primary work is farmers. Still, with the damage to their irrigation system, the district has not been able to carry out agricultural or plantation activities.

As already explained, the phenomenon of liquefaction in the soil can be destructive and significantly negatively impact soil stability. It can cause changes in soil properties and the loss of agricultural land, which is detrimental to farmers due to loss of livelihoods. The first step that needs to improve resources is to identify the physical properties of the soil in the area affected by liquefaction and provide suggestions for what types of crops are suitable in current conditions.

The people of Langaleso Village have a livelihood as farmers. The local government expected to provide new land to village communities that have lost agricultural and plantation land. And for the location is not far from the Permanent Residential they get so that the community can meet their individual needs.

The people of Langaleso Village still hope for assistance in the form of capital from the local government to sell or plant crops to meet their daily needs.

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