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INCREASING THE RESILIENCE OF THE COMMUNITIES OF KABANDUNGAN VILLAGE AND BARUJAMAS VILLAGE PADALUYU VILLAGE, CUGENANG SUB-DISTRICT, CIANJUR REGENCY THROUGH THE RECONSTRUCTION OF EARTHQUAKE-RESISTANT BUILDINGS AND POST-EARTHQUAKE AQUAPONIC FARMING

Renea Shinta Aminda [1], Tika Hafzara Siregar [2], Syaiful [3], Dinda Dwi Saputri [4], Anggi Amelia [5], Lia Apriani [6], Puri Anita Lestari [7], Salma Leandra Damiana [8]
Universitas Ibn Khaldun, Bogor
[1] renea@uika-bogor.ac.id, [2] tika_hafzara@apps.ipb.ac.id, [3] syaiful@uika-bogor.ac.id

Abstract

Padaluyu is one of the villages in Cugenang District, Cianjur Regency. Padaluyu Village has an area of approximately 595,110 ha. Currently, in the Padaluyu village area, Kampung Kabandungan RT 04/RW 03, Cugenang District, Cianjur Regency, there was an earthquake of Mw 5.6 on Monday, November 21, 2022. This event has resulted in damage to residents' houses, infrastructure, and residents' agricultural land. The purpose of this activity is to provide assistance to increase the resilience of the people of Kabandungan village and Barujamas village, Padaluyu village, Cugenang sub-district, Cianjur district through the reconstruction of earthquake-resistant buildings and post-earthquake aquaponic farming training. Improving the understanding of earthquake-resistant buildings is carried out through the presentation of earthquake-resistant building materials and visual simulations. Aquaponic farming training is carried out by exposing aquaponic farming material, making aquaponic buildings and installations, and practicing aquaponic farming. The result of this activity is that the people in RT 03 RW 04 and RT 03 RW 07 gain increased knowledge and understanding about the construction of earthquake-resistant housing which can be applied in the construction or repair of post-earthquake residents' houses. Residents' understanding of modern agriculture using the aquaponic method increases and residents can practice aquaponic farming by utilizing their yards to meet their food needs for vegetables and side dishes. The Head of Padaluyu Village hopes that this training can motivate the community to build houses and make very good use of vacant land.

Keywords: Aquaponics, Earthquake, Earthquake Resistance, Padaluyu Village.

INTRODUCTION

Padaluyu is one of the villages in Cugenang District, Cianjur Regency. Padaluyu Village is a Split Village from Kemangmanis Village, Cugenang District in 1980. Padaluyu Village has an area of approximately 595,110 ha and is administratively divided into 3 sub-districts. Namely Hamlet 1, Hamlet 2, and Hamlet 3. The boundaries of Padaluyu Village are: To the north, it is bordered by Cigrass Village, Cugenang District. To the east, it is bordered by

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Sukajaya Village, Cugenang District. To the south, it is bordered by Bunikasih Village, Warungkondang District, and to the West by Sukabumi Regency.

Currently, in the Cianjur Regency, Cugenang District, Padaluyu Village, an earthquake of Mw 5.6 occurred on Monday, November 21, 2022. Meanwhile, Padaluyu Village, Kabandungan Village, RT 04/RW 03, Cugenang District, Cianjur Regency, is one of the areas affected by the earthquake. The results of initial observations obtained data that there were 28 RTs and 8 RWs spread across Padaluyu Village. The current conditions include RT 03 and RT 04 Kampung Kabandungan and 4 RTs in RW 07 and RW 08 Barujamas village and Balandongan village suffered quite severe damage (almost all the houses collapsed). Meanwhile, 16 RTs experienced moderate damage. Housing residents located in the area generally have construction that is not earthquake resistant. According to a volunteer, around 250 heads of families in Padaluyu Village are currently in need of assistance with food, clean water, blankets, medicines, and a medical team. Preliminary information obtained from field visits, it is known that the losses incurred as a result of the earthquake were damage to agricultural land, and destruction of road infrastructure, houses, and public facilities. To restore the condition of the victims of the earthquake disaster, it is necessary to restore several aspects of life. One aspect that can support community resilience is the aspect of housing and food security.

Based on the above considerations, to deal with the impact of the earthquake disaster in the Cianjur Region, it is proposed to increase community resilience in Haregem Cugenang Cianjur Village through the construction of earthquake-resistant buildings and post-earthquake aquaponic farming. The purpose of this activity is to introduce earthquake-resistant building construction made of wood/bamboo to increase residents' resilience to homes. Furthermore, training was also carried out on the application of aquaponic farming which could be directly applied to the resident's yards. This activity will be carried out by a team from UIKA Bogor along with 5 students. Students will carry out MBKM activities with learning outside the campus on humanitarian projects in Kabandungan village and Barujamas village, Padaluyu village.

The focus of this activity is to conduct training on aspects of increasing knowledge of earthquake-resistant buildings and the application of aquaponic farming to increase residents' resilience in the aspects of housing and food. There are two main activities to be carried out, namely:

1. Introduction of earthquake-resistant houses with lightweight materials made of wood and bamboo.
2. Earthquake-resistant building construction training.
3. Training on the application of aquaponic farming in the yard.

The purpose of this activity is to increase the resilience of post-earthquake community members through increasing knowledge of earthquake-resistant building construction and the application of aquaponic farming. This activity can increase the resilience of residents in aspects of strengthening housing and food security. The method used is through the implementation of training activities and the provision of aquaponic farming facilities. The goals of this activity are: 1) Reducing the loss of residents due to damage to buildings due to earthquakes. 2)

Anticipating food insecurity events through the application of aquaponic farming. 3) Food security and housing resilience for earthquake-affected communities have increased.

IMPLEMENTATION METHOD

The location of PkM is in two villages, namely Kabandungan village and Barujamas village. The location of this community service activity was affected by the earthquake on November 21 2022 which resulted in many residents' houses collapsing and damage to infrastructure and agriculture. Figure 1 shows a map of the service location.

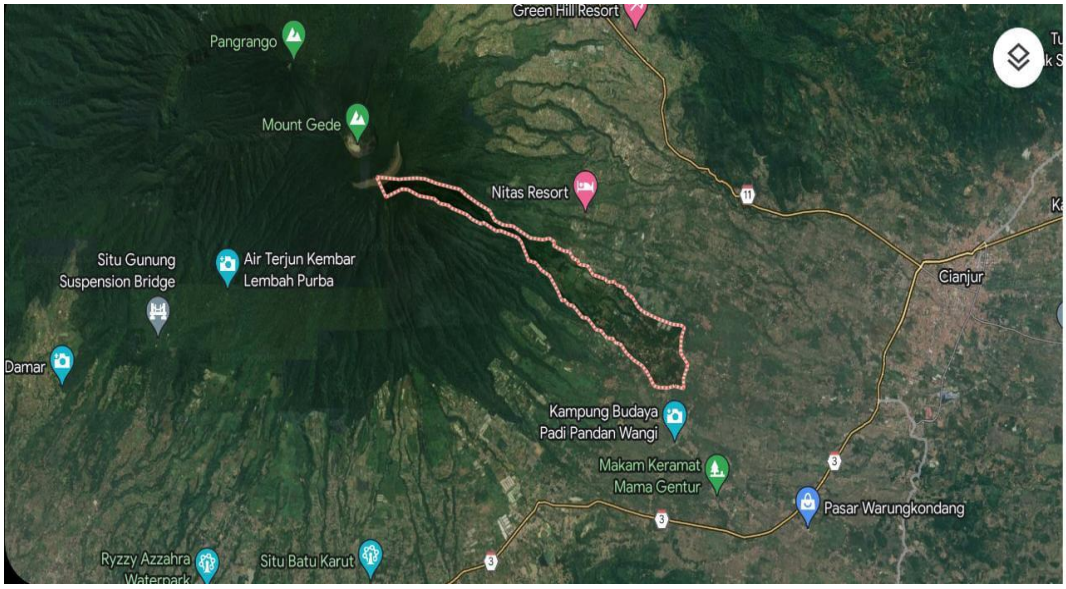

Figure 1. Location of PKM locations in Padaluyu Village, Cugenang District, Cianjur Regency

The earthquake has resulted in material losses for residents. Residential housing located in the area collapsed and agricultural land was damaged. This resulted in huge losses thereby reducing the resilience of residents. The aspects of housing security and residents' food security are the focus of this activity. Increasing residents' resilience is carried out through increasing knowledge of earthquake-resistant building construction and the application of aquaponic farming. Figure 2 is the stages in increasing the resilience of residents in the aspects of housing and food aspects through training and the provision of agricultural technology installations.

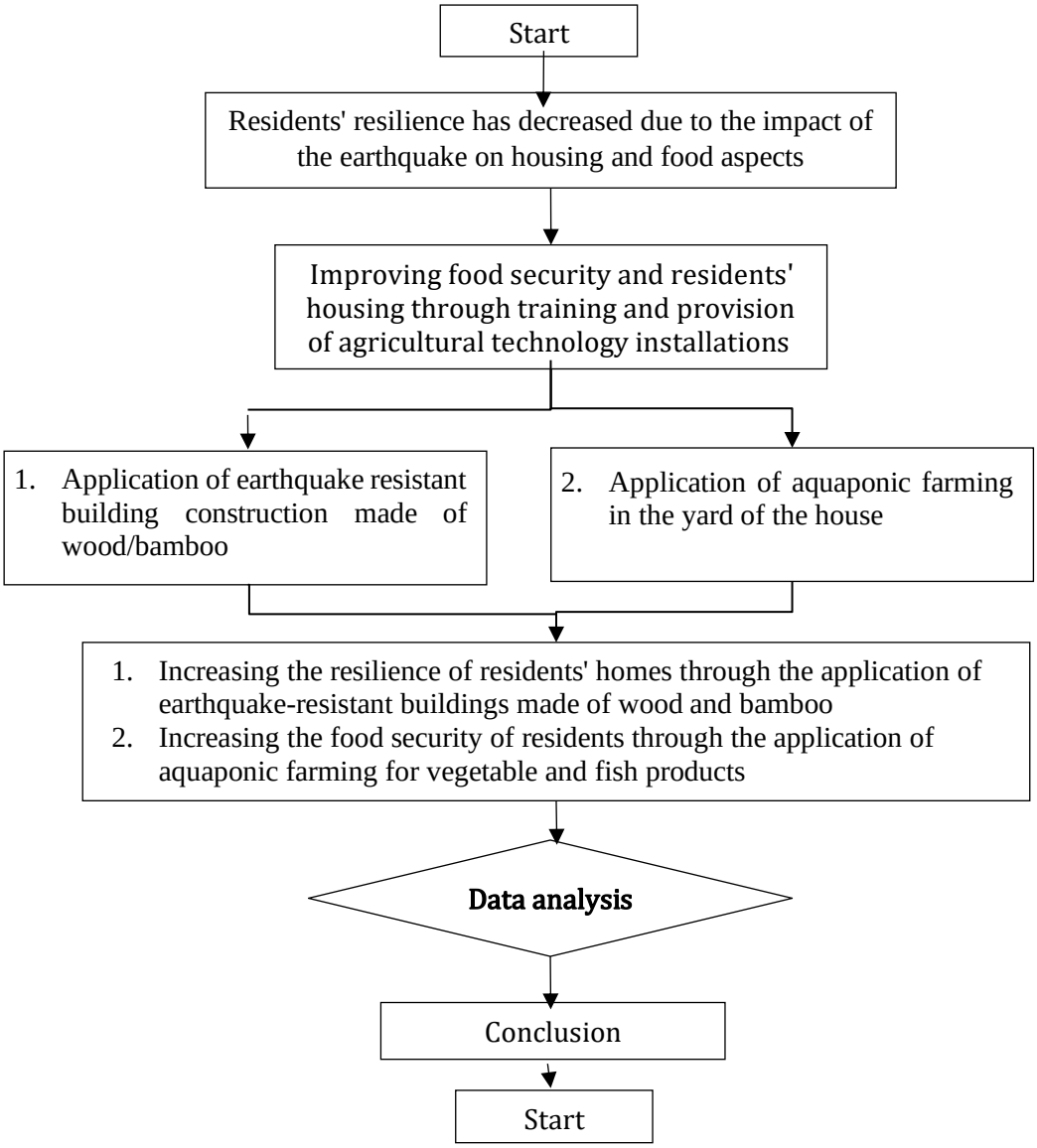

Figure 2. Flowchart of the PkM method in increasing the food security of residents affected by the earthquake

RESULTS AND DISCUSSION

Results of PkM activities

1. Earthquake Resistant Houses

The technology that will be applied to partners is to provide a detailed understanding to partners and participants who take part in this program of how important it is to understand earthquake-resistant houses earlier to reduce the impact on loss of life and property. The simple knowledge conveyed is related to the selection of materials to build earthquake-resistant houses. The materials for this building are lightweight, easy to obtain and affordable, durable, and long-term. Knowledge about bamboo is needed by partners so the bamboo chosen must be old. Preserved within a certain time 2-3 months. Or preservation using good quality paint. Figure 2 shows the process of selecting earthquake-resistant building materials systematically.

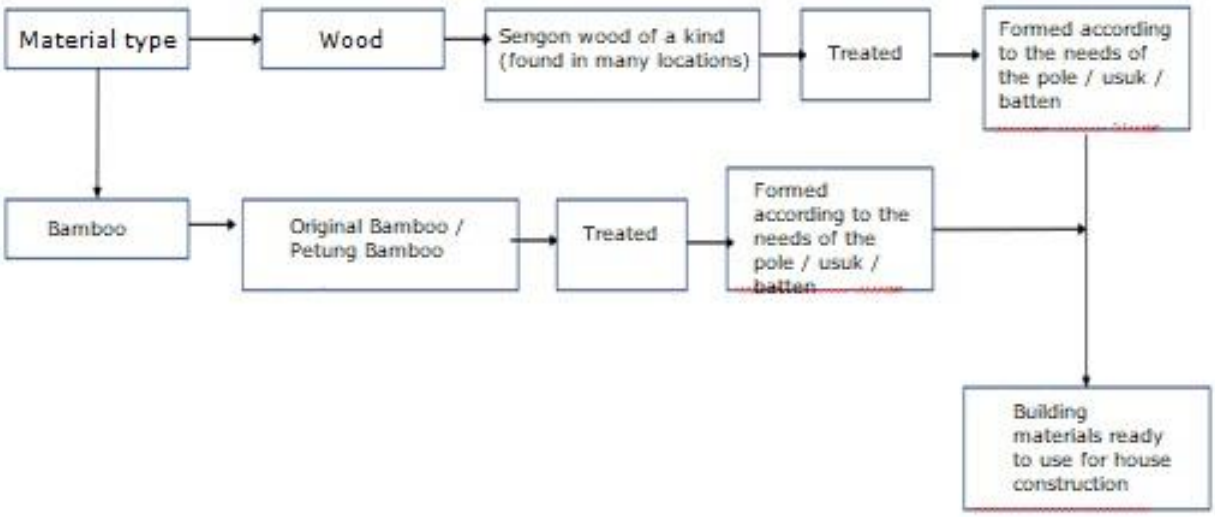

Figure 3. Systematic selection of bamboo and wood materials

2. Suggested earthquake-resistant house design

The recommended earthquake-resistant houses are those made of inexpensive materials, easy to obtain, and in locations where more partners live. Because the current earthquake-resistant houses are still in the form of houses with modern concepts the recommended earthquake resistance has not been maximally implemented. The solution for bamboo and wood houses is the most feasible choice for implementation, besides being easy to work with, it's also easy to get the materials. Above, it has been said that a good earthquake-resistant house is a selection of quality materials and requires separate experience. This is where an understanding of quality material will be taught to partners and training participants so that they don't choose the wrong material suggested.

3. Aquaponic Farming in the Home Yard

Training on the application of aquaponic farming for residents is carried out to improve residents' skills in aquaponic farming technology. Residents have been trained by resource persons on how to do aquaponic farming. The aquaponic farming installation was built with the residents participating in the training as an aquaponic farming pilots.

The aquaponics work system is very simple. Water from fish ponds originating from fish cultivation is channeled to plants because it contains many nutrients needed by plants. The plants will absorb the nutrients that come from the water and fish waste. Instead, the plants will provide oxygen to the fish through water that has been filtered by the growing media. Aquaponics itself consists of two main parts. The main parts are the aquatic (water) part for raising aquatic animals and the hydroponic part for growing plants. Figure 4 is an aquaponics work system.

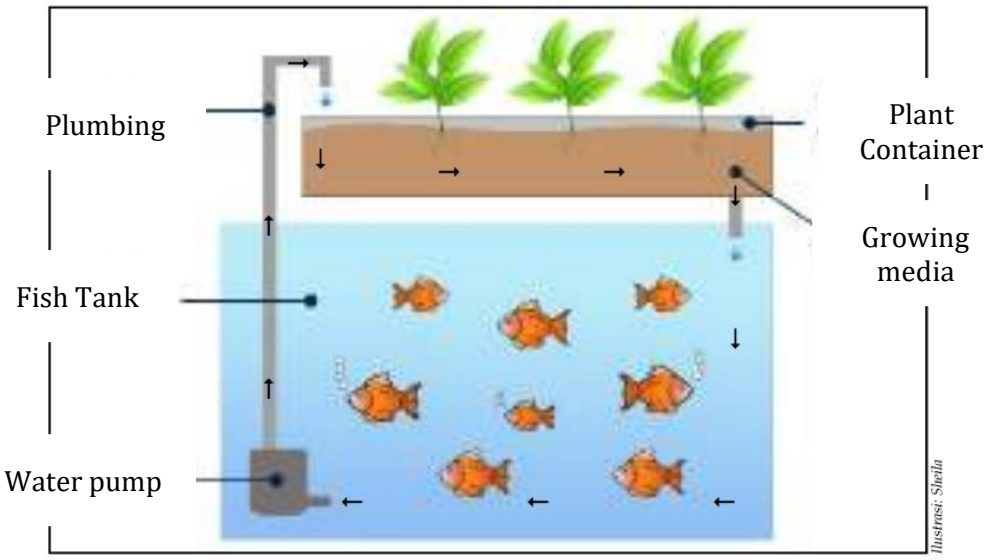

Figure 4. Aquaponics work system

The aquaponic installation components consist of:

a. Fish rearing tank tarpaulin pond
b. Solid waste capture and separation unit (feed and faeces residue)
c. A biofilter is a place where nitrifying bacteria can grow and convert ammonia to nitrate, which can be used by plants
d. The hydroponic subsystem is part of the system in which plants grow by absorbing excess nutrients from the water
e. The sump is the lowest point in the system through which water flows to and from which is pumped back to the rearing tank.

Units for solids removal, biofiltration, and/or hydroponic subsystems can be combined into one unit or subsystem, which prevents water from flowing directly from the fish farm section (pond) to the hydroponic subsystem. Citizens' food security will increase with the fulfillment of food for households which is reflected in the availability of sufficient food, both in quantity and quality, safe, equitable, and affordable.

PkM discussion in Padaluyu village

1. Assistance and provision of tents/posts

Based on a review of the initial PkM activities, the Padaluyu villagers needed assistance. The assistance meant is the community's understanding of the impact of the earthquake. The impact of the earthquake that was directly felt by the community was the constraints on food and housing/dwelling. The presence of the UIKA Bogor campus with a program initiated by the Ministry of Culture and Research, Technology, and Higher Education is very beneficial for the community. This benefit can be seen from the enthusiasm of the community in attending the assistance held. The implementation of this assistance is divided into two stages. The first stage is to provide understanding and direct assistance to the community with as many as 20 people for each activity. This assistance consists of assistance regarding the community's

understanding of the importance of building earthquake-resistant houses. This means that the houses prepared must meet the standards set by the government with simple earthquake-resistant houses. This is important so that people's understanding of the impact of the earthquake on their families and their environment is getting stronger. Figure 5 shows assistance in understanding earthquake-resistant houses.

Figure 5. Assistance for earthquake-resistant simple houses

After providing assistance and presentation on the concept of earthquake-resistant houses, it was found that more than 75% of the buildings in the affected areas did not meet the requirements for constructionally feasible residential buildings. A proper building as a construction must fulfill the concept that is in it, 1) the foundation with the quality of materials according to SNI, 2) the quality of reinforcement/reinforcement meets SNI standards, 3) the cement used must also meet the standards set for each region and the last is 4) the water used to make the concrete mixture is water that is suitable for drinking. As for the quality of the wood, it is Merau or Meranti wood which is older than 10 years. The quality of bamboo must also be of good quality and old age. The bamboo in this area is Gombong bamboo and Ori bamboo, so it needs to be preserved before being used as construction tools.

The next activity was setting up tents/posts in the most severely affected location, namely in Barujamas village RT 03/RW 07. The condition of this village was very apprehensive with the number of houses that collapsed due to the earthquake which lasted only 6 seconds. More than 80% of the people in this village made emergency tents. Moreover, because earthquakes are still being felt every day, it will be difficult for people to do activities inside their homes. This includes people whose houses were not damaged but experienced psychological trauma so assistance is needed they also take the initiative to set up tents in their yards or open areas owned by PT Perkebunan in this area. Figure 6 shows the construction of tents/posts to anticipate shortages of existing emergency posts or tents.

Figure 6. Provision of posts/tents in Barujamas village, Cugenang village

2. Assistance and submission of planting media and Aquaponic seeds

The second activity is assisting in increasing food security for the people of Kabandungan Village, Padaluyu Village, Cugenang District, and Cianjur Regency through aquaponic farming after the earthquake. Aquaponic farming is a type of farming that combines a system of growing vegetables with raising fish. So that in a small area can produce vegetables and fish. The aquaponics work system is very simple. This aquaponic farming is very suitable to be implemented in the Padaluyu Village area where some of the residents have fish pond businesses. After the earthquake, many agricultural lands were damaged and access to food needs became difficult. With the application of aquaponic farming, the community can meet their food needs in the form of vegetables and fish independently.

In this activity, the Ibn Khaldun university team provided an aquaponic farming installation kit to the head of Padaluyu Village. This installation can be used as a demonstration and learning in the application of aeroponic farming. This aquaponics installation contains 100 planting holes and a fish pond that already contains catfish seeds. Planting media in the form of husk charcoal and zeolite stones as well as fish feed was given to residents to be able to practice aquaponic farming. Figure 7 shows the symbolic handing over of the aquaponics installation to the village head of Padaluyu.

Figure 7. Background where Aquaponics was given to residents affected by the earthquake in Kabandungan village, Padaluyu Village, Cugenang District

CONCLUSION

Assistance to increase the resilience of the people of Kabandungan village and Barujamas village, Padaluyu village, Cugenang sub-district, Cianjur district through the reconstruction of earthquake-resistant buildings and post-earthquake aquaponic farming training has been carried out. Improving the understanding of earthquake-resistant buildings is carried out through the presentation of earthquake-resistant building materials and visual simulations. Aquaponic farming training is carried out by exposing aquaponic farming material, making aquaponic buildings and installations, and practicing aquaponic farming. The result of this activity is that the people in RT 03 RW 04 and RT 03 RW 07 gain increased knowledge and understanding about the construction of earthquake-resistant housing which can be applied in the construction or repair of post-earthquake residents' houses. Residents' understanding of modern agriculture using the aquaponic method increases and residents can practice aquaponic farming by utilizing their yards to meet their food needs for vegetables and side dishes.

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