

Natural disaster and restoration housing in Asian countries

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ABSTRACT

"Core housing" is predominant for restoration housing in South-East Asian countries. "Core Housing" is superior in low cost and quick supplement and adoptable to individual life style. In addition to physical these advance, this housing system gives the victims a sense of purpose and restores their desire to live.

Keyword :RESTORATION HOUSING, FLORES ISLAND, MT. PINATUBO, BALI ISLAND

1. Object

Since the old days, Japan has had many experiences with natural disasters and has developed various ways of managing with disaster. Traditional methods, however, focused on restoration rather than prevention. After natural disaster, Damaged house could easily be repaired or rebuild and its components, easily replaced. A Japanese house was essentially a "temporary" structure". Today, the situation is completely different. The Great Hanshin earthquake on 17 January 1995 has proved it. All the house damaged by the earthquake were demolished without concerning a possibility of repairs. It made many victims homeless. And 48,300 temporary housing units have been built, but because of lack of land space, many of the temporary housing unit had to be built in places remote from the intended beneficiaries original domicile. In Asia, especially in island countries, Taiwan, the Philippines and Indonesia, natural disasters, such as volcanic eruptions, earthquakes and typhoons, occur with relative frequency as well as Japan. In these countries, the restoration housing were supplied by the method of "Core Housing". "Core Housing" is popular way for low cost housing in South East Asian countries. Only elemental facilities, toilet, kitchen and one room, and the dwellers upgrade it by themselves according their economic situation. Economic status is completely different among Japan and these countries. We don't think "core housing" is effective for the restoration housing in Japan but for the temporary housing it is effective. The objective of this study is to evaluate restoration housing which were supplied by the method of "Core Housing" and to establish the method of restoration housing in South-East Asian countries.

2. Method

Surveys of disaster restoration housing have been conducted in Japan, Indonesia and the Philippines. In Japan, Okushiri, a island which incurred severe damage from a tsunami on 17 July 1993, was the subject of a survey carried out between 24 February to 5 March 1994. From October 25 -29, 1993, another site Shimabara, affected by the 1991 eruption of Mt. Unzen, was surveyed. In both places, questionnaires were used to evaluate the actual housing situation and housing plans were drawn to determine the usage of spaces in the temporary houses.

In Indonesia, a survey of housing of resettlement site in the island of Flores, which suffered from an earthquake in 1993, was done in two stages. The first stage took place on August 1993 ; the second, in December of the same year. The survey focused on the following aspects: (1) public facilities, (2) way of living at resettlement, (3) previous life-style, (4) traditional housing style, and (5) housing systems. A comparative study was made between life in a traditional house and that in a house of resettlement site.

In the Philippines, on August 11-29, and again on October 4-24,1994, surveys of restoration housing for the victims of the Mt. Pinatubo eruption were conducted. Both lowland and upland settlement were studied. Lowland settlements were designed for lowland dwellers while upland settlements were intended for Aetas, an indigenous tribe which lived on the slopes of Mt. Pinatubo and subsisted on hunting and gathering. The survey focused on the following aspects: (1) public facilities, (2) way of living, (3) previous life-style, and (5) housing system.

3. Indonesia

(1) Introduction

We compare to two types of restoration housing project, in Bali island and Flores island, which was carried out by different system. There were two big earthquakes in Bali island, 14/7, 1976. The epicenter was located a little northeast from the center of Bali island(at lat. 8.25 S, long. 11.4 E, magnitude 5.6) and the bottom of the sea of north offing of Bali island (at lat.8 S, long. 11.4 E, magnitude 5.5).The extend of damage was that 573 lives were lost and 3920 were injured and 85,000 building were destroyed. After this earthquake, "Bali Emergency Housing Project" was carried out for the purpose of restoration. The features of this project was that it was done according to the system of a traditional house and village in Bali and that houses were constructed at the place originally dominate by the method of " core housing".

Those who are living in Flores island suffered heavy damage from the earthquake and tsunami on 12/12, 1992. Over 2,000 lives were lost. Uring district had a crushing blow by tsunami. All of wooden houses were washed away. In addition, from the 1400 people that used to live in this area 87 lives were lost . Those who live in Uring are from the Bugis tribe who is famous for the ocean tribe and for fishermen. After the earthquake and tsunami, Indonesia government prohibited to live in Uring area and carried out resettlement program for Buginese. A housing complex was constructed for the people of Uring at Uring Baru, in Nangafure by the method of " core housing". Both Bali Project and Flores Project were carried out by the method of " core housing". Though in Bali Project the traditional housing style take into consideration, in Flores project it was not take into consideration.

(2) Bali project

1) Project outline

The project was divided into 2 phase and first phase was the emergency shelter program and second phase was emergency housing program. In Emergency shelter program temporary shelters were constructed by the community under the government support. Continuous with Emergency shelter program, Emergency housing program was carried out. In Emergency housing project, one core house were constructed in each dwelling site. A traditional Bali house is composed by the separated units; kitchen is one unit, bed room is one unit. The house hold shrine, *Sanga*, is essential unit in the traditional Bali houses. This project was carried out BIC (Bali Building Information Center). The planning method of BIC was follows 1) making documentation about the traditional Bali buildings , 2) making a core staff including BIC staff and community reader and architectural student, 3) construction of model house in each site. And Each dweller constructed by themselves with the assistance of core staff. Building materials were supplied by government and other agencies.

2) The present situation

The Area of investigation was Buleleng Province, Kabupaten Buleleng. This province was the most affected by that earthquake. The purpose of this investigation was to evaluate housing where the method of traditional housing system were adopted and to clarify how these houses had been used dwelling the last 17 years. The following is the present situation of these houses.

(1) The residence in Seririt ward Pengastulan village, Kecamatan Seririt Desa Pengastulan (Fig.1)

Pengastulan village locate in northern part of Bali island. This village was composed of 4 small communities, Banjar. The member of 3 Banjar are Hindu and the member of the other Banjar is Muslim. In this village, the houses after disaster was supplied by public corporation faze 1. The public corporation faze 1 supplied 500 unit to all area of Bali island. A traditional Balinese residence are composed by many buildings. Each building has a different function. This residence was constructed following the traditional housing system in Bali. There were 12 buildings in this residence. 6 of them were for sleeping and 6 are for food making. Two units for bedroom were supplied for restoration housing after disaster. There was house hold shrine at the south-end of this site. The restoration houses were still used for sleeping room without any change.

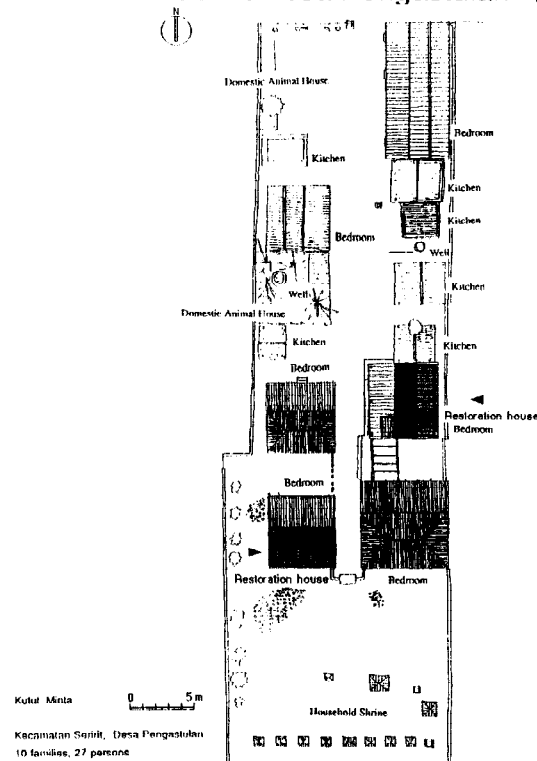


Fig. 1 Site Plan of Residence in Pengastulan

(2) The residence in Seririt ward , Desa Gobleg (Fig. 2)

Gobleg village is located in south mountain area of Seririt ward. This house was supplied by the public corporation faze 2. The public corporation faze 2 supplied 500 unit through all the Bali island. In this village, it supplied 30 units. This residence was constructed following the traditional Balinese style. There were 4 buildings in which 1 was for sleeping and 1 was the kitchen and 1 was for both toilet and bath, and 1 is for storage. The

household shrine was situated at the southeast corner. The restoration house was still being used as sleeping room. This restoration house was built by the family under the guidance of public corporation. All materials and Rp. 20,000 were given by the public corporation.

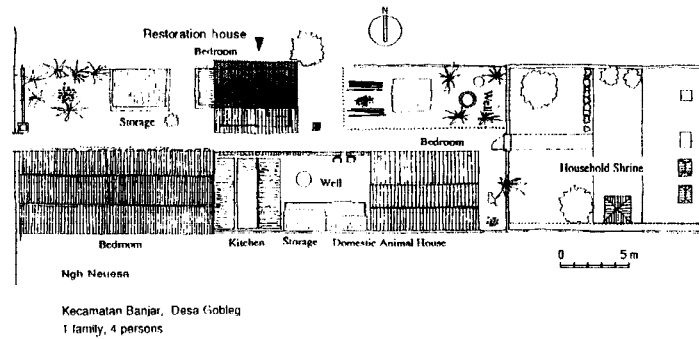


Fig.2 Site Plan of Residence in Gobleg village

(3) The residence in Seririt ward Banjar Asem Village, Kecamatan Seririt Desa Banjar Asem (Fig 3)

This house was supplied by the ministry of Public Works, Cipta Karya. Cipta Karya supplied 1000 units for the Bali island. To this village, 42 units were supplied. The residence was built according to traditional Balinese housing system. In this residence, there were 7 buildings. 3 of them were building for sleeping, 3 were for kitchen and 1 was a small shop, Warun. The household shrine was located in southeast corner. The restoration house was remodeled and terrace became room. The restoration house was build by the family. They built their house following a master plan by government. Cipta Karya supplied the materials and Rp. 15,000.

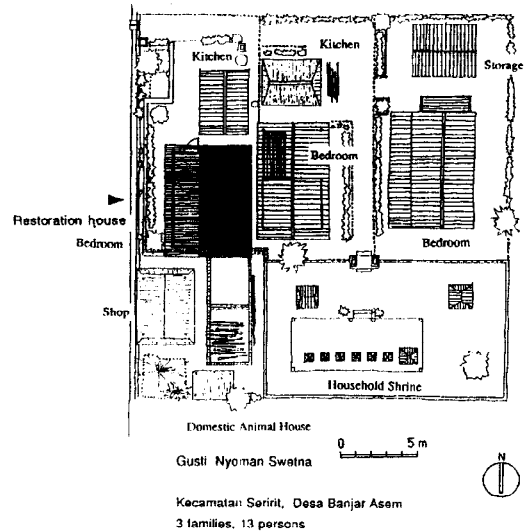


Fig. 3 Site Plan of Residence in Banjar Asem Village

(3) Flores Island

1) Outline of Project

Uring Baru is located in the 7 kilometer west from Maumere. This housing complex were constructed by the Indonesian Army. It lies sea ward and mountain ward, sandwiching the main road toward west. Total number of units were 758 unit, sea ward 305 unit and mountain ward 456 unit. The date of this resettlement beginning was 9/3,1993. From 12/12,1992 to 9/3,1993, about 3 months, a victim had suffered from camping out. In this housing complex ,not only the people from Uring but also people from Maumere, who took refuge, lived in. Almost all people from Maumere were Christian. On the other hand, people from Uring were almost all Muslim. At the mountain ward, in the west part,lived people from Uring, over the river, in the east part, people from Maumere, and, at the sea ward, people from Uring. Like this, habitat isolation according to religion were practiced. In this house complex, there are religious facilities like Mosque and church. The religious facilities were arranged according to the habitat isolation from religion. A community unit was composed from RT and RW , 5 - 10 RT consist one RW , as well as the other districts in Indonesia. At the level of RT and RW, the habitat isolation was planned but at the level of elementary school, people of different religious were united. A commercial area was planned, but there were many small shops under private management. At the sea, though it had not all completed, a harbor for the fishermen had planned. In the mountain ward there were many vacant units. This was the result of the people from Maumere going back to Maumere and people from Uring,that dislike the area far from sea, leaving it.

2) The restoration houses in Uring Baru (Photo 1)

We choose for investigation the area where people from Uring moved in. There were 20 units surveying. In the sea ward, the average number of people living in one unit was 4.6 person. The average age of the area was 34.2 years old. All people living in this area were fisherman. They were washed away their fishing boat by tsunami. Water supplies of Uring Baru, there was a large tank at the top of the dwelling complex at the mountain ward. From that tank, water was supplied to small tanks, which were installed about each 40 units. At the sea ward, there was plenty of water supply. But at the mountain ward, water supply was sometimes shortage. Concerning about toilets, there was one toilet on each street. There were only 2 units that had a toilet in the house within the area which We surveyed. As concerns of the way of living in the restoration houses, the supplied houses were ordinary used as sleeping room. It was because that the houses became hot during day time due to the ventilation that was not good and the roof that becomes very hot by sunshine. To spend the hot day time, the small hat with high raised floor was built in S units. Its structure was very simple, as shown in Fig. 4. Almost all(85%) houses had their interior remodeled with the division of by one room into two or three rooms by using carton or pray wood. In 85% of the houses beds were used as sleeping places.



Photo 1 Resettlement Site in Flores island

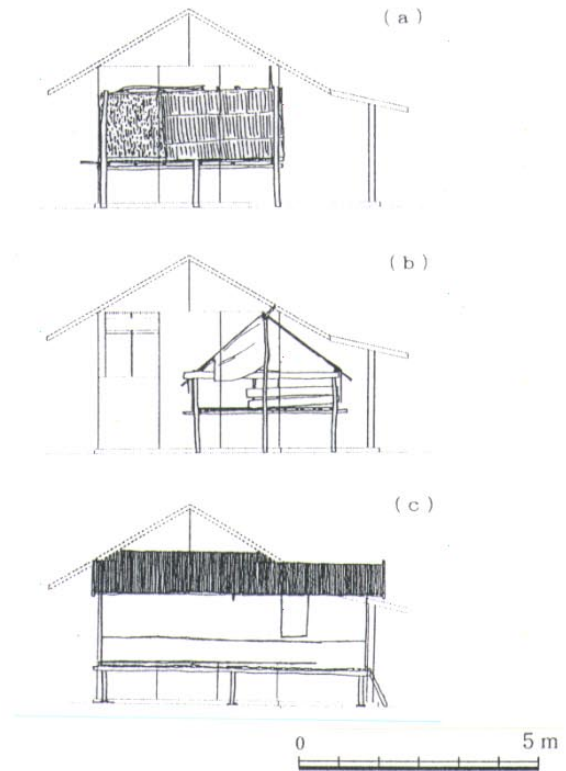


Fig. 4 Extension by Dwellers

4. Philippine

(1) INTRODUCTION

In June 1991, The eruption of Mt. pinatubo affected much area and population. And lahar continue to endanger many people now. A total number of affected people until 1994 were 477608 families consisting of 2287279 persons. This study is concerned about the restoration housing for the victims of that eruption. There are two types of victims. One is the upland people called Aeta, the other is lowland people. Government and NGO carried out resettlement program in different ways between them. Resettlement site is divided into 4 types according to the dweller and supplying organization, lowlander-government, lowlander- NGO, uplander-government, uplander- NGO. Philippine Government supplied for lowlander 11 resettlement site for 28,062 families and for uplander 10 resettlement site for 5,250 families until 1992. The resettlement site for uplander were supplied with cultivating field. Uplander, Aetas, were originally lived with hunting and gathering on the foot of Mt. Pinatubo. The government planned uplander to settle down in one place. But uplander had only the skill of cultivating burned firming and the policy of settling down haven't gone well. The resettlement site for lowlander were planned with product area but the economic situation of Philippine is not so well that the

product center project haven't gone well. The housing system of all resettlement site is "core housing". The housing for lowlander are constructed by the follow block. The house planned one room with toilet and the dweller upgrade by themselves. The housing for uplander were constructed by bamboo. Uplander's house were originally constructed by the bamboo and the dweller could easily repair their houses. The resettlement site of NGO-uplander are scattering around the damaged area. We could not detect all the planning policy and housing method. We surveyed the resettlement site named Katutubo village managed by Catholic sisters. The housing system was "core housing" and only wooden construction and base constructed by fallow block were supplied and the dweller made roof of kogon glass by themselves. The policy of this resettlement site was not to settle down but to make shelter for uplander. It was because the uplander was the expert of Mountain area and for uplander the NGO think the life in mountain was best. This study mainly deals with restoration housing for lowland victims organized by NGO in Porac. That takes "Core Housing" system. We surveyed how they live and improved their own house .

(2) OUTLINE of PROJECT

This resettlement site was constructed under the support of NGO, Porac Pampanga Tindig Porac Development Foundation, Inc and completed on February 1994. This NGO was managed by donation from three Non Governmental Organization; PAF (Philippine American Foundation) U.S.AID (U.S. Agency for International Development) and CHF (Cooperative Housing Foundation). The total donation amount was \$ 32,000 and construction cost was 6,950,000 peso. When we surveyed, there were 89 houses, and almost all of them had residents. The housing lot has 141 to 195.m² land, one unit is 30.m². Houses were supplied by the method of "core housing". Every unit has toilet facility and drainage system. Every 4 to 6 houses has one well with hand pump. Wall is made of concrete block, and roof is made of galvanized iron sheet. Most of residents improve them in their own way according to their income. Every resident has to pay 82,425 pesos on loan from NHMFC (National Home Mortgage Financial Cooperation), and repay 750 pesos per month for 25 years with interest at 9%. Most of residents have regular employment: teacher, municipal officer, office worker. It is because Credit like GSIS (Government Service Insurance System), SSS (Social Security System) need to use this mortgage and only who have regular occupation in Philippine can enter these social security system.

(3) RESULTS

We made survey on 37 houses. 59% of them had improved. 37 houses can classify to 6 types according to their type of improvement.

1, No improvement (12 houses): Most of the residents made bed space by arranging shelves or chests to form a partition.

2, No extension but remodeling (6 houses): In this type, all of the residents made bedroom by plywood. Some of them employ a carpenter, and some made it themselves. All the bedrooms were made at the same place. (Fig. 5)

3, Extension of temporary kitchen (4 houses): In this type, all of the extensions were located at the back of the core. These extensions were made of bamboo. Kitchen was put outside, so inside of the core was composed of two

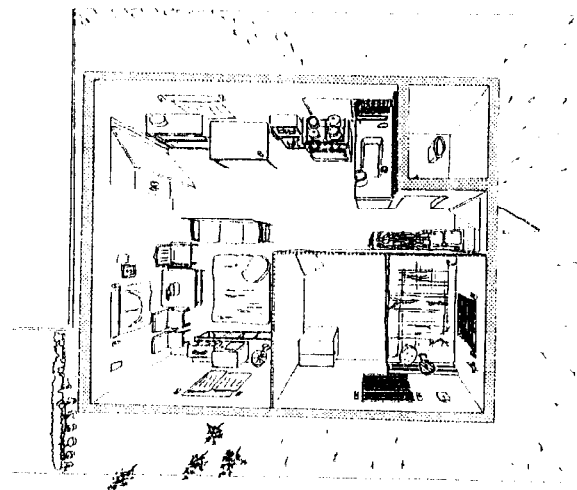


Fig.5 Remodesd house

parts;bed space(or room) and living room.

4,Extension of eat-in kitchen(5 houses) : In this type,area of extension was 16.6.m. on the average.Extension part was separated from the core and garden.

5,Extension of eat-in kitchen and bedroom (8 houses) : In this type,we could classify two more types.One extension was composed of one room,the other was composed of two rooms;eat-in kitchen and bedroom. This house (Fig.6) was the latter type.

6,Extension of eat-in kitchen and dining,bedroom,and toilet (2 houses) : In this house (Fig.7) ,the core unit divided into 2 bed romms and 1 livingroom and at the extension 1 eat-in kitchen,and 1 extra toilet have made. So living space became very wide.And there was an entrance hall at the front side of the core.They enclosed their land with a bamboo fence.In the garden,we could see many plants and a few barns.

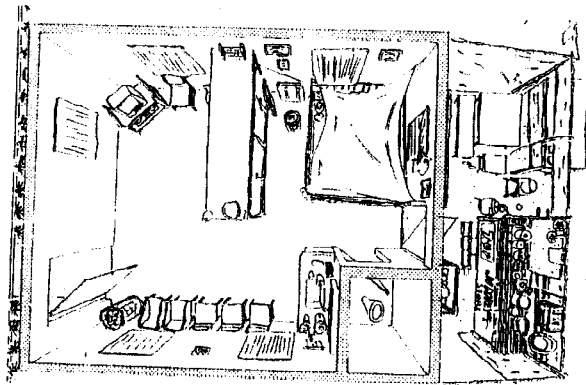


Fig. 6 Extension of Kitchen and Bedroom

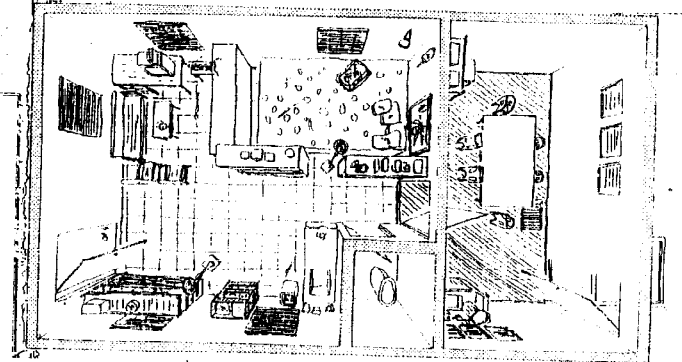
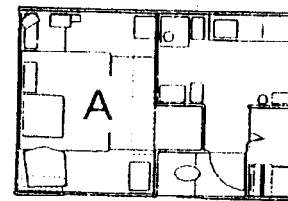


Fig.7 Extension of kitchen and dining and toilet

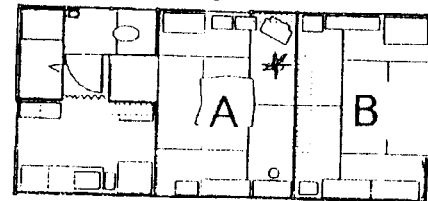
5. TEMPORARY HOUSING IN JAPAN (FIG.8)

The disaster relief law and the guidance principle from the ministry of social welfare define the specifications for temporary house. There are many points which does not obey the regulation. The regulation about temporary houses has not been already up to dated. For example, the maximum number of the temporary houses were defined 30% of destroyed houses, but in cases, Unzen, Okushiri and Great Hanshin-Awaji Disaster, it was not obeyed. Japanese government has provided temporary house for all those who wanted to live in the temporary houses. The guidance principle do not admit installing bath but it was installed in temporary houses of Shimabara, Okushiri and Hanshin. These beyond guidance were managed by a special regulation with the minister's admission.

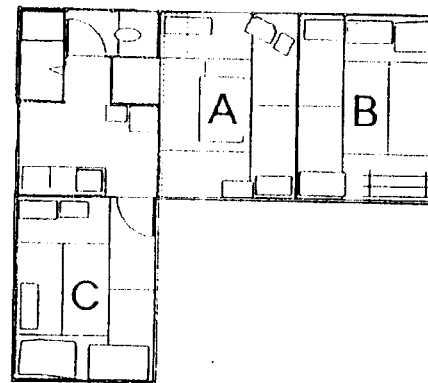
From soon after the end of World War 2 to the 1950's, there were many squatter in a flood plain along the river in urban area. In those days, the government was negative to construct temporary houses for fear that they could becomes the slum. The disaster relief law was established in these situation. In 60's, temporary houses were materially improved with growth of Japanese economic condition. From 60's, although the



plan of 1+K type in Shimabara



plan of 2+K type in Shimabara



plan of 3+K type in Shimabara

Fig.8 Temporary Housing in Japan

social condition had changed completely, the standard of the temporary house remained the same. Temporary house can become a real shelter for the victims of disasters concerning not only about practical aspect but also about the psychology aspect.

According to the survey in Okushiri and Shimabara, there is much dissatisfaction with regard to the temporary houses among the victims of natural disasters. The point of discontentment about the temporary house are 1) the shortage of the storage, 2) the inconvenience in using the bath, 3) the smallness of the house, 4) the lack of the place to take off shoes. It is because the regulation about temporary houses has not been already up to dated. The dissatisfaction about the bath and the entrances shows the special character of the Japanese way of living. A multiple supply system of temporary houses which consider the regional character and the type of the disaster is requested.

6. COMMENT

" Core housing " is predominant for restoration housing in South-East Asian countries. This method is superior in low cost and quick supplement and adopting to individual life style.

In case of Japan, the problems of living in temporary housing were related to the character of Japanese way of life. For example, the main complaint of a dweller were as follows; (1) There is no space to take off the shoes, and (2) the narrowness of bath. In addition to these practical aspects, psychological problems have also existed. In Indonesia, traditional houses have raised floors but the government -supplied housing had the floor on ground level. The dwellers therefore built the raised floors themselves.

In Flores island, at the resettlement site, two religions, Islam and Christianity, coexist with no apparent friction between them. A musjit and a Christian church became the centers of the community, where traumatic problem related to the disaster were addressed. Both the Christian and the Muslim children attend the local elementary school. Nevertheless, a plan for segregating the two groups is being considered.

In case of the Philippines, the problem lies on the housing supply system for Aetas. Their traditional sources of livelihood were hunting and gathering. By providing them agricultural land, the government expects them to turn to sedentary farming for livelihood. The slash and burn method practiced by the Aetas is not possible under the present circumstances. They are being taught rice cultivation. This contributes to the downfall of the Aetas traditional life-style.

In both Indonesia and Philippines, restoration housing means a one-room core around which the dweller makes improvements according to his needs or life-style. The act of making improvements to the house is in itself a panacea for the trauma of disaster. In case of Japan, notwithstanding, house improvements were not permitted.

Because of the difference in the economic situations of the three countries in question, the system for the permanent housing in Indonesia and the Philippines cannot be applied to Japan. For evacuation centers and temporary housing, the difference are less apparent. Mental care is a more serious problem in Japan. In Indonesia, the church and the musjit play a central role in the mental well-being of the disaster victims. Likewise, in the Philippines, the church is pivotal in keeping mind and body alive. In Japan, on the other hand, there is no provision for community facilities within the temporary housing sites. In this field, Japan can learn from Indonesia and the Philippines. With respect to the system of housing, the core type is good for its potential for improvement. It gives the victims a sense of purpose and restores their desire to live.