



Importance of Social Space in Self-built and Donated Post-disaster Housing after Java Earthquake 2006

Syam Rachma Marcillia, Ryuzo Ohno

Built Environment,
Tokyo Institute of Technology, Japan

rachma3382@yahoo.com

Abstract

Housing reconstruction cases without cultural sensitivity had resulted in rejection. These raise challenges to understand the importance of cultural background and how it affects residents' lifestyles. This study investigated self-built and donated housing through on- field research with questionnaires, interviews, and field observations. Items related to dwelling usage, behaviour adjustments, evaluation and community activities participation were obtained. Results suggest that residents adjust their physical behavioural aspects to maintain previous social behaviour lifestyles, though evaluations indicate dissatisfaction with the unchangeable donated housing design. Social interactions importance, flexibility and open-ended design in housing are advantageous for their post-disaster recovery.

Keywords: self-built housing, donated housing, lifestyle, social interaction, adjustments

eISSN 2514-751X © 2018. The Authors. Published for AMER ABRA cE-Bs by e-International Publishing House, Ltd., UK. This is an open-access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>). Peer-review under responsibility of AMER (Association of Malaysian Environment-Behaviour Researchers), ABRA (Association of Behavioural Researchers on Asians) and cE-Bs (Centre for Environment-Behaviour Studies), Faculty of Architecture, Planning & Surveying, Universiti Teknologi MARA, Malaysia.
DOI: <https://doi.org/10.21834/aje-bs.v3i6.241>

1.0 Introduction

An earthquake measuring Mw 6.3 (USGS and ERI) hit Java island of Indonesia with an epicenter of about 20 km south of Yogyakarta on Saturday, 27 May 2006. Although the shaking lasted for only 57 seconds, it killed over 5,000 people, injured thousands, and displaced up to 200,000 people from their homes. After the earthquake, housing reconstruction program were undertaken by many parties, NGOs and government. There had been cases where emergency house reconstruction built in a short time without cultural sensitivity had resulted in rejection of ill designed settlement. In contrary, some community based reconstruction housing has good response because its open ended design that facilitated the cultural needs. These highlight the importance of understanding cultural background in the design of a dwelling as stated in Rapoport (1987), it is necessary to consider both why environments should be culturally responsive and to whom they should be culturally responsive and, consequently, how.

Social behavior is one of the important cultural backgrounds in Indonesia dwellings and Java specifically. For Javanese, a house is living environment that represent the philosophical concept of the society itself (Tjahjono, 1989). In previous researches, traditional 'margersari' housing and other public housing so called 'core house' consist of 'guest room', 'bedroom' and 'kitchen' (Ikaputra, 1992). In the public housing also, 'core house' alteration start with the expansion of double/triple size of 'guests room' which is a social space and then private space 'bedroom'. (Yoyok S., 1993). Even in early stage of Java 2006 earthquake recovery we found the existence of 'guest area' in temporary tents and house. Although their needs of functional room (bedroom, kitchen, etc.) are not fully accomplished within the house yet, the importance to facilitate social interaction is express and actualizes in the 'guest area'. Apparently social behavior still has influence in Java dwellings. Correspondently, it is believed in that social behavior inevitably is still an important cultural factor even in post disaster housing and different type of physical environment have influence to facilitate or inhibit certain social interaction that are necessary for the residents in Java 2006 post disaster housings. In this study, data on physical setting as well as residents' behavior in self-built and donated post disaster housing are interpreted in the emphasis of the dwellings usage and adjustment for personal-social space, residents' evaluation and participation in community activities are also studied to understand its influenced from residents' perspective.

Social concept in Javanese traditional dwellings

A house is called 'omah' in Javanese culture that comprised of a front and back, which represents principal value of a domestic setting as place to settle down and a place to establish relations (Revianto, 1997). In Javanese dwellings, the front part of the house called 'pendopo', which is used for guest reception. It is usually the tidies and most socially prestigious part of the house which shows the social status of the owner. Inner part of Javanese house is called 'omah jero/dalem' which used for sleeping area and sacred activity; and also 'gandok/pringgitan' for sleeping, eating, and family gathering. The back part of the house called 'omah mburu/pawon' for cooking and 'kulah' for bathing. Differentiation between front and back area in Java dwellings signify the importance of personal and social aspects within the house. Because social aspects occurred as an integral part of the house, behavior

privacy mechanism is appropriated to secure residents' privacy. The back parts are more secured parts, though security can be accomplished through layering, heightening and thickening the enclosing separation fixed features such as wall or minimizing penetration of light.

2.0 Methodology

Although environments are not the determining factor to generate certain behavior they can facilitate or inhibit certain behaviors, cognitive processes, etc. (Rapoport,1969). Two study cases in Java 2006 earthquake self-built and donated post disaster housing are considered as 'constraint dwelling' because there is a change of situation from their ideal living environment to their 'temporary' restricted condition which can acts as inhibiting environment and therefore adjustments are necessary to fulfill their lifestyle needs.

The study presumed that the development of temporary house to permanent house will be the reflection and actualization of residents' cognition of suitable dwellings in self-built post disaster housing, whereas the limited condition of donated housing on the other hand would inhibit some of residents' previous lifestyle that could cause dissatisfaction and as consequences physical and behavioral adjustment are being made. In addition, residents' participation in community activities was also studied to understand the importance of social interaction based on residents' perspective.

2.1 Overview of Case Studies

The first case study areas are self-built post disaster dwellings located in three sub-villages of *Ketonggo, Bawuran and Tegalorejo, Yogyakarta*. Two integrated surveys were taken in 2 years difference to see the development from temporary house to permanent house. In first survey, 39 respondents were chosen based on houses' condition where most houses destroyed and the permanent houses rebuilt by the residents themselves based on their own design cognition. Second survey targeted same respondents but only 33 respondents were re-surveyed as some of them were moved out from the villages.

The second study area is dome donated post disaster housing in *New Ngelepen, Yogyakarta*. After the earthquake, in original *Ngelepen* village, almost 50 houses were demolished by catastrophic landslide and the area declared as a geographically unbuildable land. As a result, the residents were relocated to *New Ngelepen* post disaster settlement, situated about 1km from the original village.

The *New Ngelepen* introduced house clusters site plan design where every 11/12 house form a block that shared electricity, public toilet/washing area and approach pathways. Dome monolithic with a hemispherical roof and a circular plan were introduced with concrete cast as a single and integral structure as the donated post disaster houses. The diameter of the house is 7 meters, two stories, with the total area about 38 square meters. The development of the houses began in October 10, 2006, and started to be occupied at the end of April 2007. The unique limited dome house design and its different settlement type from residents' original housing was investigated to understand its influence to residents' social interaction within the first 3 years occupancy. A total of 68% of the residents in 34 occupied

dome houses were interviewed (heads of the household and spouses). The details descriptions and location area of both study cases are shown in Table 1 and Figure 2.

Table 1: Detail description of case studies areas

case	Java Post disaster dwellings	Dome Housing
Resident ethnic	Javanese 100%	Javanese 100%
Status	Owner 100%	House owner 100%, Land borrower
Dwelling Design	Self-built post disaster temporary and permanent house build by self-design cognition	Donated dome housing with unchangeable limited size & differ design cognition with original house
Area type	Rural area, Yogyakarta, Java 3 sub villages (Ketonggo, Manggung and Tegalrejo). First survey obtained 39 data, only 33 data were re-attained.	Rural area, New Ngelepen, Yogyakarta, Java From total 71 houses, only 51 lived in
Time survey	First survey in Nov.-Dec. 2006 Second survey in Nov. 2008	August 2009

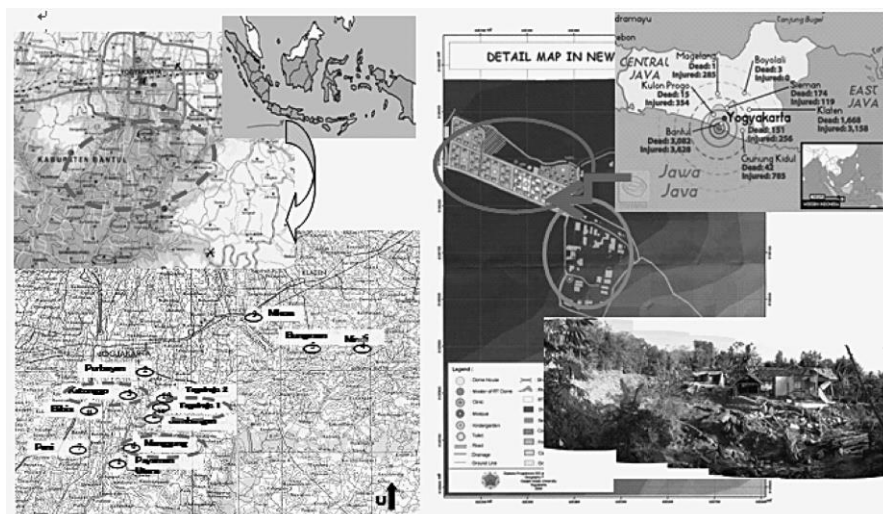


Figure 2: Location of self-built post disaster housing cases (left) and donated post disaster housing (right)

2.2 Data questionnaires and Interview

Questionnaires, in-depth interviews and observation with the residents were conducted with the help of Gadjah Mada University volunteers. Each team consists of 2 people, one person was asked to sketch the house plan while the other interviews the resident. Information acquired

as follows:

- a. Background: Residents (age, sex, family, occupation, income, etc.) and house (structure, house age, land status, etc.)
- b. House plan: room space, size, etc
- c. Space usage :include personal and interpersonal activities
 - Personal activities in space which include: *personal biological needs* (eating, sleeping, etc), *entertainment* (watch TV, relaxing, etc), *work* (study, etc) and *household routines* (cooking, etc).
 - Interpersonal activities which include: location and behaviors in accepting different guest types in the house and interaction and frequency with neighbors.
- d. Cognition of space on front/back, hidden/seen, public/private, flexibility,etc
- e. Evaluation of house, outdoor space and neighborhoods space (for dome housing)

3.0 Results

3.1 Importance of social interaction

In self-built post disaster housing, 95% of the residents' value traditional social behavior where they still cherished traditional Javanese living practices and community values such as *gotong royong* (spirit of helping one another through good and bad) and *kekeluargaan* (feeling of extended kinship in which the community is considered to be one big family). Over 60% said these values grew even more significant to them following the earthquake. Accepting guest activities in the house occurs 41% for everyday occasions and 90% residents involved in community gathering and accept large gathering guests in their house. the high importance of social interaction had led many recovery programs operated by NGOs and the government to be community-based and designed to incorporate such traditional practices into the rehabilitation process.

Similar situations happen in dome donated post disaster housing. Approximately more than 95% (both heads of household and spouses) said that they participate in community activities with their own willingness, while only less than 5% feel obligated to participate and null for no participation. High participation to community activities is supported by their perception on the importance of the value and existence of community activities in their neighborhood. Approximately 65% head of household and 57% of spouses response is "I feel that community activities are very important" and approximately only about 34% for both heads of household and spouses said that "they are neutral, don't really have certain feeling". Unfortunately the incapability of dome house design to facilitate certain social interaction behavior results in the usage of outer space of the house and neighborhood as the 'guest area' or 'incidental social interaction space'.

3.2 Physical changes from temporary to permanent self-built post disaster housing

Self-built housing expansion from temporary to permanent houses made by the residents within 2 years period after the earthquake indicates the need of guest room increases by 5 times its original size and 3.6 times its original total room number (Figure 3). The expansion

and separation tendency of guest area have relevant founding with public housing complex in Yogyakarta where most 'core house' alteration cases started with the expansion of guest room to the front area and had doubled its original size (Yoyok, 1993). However, total room number and addition of bedroom modification is still the highest overall adjustments which also indicate a high need of private space although its average room size actually decreases (Figure 3). There are also cases where both temporary and permanent house were used simultaneously by the residents show that guest area is one of the earliest function that move from temporary to permanent house which apparently have a better structures and overall appearance. This indicated the need of having a 'good' image space for interaction with guests (findings supported by Revianto, 1997).

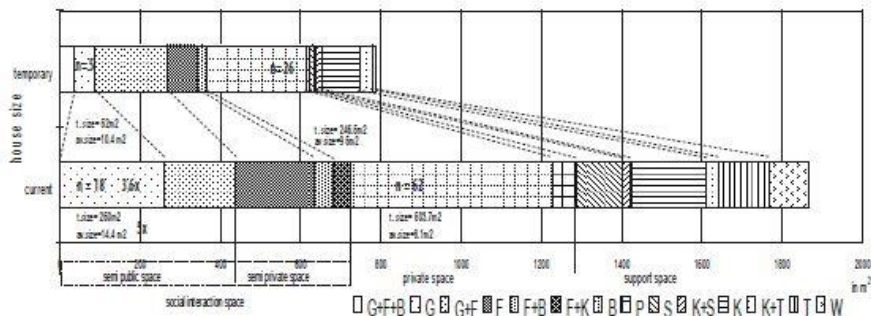


Figure 3: Size expansion from temporary to permanent in self-built houses

3.3 Cognition of spaces in self-built post disaster housing

Space pattern development in self-built housing also showed the existence of private/public spaces even in the simplest house plan by using semi fixed element to differentiate private/public space such as the use of furniture, semi fixed partition, etc. as illustrated in Figure 4.

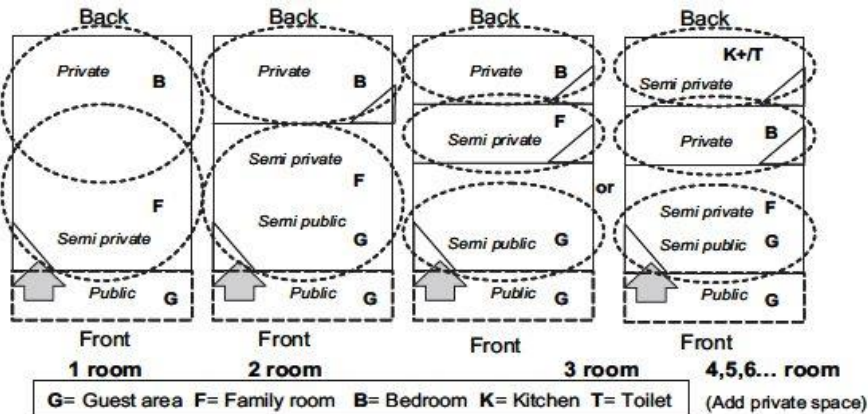


Figure 4: Development of private/public space pattern in self-built post disaster housing

Importance of private/public space is supported by residents' cognition of front/back area that is frequently associated to hidden/shown area to other people. These findings are relevant with previous research on traditional dwellings where front of house is outwardly-oriented domain where domestic prestige displayed in form of status differences and formality in meeting others (Reviyanto, 1997). Residents' spaces cognition of private/public, front/back, shown/hidden are much related with 'self'(personal) and 'other'(interpersonal) space domain that actualize in the arrangement and allocation of the spaces. It showed embodied principal ideas underlying the formation of a domestic setting as place to live and interact with others in their post disaster housing.

3.4 Dwelling conditions and usage in dome donated post disaster housing

After analyzing residents' dwelling conditions and how dome donated post- disaster housing is used and altered. The findings suggest that the residents use and recognize some rooms/areas within the house and its outdoor space differently than the master plan. In master plan, 2nd floor of the dome house planned as family room, though only 44% of the residents acknowledged the availability of family rooms (mostly used the 2nd floor for storage). Moreover, 67% of the residents use their yards as a crop yard, fish pond, or chicken coop although master plan suggests yards to be aesthetically clustered fruits and flower gardens.

The residents indicated that not all their needs were met as certain rooms/ spaces were unavailable in the original dome houses. In addition to adjustments already made, the residents noted future plans to change the condition of the original dome house. Changes to terraces, kitchens, and private bathrooms were highest on the residents' lists. Of the original dome houses more than 80% have an added terrace or canopy to protect the dome openings from the elements (original windows and doors in the dome houses were unsuited for a tropical environment) as well as to provide additional social space to the inner guest room. Furthermore, more than 80% of residents would prefer to add a 'dirty' kitchen in addition to 'clean' kitchen (findings supported by Ikaputra, 2008). The adjustments and preferences for additional rooms/spaces suggest misfits in the dome house design.

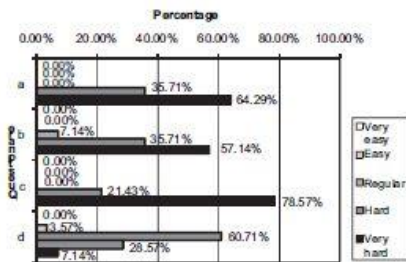
3.5 Residents' evaluation of dome donated post disaster housing

Residents' evaluation to their dome house design shows "very hard" capability of residents to "to change the order/function of the rooms" (64%), "to expand the room" (57%), and "to change the location of the doors or windows" (76%). Only 61% for capability "to give rooms addition" shows "regular" capability (Figure 6). we can make a conclusion that flexibility in dome houses is one of the most complicated problems for the residents except for capability "to give rooms addition" although in reality it is also hard for the residents to add room that compatible with original donated house.

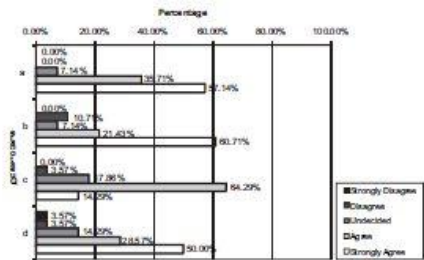
Evaluation for house outdoor space shows "very agree" attitude toward statement "it is better for each house to have private approach pathway" (57%), "there is not enough yard/room in the house to have social gathering" (61%) and "it is important to have a front terrace but the space available is not possible to made one" (50%), while only 64% shows "agree" attitude toward statement "each house should have own pathway from house to

public toilet area” (Figure 5).

From house outdoor evaluation showed that there is not enough space for need of front terrace for large gathering space. Moreover, house outdoor design elements such as pathways that were design to promote social interaction infact only intrude their privacy. Inflexibility of the dome house design to provide enough social interaction space in the built-in ‘guest area’ had resulted in the usage of surrounding outer space or even the neighborhoods space. Unfortunately, dome house outdoor site plan also have some misfit relating to its used as an extension space that facilitates the social interaction. From the interview and observation, during the day while housewives chat on side of the streets, little children were playing freely on the streets, although it considered dangerous. The streets are also use as social gathering spaces. Near neighborhood entrance, main street was painted as badminton field where youths and man gather in the evening to play badminton or just to hang around. Social gathering that used to be facilitated in original dwellings but not possible in dome houses, now performed on the streets such as wedding ceremony, large meeting, etc.



- a. Easiness to change the order/function of the rooms.
- b. Easiness to expand the original room
- c. Easiness to change the location of the doors or windows.
- d. Easiness to give rooms addition



- a. It is better for each house to have private approach pathway.
- b. There is not enough yard/room in the house to have social gathering.
- c. Each house should have own pathway from house to public toilet/washing area
- d. It is important to have a front terrace but the space available is not possible to made one.

Figure 5: Residents' evaluation to dome donated post disaster housing design (left) and outdoor space (right)

5.0 Conclusion

In self-built post disaster dwellings, physical changes and development from temporary to permanent such as size and room number expansion, space mod which also indicate a high need of private space. These show that both needs of social interaction space and private space are simultaneous exist. The duality spheres in the house also actualize in their cognition of spaces. Respondents' cognitions of private/public, front/back, hidden/shown spaces are much related with the arrangement and allocation of 'self'(personal) and other'(interpersonal) space and how it is interrelated in spatial arrangement of fixed and semi-fixed elements of the house. These findings are relevant to Java traditional housing that contains both interrelated 'self' and 'others' domains (Revianto, 1997).

In dome donated post disaster housing, discrepancies between the intended usages in the master plan and actual usages show insensitivity of residents' cultural needs. Thus, the residents have had to adapt and adjust physical and behavioral aspects to maintain their previous personal and social lifestyles. Even though social interactions indeed still facilitated and preserved by the respondents within the house, because of its inflexible design, sometimes private space is intruded. As consequences some behavior adjustments are needed to be taken such as appointment of time and preparing of incidental 'guest area'.

The evaluation on the house design and outdoor spaces suggests dissatisfaction where residents are incapable of changing the condition of their donated post-disaster house design. Due to design limitations, in some cases where certain activities cannot be done inside and outside the house space then neighborhood spaces such as streets, etc. will bear bigger role in facilitating these social interaction needs

This research has once again highlighted the importance of social behavior (space) in Java dwelling even at in constraint situation. Meaning, values and ideals of social behavior are reflected on their cognition of spaces in the dwellings as well as their physical-behavior adjustments. It is necessary that even in constraint dwelling such as post disaster housing need to consider social behavior importance as culturally sensitive design for reconstruction recovery. Flexibility and open ended design in physical built environment would give an advantage in their critical transition to the new environment

Acknowledgement

The author acknowledged support from G-COE Center for Urban Earthquake Engineering (CUEE) in Tokyo Institute of Technology for funding this research. A sincere thanks to Prof. Ryuzo Ohno for his support and guidance for this study. Last but not least, thanks to all Gadjah Mada Architecture students who helped me to do field survey and interviewed and to the people in New Ngelepen who are willing to help in this research.

References

- Ikaputra (1992). *Room Composition of Traditional Urban Settlement,; the case of magersari's house*. Annual Meeting Architectural Institute of Japan. Architectural planning and design rural planning 1992, 35-36.
- Ikaputra (2008). *Response to Localize the Imported Culture*. Proceeding of the 14 World Conference on Earthquake Engineering October 12-17, 2008, Beijing, China
- Rapoport (1969). *House Form and Culture*. Englewood Cliffs, N.J.: Prentice-Hall.
- Rapoport, A. (1987). On the cultural responsiveness of architecture. *Journal of Architecture Education* 41(1), 10-15.
- Revianto B.S. (1997). *Omah, The Construction of Meanings in Javanese Domestic Settings*. Published master thesis. School of Architecture Montreal, McGill University
- Tjahjono, G. (1989). Center and Duality in the Javanese Dwelling. In J.P Bourdier and N. AlSayyad (eds) *Dwellings, Settlements and Traditions: Cross Cultural Perspective*. Berkeley: International Association for the Study of Tradition Environment.