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Placemaking in Yogyakarta's public housing: the role of square layouts and community initiatives in sustainable design

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ABSTRACT

In Yogyakarta's public housing, squares are created by residents and local institutions, while the regulations only require a standard size. This regulation gap has created wide variation in square design and use among neighborhoods. This study explores how placemaking process through spatial layout and use uncover main features for sustainable public housing. Employing a multiple case study methodology, three squares were investigated to examine interactions across layout, use, and community agency. Data were gathered using a mix of spatial mapping of boundaries and accessibility, behavioral observations of everyday and event-based uses, interviews with residents, and visual recording of user-led modifications. Comparative analysis revealed squares have multi-purpose functions, with function influenced by streets distance, building's function, accessibility, and semi-fixed elements. The most vibrant squares were also situated adjacent to streets, accommodating diverse activity and user groups, and encouraging social interaction. Locally initiated changes enhanced usability but also reacted to localized privatization efforts. The study concludes that sustainable public housing design should include flexible frameworks that ensure people's participation, prioritize accessibility, and utilize semi-fixed elements to meet the balance between functionality and socio-cultural needs. The process is conducive to SDGs 11's vision of inclusive, safe, and resilient cities.

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Community-led; placemaking; public housing; sustainable settlement; case studies

1. Introduction

Public housing development requires well-planned open spaces, especially squares, to serve as spaces for play, exercise, and social interaction among residents and locals. In Indonesia, the provision of squares in public housing is mandated by Ministry of Home Affairs Regulation No. 9 of 2009 (Menteri 2009), which requires developers to allocate land for square facilities. However, this regulation focuses primarily on land allocation rather than on the development of functional public spaces. As a result, many public housing squares, especially those provided by public housing agents are underutilized, whereas others are independently designed and developed by occupants' institutions to suit their needs.

The process of transforming these spaces into vibrant community hubs is known as placemaking. Placemaking extends beyond aesthetic improvements, as it fosters social interactions (Costa et al. 2021), enhances community engagement (Richards 2020; Sen and Nagendra 2020), and contributes to a sense of belonging (Bagioui and Sofianou 2020)

among residents. Previous studies have highlighted the role of occupant participation in shaping open spaces, particularly in the public housing context. Zhang et al. (Zhang, Zhang, and Liang 2024) stated that direct public involvement in open space design strengthens a community's attachment to a space, whereas Siu and Soyinka (2018) revealed that such community involvement in open space maintenance is more prevalent in public housing than in other types of housing development.

A relevant case of placemaking in public housing was observed in Yogyakarta, where community-driven initiatives have shaped public squares since the 1970s. Yogyakarta, characterized by medium-scale housing and strong local cultural influences, presents a unique context for studying the variations and challenges of placemaking. The National Urban Development Corporation provides the initial square facilities, which are further developed through resident and institutional participation. This grassroots approach aligns with the key principles of placemaking, which emphasize inclusivity, adaptability, and cultural sensitivity.

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Placemaking is crucial to fostering sustainable urban development. According to Ellery et al. (Ellery, Ellery, and Borkowsky 2021), effective placemaking creates a strong sense of place, which influence how individuals perceive and interact with their surroundings. Furthermore, placemaking integrates key urban design criteria including accessibility, comfort, diverse activities, and sociability to ensure that open spaces remain functional and engaging. It also contributes to achieving the Sustainable Development Goal (SDG) 11 target of creating safe, inclusive, and accessible public spaces (United Nations Environment Programme 2018).

Housing squares can be categorized based on hierarchy, function, and form. Gupta et al. (2016) classified squares into different scales, from doorstep play spaces to city parks, while Winandari et al. (Winandari, Wibisono, and Djunaedi 2024) categorized square functions, including ceremonial spaces, meeting places, and recreational areas. In Indonesia, public housing squares are designated for multiple functions, such as sports fields, public parking, and communal gathering areas, as outlined in Ministry of Home Affairs Regulation No. 9 of 2009 (Menteri 2009).

Understanding placemaking within public housing squares requires an examination of the spatial layout and space utilization. The relationship among space layout, user activities, and community engagement plays a crucial role in determining the effectiveness of public spaces. The physical layout of the squares, including boundaries and spatial elements, influences their use and accessibility. Additionally, social factors, such as user demographics, behavioral patterns, and community involvement, shape the success of these spaces.

This study explores how placemaking influences the development and functionality of public housing in Indonesia. By analyzing case studies, this research identifies key factors contributing to sustainable placemaking and proposes design strategies that enhance the quality of public spaces. The findings provide valuable insights for urban planners, policy-makers, and community stakeholders in creating more inclusive and livable public housing environments.

2. Literature review

2.1. Sustainable placemaking

Placemaking can be rephrased as the process of creating unique, meaningful, and engaging spaces that foster a sense of community and enhance the quality of life of its inhabitants. It involves designing and managing public spaces that are accessible, vibrant, and reflective of local culture and context. This approach prioritizes the needs and aspirations of people who live, work, and play in these spaces, aiming to

create a strong sense of place and belonging. According to Ellery et al. (Ellery, Ellery, and Borkowsky 2021), placemaking principles are: 1) the process of placemaking creates an attachment or connection between the community member and the place in which they live, work, and play, which is often referred to as an individual's sense of place; 2) an individual's "sense of place" can be either positive or negative in nature; and 3) placemaking as a process can occur along a continuum from change that is imposed upon an individual to change that is created by the individual.

Placemaking involves participation of the community, stakeholders, and government in the planning, design, management, and programming of public spaces. Placemaking has four criteria for creating successful places: access and links, comfort and image, uses and activities, and sociability. Placemaking can be used as a tool to improve the living conditions and quality of life of residents of informal settlements, which are areas of unplanned and substandard housing that often lack basic services and infrastructure. Placemaking faces challenges such as lack of knowledge and experience, community participation, regulations and policies, funding, and time (Mehanna and Mehanna 2023). Community involvement in design fosters sustainable development (Yuliani, Hardiman, and Setyowati 2020).

One of SDG 11's targets is to have a safe, inclusive and accessible square (United Nations Environment Programme 2018). Squares can be grouped in several ways, for example, according to their hierarchy, function, or form. Based on hierarchy, Gupta et al. (2016) classified squares as play spaces at doorsteps, neighborhood parks, community parks, and city parks. In addition, the Ministry of Home Affairs of the Republic of Indonesia Regulation no. 9, 2009, states that a housing square can function as a sports facility, field, public parking lot, and cemetery.

As mentioned earlier, public housing squares in Yogyakarta have applied placemaking principles in their design process. Different researchers have varied in their suggestions regarding the elements that play a key role in placemaking. PPS asserts that the user, activity, comfort, image, accessibility, connectedness, and sociability are key elements in placemaking. Son et al. (2022) argued that space identity, community, collaboration, and holistic plans are core elements of placemaking. Generally, all these key elements imply that the placemaking process is evident in the layout and use of space. A two-way relationship between layout and the use of space occurs to maximize user needs through appropriate design. The space layout is formed by boundaries and elements consisting of fixed, semi-fixed, and non-fixed elements. The use of space is closely

related to the user, time, and activities that occur there. Figure 2 shows the relationship between layout, use of space, and appropriate design.

2.2. Space layout

The space layout is influenced by boundaries and elements. The space boundaries can be walls or plants. Wall height and plant density affected the closure space level. Space elements can be grouped into three types: fixed-feature space, semi-fixed feature space, and informal space (Winandari and Pramitasari 2012). A permanent element is difficult to move. An example of a semi-permanent element is furniture, which is easily movable. The informal elements consist of human activities, and behavior. Examples of these elements are walls, floors, sculptures (Winandari and Pramitasari 2012), trash cans, light stands, benches (Winandari 2015), plants such as trees, flower/vegetable gardens, shrubs, fruit trees, perennial plants (Cosco 2007), varied ground surfaces, mounds/slopes, logs, vines, stepping stones, smooth rocks, pets, play equipment, sand play, play-houses, picnic tables, water play, benches, swings, arts/crafts, balance beams, and music play (Smalberger 2005). Both the boundaries and elements were used to determine the existence of a space layout.

2.3. The use of space

Understanding the relationship between users and activities is important for maintaining space characteristics and activities (Costa et al. 2021). Moreover, Akbar and Edelenbos (2021) state that this relationship involves many people at various levels as well as better resources. Research conducted by Smalberger (2005) suggests that one's experience and memory affect one's views of life. This finding is reinforced by Yu and Rosenberg (2020), who argued that the environment's role in people/environment relationships is to provide safety and emotional comfort. This can be achieved through the social and cultural values offered by open space (Sundevall and Jansson 2020). One effective way to strengthen the emotional connections between people, parks, and communities (Ji 2009), as well as improve societal welfare (Ricketts 2008), is to involve occupants directly in the design and management. According to Wickes and Hipp (2018), the relationship between residents and social control can reduce crime rates. The largest users of open spaces are children, teenagers, and seniors (Kramarova and Kankovsky 2021). Users can be grouped based on age, ethnicity, gender (Winandari 2015), or social class. Each group has different needs and usage patterns.

2.4. Appropriate design of housing square

Residents want to stay close to the open space (especially if the space has a larger size and more attractive facilities (Wu and Plantinga 2003). Winandari et al. (2014) argued that the use of space should provide for interaction among the young and parents, groups, and individuals, as well as males and females as much as possible. This is much easier if the space has an open layout that increases human activity and social relations (Winandari and Pramitasari 2012).

Several studies found that a good open space has a green wide sidewalk with a narrow street, spread in several locations (Wu and Plantinga 2003), near their house (Elshinawy et al. 2023), easily accessible (Sundevall and Jansson 2020), and is in harmony with the local environment (Abus, Lubis, and Abus 2022) to support the activities of individuals and groups. Spaces should be placed in the middle of residential environments (Winandari 2018) for easy access and utilization. A study revealed that horizontal housing occupants gave a negative assessment of the square located at the housing tip or edge due to safety, hazard, and anti-social issues that may occur (Urban Parks 2007). Related to square quality, previous research shows that a high-quality large park within walking distance is more important to residents than several open spaces within a short distance (Sugiyama et al. 2010).

3. Methods

This study employs an exploratory case study approach to investigate the placemaking process in public housing squares in Yogyakarta. The methodology is structured to facilitate a comparative and analytical assessment of how the spatial layout influences user activities across different square locations within public housing environments. This study did not require formal ethical approval as it focused on publicly accessible communal squares and did not involve sensitive or identifiable personal data. Interviews with community members were conducted with verbal consent and full understanding of the research objectives. The participants were informed that their involvement was voluntary, and no personal data was collected.

Case selection followed a purposeful sampling strategy, focusing on three distinct square locations within public housing: the center, edge, and corner of the housing area. These locations were selected based on their spatial characteristics and frequency of use. The selection process was conducted in three stages: a grand tour observation of 40 squares in four public housing complexes in Yogyakarta, categorization of square locations into 10 squares near the main street, 23 squares in the center of housing blocks, and seven squares at the housing edge; and the final selection of

one square from each category with the highest recorded user activity for an in-depth case study.

To analyze the spatial layout and use of space, a multi-method data collection approach was applied, consisting of physical observations and in-depth interviews. Physical observations were conducted to document the spatial characteristics, patterns of movement, and activity distribution within the selected squares through systematic photographic documentation and direct mapping of space utilization. In-depth interviews were conducted with 20 housing occupants and two government officials to understand their motivations and perceptions regarding space usage.

The analytical process was structured into five stages to ensure the systematic comparison and synthesis of the findings. First, a literature review was conducted to identify the key variables influencing placemaking, including the square location, spatial boundaries, layout configuration, and activity patterns. This step also helped to establish the study's research propositions. Second, an empirical study and data collection were conducted through physical observations and interviews to gather factual data on spatial configuration and activity patterns. Third, the collected empirical data were mapped to visually represent the relationships between spatial configuration and use patterns. Fourth, a comparative case analysis was conducted by systematically comparing spatial characteristics and activity patterns across the selected squares. The analysis involved both an intra-case examination and cross-case comparisons to identify the spatial determinants that influence placemaking outcomes. Finally, the results were synthesized into broader theoretical insights, contributing to an enhanced understanding of placemaking in public housing squares.

This study primarily employs qualitative descriptions, and the findings are systematically analyzed and synthesized to generate theoretical insights rather than statistical generalizations. The comparative approach, which involves cross-case analysis and

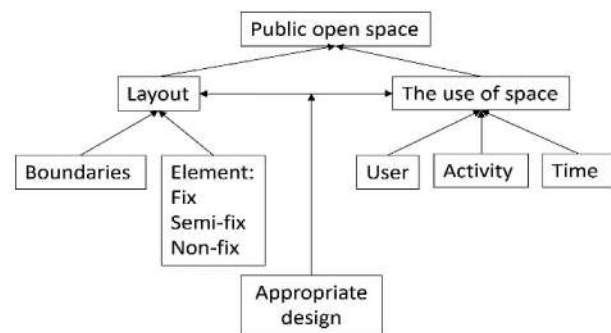


Figure 1. Components that influence public housing square.

mapping of spatial use patterns, ensures that this study provides a structured and rigorous examination of placemaking dynamics in public housing squares. By identifying key spatial determinants and their influence on user behavior, this study contributes to a deeper theoretical understanding of the relationship between spatial layouts and social interactions in shared public spaces.

4. Result

4.1. Yogyakarta's public housing data

Yogyakarta is a province comprising four districts and one municipality. There are four public housing sites in this province: Condong Catur, Minomartani, Trimulyo, and Guvosari (Figure 1). Based on the public housing agent's archive, the four public housings units are mass housing with more than 1000 units lying between 21- and 32-hectare sized pieces of land. The housing design prioritizes the number of units that can be accommodated. Each feature had its own features (Table 1).

The first is the Condong Catur public housing, the oldest public housing in Yogyakarta, built in 1976. Located in the Sleman district, it consists of 1249 units on a 21.741-hectare piece of land. It has

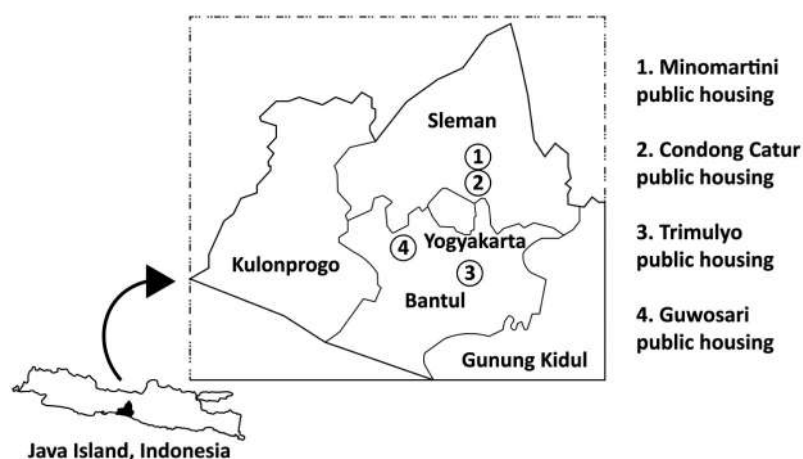


Figure 2. Location of Yogyakarta's public housing.

1206 households, with 4687 people living in this housing, grouped into 38 neighborhoods, and had the highest density (2156 people/km²). The second is Minomartani public housing, built in 1981 and located in Sleman district. It has 1936 units – with the largest number of units spread over 32.441 hectares of land. This public housing has 1833 households with 6063 people grouped into 30 neighborhoods. The third is Trimulyo public housing built in 1994 in the Bantul district. It has 1936 units; the largest number of units spread over a 42.18-hectare piece of land. There were 484 households with 1188 people grouped into eight neighborhoods, forming part of the three blocks. Lastly, Guwosari public housing was built in 1996 and is located in the Bantul district. It has 1082 units on a 25.7-hectare piece of land. This housing consists of 111 households with 333 people grouped into four neighborhoods that form part of the two hamlets. Unlike the first two, the latter two houses, Guwosari and Trimulyo, have larger areas with lower densities (120 people/km² and 542 people/km², respectively). As the most recent type of public housing, both are still under construction and are located in a less developed district.

The two oldest public housings were originally intended for local civil servants, while the others were intended for middle- to low-income people who living in Yogyakarta. Along the way, non-public servants bought houses from public servants that were sold due to retirement or moved to another town.

Public housing blends with the surrounding environment as there is no fence separating the two. It is open and freely accessible to occupants or locals through several entrances. The main streets in public housing have become the main connecting lines between important places in the districts.

In relation to public open spaces, the National Urban Development Corporation as a public housing developer, only prepared land for public and social amenities. The facilities were built by relevant institutions or residents at the neighborhood level living around the space. They made decisions about its design, development, and management. This process has taken place since inhabitation until now. These amenities consist of educational facilities, health facilities, public administration blocks, and sports centers scattered in several places depending on the ease of accessibility of each user group. However, there are blocks that have no public open space in their

neighborhood, especially in the Condong Catur Public Housing, which has only three public open spaces for all residents.

4.2. Square layout and the use of space

Blended with the surroundings, all public housing facilities including the square, can be easily accessed and used by residents and locals. All public housing squares are owned by the local government and managed by the neighborhood board. Each housing had several squares scattered across several locations. Based on its location, the square of public housing in the four cases can be grouped into three types: close to the main street, in the center of the blocks, and at the edge of the housing (see Figure 3). Most of these squares (43%) are situated in the center of the blocks surrounded by streets, with houses that are fronted onto the street. Thirty-four per cent of the squares are situated close to the main street, and 23% are on the edge of housing. The layout and use of space character results for the three types of squares show the similarities and differences between them.

4.3. The square close to the main street

Ten squares are located close to the main street. One of them is Condong Catur public housing. Surrounded by streets on both sides and bounded by high walls on the other two sides, this space is enclosed by public facilities such as elementary school, public junior high school, private kindergarten, mosque, commercial facilities (semi-permanent kiosks), and houses. The street around the square measuring 6 m wide and covered with asphalt, connects the square to public facilities and houses with no pedestrian ways. The space boundaries consist of high walls to schools and streets, as well as gutters to houses and other public facilities. Inside the square, there are some fixed elements such as kiosks, signage, and trees, and semi-fixed elements such as soccer posts, benches, tables, pushcarts, and trash cans that make up the square layout (see Figure 4).

This square was used daily and at specific times. All activities were performed by residents, educational institutions, and mosque organizations around the field, as well as locals. Daily, this square is used as a place to play, exercise, socialize, and trade. The children play and eat three times a day. On the other hand,

Table 1. Yogyakarta's public housings data.

| Public housing | Year of construction | District | Number of housing units | Area (ha) | Number of households | Number of populations | Number of neighborhoods |
|----------------|----------------------|----------|-------------------------|-----------|----------------------|-----------------------|-------------------------|
| Condong Catur | 1976 | Sleman | 1249 | 21,741 | 1206 | 4687 | 38 |
| Minomartani | 1981 | Sleman | 1936 | 32,441 | 1833 | 6063 | 30 |
| Trimulyo | 1994 | Bantul | 881 | 42,18 | 484 | 1188 | 8 |
| Guwosari | 1996 | Bantul | 1082 | 25,7 | 111 | 333 | 4 |

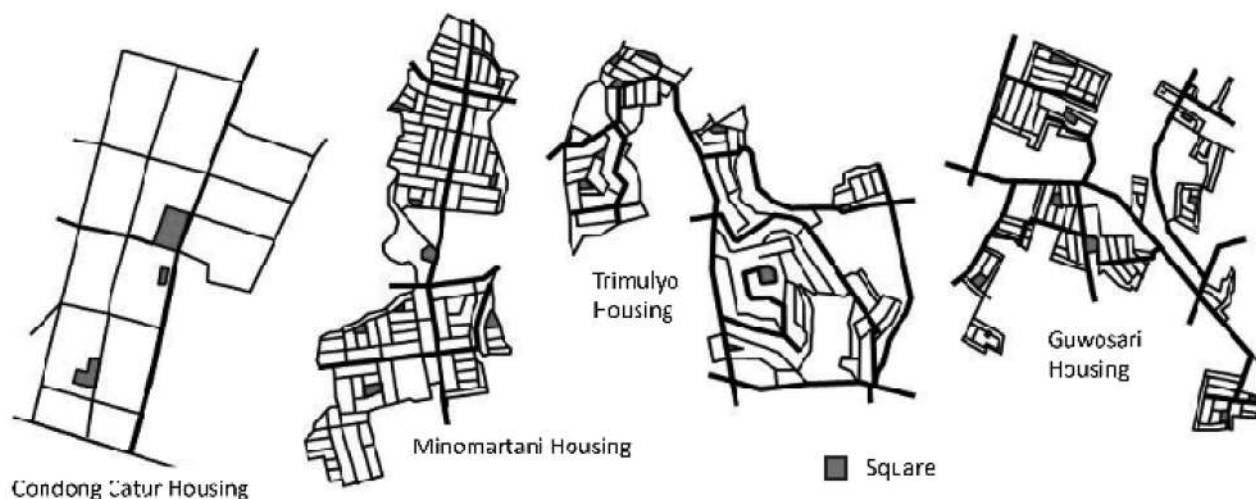


Figure 3. Square location in Yogyakarta's public housing.

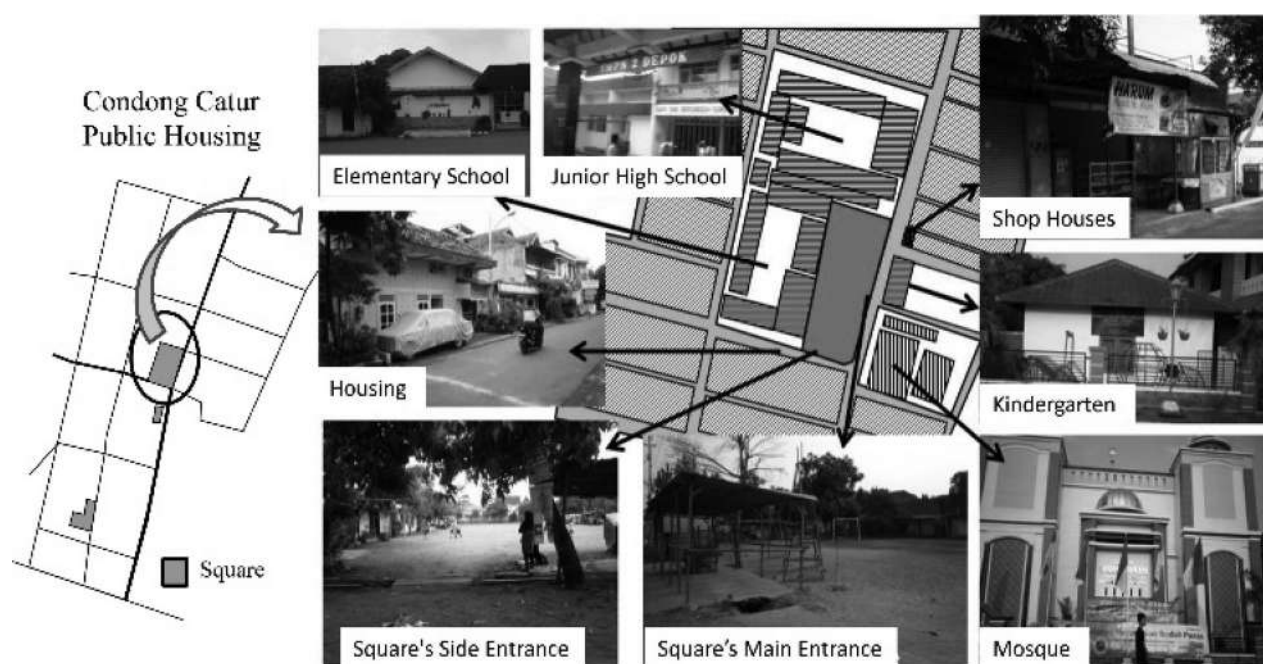


Figure 4. Square close to the main street.

students play twice a day and exercise once a day from 07.00 am to 10.00 am. Both used it at different times. During school hours, the eastern side of the square was used by school staff as a parking area. Men and teenagers gather and chat once a day; on the other hand, women take care of children and chat twice a day. Temporary vendors sell their merchandise once a day from 09.00 to 09.15 am. Permanent vendors sell their things from 09.00 am to 08.00 pm. Some of them were occupants of public housing, while others were from the surroundings.

During holidays such as the Independence Day of the Republic of Indonesia or an Islamic holiday, this square serves as a place for inter-village football matches, grand ceremonial occasions, Eid's prayers, and animal sacrifices for Eid Al-Adha celebrations. Occupants and locals use it for prayers twice a year during the Eid Al-Fitr and Eid Al-

Adha holidays. In addition, they use it for animal sacrifice once a year during the Eid Al-Adha holiday. On Independence Day, this square is used for a flag ceremony once a year and for football games ahead of the celebration. These activities are favored by the square's location close to the educational institutions and the largest mosque in this housing, as well as its location in the center of housing.

4.4. The square in the center of blocks

Twenty-three squares were located at the center of the blocks. This is typical for most public housing in Yogyakarta. One was in the Minomartani public housing. Surrounded by streets on either side, separating the square from houses, this space is enclosed by houses and public facilities, such as

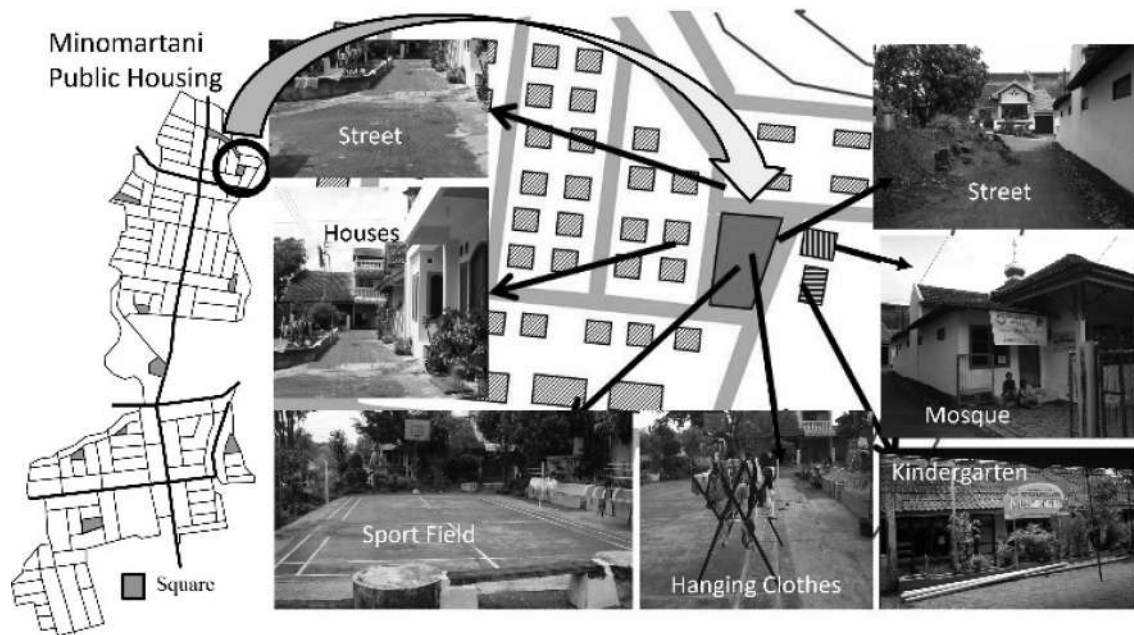


Figure 5. Square location in Yogyakarta's public housing.

kindergarten and mosque. Similar to the first case, these streets connect the square to public facilities and houses without pedestrian ways. However, this street is 4 m wide and is covered by asphalt and paving blocks. This square is bounded by permanent benches as high as 50 cm, a street connecting the houses on the eastern side with a floor height of approximately 1 m, and shrubs to the public facilities on the south and western sides. Inside the square, there are some fixed elements, such as benches, basketball posts, badminton posts, trees, shrubs, and semi-fixed elements, such as racks for drying clothes and trash cans.

Used daily and at specific times, all activities were performed by residents and locals. This square is used daily as a place for play, sports, socializing among residents, and drying clothes. Children and women take care of children who are playing, eating, and chatting with each other twice a day. Both used at square at the same time. Teenagers play basketball and chat once a day. Men chit-chat once a day and play badminton once a week. Clothes are dried throughout the day, particularly on shiny days.

On specific days, like the days prior to the Independence Day of the Republic of Indonesia, this square serves as a place for various games, communal meetings like the *tirakatan* in local language as well as a venue for performance. Its location in the center of the blocks and not being close to the main street makes it a semi-public square that is often used by residents around it and rarely by locals. The existence of a private rack for drying clothes confirms that this square is semi-public.

4.5. The square at the edge of the housing

Seven squares were located at the edge of housing. These are rare in Yogyakarta's public housing. One was in the Minomartani public housing. This square is surrounded by a street on the south and western sides that separates the square from the houses. The streets on both sides connecting the square to the public facilities and houses were 4 m wide and covered with asphalt with no pedestrian ways. This square is bounded by the gazebo to the houses on the southern side, compost cans to the houses on the western side, a wall to the public facilities on the eastern side, and a floor elevation of approximately 15 cm high on the northern side. On the northern side, close to the square, there is public health care and a neighborhood hall called *Balai RW*. Inside the square, there are some fixed elements such as benches, flag posts, badminton posts, flower cans, compost cans, halls, signage, water tower, trees, shrubs, and semi-fixed elements such as trash cans (see Figure 6).

This square was used daily and at specific times. In its day-to-day life, it was used as a place for play, sports, and socialization among the occupants. Children play and eat twice a day, as well as women taking care of children, and each of these gathers there at the same time. Teenagers gather once a day. Men gather once a day and play badminton twice per week. Similar to the second type, it also serves as a place for various games, performances, and *tirakatan* prior to the Independence Day of the Republic of Indonesia. Although it is located at the edge of the housing, the square is used by residents and nearby neighbors.

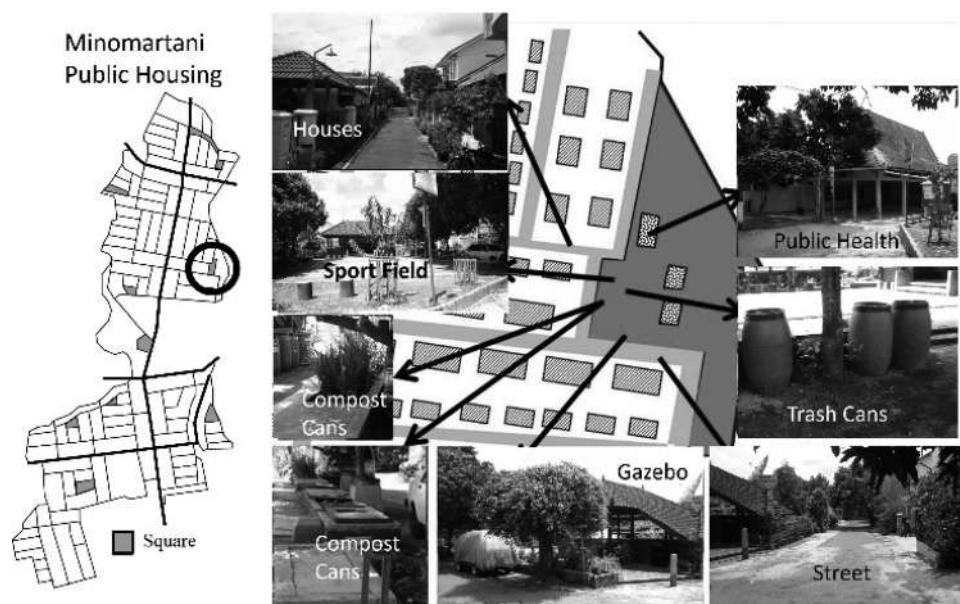


Figure 6. Square at the edge of the housing.

5. Discussion

The three cases of public open spaces have their own layouts and user activities. All are used for several activities, such as playing, eating, taking care of children, exercising, parking, socializing, trading, praying, and drying clothes. The cases were compared to determine their similarities and differences. There are several ways to explore the similarities and differences between these cases to determine the factors that influence the layout and use of a space.

First, in contrast to Gupta's (Gupta et al. 2016) concept of square hierarchy, the three cases serve as neighborhood parks and sports facilities. All were designed and used for local-scale neighborhoods. The layouts of squares vary depending on their access to the main streets, the functions of the buildings around them, the building orientation, and the boundary. The accessibility to the square from Main Street and the surroundings (see Figure 4–6) shows that the square close to the main streets has more space utilization and user groups. Compared to others, there is an increase in the number of activities and in the variety of users owing to the variety of public facilities and the presence of the main street.

On the other hand, the other two are dominated by houses and surrounded by the neighborhood's streets. It reduces the number of activities and limits the user groups. Daily square users are dominated by children and women taking care of their children. Exceptions are found in the square close to the main street where the user group is dominated by street vendors who sell throughout the day. In contrast to Huang et al. (Huang, Deng, and Fei 2025), who asserted that there are different needs and usage patterns for each group, all cases showed that all the groups tended to use the space close to the neighborhood street. The exception

is in the square close to the main street and school entrance, which is used for parking. It could be argued that the closer the street, the more varied the activities and users.

In accordance with the Winandari (Winandari, Wibisono, and Djunaedi 2024) criteria, the three cases are enclosed squares surrounded by houses, except for the first type, which is close to the main street which is surrounded by educational institutions and mosques. The results of the three cases suggest that the spaces serve as meeting places as well as great places for ceremonial occasions. Yogyakarta's public housing squares do not provide a setting for civic buildings or buildings for recreation, but serve as settings for educational buildings and mosques. In line with their function as great places for ceremonial occasions, these squares are used for interaction by residents and locals especially during the celebration of the Independence Day of the Republic of Indonesia and Islamic holidays, such as Eid al-Fitr and Eid al-Adha. This reinforces the previous observation that a neighborhood square should be usable by everyone (Winandari, Wibisono, and Djunaedi 2024).

Thus, the activities on the square are influenced by the functions of the buildings around it and their location within the housing. Furthermore, at layout that is open and easily accessible, increases activity and social relations between residents and locals (Yu and Rosenberg 2020). All squares show that activities generally occur in areas that are open and easily accessible to the surroundings. These places are always located close to the street with buildings oriented to it. The frequently used area is in the middle of the square and is usually used for exercise. On the other hand, areas rarely used were located on the sides of the square, with limited or no access because of the boundaries

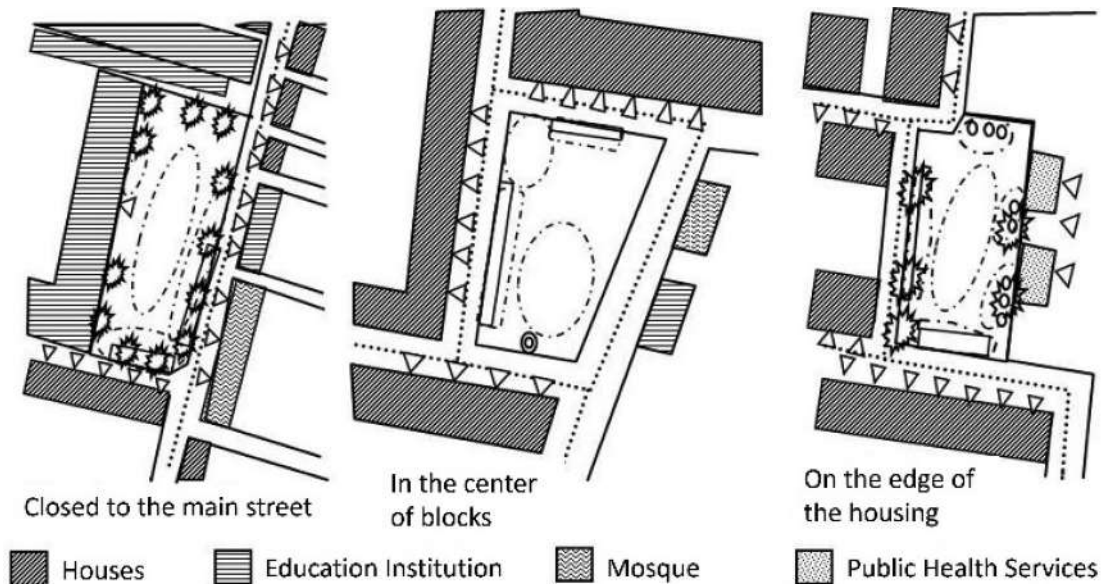


Figure 7. Square layout.

(see Figure 7). Contrary to the statement about the occupant's negative evaluation of the square located at the edge of the housing (Abus, Lubis, and Abus 2022), this phenomenon occurs in all cases.

Similar to other housing, in Yogyakarta's public housing, at the square located on the edge of the housing is used for various activities. Contrary to the findings of some previous studies and concepts (Son et al. 2022), the easy accessibility, attractive design, and proximity of public facilities make the square more useful. Consequently, it can be argued that easy accessibility, an interesting layout, and proximity to public facilities support a lively public open space compared to placement square locations on housing. This condition confirmed the achievement of a sustainability target (United Nations Environment Programme 2018).

According to previous research, community involvement is important in square development (Sundevall and Jansson 2020). This was confirmed by the residents in three cases. All squares were developed independently by the occupants to maximize space use. Social control and relationships among residents explain that the crime rate in the square decreases with strong relationships among residents. This occurred along the edge of housing. The desire of residents to live close to open spaces (Kramarova and Kankovsky 2021) with more attractive facilities was pursued by adding sports facilities, shaded trees, plants, and furniture. As expressed by some research, occupants add furniture such as trash cans, light stands, benches, plants, and various ground surfaces such as paving blocks, grass, and stepping stones (Son et al. 2022). The three cases show that in addition to the furniture pointed out in previous research, tables, basketball rings, football goalposts, badminton posts,

flagpoles, compost cans, and a large gazebo called *balai*.

Finally, most activities take place around fixed and semi-fixed elements, and at the entrance of educational institutions. Sports activities always take place in the middle of the square, such as football games in the square close to Main Street, badminton games, and basketball games in the other squares. The square edges where fixed and semi-fixed elements are found are generally used for play, socializing (in all square types), trade (the square close to the main street), and drying clothes (the square in the center of the blocks). The exception was seen in the square that was in the center of blocks with no fixed or semi-fixed elements on the side close to the street and houses because of floor height differences between the mosques and the square. The difference was quite large, at approximately 1 m. In the square close to the main street, there are kiosks with flexible and semi-permanent designs built by street vendors. When a square is used for worship, the kiosks are emptied so that they do not disrupt the ceremony. Similarly, in the square located in the center of the blocks, residents living close to the square added a rack to dry clothes during the day when no one used it. Both cases show that most furniture placed near houses or neighborhood streets is private furniture owned by occupants or vendors. Therefore, the closer the street, the more residential buildings there are, and the greater the privatization carried out by occupants through the placement of semi-fixed elements.

The findings reveal that the square in public housing complexes in Yogyakarta serves as a multifunctional space that enhances urban sustainability, aligning with SDG 11: Sustainable Cities and Communities. As a central node for social interactions,

community gatherings, and informal economic activities, the square significantly contributes to livability (SDG 11.1) and supports inclusive urban planning (SDG 11.3). This research highlights that its strategic location and adaptability to various uses reinforce resident's engagement in shaping their built environment, demonstrating the potential for bottom-up governance models in public space management. Additionally, the presence of the square enhanced accessibility and public safety, supporting SDG 11.7, which advocates inclusive and safe public spaces (Nations 2021). However, challenges such as spatial conflicts, inadequate maintenance, and encroachment risks indicate the need for policy interventions that prioritize community-driven spatial governance. These insights underscore the importance of integrating resident-led initiatives into urban housing policies to ensure long-term sustainability and resilience of the square as a key urban element.

6. Conclusion

This research highlights the multifunctional role of public housing squares as spaces for community gatherings, educational activities, religious events, and major celebrations such as Indonesia's Independence Day and Islamic holidays. By analyzing three selected cases, this study identifies key spatial and social variables that shape the placemaking process. First, squares located near the main streets provide a greater variety of public facilities, attract more diverse user groups, and support a wider range of activities. While all user groups utilize spaces near neighborhood streets, women tend to prefer areas with visual protection, shade, and clear sightlines for children's activities. In daily use, children and women dominate squares located at the center and edge of the housing area, whereas street vendors are more prominent in squares adjacent to the main streets. Second, the functions of the surrounding buildings influence square utilization. Squares near the main streets are typically bordered by educational institutions, mosques, and commercial establishments, fostering higher foot traffic and social interactions. By contrast, squares deeper within the housing area are primarily surrounded by residential buildings, leading to different patterns of use. Third, spatial configuration plays a crucial role in the activity distribution. Squares with open layouts, easy accessibility to residential units, and proximity to public facilities tend to support more dynamic interactions. Parking areas are generally located near square entrances or adjacent to public buildings, which further reinforce the connection between mobility and space usage.

Beyond physical characteristics, this study emphasizes the role of residents in shaping and sustaining

public squares. Community participation is evident in the addition of infrastructure elements such as benches, tables, plants, lighting, playgrounds, and sports equipment. Social and trade-related furniture is typically placed near houses or streets, whereas sports-related elements are positioned at the center of the squares. The presence of semi-fixed elements also indicates varying degrees of privatization, with squares enclosed by residential buildings exhibiting more personalized modifications by occupants.

From these findings, four key factors emerged as critical to sustainable placemaking in public housing squares: proximity to streets, the function of surrounding buildings, accessibility, and the placement of furniture. The most active and widely used squares are those that are easily accessible, surrounded by both functional and residential buildings, and are capable of accommodating diverse activities. The closer a square is to a main street, the more varied its activities are. Similarly, improved accessibility encourages greater diversity in terms of both users and functions. Women tend to gather in shaded areas with clear visibility of children's play zones, highlighting the relationship between spatial design and social interaction. To provide specific recommendations, this study can translate its findings into design guidelines for optimal spatial configurations, accessibility, and user engagement. It can also propose policies that encourage sustainable placemaking, such as regulations for integrating multipurpose public spaces into housing development. Additionally, engaging stakeholders in participatory planning and assessing the long-term adaptability of public squares would help align interventions with community needs, while supporting economic activities and social interactions.

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Nathalie Lancreret is a director of Centre Asie du Sud-Est CNRS, France. Her contribution is revising for urban content and final approving.

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




















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to me, nirkw

17-Jun-2025

JAABE2506673RA - Placemaking in Yogyakarta's Public Housing: The Role of Square Layouts and Community Initiatives in Sustainable Design

Dear Dr. Winandari:


I hope this email finds you well.

I am writing to request you to provide a discount code if you have one since you have chosen that option while requesting a waiver for your manuscript.

Also, you have mentioned "TF-Top-Author-24" in your custom questions, could you elaborate or provide any information regarding this ?

Looking forward to your response.

Sincerely,
Swamamughi Paneerselvam
Journal of Asian Architecture and Building Engineering Editorial Office



M.I.Ririk Winandari <m.i.ririk@trisakti.ac.id>

to tabe-peerreview

Wed, Jun 18, 7:25 AM

Dear Editor,

Thank you for the information you provided.

One of the authors of my article, Dr. Sri Yuliani, has a discount code for your journal. The code, which is attached, is "TABE-2025-C29994" and provides a 20% discount. The code "TF-Top-Author-24" that I mentioned in my previous question has been updated to "TABE-2025-C29994."

I hope this clarifies your question. Looking forward to hearing the next good news.

Sincerely,

Maria Immaculata Ririk Winandari| Lecturer & Researcher
Department of Architecture, Trisakti University
Jl. Kyai Tapa No. 1, Grogol, Jakarta, 11440
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16-Jun-2025

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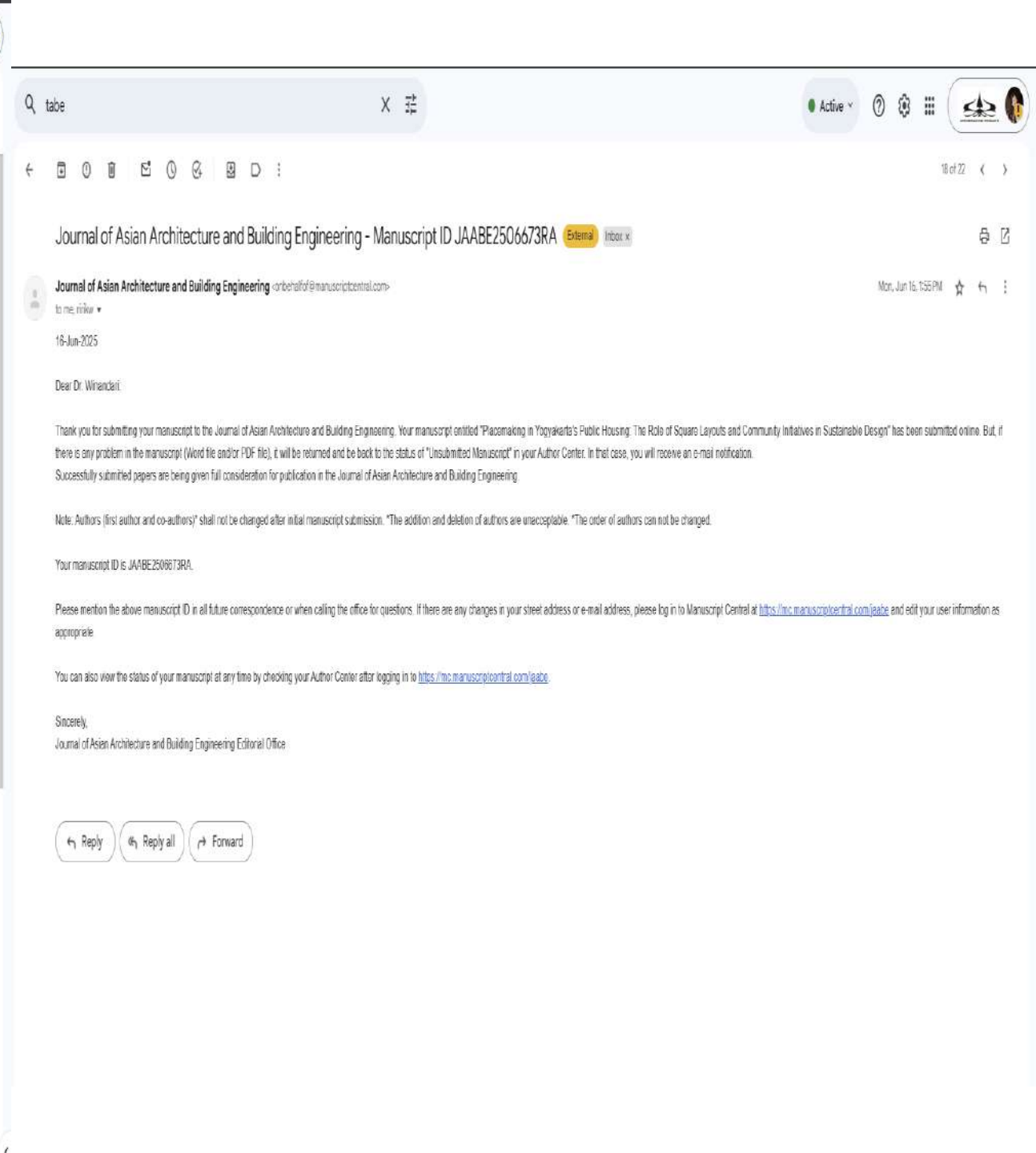
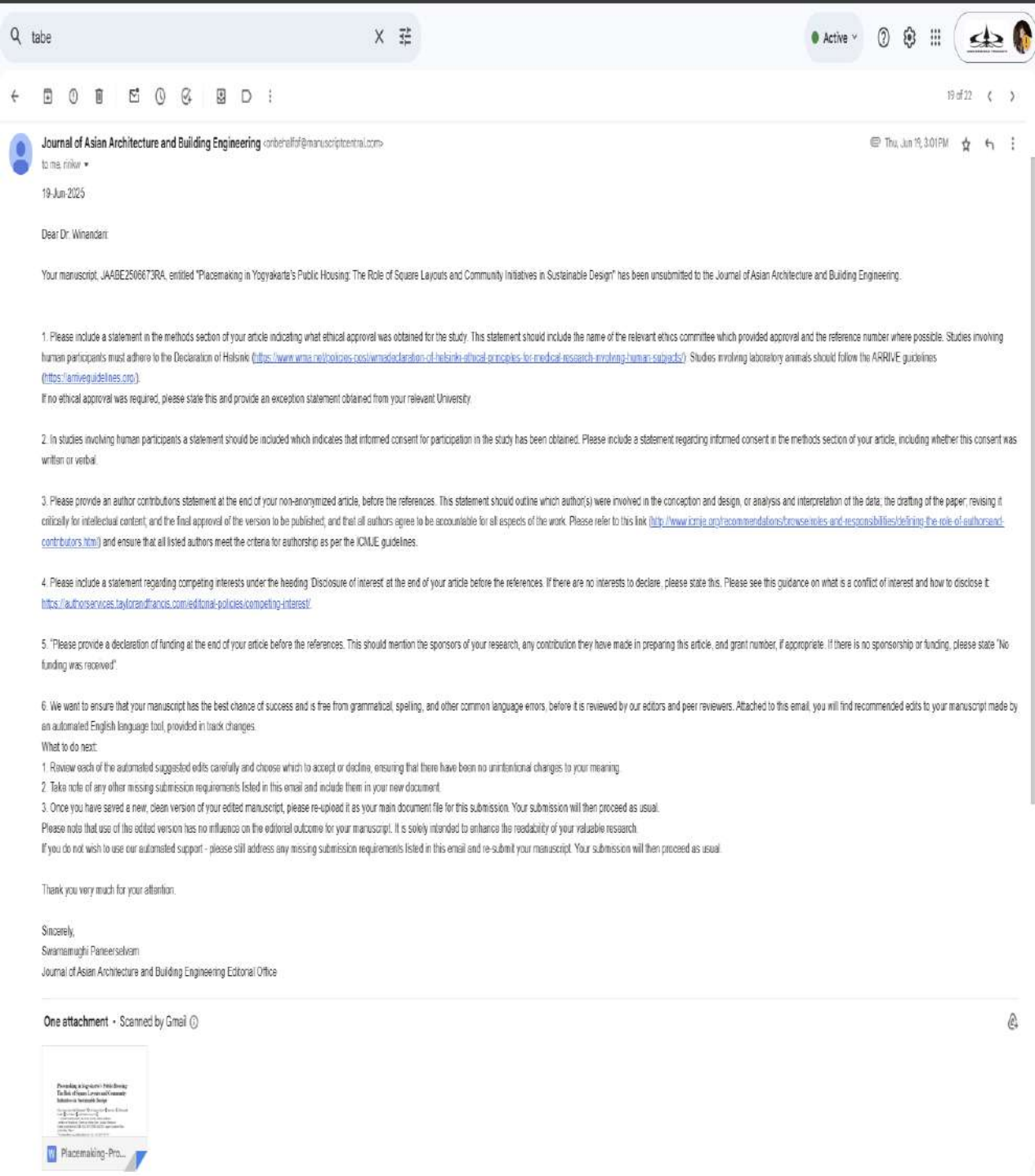
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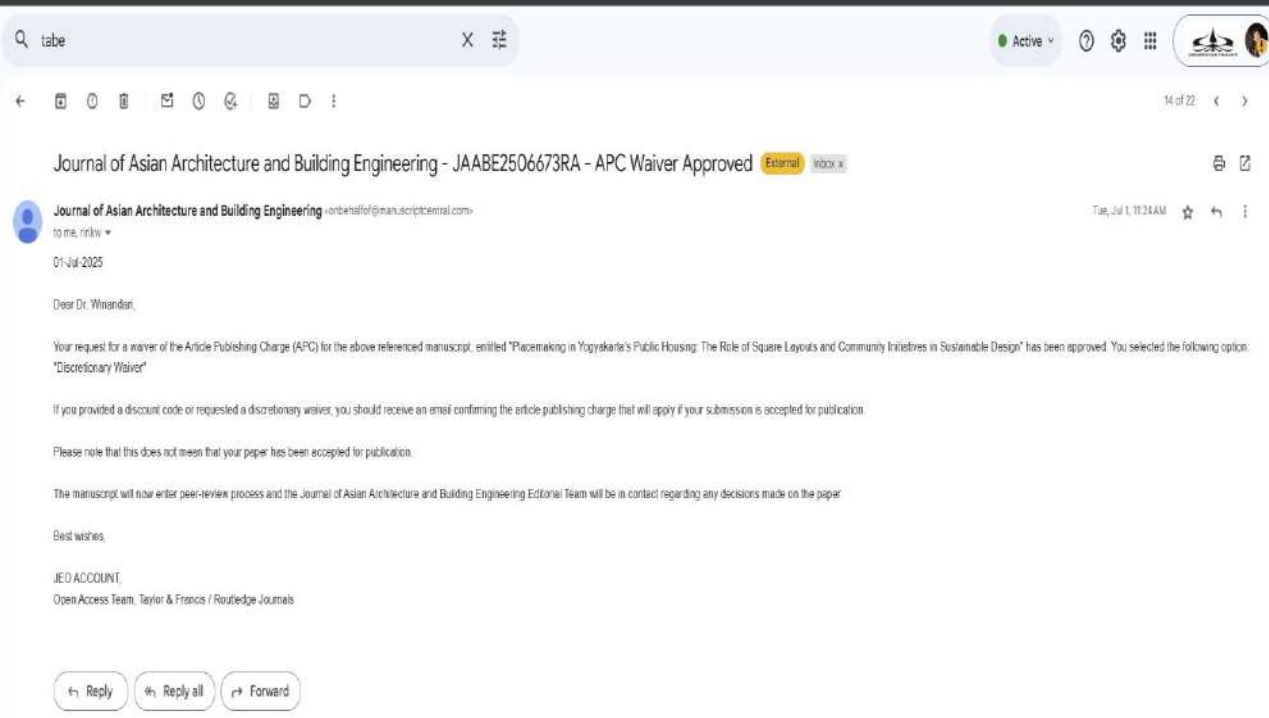
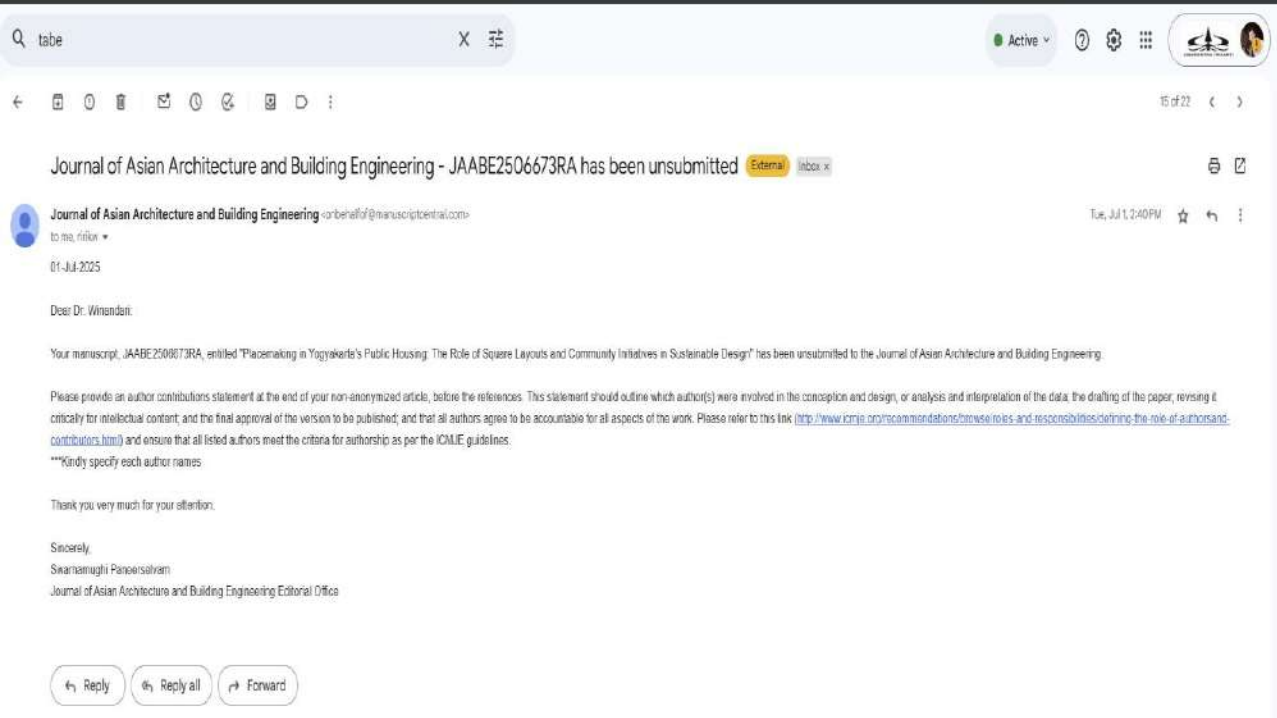
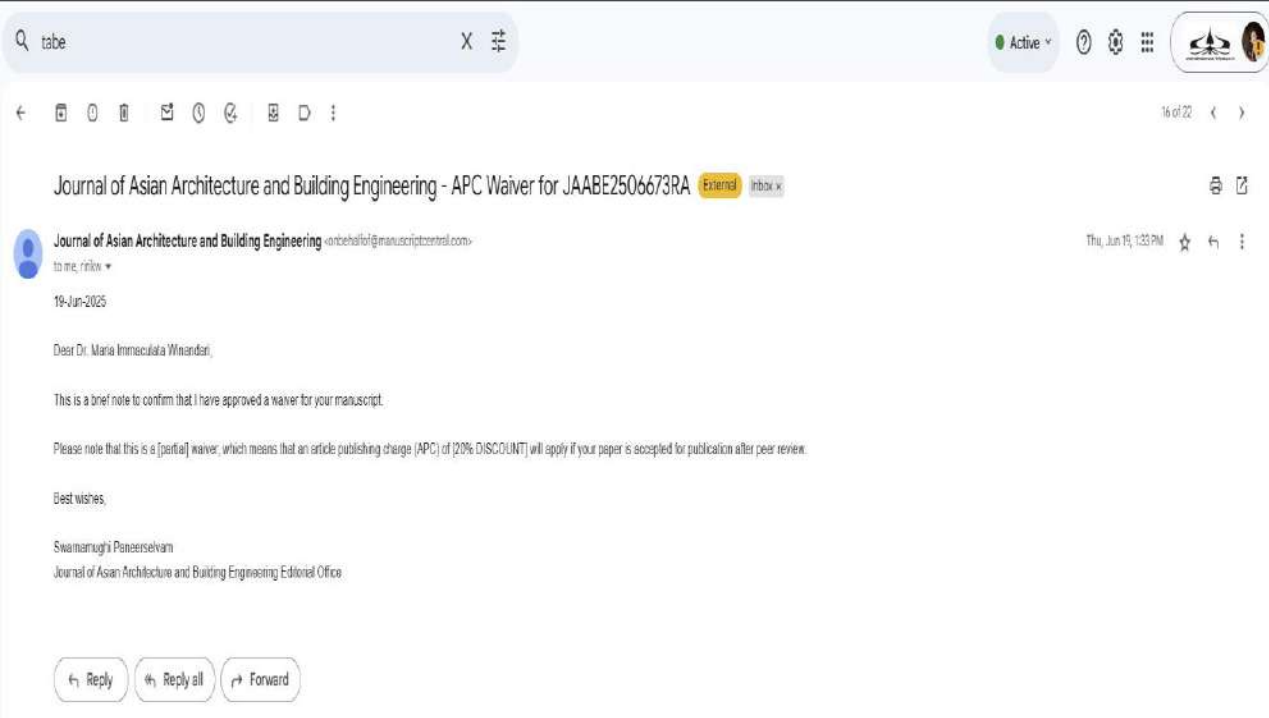
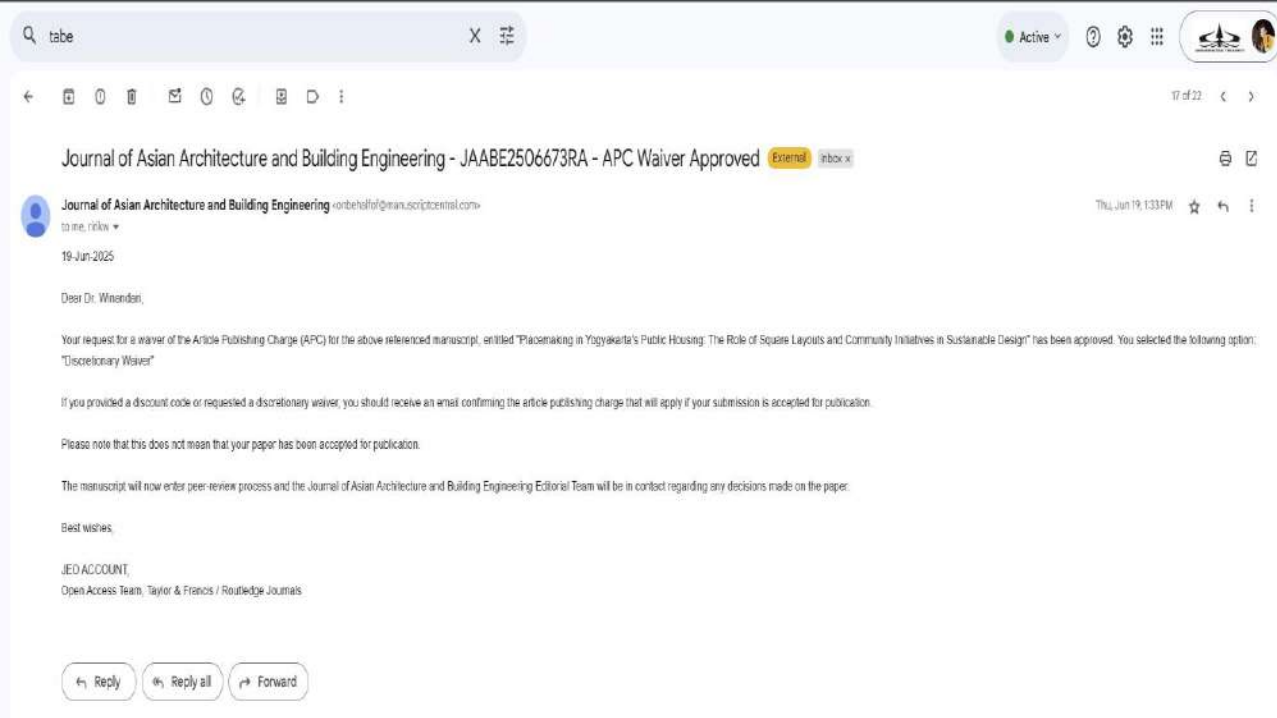
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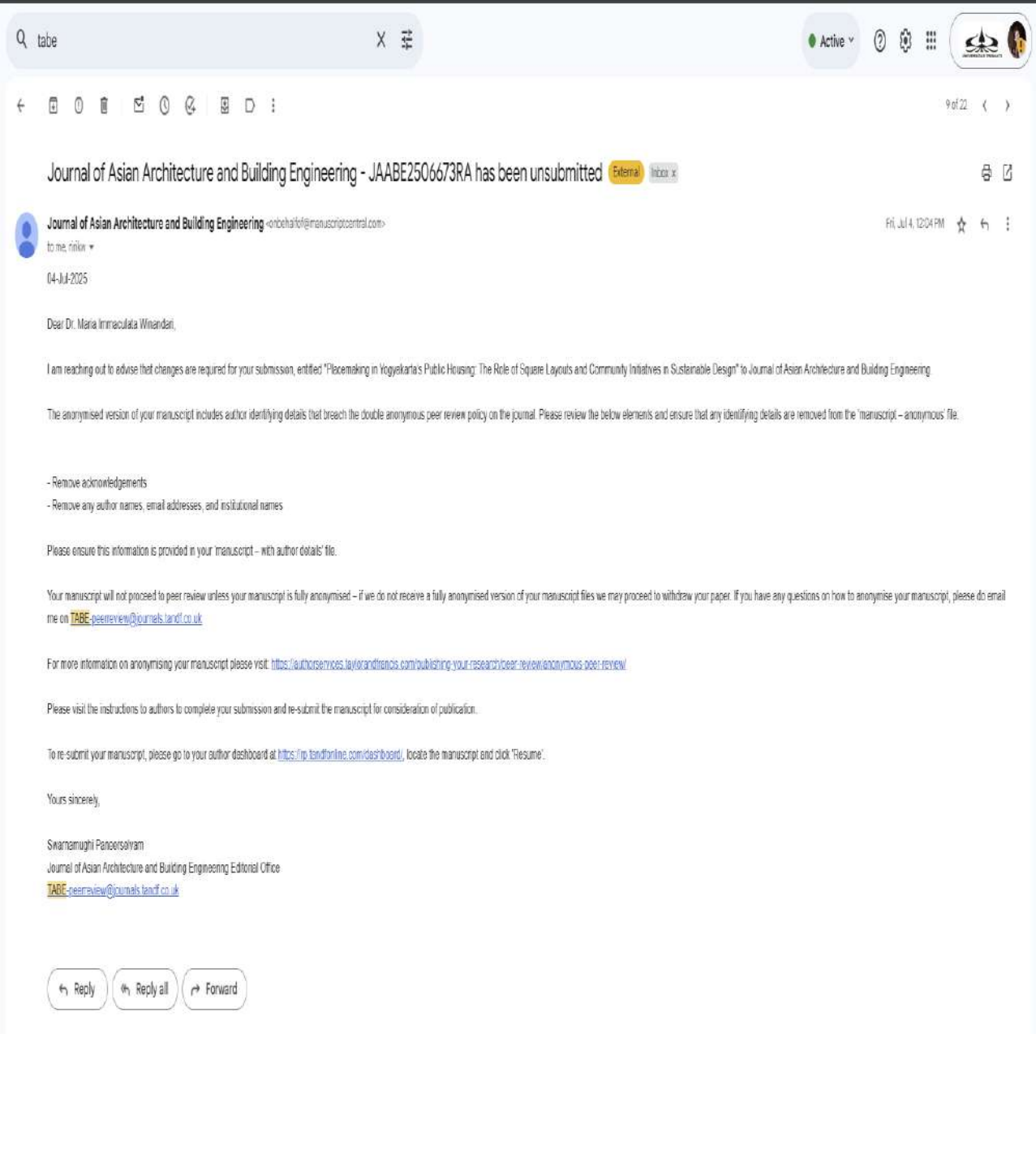
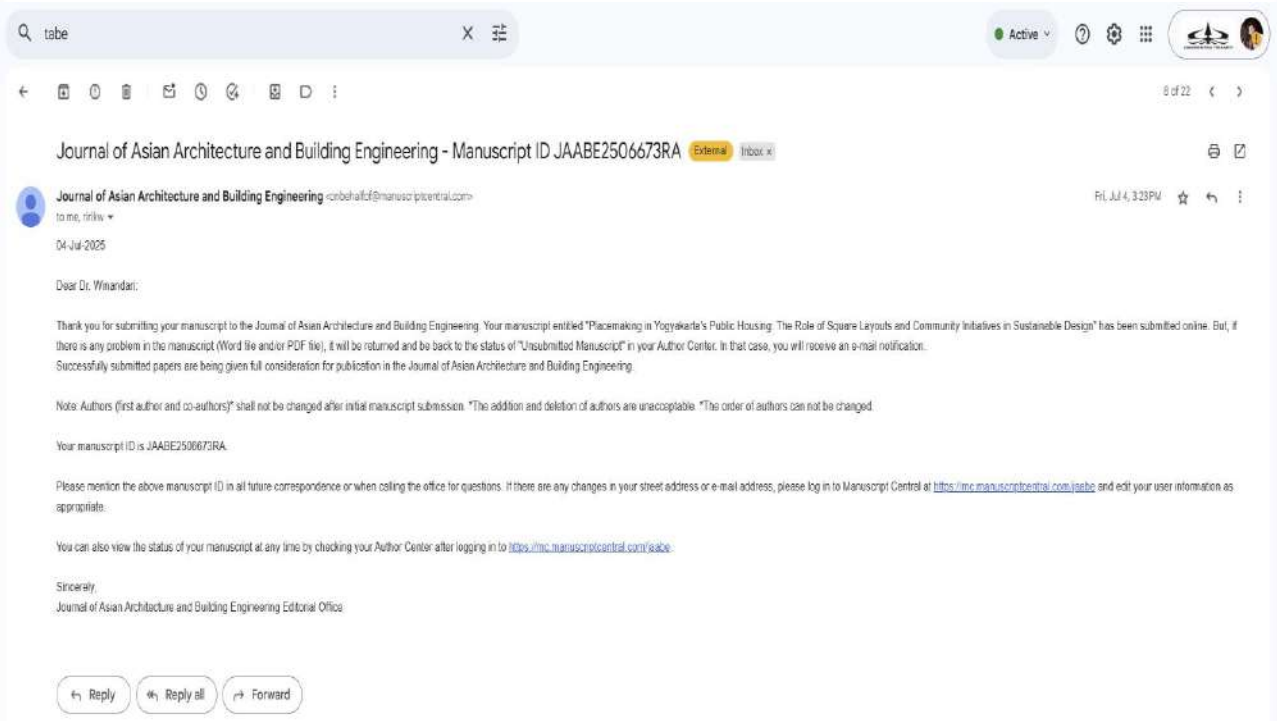
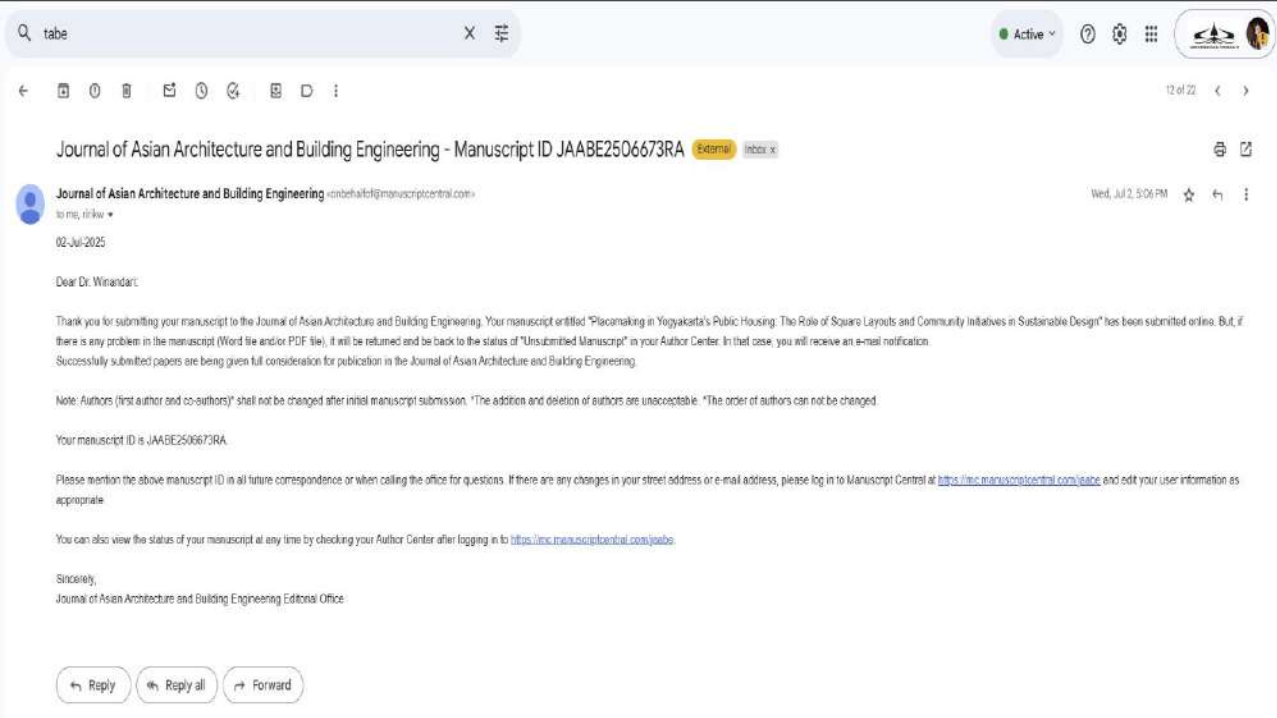
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to me

Thu, Jun 19, 1:34 PM

Dear Dr. Winandari,

Many thanks for your email.

Thanks for providing the requested details, I have now processed your waiver request.

Please do let me know if you need any other assistance.

Kind regards,

Swamamughi Paneerselvam
Journal of Asian Architecture and Building Engineering Editorial Office
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Journal of Asian Architecture and Building Engineering

From: mu.rink@trisakti.ac.id
Sent: 16-09-2025 6:07 AM
To: TABE-peerreview@journals.tandf.co.uk
Cc:
Subject: Re: Re: Journal of Asian Architecture and Building Engineering

Dear Editor,

Thank you for the information you provided.

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I hope this clarifies your question. Looking forward to hearing the next good news.

Sincerely,

Maria Immaculata Ririk Winandari | Lecturer & Researcher
Department of Architecture, Trisakti University
Jl. Kyai Tape No. 1, Crogot, Jakarta, 11440
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On Tue, Jun 17, 2025 at 4:50 PM Journal of Asian Architecture and Building Engineering <jabehalf@manuscriptcentral.com> wrote:
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Department of Architecture, Trisakti University

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Journal: Journal of Asian Architecture and Building Engineering TABE

Article ID: TABE (2570036)

Dear Maria Immaculata Rink Winandari

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Email: TABE-production@journals.tandf.co.uk

Manuscript Title: TABE - (Placemaking in Yogyakarta's Public Housing: The Role of Square Layouts and Community Initiatives in Sustainable Design)

Manuscript DOI: 10.1080/13467581.2025.2570036

Journal: TABE- Journal of Asian Architecture and Building Engineering

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Thank you,

Amit Singh Rawat

On behalf of the TABE production team

Taylor and Francis

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to me, amitsinghrawat

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Manuscript DOI: 10.1080/13467581.2025.2570036

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Placemaking in Yogyakarta's public housing: the role of square layouts and community initiatives in sustainable design

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ABSTRACT

In Yogyakarta's public housing, squares are created by residents and local institutions, while the regulations only require a standard size. This regulation gap has created wide variation in square design and use among neighborhoods. This study explores how placemaking process through spatial layout and use uncover main features for sustainable public housing. Employing a multiple case study methodology, three squares were investigated to examine interactions across layout, use, and community agency. Data were gathered using a mix of spatial mapping of boundaries and accessibility, behavioral observations of everyday and event-based uses, interviews with residents, and visual recording of user-led modifications. Comparative analysis revealed squares have multi-purpose functions, with function influenced by streets distance, building's function, accessibility, and semi-fixed elements. The most vibrant squares were also situated adjacent to streets, accommodating diverse activity and user groups, and encouraging social interaction. Locally initiated changes enhanced usability but also reacted to localized privatization efforts. The study concludes that sustainable public housing design should include flexible frameworks that ensure people's participation, prioritize accessibility, and utilize semi-fixed elements to meet the balance between functionality and socio-cultural needs. The process is conducive to SDGs 11's vision of inclusive, safe, and resilient cities.

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1. Introduction

Public housing development requires well-planned open spaces, especially squares, to serve as spaces for play, exercise, and social interaction among residents and locals. In Indonesia, the provision of squares in public housing is mandated by Ministry of Home Affairs Regulation No. 9 of 2009 (Menteri 2009), which requires developers to allocate land for square facilities. However, this regulation focuses primarily on land allocation rather than on the development of functional public spaces. As a result, many public housing squares, especially those provided by public housing agents are underutilized, whereas others are independently designed and developed by occupants' institutions to suit their needs.

The process of transforming these spaces into vibrant community hubs is known as placemaking. Placemaking extends beyond aesthetic improvements, as it fosters social interactions (Costa et al. 2021), enhances community engagement (Richards 2020; Sen and Nagendra 2020), and contributes to a sense of belonging (Bagiouk and Sofianou 2020)

among residents. Previous studies have highlighted the role of occupant participation in shaping open spaces, particularly in the public housing context. Zhang et al. (Zhang, Zhang, and Liang 2024) stated that direct public involvement in open space design strengthens a community's attachment to a space, whereas Siu and Soyinka (2018) revealed that such community involvement in open space maintenance is more prevalent in public housing than in other types of housing development.

A relevant case of placemaking in public housing was observed in Yogyakarta, where community-driven initiatives have shaped public squares since the 1970s. Yogyakarta, characterized by medium-scale housing and strong local cultural influences, presents a unique context for studying the variations and challenges of placemaking. The National Urban Development Corporation provides the initial square facilities, which are further developed through resident and institutional participation. This grassroots approach aligns with the key principles of placemaking, which emphasize inclusivity, adaptability, and cultural sensitivity.

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Placemaking is crucial to fostering sustainable urban development. According to Ellery et al. (Ellery, Ellery, and Borkowsky 2021), effective placemaking creates a strong sense of place, which influence how individuals perceive and interact with their surroundings. Furthermore, placemaking integrates key urban design criteria including accessibility, comfort, diverse activities, and sociability to ensure that open spaces remain functional and engaging. It also contributes to achieving the Sustainable Development Goal (SDG) 11 target of creating safe, inclusive, and accessible public spaces (United Nations Environment Programme 2018).

Housing squares can be categorized based on hierarchy, function, and form. Gupta et al. (2016) classified squares into different scales, from doorstep play spaces to city parks, while Winandari et al. (Winandari, Wibisono, and Djunaedi 2024) categorized square functions, including ceremonial spaces, meeting places, and recreational areas. In Indonesia, public housing squares are designated for multiple functions, such as sports fields, public parking, and communal gathering areas, as outlined in Ministry of Home Affairs Regulation No. 9 of 2009 (Menteri 2009).

Understanding placemaking within public housing squares requires an examination of the spatial layout and space utilization. The relationship among space layout, user activities, and community engagement plays a crucial role in determining the effectiveness of public spaces. The physical layout of the squares, including boundaries and spatial elements, influences their use and accessibility. Additionally, social factors, such as user demographics, behavioral patterns, and community involvement, shape the success of these spaces.

This study explores how placemaking influences the development and functionality of public housing in Indonesia. By analyzing case studies, this research identifies key factors contributing to sustainable placemaking and proposes design strategies that enhance the quality of public spaces. The findings provide valuable insights for urban planners, policymakers, and community stakeholders in creating more inclusive and livable public housing environments.

2. Literature review

2.1. Sustainable placemaking

Placemaking can be rephrased as the process of creating unique, meaningful, and engaging spaces that foster a sense of community and enhance the quality of life of its inhabitants. It involves designing and managing public spaces that are accessible, vibrant, and reflective of local culture and context. This approach prioritizes the needs and aspirations of people who live, work, and play in these spaces, aiming to

create a strong sense of place and belonging. According to Ellery et al. (Ellery, Ellery, and Borkowsky 2021), placemaking principles are: 1) the process of placemaking creates an attachment or connection between the community member and the place in which they live, work, and play, which is often referred to as an individual's sense of place; 2) an individual's "sense of place" can be either positive or negative in nature; and 3) placemaking as a process can occur along a continuum from change that is imposed upon an individual to change that is created by the individual.

Placemaking involves participation of the community, stakeholders, and government in the planning, design, management, and programming of public spaces. Placemaking has four criteria for creating successful places: access and links, comfort and image, uses and activities, and sociability. Placemaking can be used as a tool to improve the living conditions and quality of life of residents of informal settlements, which are areas of unplanned and substandard housing that often lack basic services and infrastructure. Placemaking faces challenges such as lack of knowledge and experience, community participation, regulations and policies, funding, and time (Mehanna and Mehanna 2023). Community involvement in design fosters sustainable development (Yuliani, Hardiman, and Setyowati 2020).

One of SDG 11's targets is to have a safe, inclusive and accessible square (United Nations Environment Programme 2018). Squares can be grouped in several ways, for example, according to their hierarchy, function, or form. Based on hierarchy, Gupta et al. (2016) classified squares as play spaces at doorsteps, neighborhood parks, community parks, and city parks. In addition, the Ministry of Home Affairs of the Republic of Indonesia Regulation no. 9, 2009, states that a housing square can function as a sports facility, field, public parking lot, and cemetery.

As mentioned earlier, public housing squares in Yogyakarta have applied placemaking principles in their design process. Different researchers have varied in their suggestions regarding the elements that play a key role in placemaking. PPS asserts that the user, activity, comfort, image, accessibility, connectedness, and sociability are key elements in placemaking. Son et al. (2022) argued that space identity, community, collaboration, and holistic plans are core elements of placemaking. Generally, all these key elements imply that the placemaking process is evident in the layout and use of space. A two-way relationship between layout and the use of space occurs to maximize user needs through appropriate design. The space layout is formed by boundaries and elements consisting of fixed, semi-fixed, and non-fixed elements. The use of space is closely

related to the user, time, and activities that occur there. Figure 2 shows the relationship between layout, use of space, and appropriate design.

2.2. Space layout

The space layout is influenced by boundaries and elements. The space boundaries can be walls or plants. Wall height and plant density affected the closure space level. Space elements can be grouped into three types: fixed-feature space, semi-fixed feature space, and informal space (Winandari and Pramitasari 2012). A permanent element is difficult to move. An example of a semi-permanent element is furniture, which is easily movable. The informal elements consist of human activities, and behavior. Examples of these elements are walls, floors, sculptures (Winandari and Pramitasari 2012), trash cans, light stands, benches (Winandari 2015), plants such as trees, flower/vegetable gardens, shrubs, fruit trees, perennial plants (Cosco 2007), varied ground surfaces, mounds/slopes, logs, vines, stepping stones, smooth rocks, pets, play equipment, sand play, play-houses, picnic tables, water play, benches, swings, arts/crafts, balance beams, and music play (Smalberger 2005). Both the boundaries and elements were used to determine the existence of a space layout.

2.3. The use of space

Understanding the relationship between users and activities is important for maintaining space characteristics and activities (Costa et al. 2021). Moreover, Akbar and Edelenbos (2021) state that this relationship involves many people at various levels as well as better resources. Research conducted by Smalberger (2005) suggests that one's experience and memory affect one's views of life. This finding is reinforced by Yu and Rosenberg (2020), who argued that the environment's role in people/environment relationships is to provide safety and emotional comfort. This can be achieved through the social and cultural values offered by open space (Sundevall and Jansson 2020). One effective way to strengthen the emotional connections between people, parks, and communities (Ji 2009), as well as improve societal welfare (Ricketts 2008), is to involve occupants directly in the design and management. According to Wickes and Hipp (2018), the relationship between residents and social control can reduce crime rates. The largest users of open spaces are children, teenagers, and seniors (Kramarova and Kankovsky 2021). Users can be grouped based on age, ethnicity, gender (Winandari 2015), or social class. Each group has different needs and usage patterns.

2.4. Appropriate design of housing square

Residents want to stay close to the open space (especially if the space has a larger size and more attractive facilities (Wu and Plantinga 2003). Winandari et al. (2014) argued that the use of space should provide for interaction among the young and parents, groups, and individuals, as well as males and females as much as possible. This is much easier if the space has an open layout that increases human activity and social relations (Winandari and Pramitasari 2012).

Several studies found that a good open space has a green wide sidewalk with a narrow street, spread in several locations (Wu and Plantinga 2003), near their house (Elshinawy et al. 2023), easily accessible (Sundevall and Jansson 2020), and is in harmony with the local environment (Abus, Lubis, and Abus 2022) to support the activities of individuals and groups. Spaces should be placed in the middle of residential environments (Winandari 2018) for easy access and utilization. A study revealed that horizontal housing occupants gave a negative assessment of the square located at the housing tip or edge due to safety, hazard, and anti-social issues that may occur (Urban Parks 2007). Related to square quality, previous research shows that a high-quality large park within walking distance is more important to residents than several open spaces within a short distance (Sugiyama et al. 2010).

3. Methods

This study employs an exploratory case study approach to investigate the placemaking process in public housing squares in Yogyakarta. The methodology is structured to facilitate a comparative and analytical assessment of how the spatial layout influences user activities across different square locations within public housing environments. This study did not require formal ethical approval as it focused on publicly accessible communal squares and did not involve sensitive or identifiable personal data. Interviews with community members were conducted with verbal consent and full understanding of the research objectives. The participants were informed that their involvement was voluntary, and no personal data was collected.

Case selection followed a purposeful sampling strategy, focusing on three distinct square locations within public housing: the center, edge, and corner of the housing area. These locations were selected based on their spatial characteristics and frequency of use. The selection process was conducted in three stages: a grand tour observation of 40 squares in four public housing complexes in Yogyakarta, categorization of square locations into 10 squares near the main street, 23 squares in the center of housing blocks, and seven squares at the housing edge; and the final selection of

one square from each category with the highest recorded user activity for an in-depth case study.

To analyze the spatial layout and use of space, a multi-method data collection approach was applied, consisting of physical observations and in-depth interviews. Physical observations were conducted to document the spatial characteristics, patterns of movement, and activity distribution within the selected squares through systematic photographic documentation and direct mapping of space utilization. In-depth interviews were conducted with 20 housing occupants and two government officials to understand their motivations and perceptions regarding space usage.

The analytical process was structured into five stages to ensure the systematic comparison and synthesis of the findings. First, a literature review was conducted to identify the key variables influencing placemaking, including the square location, spatial boundaries, layout configuration, and activity patterns. This step also helped to establish the study's research propositions. Second, an empirical study and data collection were conducted through physical observations and interviews to gather factual data on spatial configuration and activity patterns. Third, the collected empirical data were mapped to visually represent the relationships between spatial configuration and use patterns. Fourth, a comparative case analysis was conducted by systematically comparing spatial characteristics and activity patterns across the selected squares. The analysis involved both an intra-case examination and cross-case comparisons to identify the spatial determinants that influence placemaking outcomes. Finally, the results were synthesized into broader theoretical insights, contributing to an enhanced understanding of placemaking in public housing squares.

This study primarily employs qualitative descriptions, and the findings are systematically analyzed and synthesized to generate theoretical insights rather than statistical generalizations. The comparative approach, which involves cross-case analysis and

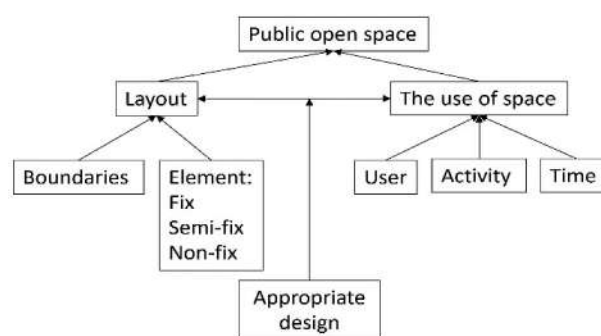


Figure 1. Components that influence public housing square.

mapping of spatial use patterns, ensures that this study provides a structured and rigorous examination of placemaking dynamics in public housing squares. By identifying key spatial determinants and their influence on user behavior, this study contributes to a deeper theoretical understanding of the relationship between spatial layouts and social interactions in shared public spaces.

4. Result

4.1. Yogyakarta's public housing data

Yogyakarta is a province comprising four districts and one municipality. There are four public housing sites in this province: Condong Catur, Minomartani, Trimulyo, and Guvosari (Figure 1). Based on the public housing agent's archive, the four public housings units are mass housing with more than 1000 units lying between 21- and 32-hectare sized pieces of land. The housing design prioritizes the number of units that can be accommodated. Each feature had its own features (Table 1).

The first is the Condong Catur public housing, the oldest public housing in Yogyakarta, built in 1976. Located in the Sleman district, it consists of 1249 units on a 21.741-hectare piece of land. It has

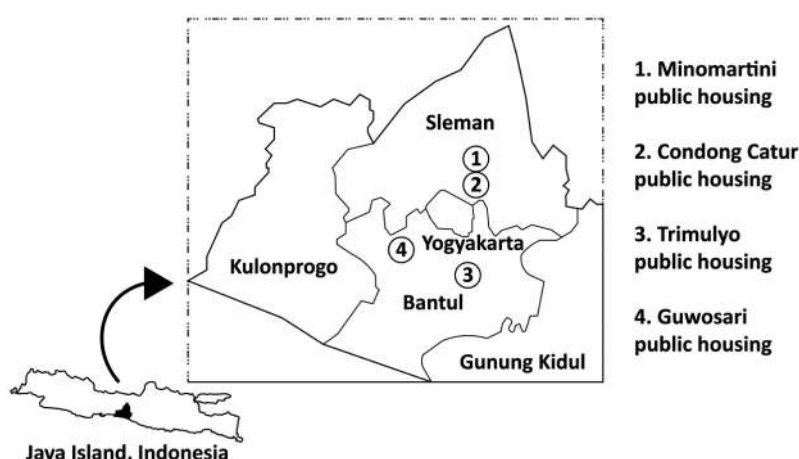


Figure 2. Location of Yogyakarta's public housing.

1206 households, with 4687 people living in this housing, grouped into 38 neighborhoods, and had the highest density (2156 people/km²). The second is Minomartani public housing, built in 1981 and located in Sleman district. It has 1936 units – with the largest number of units spread over 32.441 hectares of land. This public housing has 1833 households with 6063 people grouped into 30 neighborhoods. The third is Trimulyo public housing built in 1994 in the Bantul district. It has 1936 units; the largest number of units spread over a 42.18-hectare piece of land. There were 484 households with 1188 people grouped into eight neighborhoods, forming part of the three blocks. Lastly, Guwosari public housing was built in 1996 and is located in the Bantul district. It has 1082 units on a 25.7-hectare piece of land. This housing consists of 111 households with 333 people grouped into four neighborhoods that form part of the two hamlets. Unlike the first two, the latter two houses, Guwosari and Trimulyo, have larger areas with lower densities (120 people/km² and 542 people/km², respectively). As the most recent type of public housing, both are still under construction and are located in a less developed district.

The two oldest public housings were originally intended for local civil servants, while the others were intended for middle- to low-income people who living in Yogyakarta. Along the way, non-public servants bought houses from public servants that were sold due to retirement or moved to another town.

Public housing blends with the surrounding environment as there is no fence separating the two. It is open and freely accessible to occupants or locals through several entrances. The main streets in public housing have become the main connecting lines between important places in the districts.

In relation to public open spaces, the National Urban Development Corporation as a public housing developer, only prepared land for public and social amenities. The facilities were built by relevant institutions or residents at the neighborhood level living around the space. They made decisions about its design, development, and management. This process has taken place since inhabitation until now. These amenities consist of educational facilities, health facilities, public administration blocks, and sports centers scattered in several places depending on the ease of accessibility of each user group. However, there are blocks that have no public open space in their

neighborhood, especially in the Condong Catur Public Housing, which has only three public open spaces for all residents.

4.2. Square layout and the use of space

Blended with the surroundings, all public housing facilities including the square, can be easily accessed and used by residents and locals. All public housing squares are owned by the local government and managed by the neighborhood board. Each housing had several squares scattered across several locations. Based on its location, the square of public housing in the four cases can be grouped into three types: close to the main street, in the center of the blocks, and at the edge of the housing (see Figure 3). Most of these squares (43%) are situated in the center of the blocks surrounded by streets, with houses that are fronted onto the street. Thirty-four per cent of the squares are situated close to the main street, and 23% are on the edge of housing. The layout and use of space character results for the three types of squares show the similarities and differences between them.

4.3. The square close to the main street

Ten squares are located close to the main street. One of them is Condong Catur public housing. Surrounded by streets on both sides and bounded by high walls on the other two sides, this space is enclosed by public facilities such as elementary school, public junior high school, private kindergarten, mosque, commercial facilities (semi-permanent kiosks), and houses. The street around the square measuring 6 m wide and covered with asphalt, connects the square to public facilities and houses with no pedestrian ways. The space boundaries consist of high walls to schools and streets, as well as gutters to houses and other public facilities. Inside the square, there are some fixed elements such as kiosks, signage, and trees, and semi-fixed elements such as soccer posts, benches, tables, pushcarts, and trash cans that make up the square layout (see Figure 4).

This square was used daily and at specific times. All activities were performed by residents, educational institutions, and mosque organizations around the field, as well as locals. Daily, this square is used as a place to play, exercise, socialize, and trade. The children play and eat three times a day. On the other hand,

Table 1. Yogyakarta's public housings data.

| Public housing | Year of construction | District | Number of housing units | Area (ha) | Number of households | Number of populations | Number of neighborhoods |
|----------------|----------------------|----------|-------------------------|-----------|----------------------|-----------------------|-------------------------|
| Condong Catur | 1976 | Sleman | 1249 | 21,741 | 1206 | 4687 | 38 |
| Minomartani | 1981 | Sleman | 1936 | 32,441 | 1833 | 6063 | 30 |
| Trimulyo | 1994 | Bantul | 881 | 42,18 | 484 | 1188 | 8 |
| Guwosari | 1996 | Bantul | 1082 | 25,7 | 111 | 333 | 4 |

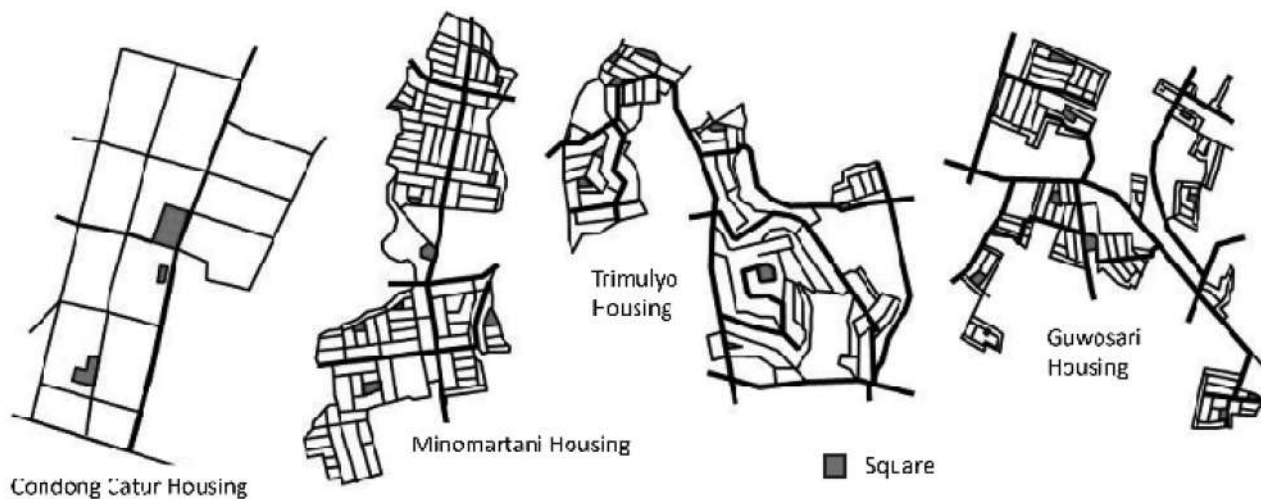


Figure 3. Square location in Yogyakarta's public housing.

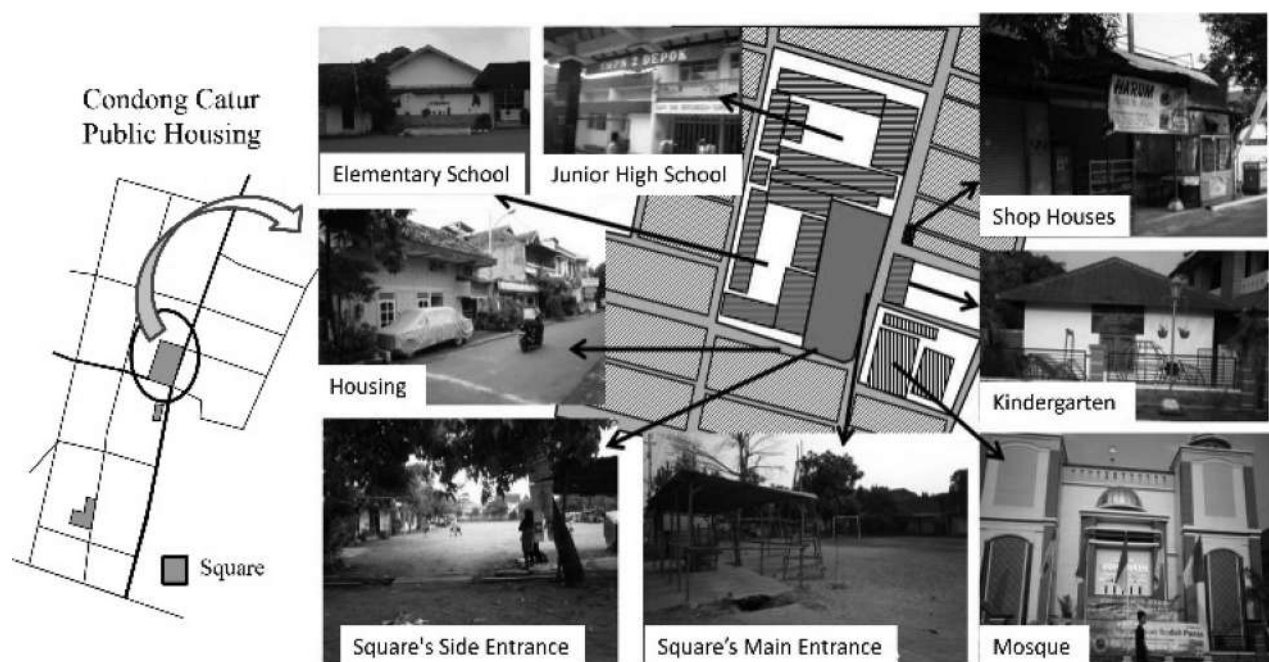


Figure 4. Square close to the main street.

students play twice a day and exercise once a day from 07.00 am to 10.00 am. Both used it at different times. During school hours, the eastern side of the square was used by school staff as a parking area. Men and teenagers gather and chat once a day; on the other hand, women take care of children and chat twice a day. Temporary vendors sell their merchandise once a day from 09.00 to 09.15 am. Permanent vendors sell their things from 09.00 am to 08.00 pm. Some of them were occupants of public housing, while others were from the surroundings.

During holidays such as the Independence Day of the Republic of Indonesia or an Islamic holiday, this square serves as a place for inter-village football matches, grand ceremonial occasions, Eid's prayers, and animal sacrifices for Eid Al-Adha celebrations. Occupants and locals use it for prayers twice a year during the Eid Al-Fitr and Eid Al-

Adha holidays. In addition, they use it for animal sacrifice once a year during the Eid Al-Adha holiday. On Independence Day, this square is used for a flag ceremony once a year and for football games ahead of the celebration. These activities are favored by the square's location close to the educational institutions and the largest mosque in this housing, as well as its location in the center of housing.

4.4. The square in the center of blocks

Twenty-three squares were located at the center of the blocks. This is typical for most public housing in Yogyakarta. One was in the Minomartani public housing. Surrounded by streets on either side, separating the square from houses, this space is enclosed by houses and public facilities, such as

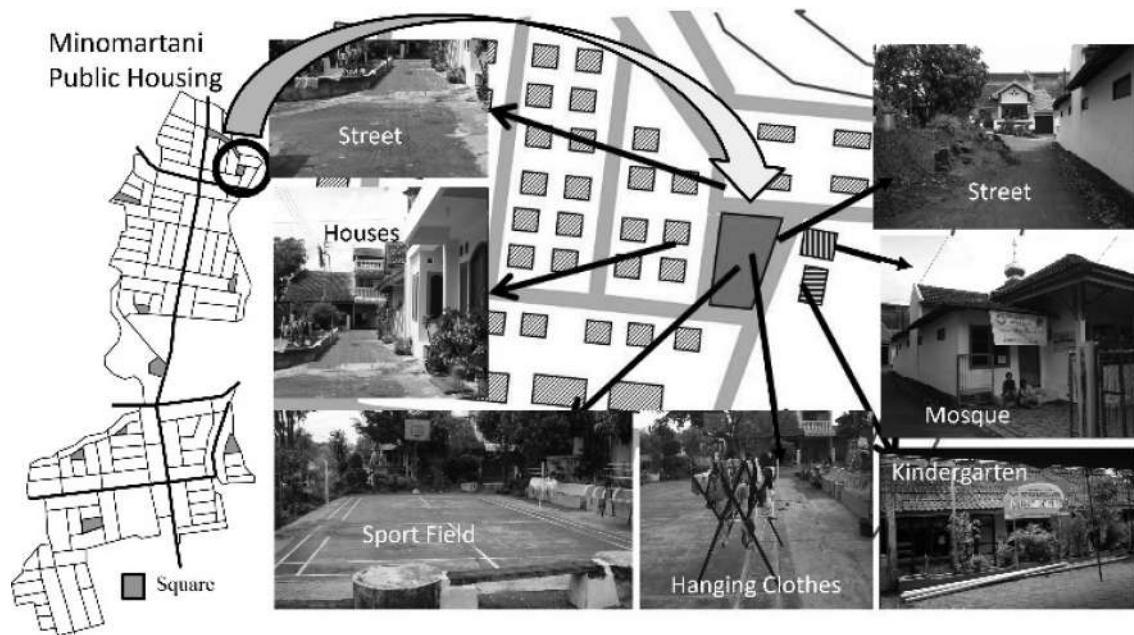


Figure 5. Square location in Yogyakarta's public housing.

kindergarten and mosque. Similar to the first case, these streets connect the square to public facilities and houses without pedestrian ways. However, this street is 4 m wide and is covered by asphalt and paving blocks. This square is bounded by permanent benches as high as 50 cm, a street connecting the houses on the eastern side with a floor height of approximately 1 m, and shrubs to the public facilities on the south and western sides. Inside the square, there are some fixed elements, such as benches, basketball posts, badminton posts, trees, shrubs, and semi-fixed elements, such as racks for drying clothes and trash cans.

Used daily and at specific times, all activities were performed by residents and locals. This square is used daily as a place for play, sports, socializing among residents, and drying clothes. Children and women take care of children who are playing, eating, and chatting with each other twice a day. Both used at square at the same time. Teenagers play basketball and chat once a day. Men chit-chat once a day and play badminton once a week. Clothes are dried throughout the day, particularly on shiny days.

On specific days, like the days prior to the Independence Day of the Republic of Indonesia, this square serves as a place for various games, communal meetings like the *tirakatan* in local language as well as a venue for performance. Its location in the center of the blocks and not being close to the main street makes it a semi-public square that is often used by residents around it and rarely by locals. The existence of a private rack for drying clothes confirms that this square is semi-public.

4.5. The square at the edge of the housing

Seven squares were located at the edge of housing. These are rare in Yogyakarta's public housing. One was in the Minomartani public housing. This square is surrounded by a street on the south and western sides that separates the square from the houses. The streets on both sides connecting the square to the public facilities and houses were 4 m wide and covered with asphalt with no pedestrian ways. This square is bounded by the gazebo to the houses on the southern side, compost cans to the houses on the western side, a wall to the public facilities on the eastern side, and a floor elevation of approximately 15 cm high on the northern side. On the northern side, close to the square, there is public health care and a neighborhood hall called *Balai RW*. Inside the square, there are some fixed elements such as benches, flag posts, badminton posts, flower cans, compost cans, halls, signage, water tower, trees, shrubs, and semi-fixed elements such as trash cans (see Figure 6).

This square was used daily and at specific times. In its day-to-day life, it was used as a place for play, sports, and socialization among the occupants. Children play and eat twice a day, as well as women taking care of children, and each of these gathers there at the same time. Teenagers gather once a day. Men gather once a day and play badminton twice per week. Similar to the second type, it also serves as a place for various games, performances, and *tirakatan* prior to the Independence Day of the Republic of Indonesia. Although it is located at the edge of the housing, the square is used by residents and nearby neighbors.

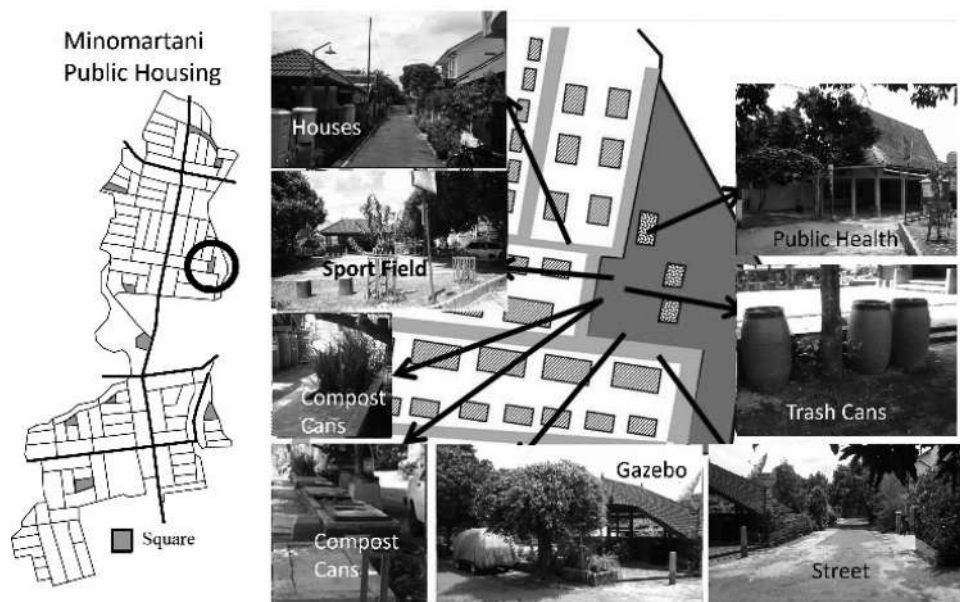


Figure 6. Square at the edge of the housing.

5. Discussion

The three cases of public open spaces have their own layouts and user activities. All are used for several activities, such as playing, eating, taking care of children, exercising, parking, socializing, trading, praying, and drying clothes. The cases were compared to determine their similarities and differences. There are several ways to explore the similarities and differences between these cases **to determine the factors that influence the layout and use of a space.**

First, **in contrast to Gupta's** (Gupta et al. 2016) concept of square hierarchy, the three cases serve as neighborhood parks and sports facilities. All were designed and used for local-scale neighborhoods. The layouts of squares vary depending on their access to the main streets, the functions of the buildings around them, the building orientation, and the boundary. The accessibility to the square from Main Street and the surroundings (see Figure 4–6) shows that the square close to the main streets has more space utilization and user groups. Compared to others, there is an increase in the number of activities and in the variety of users owing to the variety of public facilities and the presence of the main street.

On the other hand, the other two are dominated by houses and surrounded by the neighborhood's streets. It reduces the number of activities and limits the user groups. Daily square users are dominated by children and women taking care of their children. Exceptions are found in the square close to the main street where the user group is dominated by street vendors who sell throughout the day. In contrast to Huang et al. (Huang, Deng, and Fei 2025), who asserted that there are different needs and usage patterns for each group, all cases showed that all the groups tended to use the space close to the neighborhood street. The exception

is in the square close to the main street and school entrance, which is used for parking. It could be argued that the closer the street, the more varied the activities and users.

In accordance with the Winandari (Winandari, Wibisono, and Djunaedi 2024) criteria, the three cases are enclosed squares surrounded by houses, except for the first type, which is close to the main street which is surrounded by educational institutions and mosques. The results of the three cases suggest that the spaces serve as meeting places as well as great places for ceremonial occasions. Yogyakarta's public housing squares do not provide a setting for civic buildings or buildings for recreation, but serve as settings for educational buildings and mosques. In line with their function as great places for ceremonial occasions, these squares are used for interaction by residents and locals especially during the celebration of the Independence Day of the Republic of Indonesia and **Islamic holidays, such as Eid al-Fitr and Eid al-Adha.** This reinforces the previous observation that a neighborhood square should be usable by everyone (Winandari, Wibisono, and Djunaedi 2024).

Thus, the activities on the square are influenced by the functions of the buildings around it and their location within the housing. Furthermore, at layout that is open and easily accessible, increases activity and social relations between residents and locals (Yu and Rosenberg 2020). All squares show that activities generally occur in areas that are open and easily accessible to the surroundings. These places are always located close to the street with buildings oriented to it. The frequently used area is in the middle of the square and is usually used for exercise. On the other hand, areas rarely used were located on the sides of the square, with limited or no access because of the boundaries

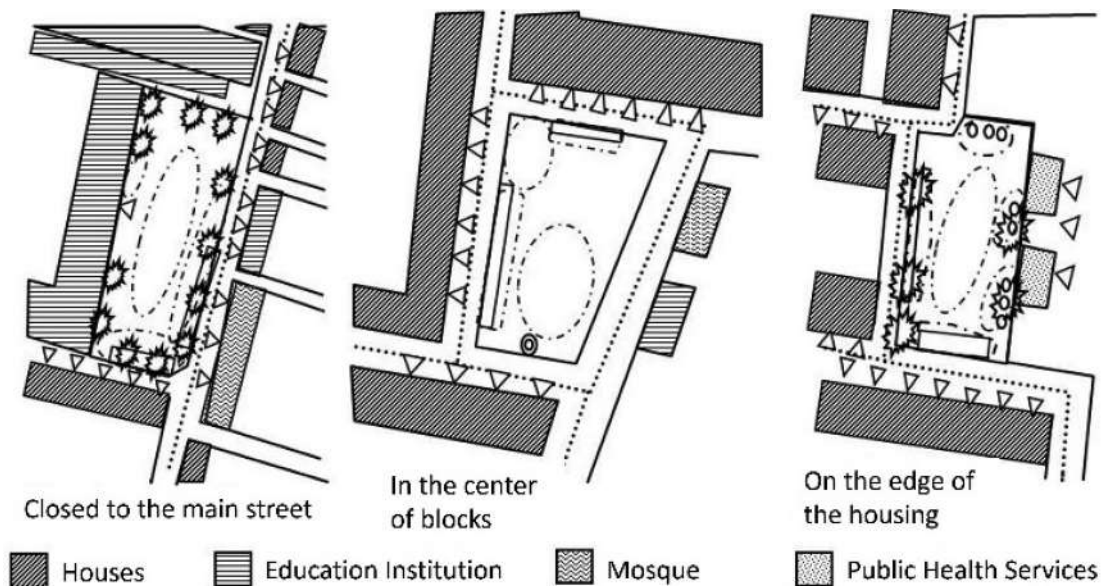


Figure 7. Square layout.

(see Figure 7). Contrary to the statement about the occupant's negative evaluation of the square located at the edge of the housing (Abus, Lubis, and Abus 2022), this phenomenon occurs in all cases.

Similar to other housing, in Yogyakarta's public housing, at the square located on the edge of the housing is used for various activities. Contrary to the findings of some previous studies and concepts (Son et al. 2022), the easy accessibility, attractive design, and proximity of public facilities make the square more useful. Consequently, it can be argued that easy accessibility, an interesting layout, and proximity to public facilities support a lively public open space compared to placement square locations on housing. This condition confirmed the achievement of a sustainability target (United Nations Environment Programme 2018).

According to previous research, community involvement is important in square development (Sundevall and Jansson 2020). This was confirmed by the residents in three cases. All squares were developed independently by the occupants to maximize space use. Social control and relationships among residents explain that the crime rate in the square decreases with strong relationships among residents. This occurred along the edge of housing. The desire of residents to live close to open spaces (Kramarova and Kankovsky 2021) with more attractive facilities was pursued by adding sports facilities, shaded trees, plants, and furniture. As expressed by some research, occupants add furniture such as trash cans, light stands, benches, plants, and various ground surfaces such as paving blocks, grass, and stepping stones (Son et al. 2022). The three cases show that in addition to the furniture pointed out in previous research, tables, basketball rings, football goalposts, badminton posts,

flagpoles, compost cans, and a large gazebo called *balai*.

Finally, most activities take place around fixed and semi-fixed elements, and at the entrance of educational institutions. Sports activities always take place in the middle of the square, such as football games in the square close to Main Street, badminton games, and basketball games in the other squares. The square edges where fixed and semi-fixed elements are found are generally used for play, socializing (in all square types), trade (the square close to the main street), and drying clothes (the square in the center of the blocks). The exception was seen in the square that was in the center of blocks with no fixed or semi-fixed elements on the side close to the street and houses because of floor height differences between the mosques and the square. The difference was quite large, at approximately 1 m. In the square close to the main street, there are kiosks with flexible and semi-permanent designs built by street vendors. When a square is used for worship, the kiosks are emptied so that they do not disrupt the ceremony. Similarly, in the square located in the center of the blocks, residents living close to the square added a rack to dry clothes during the day when no one used it. Both cases show that most furniture placed near houses or neighborhood streets is private furniture owned by occupants or vendors. Therefore, the closer the street, the more residential buildings there are, and the greater the privatization carried out by occupants through the placement of semi-fixed elements.

The findings reveal that the square in public housing complexes in Yogyakarta serves as a multifunctional space that enhances urban sustainability, aligning with **SDG 11: Sustainable Cities and Communities**. As a central node for social interactions,

community gatherings, and informal economic activities, the square significantly contributes to livability (SDG 11.1) and supports inclusive urban planning (SDG 11.3). This research highlights that its strategic location and adaptability to various uses reinforce resident's engagement in shaping their built environment, demonstrating the potential for bottom-up governance models in public space management. Additionally, the presence of the square enhanced accessibility and public safety, supporting SDG 11.7, which advocates inclusive and safe public spaces (Nations 2021). However, challenges such as spatial conflicts, inadequate maintenance, and encroachment risks indicate the need for policy interventions that prioritize community-driven spatial governance. These insights underscore the importance of integrating resident-led initiatives into urban housing policies to ensure long-term sustainability and resilience of the square as a key urban element.

6. Conclusion

This research highlights the multifunctional role of public housing squares as spaces for community gatherings, educational activities, religious events, and major celebrations such as Indonesia's Independence Day and Islamic holidays. By analyzing three selected cases, this study identifies key spatial and social variables that shape the placemaking process. First, squares located near the main streets provide a greater variety of public facilities, attract more diverse user groups, and support a wider range of activities. While all user groups utilize spaces near neighborhood streets, women tend to prefer areas with visual protection, shade, and clear sightlines for children's activities. In daily use, children and women dominate squares located at the center and edge of the housing area, whereas street vendors are more prominent in squares adjacent to the main streets. Second, the functions of the surrounding buildings influence square utilization. Squares near the main streets are typically bordered by educational institutions, mosques, and commercial establishments, fostering higher foot traffic and social interactions. By contrast, squares deeper within the housing area are primarily surrounded by residential buildings, leading to different patterns of use. Third, spatial configuration plays a crucial role in the activity distribution. Squares with open layouts, easy accessibility to residential units, and proximity to public facilities tend to support more dynamic interactions. Parking areas are generally located near square entrances or adjacent to public buildings, which further reinforce the connection between mobility and space usage.

Beyond physical characteristics, this study emphasizes the role of residents in shaping and sustaining

public squares. Community participation is evident in the addition of infrastructure elements such as benches, tables, plants, lighting, playgrounds, and sports equipment. Social and trade-related furniture is typically placed near houses or streets, whereas sports-related elements are positioned at the center of the squares. The presence of semi-fixed elements also indicates varying degrees of privatization, with squares enclosed by residential buildings exhibiting more personalized modifications by occupants.

From these findings, four key factors emerged as critical to sustainable placemaking in public housing squares: proximity to streets, the function of surrounding buildings, accessibility, and the placement of furniture. The most active and widely used squares are those that are easily accessible, surrounded by both functional and residential buildings, and are capable of accommodating diverse activities. The closer a square is to a main street, the more varied its activities are. Similarly, improved accessibility encourages greater diversity in terms of both users and functions. Women tend to gather in shaded areas with clear visibility of children's play zones, highlighting the relationship between spatial design and social interaction. To provide specific recommendations, this study can translate its findings into design guidelines for optimal spatial configurations, accessibility, and user engagement. It can also propose policies that encourage sustainable placemaking, such as regulations for integrating multipurpose public spaces into housing development. Additionally, engaging stakeholders in participatory planning and assessing the long-term adaptability of public squares would help align interventions with community needs, while supporting economic activities and social interactions.

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Placemaking in Yogyakarta's public housing: the role of square layouts and community initiatives in sustainable design

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ABSTRACT

In Yogyakarta's public housing, squares are created by residents and local institutions, while the regulations only require a standard size. This regulation gap has created wide variation in square design and use among neighborhoods. This study explores how placemaking process through spatial layout and use uncover main features for sustainable public housing. Employing a multiple case study methodology, three squares were investigated to examine interactions across layout, use, and community agency. Data were gathered using a mix of spatial mapping of boundaries and accessibility, behavioral observations of everyday and event-based uses, interviews with residents, and visual recording of user-led modifications. Comparative analysis revealed squares have multi-purpose functions, with function influenced by streets distance, building's function, accessibility, and semi-fixed elements. The most vibrant squares were also situated adjacent to streets, accommodating diverse activity and user groups, and encouraging social interaction. Locally initiated changes enhanced usability but also reacted to localized privatization efforts. The study concludes that sustainable public housing design should include flexible frameworks that ensure people's participation, prioritize accessibility, and utilize semi-fixed elements to meet the balance between functionality and socio-cultural needs. The process is conducive to SDGs 11's vision of inclusive, safe, and resilient cities.

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1. Introduction

Public housing development requires well-planned open spaces, especially squares, to serve as spaces for play, exercise, and social interaction among residents and locals. In Indonesia, the provision of squares in public housing is mandated by Ministry of Home Affairs Regulation No. 9 of 2009 (Menteri 2009), which requires developers to allocate land for square facilities. However, this regulation focuses primarily on land allocation rather than on the development of functional public spaces. As a result, many public housing squares, especially those provided by public housing agents are underutilized, whereas others are independently designed and developed by occupants' institutions to suit their needs.

The process of transforming these spaces into vibrant community hubs is known as placemaking. Placemaking extends beyond aesthetic improvements, as it fosters social interactions (Costa et al. 2021), enhances community engagement (Richards 2020; Sen and Nagendra 2020), and contributes to a sense of belonging (Bagiouk and Sofianou 2020)

among residents. Previous studies have highlighted the role of occupant participation in shaping open spaces, particularly in the public housing context. Zhang et al. (Zhang, Zhang, and Liang 2024) stated that direct public involvement in open space design strengthens a community's attachment to a space, whereas Siu and Soyinka (2018) revealed that such community involvement in open space maintenance is more prevalent in public housing than in other types of housing development.

A relevant case of placemaking in public housing was observed in Yogyakarta, where community-driven initiatives have shaped public squares since the 1970s. Yogyakarta, characterized by medium-scale housing and strong local cultural influences, presents a unique context for studying the variations and challenges of placemaking. The National Urban Development Corporation provides the initial square facilities, which are further developed through resident and institutional participation. This grassroots approach aligns with the key principles of placemaking, which emphasize inclusivity, adaptability, and cultural sensitivity.

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Placemaking is crucial to fostering sustainable urban development. According to Ellery et al. (Ellery, Ellery, and Borkowsky 2021), effective placemaking creates a strong sense of place, which influence how individuals perceive and interact with their surroundings. Furthermore, placemaking integrates key urban design criteria including accessibility, comfort, diverse activities, and sociability to ensure that open spaces remain functional and engaging. It also contributes to achieving the Sustainable Development Goal (SDG) 11 target of creating safe, inclusive, and accessible public spaces (United Nations Environment Programme 2018).

Housing squares can be categorized based on hierarchy, function, and form. Gupta et al. (2016) classified squares into different scales, from doorstep play spaces to city parks, while Winandari et al. (Winandari, Wibisono, and Djunaedi 2024) categorized square functions, including ceremonial spaces, meeting places, and recreational areas. In Indonesia, public housing squares are designated for multiple functions, such as sports fields, public parking, and communal gathering areas, as outlined in Ministry of Home Affairs Regulation No. 9 of 2009 (Menteri 2009).

Understanding placemaking within public housing squares requires an examination of the spatial layout and space utilization. The relationship among space layout, user activities, and community engagement plays a crucial role in determining the effectiveness of public spaces. The physical layout of the squares, including boundaries and spatial elements, influences their use and accessibility. Additionally, social factors, such as user demographics, behavioral patterns, and community involvement, shape the success of these spaces.

This study explores how placemaking influences the development and functionality of public housing in Indonesia. By analyzing case studies, this research identifies key factors contributing to sustainable placemaking and proposes design strategies that enhance the quality of public spaces. The findings provide valuable insights for urban planners, policymakers, and community stakeholders in creating more inclusive and livable public housing environments.

2. Literature review

2.1. Sustainable placemaking

Placemaking can be rephrased as the process of creating unique, meaningful, and engaging spaces that foster a sense of community and enhance the quality of life of its inhabitants. It involves designing and managing public spaces that are accessible, vibrant, and reflective of local culture and context. This approach prioritizes the needs and aspirations of people who live, work, and play in these spaces, aiming to

create a strong sense of place and belonging. According to Ellery et al. (Ellery, Ellery, and Borkowsky 2021), placemaking principles are: 1) the process of placemaking creates an attachment or connection between the community member and the place in which they live, work, and play, which is often referred to as an individual's sense of place; 2) an individual's "sense of place" can be either positive or negative in nature; and 3) placemaking as a process can occur along a continuum from change that is imposed upon an individual to change that is created by the individual.

Placemaking involves participation of the community, stakeholders, and government in the planning, design, management, and programming of public spaces. Placemaking has four criteria for creating successful places: access and links, comfort and image, uses and activities, and sociability. Placemaking can be used as a tool to improve the living conditions and quality of life of residents of informal settlements, which are areas of unplanned and substandard housing that often lack basic services and infrastructure. Placemaking faces challenges such as lack of knowledge and experience, community participation, regulations and policies, funding, and time (Mehanna and Mehanna 2023). Community involvement in design fosters sustainable development (Yuliani, Hardiman, and Setyowati 2020).

One of SDG 11's targets is to have a safe, inclusive and accessible square (United Nations Environment Programme 2018). Squares can be grouped in several ways, for example, according to their hierarchy, function, or form. Based on hierarchy, Gupta et al. (2016) classified squares as play spaces at doorsteps, neighborhood parks, community parks, and city parks. In addition, the Ministry of Home Affairs of the Republic of Indonesia Regulation no. 9, 2009, states that a housing square can function as a sports facility, field, public parking lot, and cemetery.

As mentioned earlier, public housing squares in Yogyakarta have applied placemaking principles in their design process. Different researchers have varied in their suggestions regarding the elements that play a key role in placemaking. PPS asserts that the user, activity, comfort, image, accessibility, connectedness, and sociability are key elements in placemaking. Son et al. (2022) argued that space identity, community, collaboration, and holistic plans are core elements of placemaking. Generally, all these key elements imply that the placemaking process is evident in the layout and use of space. A two-way relationship between layout and the use of space occurs to maximize user needs through appropriate design. The space layout is formed by boundaries and elements consisting of fixed, semi-fixed, and non-fixed elements. The use of space is closely

related to the user, time, and activities that occur there. Figure 2 shows the relationship between layout, use of space, and appropriate design.

2.2. Space layout

The space layout is influenced by boundaries and elements. The space boundaries can be walls or plants. Wall height and plant density affected the closure space level. Space elements can be grouped into three types: fixed-feature space, semi-fixed feature space, and informal space (Winandari and Pramitasari 2012). A permanent element is difficult to move. An example of a semi-permanent element is furniture, which is easily movable. The informal elements consist of human activities, and behavior. Examples of these elements are walls, floors, sculptures (Winandari and Pramitasari 2012), trash cans, light stands, benches (Winandari 2015), plants such as trees, flower/vegetable gardens, shrubs, fruit trees, perennial plants (Cosco 2007), varied ground surfaces, mounds/slopes, logs, vines, stepping stones, smooth rocks, pets, play equipment, sand play, play-houses, picnic tables, water play, benches, swings, arts/crafts, balance beams, and music play (Smalberger 2005). Both the boundaries and elements were used to determine the existence of a space layout.

2.3. The use of space

Understanding the relationship between users and activities is important for maintaining space characteristics and activities (Costa et al. 2021). Moreover, Akbar and Edelenbos (2021) state that this relationship involves many people at various levels as well as better resources. Research conducted by Smalberger (2005) suggests that one's experience and memory affect one's views of life. This finding is reinforced by Yu and Rosenberg (2020), who argued that the environment's role in people/environment relationships is to provide safety and emotional comfort. This can be achieved through the social and cultural values offered by open space (Sundevall and Jansson 2020). One effective way to strengthen the emotional connections between people, parks, and communities (Ji 2009), as well as improve societal welfare (Ricketts 2008), is to involve occupants directly in the design and management. According to Wickes and Hipp (2018), the relationship between residents and social control can reduce crime rates. The largest users of open spaces are children, teenagers, and seniors (Kramarova and Kankovsky 2021). Users can be grouped based on age, ethnicity, gender (Winandari 2015), or social class. Each group has different needs and usage patterns.

2.4. Appropriate design of housing square

Residents want to stay close to the open space (especially if the space has a larger size and more attractive facilities (Wu and Plantinga 2003). Winandari et al. (2014) argued that the use of space should provide for interaction among the young and parents, groups, and individuals, as well as males and females as much as possible. This is much easier if the space has an open layout that increases human activity and social relations (Winandari and Pramitasari 2012).

Several studies found that a good open space has a green wide sidewalk with a narrow street, spread in several locations (Wu and Plantinga 2003), near their house (Elshinawy et al. 2023), easily accessible (Sundevall and Jansson 2020), and is in harmony with the local environment (Abus, Lubis, and Abus 2022) to support the activities of individuals and groups. Spaces should be placed in the middle of residential environments (Winandari 2018) for easy access and utilization. A study revealed that horizontal housing occupants gave a negative assessment of the square located at the housing tip or edge due to safety, hazard, and anti-social issues that may occur (Urban Parks 2007). Related to square quality, previous research shows that a high-quality large park within walking distance is more important to residents than several open spaces within a short distance (Sugiyama et al. 2010).

3. Methods

This study employs an exploratory case study approach to investigate the placemaking process in public housing squares in Yogyakarta. The methodology is structured to facilitate a comparative and analytical assessment of how the spatial layout influences user activities across different square locations within public housing environments. This study did not require formal ethical approval as it focused on publicly accessible communal squares and did not involve sensitive or identifiable personal data. Interviews with community members were conducted with verbal consent and full understanding of the research objectives. The participants were informed that their involvement was voluntary, and no personal data was collected.

Case selection followed a purposeful sampling strategy, focusing on three distinct square locations within public housing: the center, edge, and corner of the housing area. These locations were selected based on their spatial characteristics and frequency of use. The selection process was conducted in three stages: a grand tour observation of 40 squares in four public housing complexes in Yogyakarta, categorization of square locations into 10 squares near the main street, 23 squares in the center of housing blocks, and seven squares at the housing edge; and the final selection of

one square from each category with the highest recorded user activity for an in-depth case study.

To analyze the spatial layout and use of space, a multi-method data collection approach was applied, consisting of physical observations and in-depth interviews. Physical observations were conducted to document the spatial characteristics, patterns of movement, and activity distribution within the selected squares through systematic photographic documentation and direct mapping of space utilization. In-depth interviews were conducted with 20 housing occupants and two government officials to understand their motivations and perceptions regarding space usage.

The analytical process was structured into five stages to ensure the systematic comparison and synthesis of the findings. First, a literature review was conducted to identify the key variables influencing placemaking, including the square location, spatial boundaries, layout configuration, and activity patterns. This step also helped to establish the study's research propositions. Second, an empirical study and data collection were conducted through physical observations and interviews to gather factual data on spatial configuration and activity patterns. Third, the collected empirical data were mapped to visually represent the relationships between spatial configuration and use patterns. Fourth, a comparative case analysis was conducted by systematically comparing spatial characteristics and activity patterns across the selected squares. The analysis involved both an intra-case examination and cross-case comparisons to identify the spatial determinants that influence placemaking outcomes. Finally, the results were synthesized into broader theoretical insights, contributing to an enhanced understanding of placemaking in public housing squares.

This study primarily employs qualitative descriptions, and the findings are systematically analyzed and synthesized to generate theoretical insights rather than statistical generalizations. The comparative approach, which involves cross-case analysis and

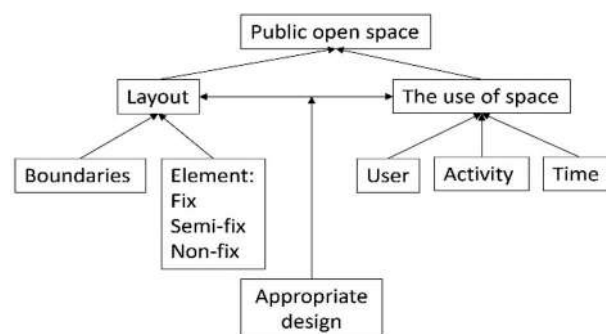


Figure 1. Components that influence public housing square.

mapping of spatial use patterns, ensures that this study provides a structured and rigorous examination of placemaking dynamics in public housing squares. By identifying key spatial determinants and their influence on user behavior, this study contributes to a deeper theoretical understanding of the relationship between spatial layouts and social interactions in shared public spaces.

4. Result

4.1. Yogyakarta's public housing data

Yogyakarta is a province comprising four districts and one municipality. There are four public housing sites in this province: Condong Catur, Minomartani, Trimulyo, and Guwosari (Figure 1). Based on the public housing agent's archive, the four public housings units are mass housing with more than 1000 units lying between 21- and 32-hectare sized pieces of land. The housing design prioritizes the number of units that can be accommodated. Each feature had its own features.

The first is the Condong Catur public housing, the oldest public housing in Yogyakarta, built in 1976. Located in the Sleman district, it consists of 1249 units on a 21.741-hectare piece of land. It has 1206 households, with 4687 people living in this

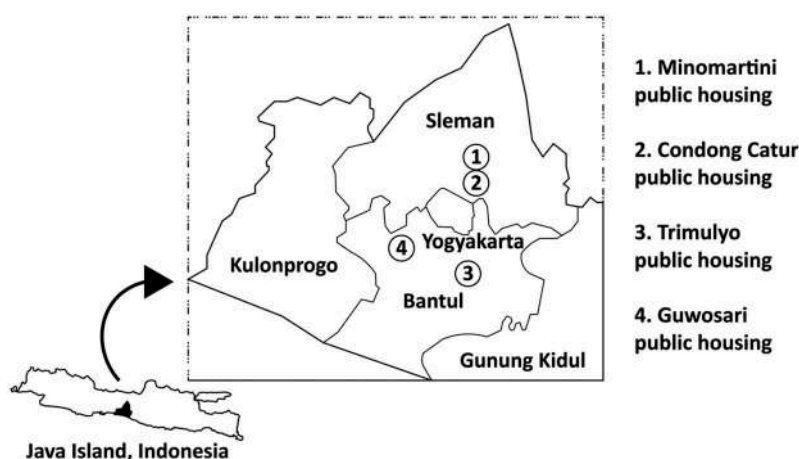


Figure 2. Location of Yogyakarta's public housing.

housing, grouped into 38 neighborhoods, and had the highest density (2156 people/km²). The second is Minomartani public housing, built in 1981 and located in Sleman district. It has 1936 units – with the largest number of units spread over 32.441 hectares of land. This public housing has 1833 households with 6063 people grouped into 30 neighborhoods. The third is Trimulyo public housing built in 1994 in the Bantul district. It has 1936 units; the largest number of units spread over a 42.18-hectare piece of land. There were 484 households with 1188 people grouped into eight neighborhoods, forming part of the three blocks. Lastly, Guwosari public housing was built in 1996 and is located in the Bantul district. It has 1082 units on a 25.7-hectare piece of land. This housing consists of 111 households with 333 people grouped into four neighborhoods that form part of the two hamlets. Unlike the first two, the latter two houses, Guwosari and Trimulyo, have larger areas with lower densities (120 people/km² and 542 people/km², respectively). As the most recent type of public housing, both are still under construction and are located in a less developed district.

The two oldest public housings were originally intended for local civil servants, while the others were intended for middle- to low-income people who living in Yogyakarta. Along the way, non-public servants bought houses from public servants that were sold due to retirement or moved to another town.

Public housing blends with the surrounding environment as there is no fence separating the two. It is open and freely accessible to occupants or locals through several entrances. The main streets in public housing have become the main connecting lines between important places in the districts.

In relation to public open spaces, the National Urban Development Corporation as a public housing developer, only prepared land for public and social amenities. The facilities were built by relevant institutions or residents at the neighborhood level living around the space. They made decisions about its design, development, and management. This process has taken place since inhabitation until now. These amenities consist of educational facilities, health facilities, public administration blocks, and sports centers scattered in several places depending on the ease of accessibility of each user group. However, there are blocks that have no public open space in their neighborhood, especially in the Condong Catur Public

Housing, which has only three public open spaces for all residents.

4.2. Square layout and the use of space

Blended with the surroundings, all public housing facilities including the square, can be easily accessed and used by residents and locals. All public housing squares are owned by the local government and managed by the neighborhood board. Each housing had several squares scattered across several locations. Based on its location, the square of public housing in the four cases can be grouped into three types: close to the main street, in the center of the blocks, and at the edge of the housing (see Figure 3). Most of these squares (43%) are situated in the center of the blocks surrounded by streets, with houses that are fronted onto the street. Thirty-four per cent of the squares are situated close to the main street, and 23% are on the edge of housing. The layout and use of space character results for the three types of squares show the similarities and differences between them.

4.3. The square close to the main street

Ten squares are located close to the main street. One of them is Condong Catur public housing. Surrounded by streets on both sides and bounded by high walls on the other two sides, this space is enclosed by public facilities such as elementary school, public junior high school, private kindergarten, mosque, commercial facilities (semi-permanent kiosks), and houses. The street around the square measuring 6 m wide and covered with asphalt, connects the square to public facilities and houses with no pedestrian ways. The space boundaries consist of high walls to schools and streets, as well as gutters to houses and other public facilities. Inside the square, there are some fixed elements such as kiosks, signage, and trees, and semi-fixed elements such as soccer posts, benches, tables, pushcarts, and trash cans that make up the square layout (see Figure 4).

This square was used daily and at specific times. All activities were performed by residents, educational institutions, and mosque organizations around the field, as well as locals. Daily, this square is used as a place to play, exercise, socialize, and trade. The children play and eat three times a day. On the other hand, students play twice a day and exercise once a day from

Q2

Table 1. Yogyakarta's public housings data.

| Public housing | Year of construction | District | Number of housing units | Area (ha) | Number of households | Number of populations | Number of neighborhoods |
|----------------|----------------------|----------|-------------------------|-----------|----------------------|-----------------------|-------------------------|
| Condong Catur | 1976 | Sleman | 1249 | 21,741 | 1206 | 4687 | 38 |
| Minomartani | 1981 | Sleman | 1936 | 32,441 | 1833 | 6063 | 30 |
| Trimulyo | 1994 | Bantul | 881 | 42,18 | 484 | 1188 | 8 |
| Guwosari | 1996 | Bantul | 1082 | 25,7 | 111 | 333 | 4 |

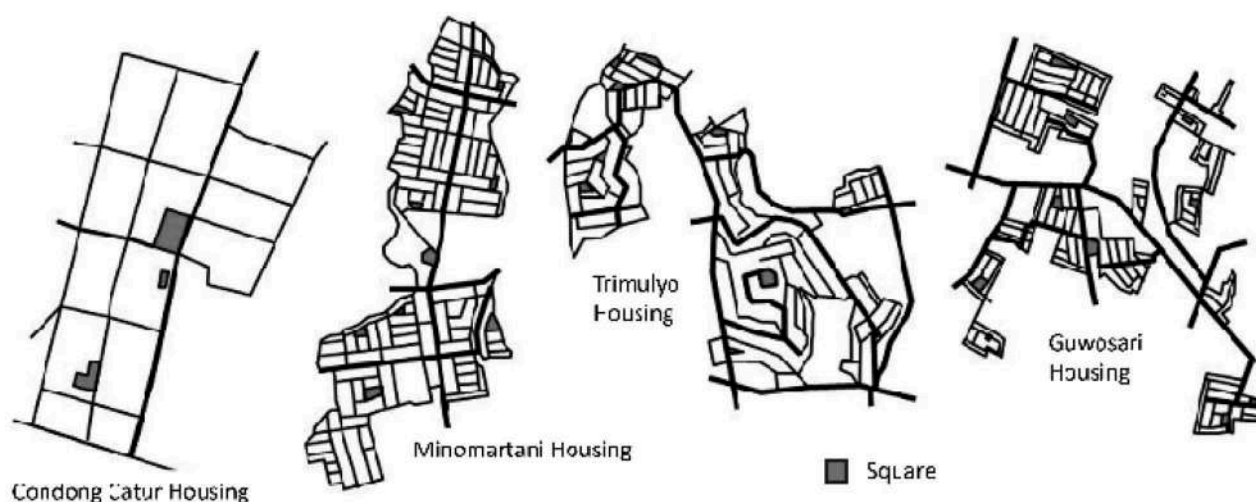


Figure 3. Square location in Yogyakarta's public housing.

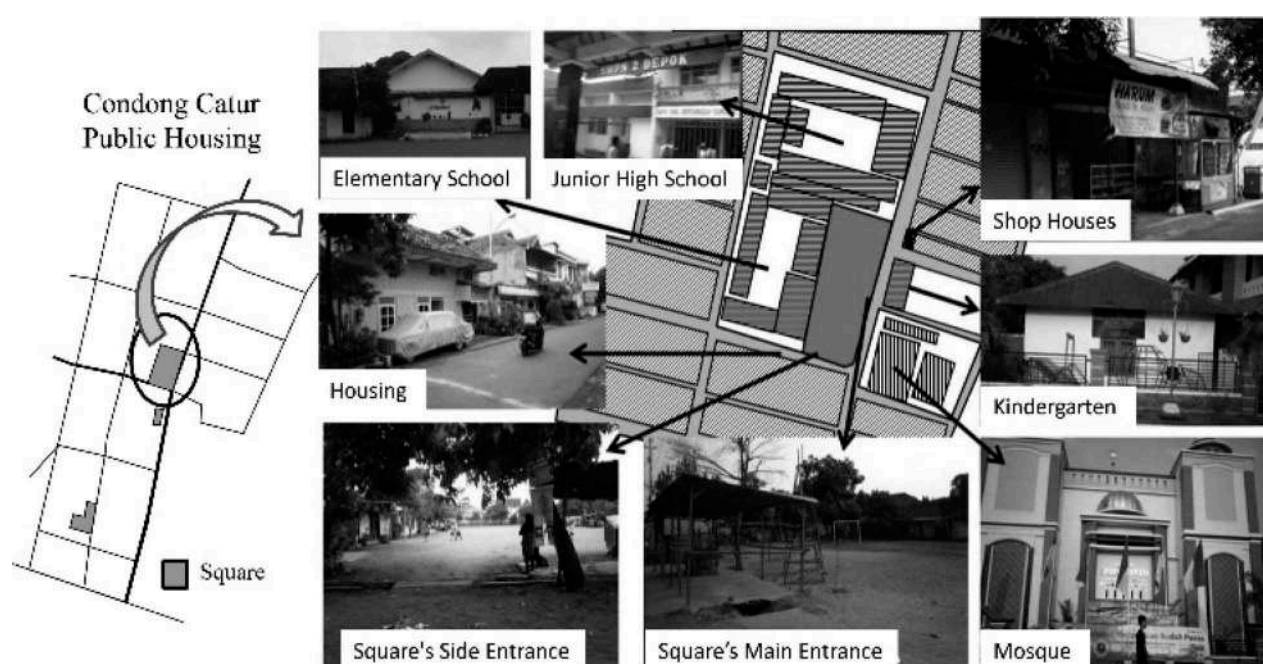


Figure 4. Square close to the main street.

07.00 am to 10.00 am. Both used it at different times. During school hours, the eastern side of the square was used by school staff as a parking area. Men and teenagers gather and chit chats once a day; on the other hand, women take care of children and chit chats twice a day. Temporary vendors sell their merchandise once a day from 09.00 to 09.15 am. Permanent vendors sell their things from 09.00 am to 08.00 pm. Some of them were occupants of public housing, while others were the surroundings.

During holidays such as the Independence Day of the Republic of Indonesia or an Islamic holiday, this square serves as a place for inter-village football matches, grand ceremonial occasions, Eid's prayers, and animal sacrifices for Eid Al-Adha celebrations. Occupants and locals use it for prayers twice a year during the Eid Al-Fitr and Eid Al-Adha holidays. In addition, they use it for animal

sacrifice once a year during the Eid Al-Adha holiday. On Independence Day, this square is used for a flag ceremony once a year and for football games ahead of the celebration. These activities are favored by the square's location close to the educational institutions and the largest mosque in this housing, as well as its location in the center of housing.

4.4. The square in the center of blocks

Twenty-three squares were located at the center of the blocks. This is typical for most public housing in Yogyakarta. One was in the Minomartani public housing. Surrounded by streets on either side, separating the square from houses, this space is enclosed by houses and public facilities, such as kindergarten and mosque. Similar to the first case, these streets connect the square

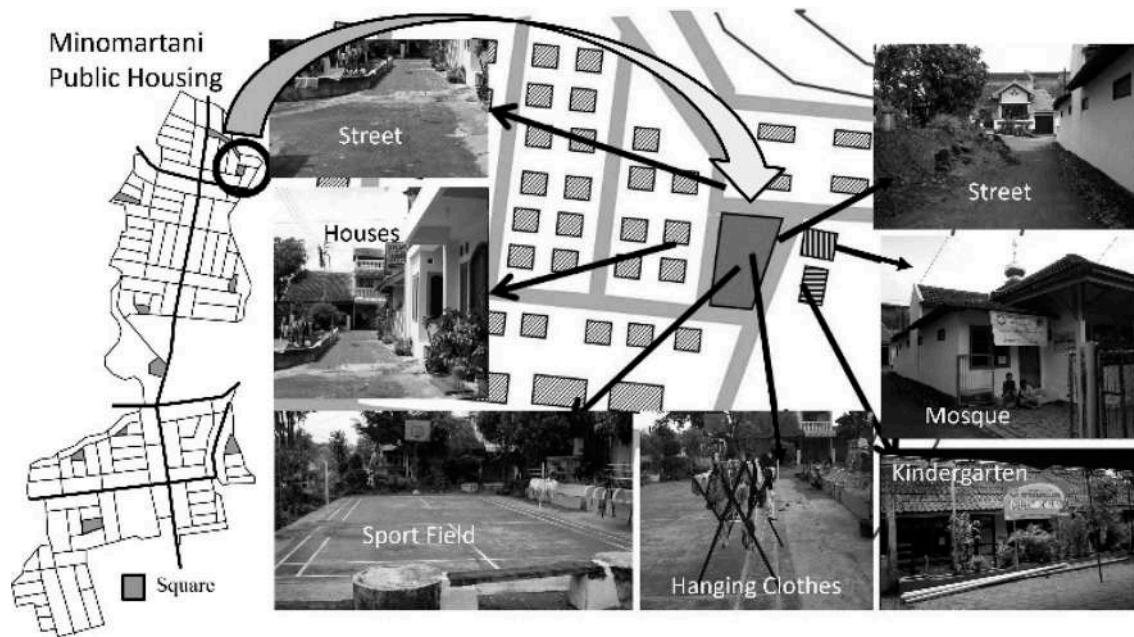


Figure 5. Square location in Yogyakarta's public housing.

to public facilities and houses without pedestrian ways. However, this street is 4 m wide and is covered by asphalt and paving blocks. This square is bounded by permanent benches as high as 50 cm, a street connecting the houses on the eastern side with a floor height of approximately 1 m, and shrubs to the public facilities on the south and western sides. Inside the square, there are some fixed elements, such as benches, basketball posts, badminton posts, trees, shrubs, and semi-fixed elements, such as racks for drying clothes and trash cans.

Used daily and at specific times, all activities were performed by residents and locals. This square is used daily as a place for play, sports, socializing among residents, and drying clothes. Children and women take care of children who are playing, eating, and chatting with each other twice a day. Both used at square at the same time. Teenagers play basketball and chat once a day. Men chit-chat once a day and play badminton once a week. Clothes are dried throughout the day, particularly on shiny days.

On specific days, like the days prior to the Independence Day of the Republic of Indonesia, this square serves as a place for various games, communal meetings like the *tirakatan* in local language as well as a venue for performance. Its location in the center of the blocks and not being close to the main street makes it a semi-public square that is often used by residents around it and rarely by locals. The existence of a private rack for drying clothes confirms that this square is semi-public.

4.5. The square at the edge of the housing

Seven squares were located at the edge of housing. These are rare in Yogyakarta's public housing. One was in the

Minomartani public housing. This square is surrounded by a street on the south and western sides that separates the square from the houses. The streets on both sides connecting the square to the public facilities and houses were 4 m wide and covered with asphalt with no pedestrian ways. This square is bounded by the gazebo to the houses on the southern side, compost cans to the houses on the western side, a wall to the public facilities on the eastern side, and a floor elevation of approximately 15 cm high on the northern side. On the northern side, close to the square, there is public health care and a neighborhood hall called *Balai RW*. Inside the square, there are some fixed elements such as benches, flag posts, badminton posts, flower cans, compost cans, halls, signage, water tower, trees, shrubs, and semi-fixed elements such as trash cans (see Figure 6).

This square was used daily and at specific times. In its day-to-day life, it was used as a place for play, sports, and socialization among the occupants. Children play and eat twice a day, as well as women taking care of children, and each of these gathers there at the same time. Teenagers gather once a day. Men gather once a day and play badminton twice per week. Similar to the second type, it also serves as a place for various games, performances, and *tirakatan* prior to the Independence Day of the Republic of Indonesia. Although it is located at the edge of the housing, the square is used by residents and nearby neighbors.

5. Discussion

The three cases of public open spaces have their own layouts and user activities. All are used for several activities, such as playing, eating, taking care of

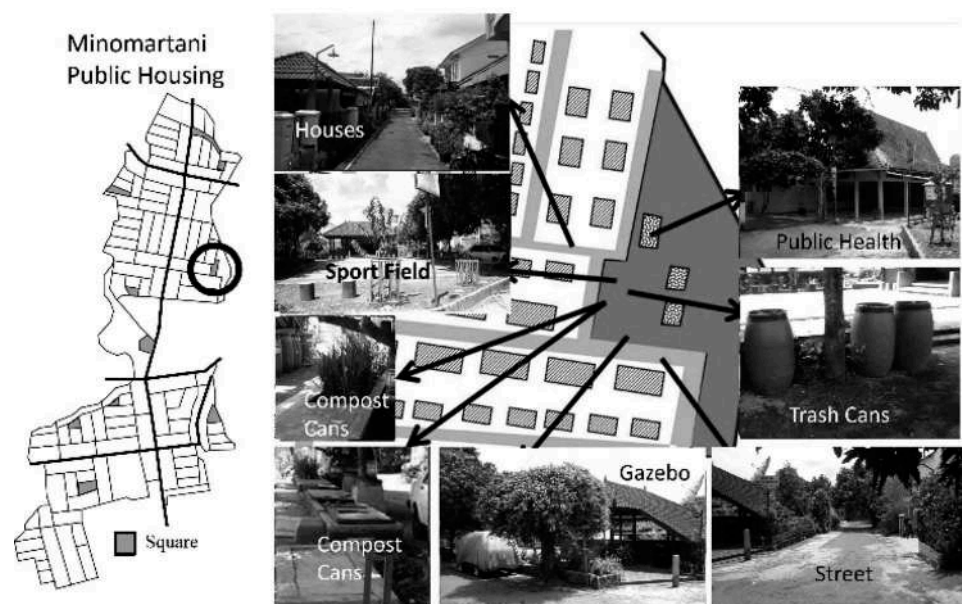


Figure 6. Square at the edge of the housing.

children, exercising, parking, socializing, trading, praying, and drying clothes. The cases were compared to determine their similarities and differences. There are several ways to explore the similarities and differences

First, in contrast to Guptas' (Gupta et al. 2016) concept of square hierarchy, the three cases serve as neighborhood parks and sports facilities. All were designed and used for local-scale neighborhoods. The layouts of squares vary depending on their access to the main streets, the functions of the buildings around them, the building orientation, and the boundary. The accessibility to the square from Main Street and the surroundings (see Figure 4–6) shows that the square close to the main streets has more space utilization and user groups. Compared to others, there is an increase in the number of activities and in the variety of users owing to the variety of public facilities and the presence of the main street.

On the other hand, the other two are dominated by houses and surrounded by the neighborhood's streets. It reduces the number of activities and limits the user groups. Daily square users are dominated by children and women taking care of their children. Exceptions are found in the square close to the main street where the user group is dominated by street vendors who sell throughout the day. In contrast to Huang et al. (Huang, Deng, and Fei 2025), who asserted that there are different needs and usage patterns for each group, all cases showed that all the groups tended to use the space close to the neighborhood street. The exception is in the square close to the main street and school entrance, which is used for parking. It could be argued that the closer the street, the more varied the activities and users.

In accordance with the Winandari (Winandari, Wibisono, and Djunaedi 2024) criteria, the three cases are enclosed squares surrounded by houses, except for the first type, which is close to the main street which is surrounded by educational institutions and mosques. The results of the three cases suggest that the spaces serve as meeting places as well as great places for ceremonial occasions. Yogyakarta's public housing squares do not provide a setting for civic buildings or buildings for recreation, but serve as settings for educational buildings and mosques. In line with their function as great places for ceremonial occasions, these squares are used for interaction by residents and locals especially during the celebration of the Independence Day of the Republic of Indonesia and Islamic holidays, such as Eid al-Fitr and Eid al-Adha. This reinforces the previous observation that a neighborhood square should be usable by everyone (Winandari, Wibisono, and Djunaedi 2024).

Thus, the activities on the square are influenced by the functions of the buildings around it and their location within the housing. Furthermore, at layout that is open and easily accessible, increases activity and social relations between residents and locals (Yu and Rosenberg 2020). All squares show that activities generally occur in areas that are open and easily accessible to the surroundings. These places are always located close to the street with buildings oriented to it. The frequently used area is in the middle of the square and is usually used for exercise. On the other hand, areas rarely used were located on the sides of the square, with limited or no access because of the boundaries (see Figure 7). Contrary to the statement about the occupant's negative evaluation of the square located at the edge of the housing (Abus, Lubis, and Abus 2022), this phenomenon occurs in all cases.

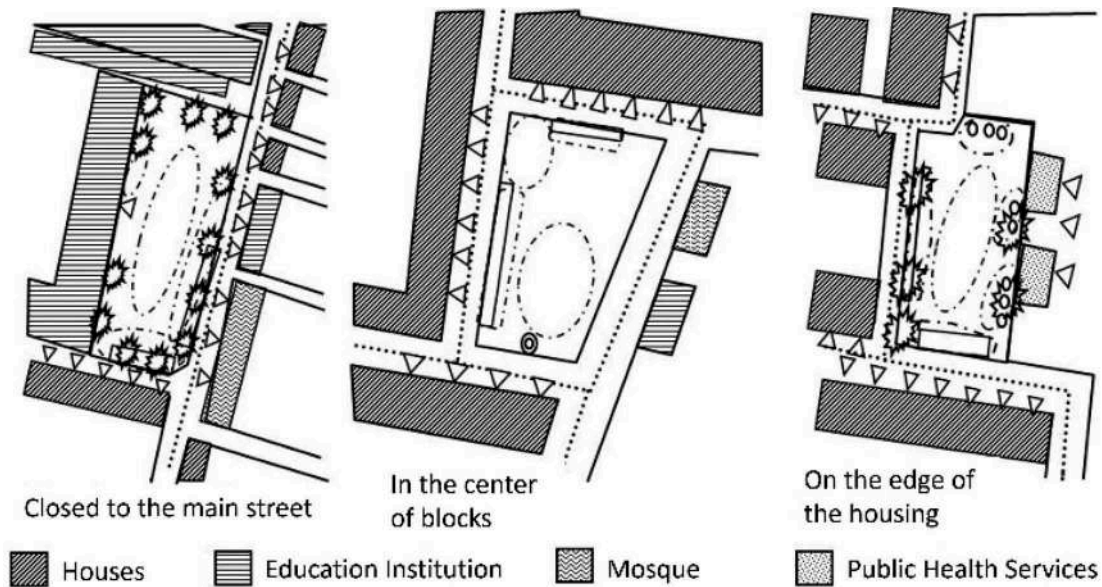


Figure 7. Square layout.

Similar to other housing, in Yogyakarta's public housing, at the square located on the edge of the housing is used for various activities. Contrary to the findings of some previous studies and concepts (Son et al. 2022), the easy accessibility, attractive design, and proximity of public facilities make the square more useful. Consequently, it can be argued that easy accessibility, an interesting layout, and proximity to public facilities support a lively public open space compared to placement square locations on housing. This condition confirmed the achievement of a sustainability target (United Nations Environment Programme 2018).

According to previous research, community involvement is important for square development (Sundevall and Jansson 2020). This was confirmed by the residents in three cases. All squares were developed independently by the occupants to maximize space use. Social control and relationships among residents explain that the crime rate in the square decreases with strong relationships among residents. This occurred along the edge of housing. The desire of residents to live close to open spaces (Kramarova and Kankovsky 2021) with more attractive facilities was pursued by adding sports facilities, shaded trees, plants, and furniture. As expressed by some research, occupants add furniture such as trash cans, light stands, benches, plants, and various ground surfaces such as paving blocks, grass, and stepping stones (Son et al. 2022). The three cases show that in addition to the furniture pointed out in previous research, tables, basketball rings, football goalposts, badminton posts, flagpoles, compost cans, and a large gazebo called *balai*.

Finally, most activities take place around fixed and semi-fixed elements, and at the entrance of

educational institutions. Sports activities always take place in the middle of the square, such as football games in the square close to Main Street, badminton games, and basketball games in the other squares. The square edges where fixed and semi-fixed elements are found are generally used for play, socializing (in all square types), trade (the square close to the main street), and drying clothes (the square in the center of the blocks). The exception was seen in the square that was in the center of blocks with no fixed or semi-fixed elements on the side close to the street and houses because of floor height differences between the mosques and the square. The difference was quite large, at approximately 1 m. In the square close to the main street, there are kiosks with flexible and semi-permanent designs built by street vendors. When a square is used for worship, the kiosks are emptied so that they do not disrupt the ceremony. Similarly, in the square located in the center of the blocks, residents living close to the square added a rack to dry clothes during the day when no one used it. Both cases show that most furniture placed near houses or neighborhood streets is private furniture owned by occupants or vendors. Therefore, the closer the street, the more residential buildings there are, and the greater the privatization carried out by occupants through the placement of semi-fixed elements.

The findings reveal that the square in public housing complexes in Yogyakarta serves as a multifunctional space that enhances urban sustainability, aligning with SDG 11: Sustainable Cities and Communities. As a central node for social interactions, community gatherings, and informal economic activities, the square significantly contributes to livability (SDG 11.1) and supports inclusive urban planning (SDG 11.3). This research highlights that its strategic location

and adaptability to various uses reinforce resident's engagement in shaping their built environment, demonstrating the potential for bottom-up governance models in public space management. Additionally, the presence of the square enhanced accessibility and public safety, supporting SDG 11.7, which advocates inclusive and safe public spaces (Nations 2021). However, challenges such as spatial conflicts, inadequate maintenance, and encroachment risks indicate the need for policy interventions that prioritize community-driven spatial governance. These insights underscore the importance of integrating resident-led initiatives into urban housing policies to ensure long-term sustainability and resilience of the square as a key urban element.

6. Conclusion

This research highlights the multifunctional role of public housing squares as spaces for community gatherings, educational activities, religious events, and major celebrations such as Indonesia's Independence Day and Islamic holidays. By analyzing three selected cases, this study identifies key spatial and social variables that shape the placemaking process. First, squares located near the main streets provide a greater variety of public facilities, attract more diverse user groups, and support a wider range of activities. While all user groups utilize spaces near neighborhood streets, women tend to prefer areas with visual protection, shade, and clear sightlines for children's activities. In daily use, children and women dominate squares located at the center and edge of the housing area, whereas street vendors are more prominent in squares adjacent to the main streets. Second, the functions of the surrounding buildings influence square utilization. Squares near the main streets are typically bordered by educational institutions, mosques, and commercial establishments, fostering higher foot traffic and social interactions. By contrast, squares deeper within the housing area are primarily surrounded by residential buildings, leading to different patterns of use. Third, spatial configuration plays a crucial role in the activity distribution. Squares with open layouts, easy accessibility to residential units, and proximity to public facilities tend to support more dynamic interactions. Parking areas are generally located near square entrances or adjacent to public buildings, which further reinforce the connection between mobility and space usage.

Beyond physical characteristics, this study emphasizes the role of residents in shaping and sustaining public squares. Community participation is evident in the addition of infrastructure elements such as benches, tables, plants, lighting, playgrounds, and sports equipment. Social and trade-related furniture

is typically placed near houses or streets, whereas sports-related elements are positioned at the center of the squares. The presence of semi-fixed elements also indicates varying degrees of privatization, with squares enclosed by residential buildings exhibiting more personalized modifications by occupants.

From these findings, four key factors emerged as critical to sustainable placemaking in public housing squares: proximity to streets, the function of surrounding buildings, accessibility, and the placement of furniture. The most active and widely used squares are those that are easily accessible, surrounded by both functional and residential buildings, are and capable of accommodating diverse activities. The closer a square is to a main street, the more varied its activities are. Similarly, improved accessibility encourages greater diversity in terms of both users and functions. Women tend to gather in shaded areas with clear visibility of children's play zones, highlighting the relationship between spatial design and social interaction. To provide specific recommendations, this study can translate its findings into design guidelines for optimal spatial configurations, accessibility, and user engagement. It can also propose policies that encourage sustainable placemaking, such as regulations for integrating multipurpose public spaces into housing development. Additionally, engaging stakeholders in participatory planning and assessing the long-term adaptability of public squares would help align interventions with community needs, while supporting economic activities and social interactions.

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