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Changes in the form of houses in the earthquake area Cihikeu village, Sarampad, Cigenang, Cianjur

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Abstract
Cihikeu Village, Sarampad Village, Cianjur Regency, is an earthquake area. From the initial survey of several residential houses in Cihikeu Village, several of the residential houses that experienced minor damage were buildings with stilt structures and woven bamboo/wood walls. Meanwhile, the houses that suffered heavy damage due to the earthquake were walled buildings. The change in the form of residential buildings in Cihikeu Village, Cianjur, which were originally structures on stilts to become permanent buildings with walls, raises the question: What factors were behind them making this change? This research uses qualitative methods, namely observation and interviews to determine changes in building shape and what factors influence these changes in shape. The results of the research resulted in changes in the shape of the building in Cihikeu Village, it experienced heavy damage caused by several things, namely: economic factors, maintenance factors and insight factors from the external environment. The impact of the earthquake where residents received assistance from certain foundations caused residents to add bathrooms, where currently residents use public bathrooms.

Keywords:
Change;
House on stilts;
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INTRODUCTION

The earthquake that occurred in Cianjur on November 21, 2022, with a magnitude of 5.6 SR resulted in 335 to 635 people dying in the world and 7,729 people being injured. The earthquake that occurred in Cianjur also damaged more than 62,628 houses in 16 sub-districts in Cianjur Regency and its surroundings [1].

In this study, it was limited to Cihikeu Village, Sarampad Village, Cianjur Regency. Cihikeu Village, Sarampad Village, Cianjur Regency. Cihikeu Village has 125 families, 432 residents, and 93 houses. Based on data obtained from the Neighborhood Association Secretariat (Rukun Tetangga/ RT), on January 9, 2023, of the 93 residential houses, there were 57 houses suffered minor damage, three houses were moderately damaged, and 33 houses were heavily damaged. Light damage occurred to houses on stilts, moderate damage occurred to 2-story houses with half walls, while heavy damage occurred to houses with walls, and 4 houses on stilts were crushed by houses with walls.

Meanwhile, houses that experienced heavy damage due to the earthquake occurred in permanent buildings with light brick walls and buildings that did not pay attention to the condition of the soil, building structure, and materials used. This also happens in several places in other parts of Indonesia [2][3].

Changes in building form to adapt to conditions [4]. There has been a change in the form of residential buildings in Cihikeu Village, Cianjur, Damage due to the earthquake occurred in buildings that were originally stilt structures and woven bamboo walls, becoming permanent buildings with light brick walls. This raises the question: What factors caused them to change the building? Figure 1 shows the house is earthquake safe.

Figure 1. The house is earthquake safe because it uses a stilt structure and woven bamboo walls

Because the Research was carried out in conjunction with Community Service, it is hoped that the output can provide provisions for residents to pay attention to building structures and provide education about the beauty of local wisdom of buildings that are proven to be safe against earthquakes in Cihikeu Village, Sarampad Village, Cianjur Regency.

METHODS

Research Method Approach

This research is qualitative field research. Qualitative field research aims to research and determine local residents' perceptions of changes in building form that have occurred in Cihikeu Village, Cianjur Regency. In research, researchers need to determine the population, sample, and sampling technique as part of the research process. Population refers to the general area consisting of subjects who have certain qualities and characteristics determined by the researcher to be studied and then drawn conclusions.

Meanwhile, the sample is part of the number and characteristics of buildings. Sampling techniques relate to how researchers determine the number of samples to be used so that analysis can be carried out after the data collection process is complete.

Research Sites

This research was conducted in Cihikeu Village, Sarampad Village, Cianjur Regency. This village has 93 residential houses, as shown in Figure 2 and Figure 3. Consists of 61 houses on stilts, while the other 32 are wall houses. The research was carried out on 89 residents' houses because 4 other houses on stilts collapsed due to being hit by the walls of the houses next to them. Research will be carried out on several housing changes that occur to get answers regarding the factors that influence them.

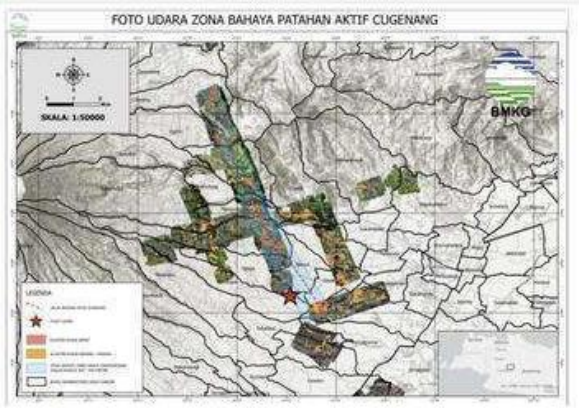

Figure 2. Location of Aerial Photographs of the Danger Zone of Cugenang District, Cianjur Regency

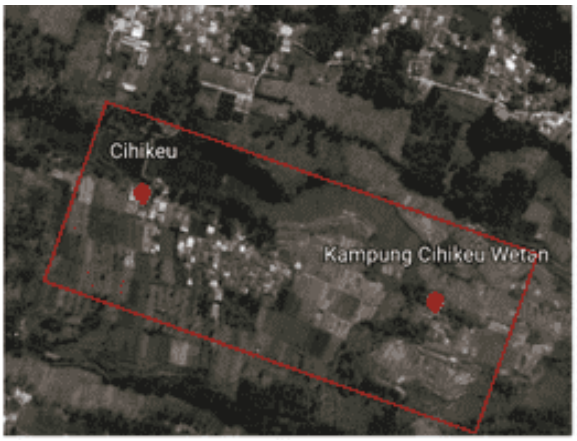

Figure 3. Location of the Earthquake Area of Cihikeu Village, Sarampad Village, Cugenang District, Cianjur Regency (Source: Gmaps)

Observation

In this method, researchers collect data by looking at changes that occur in each residential unit. This technique is used by researchers to obtain primary data. Researchers came to the research location to observe and record directly to see how the condition of residential buildings was changing

Interview

Interview techniques or interviews to find information about factors related to why the houses there live have changed a lot. So that data can be obtained about what factors make the building change. Interviews conducted by researchers are in three ways, namely by:

- collect respondents in one room (as shown in Figure 4)
- explore the respondents one by one (as shown in Figure 5)

- using snowball sampling, which is a sampling technique with the help of key informants [5]

The key informant respondents selected by the researcher were those who knew many conditions in Cihikeu Village. This sampling technique was used by researchers because researchers had difficulty getting answers from respondents. Information will be collected from:

1. Mr. Tatang, is the Secretary of RT Cihikeu Wetan
2. Mr. Ayik is a builder in Cihikeu Village who has worked a lot in Jakarta.

Interviews were conducted with them to find out what factors influenced the change in the shape of the house, which was originally a structure on stilts and had walls supporting woven bamboo into landed permanent house with light brick walls.

Figure 4. Interviews conducted by researchers to residents as respondents gathered inside one hall room

Figure 5. Observations and interviews were carried out by researchers at residents' houses and their owners

Research Instrument

The research instruments that cannot be separated from the data collection methods used are as follows:

1) Observations were carried out to find out what happened to the house which originally used a umpak stilt structure and woven bamboo walls to become a flat permanent house with adobe/brick walls.
   a. Stage Form: Entire stage, Part stage, No stage.
   b. Material: Bamboo/Wood, Light Brick, Brick, etc.
   c. Interior: Sitting room, bedroom, kitchen, toilet, etc.
2) What factors influenced the change in shape from a house that originally used a stilted structure and woven bamboo walls to a flat, permanent house with adobe/brick walls.
   a. Limited Land
   b. Addition of Family members
   c. The addition of space related to livelihoods
   d. Gradual development due to funds
   e. Information from outside about the house

The transformation of traditional houses is influenced by several factors, perhaps because globalization, regulation, economics and socialism play a major role and are the roots of all these changes [6].

Data Analysis

Stilt houses are an alternative place to live in several areas in Indonesia, but some have changed for certain reasons [7]. This also happened in the Cianjur earthquake area. From the results of the observation, an analysis was carried out to determine the characteristics of houses that had changed shape from initially using "umpak" (= a house base board made of stone); from a stilt building to a flat building. Changes in material from the use of woven bamboo and wood to the use of lightweight walls and bricks; why there were spatial changes in the building.

From the interview data, it is useful to find out the background and reasons for the change in the shape of the house. From here, an analysis was carried out on the factors that influenced the change in shape. The relationship between the two analyzes will determine what factors cause changes in the shape of the house.

RESULTS AND DISCUSSION

Observation Data Collection

In the Cihikeu Village Settlement, several houses are located close to each other. The distance between buildings ranges from 2 meters to 4 meters (as in Figure 6) There are only a few yards that are adequate for pedestrian circulation. The yards of individuals owned by fishponds ("balong") with public toilets above them. In addition to being public toilets, "balong" is also a place to cultivate fish.

As shown in Figure 8, from several survey results, most stilt houses in Cihikeu Village are of the same type with two bedrooms, and one living room. Some residential homes have one bathroom or one kitchen. Houses that do not have bathrooms will shower or defecate in public bathrooms.

The stilt houses in Cihikeu Village use a “umpak” (foundation stone used to place the pillars) foundation with dominant wood material and walls using woven bamboo (as shown in Figure 7). The use of one or two-story light wood frame buildings also occurs in most houses in other areas [8].

Figure 6. The distance between stilt houses in Cihikeu Village is close to each other, ranging from two meters to four meters

Figure 7. Side view of the Cihikeu stilt house building which uses a pile foundation *umpak* with materials dominated by wood and walls using woven bamboo

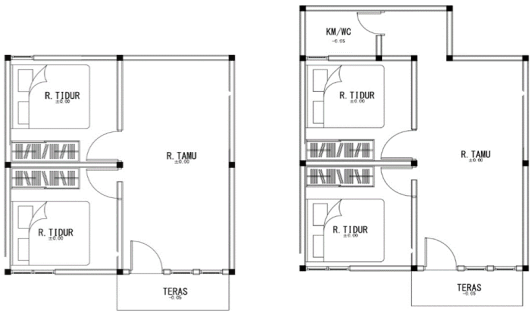

Figure 8. Plan of a house on stilts which generally have two bedrooms and some also have a kitchen or/and bathroom inside

Data Analysis Results

Changes That Occurred in Cihikeu Village Residential Houses

In the interview process with several respondents gathered in one hall, they provided information that if you want to use a wooden stilt house building, then the wood used to build the house must be maintained so that it is durable and strong. Because in addition to the many positive aspects of this wooden stilt house building, the negative aspect is that the maintenance or care of the building needs to be maximized because there are many potentials that can damage the integrity of the wooden stilt house building itself.

One of them is the presence of termites or insects that can make wood porous. So, in its maintenance, it is necessary to provide anti-termite drugs so that the insects do not eat it. Anticipation must also be done so that the wood used does not become damp and rotten.

After being occupied, the homeowner must routinely maintain and clean the house that uses wooden material. This type of building usually absorbs more dust than others. In order for the color to remain beautiful, it must also be sprayed with a special liquid which of course will increase the cost. In the data collection process, detailed observations were made of the number of buildings that experienced minor, moderate and severe damage. This was also done in several studies [9].

In addition, interviews were conducted by collecting information from one respondent to several respondents. Respondents were also selected by the researcher because they were those who knew a lot about the condition of the village and buildings in Cihikeu Village before and after the earthquake. Over time, traditional houses have changed, these changes can be seen from the change of traditional houses into modern houses whose cultural characteristics are no longer visible.

Currently, wooden houses can be owned if you have more funds compared to cement or concrete houses. Currently, everything that is back to nature is much more expensive than the artificial version. Including the price of the boards needed to build the wooden house. Especially if you must choose strong wood so that it lasts in various weather conditions. Considering that wood is a natural building material, it is not surprising that the price of wood is more expensive than concrete. Many people use concrete materials because the construction costs are not as expensive as using wood materials. In an interview with the Secretary of the RT of Cihikeu Village, the variety of assistance for earthquake victims in Cihikeu Village, Cianjur Regency varies greatly. Of the several assistances, there is assistance in the form of providing clean water and bathrooms in each resident's house. Assistance in the form of clean water pipes from the water source to each settlement. This assistance is used by residents to build bathrooms in their respective homes. So far, residents have used public bathrooms. From the interview results, before the earthquake, 90% of houses in Cihikeu Village did not have bathrooms.

Even though there are 93 residential houses in Cihikue Village, this research was carried out on 89 residential houses (because the changes to the 4 houses which completely collapsed cannot be seen). The following are the results of observations and interviews regarding several physical changes to buildings in Cihikeu village:

a. Type I (two houses)

There are 2 units of this two-story residence (out of 89 units studied or 2%). This residence is different from most residences in Cihikeu Village. This house has a combination of brick walls on the first floor and woven bamboo walls on the second floor, as shown in Figure 9.

However, this house experienced damage to the ground floor walls in the form of cracks and damage to the roof covering. This indicates that there is not enough attention to the structure of the building.

The owner believes that if he uses concrete building supports it will be more durable and easier to maintain. This house still adopts the style of the surrounding buildings, namely the use of wooden materials on the second floor of the building. The second floor is used specifically for additional bedrooms due to the increase in family members. The use of wood for the structure provides a cool and natural atmosphere.

Figure 9. Side view of a two-story building that suffered moderate damage

From this, it can be concluded that changes in shape are influenced by several factors such as ease of maintenance, limited land due to additional family members, and external influences on building style.

b. Type II (29 houses)

There are 29 single-story brick-walled houses (out of 89 units studied or 33%).

This second type of house has brick walls but without structural reinforcement. This house is equipped with a kitchen, and some have bathrooms. Because this house does not have structural reinforcement, if an earthquake occurs, the building will experience quite serious damage; starting from almost all the walls of the building collapsing, cracks in the walls, and damage to the roof structure to the walls vibrating when held, as shown in Figure 10. The results of this observation are reinforced by research [10] which shows that the main cause of house damage is the weak structural details of the joints between the walls and the roof, the inhesion of the soil roof, and the absence of tie beams on the structural walls.

Although it has not completely collapsed, the homeowner does not dare to use it because the condition of the interior of the building which is cracked is very concerning. So far, the owner feels confident that in the future his house will be durable, and the construction process will be more efficient and economical compared to wooden stilt houses.

Due to developments over time, some residents have begun to be more influenced by information from outside, including insights about buildings. In this case, several village residents also received a lot of information about modern house buildings which seemed to be more up to date with the times, so they made building changes that were more in line with the times without considering structural strengthening.


The permanent wall building in Cihikeu Village which completely collapsed


The house had brick walls without structural reinforcement so when an earthquake occurred, the house suffered damage and cracks on almost all of the walls of the building.


The house, which had brick walls without structural reinforcement, swayed when held Figure 10. The image above depicts a type II one-story house with brick walls without any structural reinforcement so that when an earthquake occurs the building suffers heavy damage.

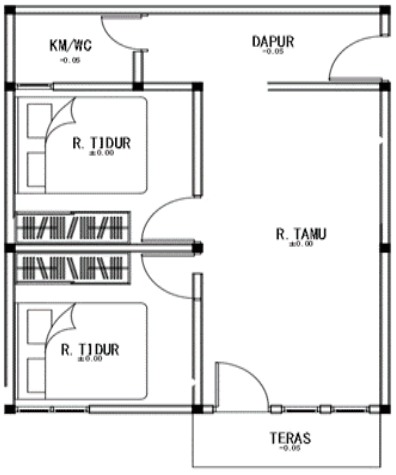

Figure 11. This residential plant is equipped with a kitchen and some have bathrooms

The change in shape is shown in Figure 10 with the floor plan as shown in Figure 11, the house is severely damaged. The change in shape is influenced by ease of maintenance, economic factors, external influences, and building style.

c. Type III (two houses)

The following are 2 single-story brick-walled houses with moderate structural reinforcement (out of 89 units studied or 2%). This house has brick walls with structural reinforcement on the building columns, so that when an earthquake occurs, this building experiences moderate damage, as shown in Figure 12. Like the stilt houses in Teunom, Aceh region, which have undergone transformation along with changes in the socio-cultural community and changes in the natural environment. Now there has been a change in the way of building houses and the appearance of houses with the use of cement, bricks, and iron [11].

This house is the result of two houses created by Mr. Ayik, who is a worker who has experience working in Jakarta as a builder on building or housing design projects. So, the owner of this house has an outside perspective regarding the understanding of what building structure materials are like. Previously, Mr. Ayik's house was a stilt house, but after he worked outside the city and gained a lot of insight into information about buildings, he took the initiative to change the building into a house with a concrete structure.

Finally, he changed the building into a concrete structure house. However, unfortunately, when the earthquake occurred, there was a lot of damage on several sides of the building because he did not use beams in the building. Then after the incident, the homeowner finally made repairs and built it according to the proper standards.


Figure 12. The brick house had damage to several sides of the building because blocks were not used in the building

He argued that buildings using bricks can withstand earthquakes if built according to the correct standards and provisions. In addition, he also argued that buildings using bricks would be more economical and affordable to finance their construction. When compared to using wood materials, it is cheaper and more practical to use concrete materials. According to him, if the reconstruction uses a stilt house for its maintenance, it will also be more complicated and require quite large maintenance costs so that it can last a long time.

At the time of the survey, Mr. Ayik was also building a concrete building at his neighbor's house which is located close to where he lives. The residence as shown in Figure 13. also underwent building additions. Additional space is in the back area of the house to be used as a kitchen and bathroom.

This type of house experienced minor damage to the roof covering. From this it can be concluded that changes in shape are influenced by ease of maintenance, economic factors, external influences on building style.

d. Type IV (43 houses)

This type of stilt house consists of 43 units (out of 89 units studied or 48%). This house is in the form of a stage with woven bamboo walls, there is an additional area at the back of the building that functions as a bathroom as shown in Figure 14. As in other places, where stilt houses are an alternative place to live that is still used to deal with climate and weather, but there is a tendency for morphological changes in the development of space in stilt houses [12, 13, 14, 15, 16].

The addition of a bathroom area as shown in Figure 15 was chosen because it was supported by funds from one of the foundations after the natural earthquake that hit the Cihikeu Village area. Before the assistance from the foundation, they used public toilets. This stilt house with woven bamboo walls experienced minor damage, namely damage to the roof covering.

From this, it can be concluded that the addition of the mass of the stilt-shaped house for the latrine function was influenced by the aid fund factor resulting from the earthquake.

e. Type V (nine houses)

This type of stilt house consists of 9 units (out of 89 units studied or 11%). This house is in the form of a stage with woven bamboo walls. However, there is an additional area at the back of the building that functions as a bathroom and kitchen that uses brick walls, as shown in Figure 16 and Figure 17.

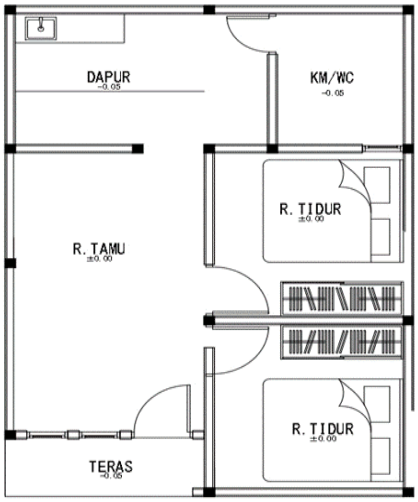

Figure 13. The plan of this residence has undergone building changes, and the addition of a larger toilet and kitchen space compared to other houses in Cihikeu Village

Figure 14. The addition of the building mass for toilet function can be seen behind the stilt house with woven bamboo walls

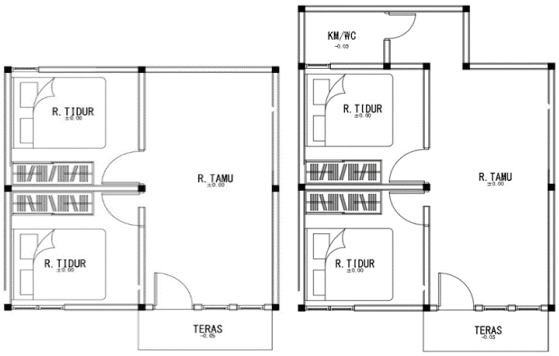

Figure15. This residence plan. Left before and right after adding building mass for bathroom functions in the residential building layout

The owner did this because it was more economical and also faster for the construction process. The addition of toilets and kitchens to the house came from funds from the earthquake relief foundation.

Figure 16. The addition of building mass for toilet and kitchen functions can be seen behind the stilt house with brick walls

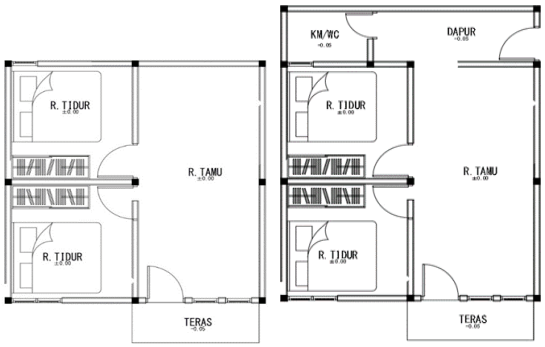

Figure 17. Plan of this residence. Left before and right after the addition of building mass for bathroom and kitchen functions

When the earthquake occurred, this house suffered minor damage to the roof covering. From this, it can be concluded that the change in shape was influenced by economic factors, a faster development process, and foundation aid funds due to the earthquake.

f. Type VI (two houses)

There are 2 residential houses of this sixth type (out of 89 units studied or 2%). This house was developed from an existing building in the form of a house on stilts with woven bamboo/wood walls. However, there was a change in the layout of the building. There is an additional area at the back of the building which functions as a bathroom area. Meanwhile, on the front side, there is an additional terrace along the front of the building with ceramic floor covering material, as shown in Figure 18 and Figure 19.

According to the owner, the owner added a terrace along the front side with ceramic tiles for easy cleaning and to make the house look more modern. When the earthquake occurred, this house suffered minor damage to the roof covering.

There are two residential houses in this sixth building type, it can be concluded that changes in shape are influenced by maintenance factors and external influences.

Figure 18. Front view of the stilt house building which has undergone changes to the terrace along the front side with the use of ceramic material as a floor covering, in contrast to the surrounding buildings which use wood

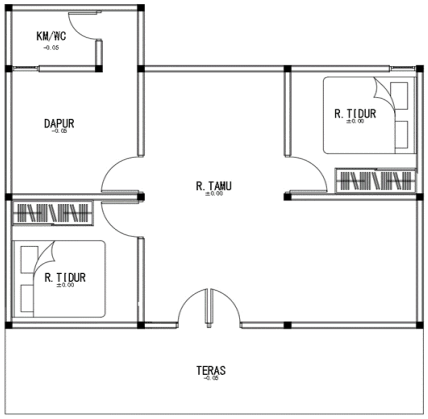

Figure 19. A residential house plan that has changed the spatial layout of the residence

g. Type VII (two houses)

The seventh type consists of two houses (out of 89 units studied or 2%). This two-story house is different from other houses in Cihikeu Village because it uses a foundation structure, sloof, columns, and beams. This house has brick walls on the ground floor, but on the second floor it uses a wooden structure and wooden floor elements the walls are made of lightweight material in the form of Glassfiber Reinforced Cement (GRC) as shown in Figure 20 and Figure 21. The use of these wooden elements has the potential to maintain temperature stability in changes in environmental temperature [17]. The second floor is used specifically for adding bedrooms due to the increase in family members. Based on research [18], this additional space is due to the increase in family members but can be caused by increasing income, increasing the age of family members, increasing vehicles, the need for more space, and factors of damaged building quality.

Figure 20. The facade of this two-story house uses brick walls on the ground floor, but the walls on the second floor use GRC (glass fiber reinforced cement) and wood

Figure 21. View of the front side of a two-story house paying attention to the structure

This house is the work of Mr. Ayik, a builder who has worked in Jakarta for a long time. According to him, the houses he built are cheaper than stilt houses and easier to maintain. This opinion also occurs in Kemloko Village, Grobogan, Central Java, which is a rural area where almost 90% of the houses have Joglo Limasan roofs. The change from Joglo Limasan roofed houses to modern houses occurred because the people in this village are immigrants who have skills as builders and foreign workers, so they already have experience building modern houses with simple and cheap roof structures [19]. The second floor is to facilitate the increase in the number of families, where the space on the second floor is used as a sleeping area.

The homeowner obtained information about modern house buildings in big cities that seemed more modern and easier to obtain compared to wooden plank houses and woven bamboo plank houses. This is reinforced by research [20] that occurred in traditional houses in the Selayar Islands Regency, along with the development of building structure technology and the improving economic conditions of the community, the use of stilt houses with wooden materials is considered no longer economical due to the limited wooden materials available. The use of natural materials with traditional building construction is also considered difficult to find and expensive, the selection of manufactured materials with permanent buildings is considered to indicate economic status [21].

When the earthquake occurred, this house suffered minor damage to the roof covering. From there are 2 residential houses It can be concluded that changes in shape are influenced by limited land due to increasing family members, economic factors, maintenance, and external influences. From the research results [22], changes in houses are influenced by livelihoods, land limitations, stages of building construction, people involved in construction, and openness of communication and information.

From the description above, the factors that influence the changes in stilt houses in Kampung Cihikeu, Sarampad Village, Cianjur are:

1. Limited land.
2. Increasing population.
3. Ease of maintenance.
4. External influences.
5. Economy (More economical).
6. Earthquake impact (Foundation assistance).

The factors causing changes in stilt houses above are reinforced by research [23] which states that the transformation of stilt house design into a different house or into a flat is a process of architectural self-adjustment from the user. There are six basic aspects in the theory of physical change put forward by Habraken, namely Body & Utensils, Furniture, Partitioning, Building Elements, Roads, and Major Arteries [24].

From Table 1, it can be explained that of the 89 housing units studied, the factors influencing change:

- There are 4 units housing in type I & type VII (out of 89 units studied or 4%) due to factors Limited Land.
- There are 4 units housing in type I & type VII (out of 89 units studied or 4%) due to factors Adding New Members.
- There are 37 units housing in type I, II, III, VI & type VII (out of 89 units studied or 42%) due to factors Ease of Maintenance.
- There are 37 units housing in type I, II, III, VI & type VII (out of 89 units studied or 42%) due to factors Outside Influence.
- There are 35 units housing in type I, II, III & type VII (out of 89 units studied or 39%) due to factors of Economy (More Efficient).
- There are 52 units housing in type IV & type V (out of 89 units studied or 58%) due to factors Impact of The Earthquake (Help from the Foundation).

There are 37 units housing in type I, II, III, VI & type VII (out of 89 units studied or 42%) due to factors

- Ease of Maintenance.
- Outside Influence.

There are 35 units housing in type I, II, III, & type VII (out of 89 units studied or 39%) due to factors:

- Ease of Maintenance.
- Outside Influence.
- Economy (More Efficient).

There were changes in the form of residential houses in the number of 33 type I, II, and III housing units (out of 89 units studied or 37%) which experienced moderate and severe damage caused by factors:

- Ease of Maintenance.
- Outside Influence.
- Economic (More Efficient).

Table 1. Conclusion on Changes in House Shape

No	House Type	Change Results	Factors that influence change	
			No *)	Checklist
1	Type I (2 houses =2%) 	• 2 storey house • The 1st floor has brick walls • The 2nd floor has wood/bamboo walls. • Less attention to concrete structures • **Moderate damage**	1 2 3 4 5 6	✓ ✓ ✓ ✓ ✓ -
2	Type II (29 houses =33%) 	• 1 storey house • Brick walled • Not paying attention to the concrete structure • Additional toilet with brick wall • **Heavy damage**	1 2 3 4 5 6	- - ✓ ✓ ✓ -
3	Type III (2 houses =2%) 	• 1 storey house • Brick walled • Less attention to concrete structures • Additional toilet with brick wall • **Moderate damage**	1 2 3 4 5 6	- ✓ ✓ ✓ -
4	Type IV (43 houses =48%) 	• 1 storey house • House on stilts • wooden/bamboo walls • Additional toilet with bamboo walls • **Light damage**	1 2 3 4 5 6	- - - - - ✓
5	Type V (9 houses =11%) 	• 1 storey house • House on stilts • wooden/bamboo walls • Additional toilet/& kitchen with brick wall • **Light damage**	1 2 3 4 5 6	- - - - - ✓
6	Type VI (2 houses =2%) 	• 1 storey house • House on stilts • wooden/bamboo walls • Additional toilet with bamboo walls • Additional ceramic tile patio • **Light damage**	1 2 3 4 5 6	- - ✓ ✓ - -
7	Type VII (2 houses =2%) 	• 2 storey house • The 1st floor has brick walls • The 2nd floor has wood /light material walls. • Less attention to concrete structures • **Light damage**	1 2 3 4 5 6	✓ ✓ ✓ ✓ ✓ -

*) The meaning of the numbers on the factors that influence house changes:

1. Limited Land	3. Ease of Maintenance	5. Economy
2. Adding New Members	4. Outside Influence	6. Impact of The Earthquake

From the results of the discussion of this research, it can be concluded that the factors that cause residents to change the shape of their houses in Cihikeu village are as follows:

A. Land Limitation Factor (4 Houses = 4%). Due to limited land, the building was made of 2 floors, with the reason of adding bedrooms.
B. Additional factor of family members (4 houses = 4%). Due to the addition of family members, the building was made into 2 floors, with the reason of adding bedrooms. This is reinforced in research [25] where the construction of new roads and economic activities affect changes in spatial planning, form, and function of space.
C. Economic Factors (more economical) (37 houses = 42%). The materials used in brick houses are easier to obtain and more economical than houses made of wood and bamboo.
D. Treatment Factors (37 houses = 42%). Houses made of brick/modern materials are easier to maintain than houses made of wood on stilts.
E. Insight factors from the external environment (number of houses 35 = 39%). Due to developments over time, some residents have begun to be more influenced by information from outside, including insights into buildings. In this case, some villagers also received a lot of information about modern house buildings that seemed to follow the times more, so they made building changes that were more in line with the times rather than maintaining traditional stilt buildings with wooden planks and bamboo weaving that were passed down from generation to generation in the area. However, the results of research [26][27] into the application of modern materials to Rumah Gadang revealed that the sustainability value of building materials in pre-modern Rumah Gadang was higher than that of modernized ones.
F. Earthquake Impact Factor (foundation assistance) (change in shape of 52 houses = 58%). The variety of assistance for earthquake victims in Cihikeu Village, Cianjur Regency varies greatly. Some of this assistance includes providing clean water and bathrooms in each residence. This house on stilts with wooden walls and woven bamboo, which was once a public toilet, is equipped with a bathroom with the help of a foundation.

What caused residents to change the shape of the buildings in Cihikeu Village so that heavy damage occurred in the second type of house, a total of 29 residential houses (33% of all the buildings studied), which were in the form of brick-walled buildings but did not pay attention to the

correct structure, both in terms of foundations, column or beam.

CONCLUSIONS

The factors causing changes to buildings that experienced moderate damage (4%) and heavy damage (33%) are as follows:

a. Economic Factors (more economical)
b. Ease of Maintenance Factor
c. Insight factors from the external environment

Meanwhile, the impact of the earthquake (with financial assistance from the Foundation) caused residents to add bathrooms, where currently residents use public toilets. This happened to 52 stilt houses with wooden plank walls and woven bamboo and these houses suffered minor damage.

In responding to changes in the shape of houses in Cihikeu Village, Cianjur Regency, which is an earthquake area, it is necessary to pay attention to the structure that is suitable for earthquake areas, if using materials that are economically cheaper and easier to obtain, and easy to maintain.

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