Communal space patterns in tsunami aid housing for creating public open space after COVID-19
(case study: Gampong Tibang, Banda Aceh, Indonesia)

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Abstract. After the 2004 tsunami disaster, many aid housing developments were carried out, including housing in Gampong Tibang (Tibang Village), Banda Aceh City, with the pattern of building in the initial plot, with low building density. The local community has developed their housing according to their needs. When the COVID-19 pandemic broke out, requiring everyone to be in their respective homes, causing open space in the housing environment to become important as a village communal space, which has social and health functions for residents. This research emphasizes how people use communal open spaces for various activities, which are adaptive to the COVID-19 health protocol. The study approach uses field research quickly, the data is obtained by observing the type of housing open space that has the public function (communal open space) and the behavior of the community in using the space. The analysis was carried out in an analytical descriptive manner, looking at the pattern of activities associated with the COVID-19 health protocol. The results showed that there were 9 communal spaces spread over 4 types: a) field with a bale (an open design building of wood), which was used by men; b) the space around the kiosk that provides seating on an open terrace for all residents; c) open space around the intersection for children to play dynamically (cycling, running, sitting); d) the terrace of the residents' house which is more for the passive activities of women. That four types of spaces according to the COVID-19 health protocol are very familiar with a natural atmosphere (enough air circulation and sufficient exposure to sunlight). The conclusion of the study shows that the need for socio-cultural space is still needed by the community during the COVID-19 pandemic which can actually make residents healthy.

1. Introduction
Banda Aceh is an old city that has thrived and survived various disasters, even in the 17th century the basic structure of the city was built, to form the city today [1]. When the Tsunami Disaster repeated itself in 2004 which hit most of the coast of Aceh, destroying existing residential areas [2], as well as urban areas such as Banda Aceh [3]. Various concepts of urban development are again offered, such as the tsunami tourism city for the city of Banda Aceh [4], as well as the construction of settlements and
housing in villages within the city of Banda Aceh as the provincial capital to be sustainable [5]. One of the villages affected by the 2004 tsunami was the Gampong Tibang (Tibang Village). Several years later after the tsunami, public housing in Tibang was rebuilt through the Aceh Rehabilitation and Reconstruction program [6]. The construction of the house is a very important assistance, so that the community can start their life and live their social and cultural life again.

As we know, house or dwelling is one of the primary human needs that must be fulfilled, which if arranged in large quantities will form a residential environment in which humans carry out the functions of livelihood, namely: socio-cultural economy [7]. The housing environment sometimes consists of various social groups within it. Each of these groups has the habit of interacting with others and other groups to meet their social needs. This social interaction is necessary for the formation of a cooperation between citizens and is a culture that must be maintained. In this interaction requires a media in the form of a communal space, in which a process of mutual understanding occurs and creates a sense of brotherhood that is indispensable as social beings [8].

Communal space is a space that functions to accommodate various community social activities such as meeting, gathering, discussing, interacting, and carrying out other public activities. Over time, the role of communal spaces can change, such as the occurrence of COVID-19 which causes people to stay at home a lot and interact more with open spaces. The role of public spaces in the post-pandemic new normal is a breath of fresh air for the community in carrying out social activities while still paying attention to health protocols [9] The changes that occur make the interaction activities carried out in the communal space also change.

World Health Organization (WHO) urges that during the COVID-19 outbreak it is better for people to stay at home. Daily activities such as studying, working and other activities have been implemented with an online system in order to reduce interaction with the outside world. Simple activities such as meeting and sharing space with other people, which are basic human needs, are starting to become difficult to feel.

The existence of public space is one of the few spaces that still provide opportunities to engage in social behavior. So, to meet these social needs, the existence of public space in the form of open space in a residential environment must be considered. In addition to meeting social needs, open spaces are also referred to by WHO as less risk of transmitting the virus than closed spaces. This is because the open space provides good air circulation with sufficient sunlight.

Gampong Tibang as an aid housing environment with development on the initial plot, initially had a lot of green open space, because the aid house was only 36 m² of type, the community was very free to use the available open space. Today, the housing environment seems to continue to grow, many aid houses have been developed with a larger area than before, so that the environment seems to be increasingly dense and reduces the green open space of the residential environment. The pattern of the open space used as a shared interaction space has also changed. Therefore, changes also occur in the use of open spaces for community activities, especially during the COVID-19 pandemic.

2. Materials and methods

2.1. Communal space in a residential neighbourhood
Humans are individuals who cannot be separated from their environment. The influence of the environment on human behavior and vice versa is explained through behavior setting theory [10]. Social activities that can occur in communal spaces are also determined by the surrounding environmental factors [11]. Therefore, the behavior pattern of a community in a communal space is closely related to the condition of the place from the communal space itself.

In the culture of living according to Doxiadis [7], settlements are places where people gather to carry out various activities, live together side by side, and use the local environment to maintain their lives. All of these are described in 5 residential elements (nature, man, society, shell & network).
Communal space is an aspect of the shell that describes the means of supporting the life of living after the needs of the house are built.

Communal space provides opportunities for each individual to interact with each other [12, 13]. The role of communal space in society according to Carmona [11] includes three aspects, namely:
a) The economic aspect of the role of communal space is to give a positive value to property values and encourage regional economic performance.
b) The health aspects, communal spaces play a role in encouraging people to be more active by providing space for exercise, this can reduce stress experienced by that person.
c) The social aspect is to provide space for interaction and communication for all circles of society, minimize the occurrence of crime and prevent the emergence of anti-social attitudes in children, to encourage intercultural interactions that improve community life.

Communal space itself is divided into three categories based on the behavior of its users or the community, namely: a) communal spaces that are planned and used properly; b) communal spaces that are planned but not properly utilized; c) communal spaces that are not planned for existence but appear as a result from the behavior of the people themselves.

2.2. Research method
This research that examines the pattern of communal space is an architectural behavior research, with a qualitative method. Research using observation methods on spatial behavior patterns and existing spatial characters [9]. The method of collecting data is carried out quickly related to the conditions in the field with interviews and documentation, with the researcher as the research instrument itself.

The location of the research is on aid housing in Gampong Tibang, Syiah Kuala, Banda Aceh City, Aceh Province, (Figure 1) which was built due to the tsunami disaster in 2004.

![Figure 1. Research site map. (Source: Google earth)](image)
The observation process was carried out in a group of aid housing in Gampong Tibang, the framework of the research location was as shown in the Figure 2 below.

![Figure 2. Scope of research location. (Source: Google earth)](image)

3. Results and discussion

3.1. Variety of communal spaces in the aid housing of Gampong Tibang

The communal spaces in the relief house area in Gampong Tibang are spread out into 9 locations as shown in Figure 3.

![Figure 3. Distribution of communal patterns in Gampong Tibang. (a) Communal space in the form of a field with the Bale, (b) Communal space around the kiosk, (c) Communal space on the side of the neighborhood road, and (d) Communal space in the front area of the resident's house. (Source: Google Earth and personal documentation)](image)
Each communal space is used differently by different users. The variety of communal spaces in Gampong Tibang is classified into four (4) types as follows. 

a) Communal space in the form of a field with the Bale (an open design building of wood) (point (a) in figure 3). This communal room is used as a gathering place for boys, teenagers to adults, either to sit or just talk to each other. The placement of the hall shows this communal space as a planned informal communal space. User behavior when using communal space can be seen in Figure 4.

![Figure 4](image_url)

**Figure 4.** Communal space in the form of a field with Bale (an open design building of wood), (a) on point 1 in Figure 3, (b) on point 7 in Figure 3.

(Source: Personal documentation)

The existence of this communal space provides a place for the community to distribute their social needs by interacting in appropriate places. The youths and gentlemen just need to come to this communal space when they want to meet and gather with other residents, because it already known as a public space for the residents. During the pandemic, the use of this communal space can be the main alternative to public space for the residents of Gampong Tibang. They can enjoy an open space with fresh air circulation and good sunlight. As recommended by WHO those open spaces are safer than closed spaces in transmitting the virus.

b) Communal space around the kiosk (point (b) in Figure 3). This communal space is in the form of grocery stalls, doorsmeer (car wash), and snack shops. This common room is used by various groups of people from children, teenagers, to adults, both men and women. After buying necessities at the shop, they will sit and interact together on the available benches as shown in Figure 5.

![Figure 5](image_url)

**Figure 5.** Communal space around the kiosk (a) on point 2 in Figure 3, (b) on point 5 in Figure 3.

(Source: Personal documentation)
These stalls become communal spaces that are not planned but are used by many people. This is because they can visit this communal space without having a special purpose, the community can fulfill their social needs while buying what is needed at the stall. However, this communal space is not recommended if there are too many users in it. This is because of the semi-closed shape with a size that is not too broad so that if it is too crowded, it will increase the risk of transmitting the virus if someone is infected.

c) Communal space on the side of the neighborhood road (point (c) in Figure 3). This communal space is used by children as a place to play, cycling and talk. Usually, they will gather in the afternoon and play together as shown in picture 6. This common room is spread out at most at several points in the housing area.

The neighborhood roadside is a communal space that can be formed easily along roads in housing areas. This communal space is the most commonly found in the research location because it is favored as a flexible gathering place for children. They can gather while playing and strolling around the housing. However, the existence of this communal space is dangerous for children when playing, because the condition is on the side of the road so it is prone to accidents if not careful. During this pandemic, the use of open spaces is a better gathering place than closed spaces. However, its use must be considered so that it is not too crowded and becomes an intermediary for the spread of the virus.

Figure 6. Communal space on the side of the neighborhood road (a) on point 3 in Figure 3 (b) on point 4 in Figure 3, (c) on point 6 in Figure 3, and (d) on point 8 in Figure 3 (Source: Personal documentation)

d) Communal space in the front area of the resident’s house (point (d) in Figure 3). The common room that appears in the front area of the resident’s houses, sometimes they even gather to the yard and terrace of the house. Usually, this communal space occurs between people and adults, and they will chat casually while waiting for sunset time.
Communal space in the front area of the resident's house (Source: Personal documentation)

Communities can easily access these communal spaces because they are located around the house. Usually, gatherings in communal spaces are carried out by people who are neighbors. They will talk from outside the fence with the residents of the house. In addition to being able to deliver the social needs of the community, this open space of communal space is also good because it is limited by a house fence so as to keep the distance between person from being too close so as to reduce the risk of being exposed to the virus during a pandemic, beside it provides good circulation for the residents.

3.2. The relation between the existence of communal spaces with the COVID-19 outbreak

The existence of communal spaces in residential areas help the communities to distribute their social needs to interact with other humans during a pandemic that limits their movement. Community activities are now more centered at home, so with a communal space around the house, people can continue to interact without having to go far from home. WHO states that open space have a minimal risk of transmitting the virus compared to closed space. Open space can also be an intermediary so that people get healthy air and sufficient exposure to sunlight.

However, its use must also be considered, it is better to use a communal space with a wider space than a narrow space. Open and wide space are safer for people to interact (as in Figure 7), so that there is a distance between each user according to health protocols. So, in general the use of this communal space if used properly and with due regard to the recommendations in preventing the spread of the epidemic, both as a means to facilitate users to fulfill their social needs.

4. Conclusions

Communal space is a form of fulfilling human needs for interaction with each other, especially during a pandemic that severely restricts movement. Housing as an environment that is currently the most accessible to the community because it is closer and safer than the outside world, must be able to provide a good communal space for the community.

The communal space that was formed as it planned in the aid housing in Gampong Tibang is only a communal space in the form of a bale in the field area while the rest is an unplanned communal space, such as the front yard of the house, the roadside area, and seating provided at the stalls around the dwelling. The communal space was created because it is located close to resident’s houses so it has easy access.

From the results of the study, it is known that an open space as a communal space that has a wide space will have a good level of security because it is open and spacious so that it can keep the distance between each user and get sufficient air and sunlight exchange. Meanwhile, communal spaces that are closed and narrow in size are at risk of transmitting viruses if space users are not complying with health protocols.
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