

Study of self-modification patterns in community-led housing for low-income people in Yangon, Myanmar

Yin Mon, Naing^{a*}, Hirohide, Kobayashi^a

^a Graduate School of Global Environmental Studies, Kyoto University, Kyoto, Japan

* Corresponding author: yinmonnaing91@gmail.com

ABSTRACT

Community-led housing was initiated in Myanmar in the late 2010s to counter the housing shortage faced by the urban poor. It has been helping the urban poor to secure the tenancy and ownership of affordable houses. However, the lack of design guidelines with the limited technical knowledge and finance resulted in sub-standard housings which led to the residents implementing modifications in their own houses to fulfil their needs. This study, thus, identifies the self-modifications patterns and the responsible reasons in the community-led housings in Yangon. Using case-study method, the study found that the residents made spatial extension, material changes and added supplementary building elements. The changes are done mainly due to the low performance of house caused by problems such as material wear-off, space limitation and poor indoor environmental conditions. Unlike the initial design, the modified dwellings had become more urban-oriented, durable and aesthetically pleasing. This study reveals the residents' changing needs and preferences while also raise the awareness of the housing flexibility and the indoor environmental quality as the design considerations. It contributes to the development of design guidelines for community-led housing that is both liveable and affordable for low-income families.

Keywords: *Community-led housing; housing conditions; low-income people; self-modification; Myanmar*

INTRODUCTION

Rapid urbanization has resulted in many urban poor living in informal settlements, vulnerable to disaster risks and forced evictions (Nassar, & Elsayed, 2018). To address these issues, different measures are introduced by the authorities, but these state-led approaches often lack the community's participation and cannot address the housing shortage of urban poor effectively. The failure resulted in the emergence of community-led housing (CLH) which considers stakeholder interests and facilitates the opportunity of self-help initiatives (Rahman, Hossain, & Kabir, 2016). CLH

is usually led by the communities themselves, with the support from the humanitarian organization, to secure the tenancy and ownership. It works in network from individual community group level to city-wide community organization to develop and manage the housing through the exchange of information and experiences (Boonyabancha, 2008; World Habitat, 2017).

CLH approach could help countries in achieving Sustainable Development Goal (11) by an increased access to adequate, safe and affordable housing for poor and vulnerable groups through their active participation in the process (Wang, 2020; United Nations, 2018). With proper planning and management, CLH units can deliver significant environmental, social and economic benefits to the residents and to the society as a whole. It provides the residents the pathway out of poverty as access to the housing including housing affordability while enhances cohesion and builds positive social capital within the network (Rahman, Hossain, & Kabir, 2016; Astuti & Prasetyo, 2014). Moreover, it enhances the sustainability of communities by adding to local housing supply for urban poor, offering amenities and facilities for the local community and acting as a learning platform and testbed for new approaches (Hudson, Scanlon, Arrigoitia & Saeed, 2019).

Yangon, the largest city of Myanmar, has the estimated informal dwellers ranging from 500,000 to 1 million (Forbes, 2019). Aiming to improve their livelihoods, the local civil society organization (CSO) introduced community-based saving groups and then developed into CLH with the saving groups members. The practice has demonstrated ways to support informal dwellers to secure the tenancy and ownership of affordable houses. Moreover, the completed housing projects act as learning medium by serving as case study areas for groups interested in developing future CLH projects (Lall, Mitra, & Sakuma, 2018). However, lack of design guidelines, along with limited budget, experiences and the technical capacity of community resulted in the sub-standard original housings with inadequate living conditions. Thus, to address the needs and discomfort in housings, the residents made modifications to their houses with available resources.

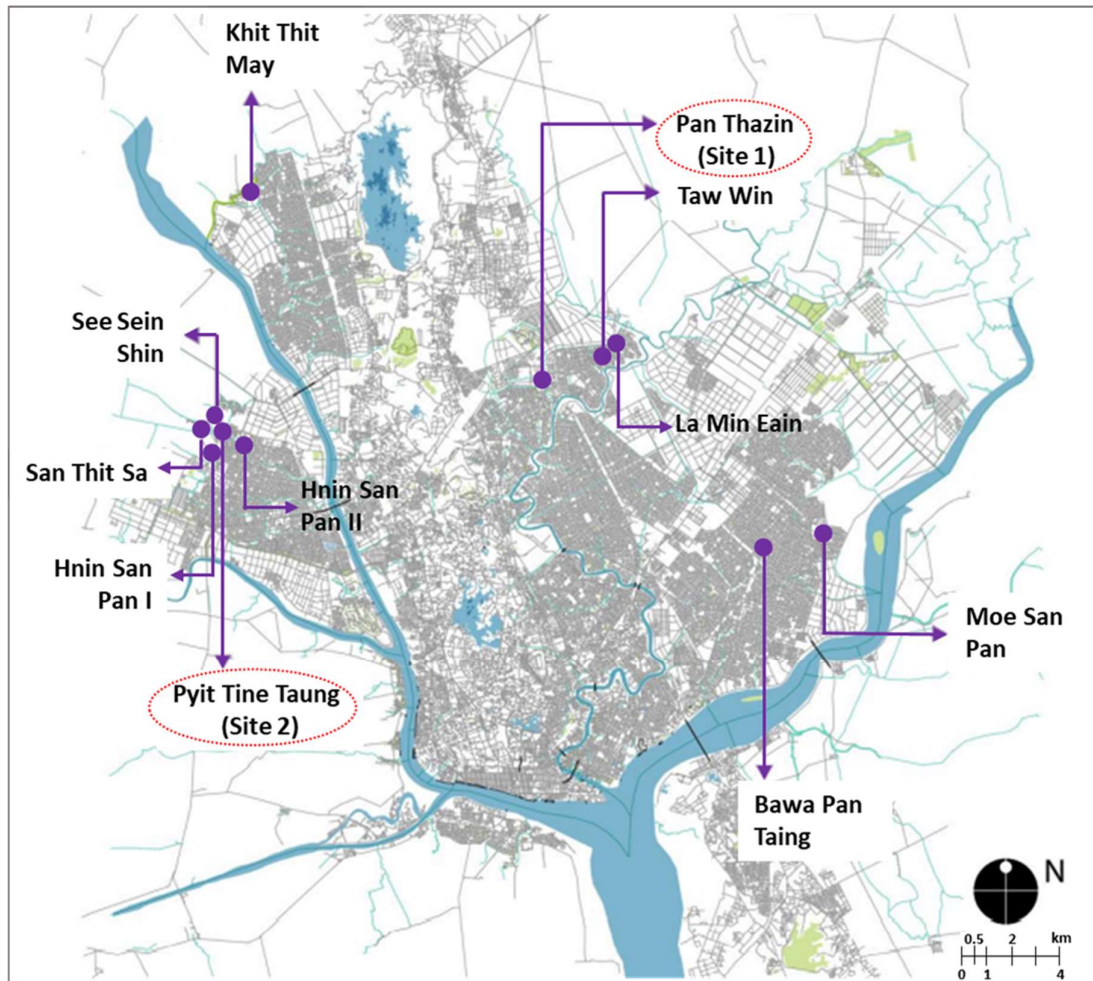
Housing modification includes any changes made to the original house, ranging from the furniture rearrangement and material changes, to structural alterations such as addition or demolition of parts of housing units (Ilesanmi, Jiboye, & Morakinyo, 2015). Modification represents the preferences, lifestyle and social status of the residents while it can enhance the residents' sense of pride and make them attached to their houses through gradual improvement to the houses (Manalang et al., 2002; Ibem, Opoko, Adeboye, & Amole, 2013). It is, therefore, important to acknowledge and understand the modification patterns and the reasons behind. Such changes can provide useful information for future housing guidelines and policies (Ward & Peters, 2007). Thus, this study attempts to investigate the self-modification patterns and their related reasons in existing CLHs to understand the design issues and the occupants' changing needs and preferences for the design guidelines development. This aims to enhance the urban poor access to the liveable and affordable housing and reduce housing inequality in urban areas, towards sustainable development in the cities.

RESEARCH METHOD

Basic information on case study area

As community-led housing in Myanmar is still in the initial phase, there are currently 11 projects (Figure 1) organized by the local CSO, Women for the World (WfW). As shown in Table 1, site-1 and site-2 were implemented in 2009 but following project activities were discontinued due to the difficulties in implementation from the political instabilities. WfW could restart the activities in 2017

as there was a shift in the governance system of Myanmar and also to accommodate the rapidly increasing number of informal dwellers in the city. From the preliminary field visit in 2019, it is found that site-1 and site-2 have undergone major transformations in both interior and exterior of houses and even the site upgrading. On the other hand, the recent project sites, site-3 to site-10 had only minor interior modifications in some houses while site-11 was rarely found with the modifications. Thus, out of all completed projects, the site-1 and site-2 were selected as case study areas as they show different patterns and have more cases and obvious manifestations of self-modifications compared to other sites. Site-1 consists of 30 housing units with 131 residents and site-2 has 65 housing units with 271 residents. As shown in Figure 2, the housing units were laid back-to-back in clustered form along the shape of the site. In addition, each site has infrastructures such as tube well, public toilet and community centre where the residents usually have weekly meeting and other community activities for both residents and nearby neighbourhood. While both sites have similar original housing designs, houses in site-2 have a larger floor area due to cheaper land from being located in a less developed area. The majority of the residents of both sites are daily workers working in industries, such as highway bus station, factories, etc. located near their houses.



Source: modified from Lall, Mitra, & Sakuma, 2018

Figure 1: Location map of CLHs in Yangon

Site no.	Site name	Location	Year	Units
Site-1	Pan Thazin	North Okkalar	2009	30
Site-2	Pyit Tine Taung	Hlaing Thar Yar	2009	65
Site-3	See Sein Shin	Hlaing Thar Yar	Mar-2017	140
Site-4	Bawa Pan Tine	Dagon Seikkan	Apr-2017	83
Site-5	Moe San Pan	Dagon Seikkan	Apr-2017	59
Site-6	Taw Win	Shwe Pauk Kan	Jul-2017	120
Site-7	Khit Thit May	Shwe Pyi Thar	Aug-2017	88
Site-8	San Thit Sa	Hlaing Thar Yar	Jan-2018	96
Site-9	Hnin San Pan-I	Hlaing Thar Yar	Apr-2018	69
Site-10	Hnin San Pan-II	Hlaing Thar Yar	Apr-2018	29
Site-11	La Min Eain	Shwe Pauk Kan	Dec-2018	58

Table 1: Basic information of completed CLHs in Yangon



Figure 2: Site plan of study areas (a) site-1 and (b) site-2

Data collection method

The objective of the study is to identify the self-modification patterns in CLHs in Yangon, along with the reasons behind modifications. It adopted a case study method and data were gathered through methods stated below:

- (a) Architectural measurement for documenting the housing characteristics, the spatial composition and the forms and patterns of modification in the houses
- (b) Household questionnaire survey for collecting the households' profiles, and clarifying the before and after conditions of houses after the modifications and the reasons behind modifications;
- (c) Observation and photography to support the architectural measurement survey and the examinations of the site and interior conditions of the houses.

As mentioned in above section, site-1 and site-2 were selected for case study areas and the field survey intended to include all the housing units in both sites. However, some houses could not be involved since the families were away during the field survey, thus a total of 91 houses (site-1 = 28 out of 30 houses; site-2 = 63 out of 65 houses) were included in this study. For the architectural measurement survey, the drawing of original floor plan was prepared beforehand, and the modified parts were recorded on the same drawing during the survey. The household questionnaire was in the form of mixed open- and close-ended questions which the residents were asked to indicate the households' profiles, modification patterns and the reasons.

RESULTS AND DISCUSSIONS

Features of original community-led housing

Implemented in 2009, site-1 has 30 housing units with plot size of 39 sq.m and floor area of 23.23 sq.m while site-2 has 65 units with plot and floor area of 50.17 sq.m and 28 sq.m respectively. The housing location, layout, design and materials were decided mainly by the residents according to their available budget, traditions and their lifestyle during the workshops organized by the CSO.

The residents financed the land purchase and housing construction mainly via an instalment loan, with meeting the additional expenses through the personal savings. Each household in site-1 had a loan of 1.2 million MMK¹, with the monthly payback of 20,000 MMK for five years. For site-2, each household took 0.9 million MMK and the monthly payback amount was 15,000 MMK for five years. These amounts were determined by the microfinance banks together with the communities based on their household incomes and savings to ensure that there was no heavy cost burden on the residents. With payback period of five years, the monthly instalment rates for both sites can be considered affordable as the range of instalment amount was approximately 7-14% of their average monthly household income (0.1-0.2 million MMK) during the time of implementation (Lall, Mitra, & Sakuma, 2018).

¹ 1 US Dollar (USD) = 1,318 Myanmar Kyats (MMK)

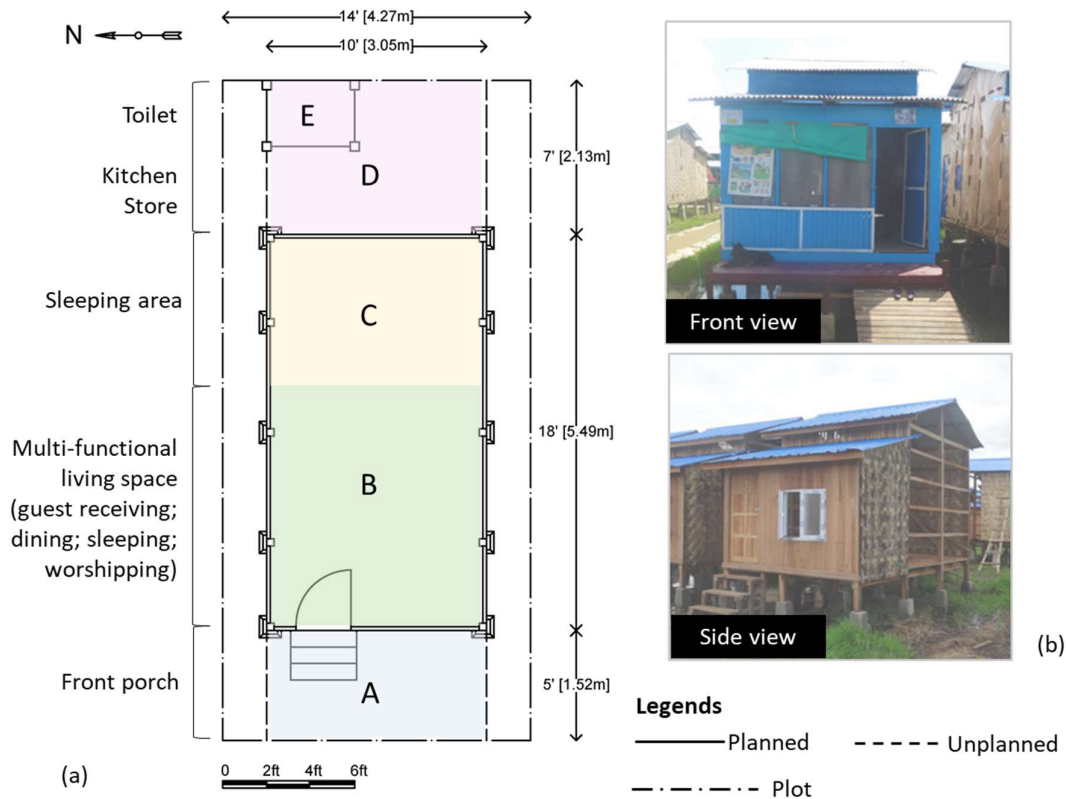


Figure 3: Initial design of CLH in site-1 (a) floor plan; (b) building form of areas B and C

Being initiated by the same CSO, most of the physical features of the houses in both site-1 and site-2 remained the same, except the floor area due to land availability. As shown in Figure 3a, the areas B, C and E were constructed with the loan granted by the bank thus having the same design, materials and structural components. In contrast, as areas A and D were constructed with the personal savings, these sections have more design freedom and a variety of materials were utilized in their construction. All the original units were single storeyed, built on stilts and had the traditional housing type called “Eain Pasit Tote²” (Figure 3b). When the houses are initially constructed, interior partitions were not added to the structure. For spatial composition, semi-private space like multi-functional living space was placed in front of private spaces such as sleeping area, kitchen and toilet. Initial building materials included bamboo weaving sheet for external walls, timber for structural system, corrugated galvanised iron (CGI) sheets for roofing and bamboo or timber for flooring.

Modification patterns and their related reasons

Although the residents lived in the originally constructed houses for around 10 years, modifications were mainly carried out in the later 2018 after they have fully paid back the bank loans. Modifications in both sites were done by the residents, with the help of the community members. The residents financed the modifications either from their savings or applied loans from the community saving group and the microfinance bank. Currently, 96% (27 out of 28 units) of houses in site-1 have been modified while in site-2, all houses have been modified, mostly in interiors. In this

² “Eain Pasit Tote” is the term in Myanmar, which is a type of traditional house commonly in central Myanmar. Its characteristic is that an additional structure is attached to the main structure at front, with different floor level and roofing of the main house.

study, three types of modification patterns were observed - (i) horizontal and/or vertical extension, (ii) changes of building materials, and (iii) changes in building elements. The varied reasons behind such changes are explained below in detail.

(i) Horizontal and/or vertical expansion

Housing extensions in this study can be classified into (i) horizontal extension, i.e., front or side expansion of the existing structure and (ii) vertical extension, i.e., addition of a second floor. No cases of back extension are found as the houses have already occupied to the maximum allowable space since the initial construction.

One of the main reasons behind the housing extension is the overcrowding inside the initial houses and the necessity of additional sleeping space for growing children and extended families. Other reasons include business purposes and the residents' own willingness to improve their houses through space expansion, which was also related to an increased household income or the intention to stay in the community for long term. As presented in Table 2, site-1 has more tendency to extend the houses among households having large families. However, in site-2, housing extension does not appear to be significantly related to household size as the purposes for extension varied not only for living and sleeping space but also commercial use and storage.

Site-1			Site-2		
No. of person	No. of house	Modified(%)-extension	No. of person	No. of house	Modified(%)-extension
1-3	4	25%	1-3	21	38%
4-6	23	57%	4-6	38	39%
7-9	1	100%	7-9	2	0%
10-11	Nil	Nil	10-11	2	50%

Table 2: Housing extension with household size

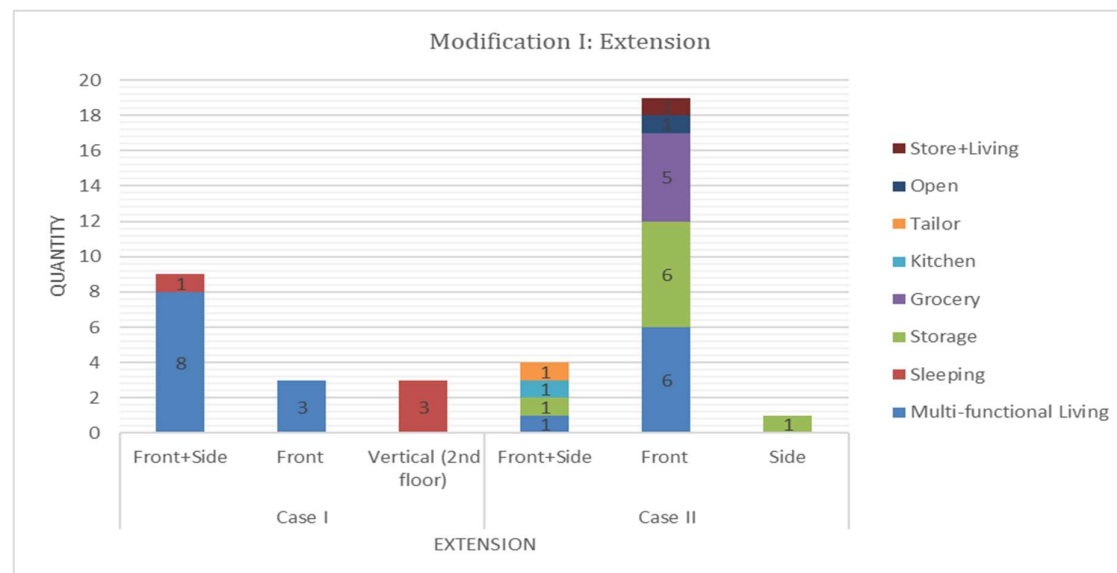


Figure 4: Housing extension in site-1 and site-2

From Figure 4, 12 houses in site-1 implemented horizontal extension in which nine units extended both the front and side parts of the existing structures and the other three units for front only extension (Figure 5; Figure 6a & 6c). Usually, the extension took place at the multi-functional living space, which was extended over the original front porch for bigger living space which as well served as the sleeping area at night. However, side extension did not have much impact on the space as it could expand only 0.31 m from each side. For vertical extension, only three cases were found (Figure 7) and it required the significant structural modification as the initial structural system could not carry the load of the additional floor. In site-2, horizontal extension was implemented in 23 out of 63 houses (Figure 4) and no vertical extension was carried out. Among horizontal extension cases, 83% (19 cases) had front-only extension, followed by both front and side extensions (4 units) (Figure 8) and side extension (1 unit). In site-2, all the side extension cases are those only of which the existing roof were extended to the side up to 1.22 m. Unlike site-1, the functions of extension varied from the residential uses such as living, sleeping space or storage to the commercial purpose, home-based grocery stores. For the case of commercial use, the extension was usually constructed in the form of semi-open space and was separated from main living area with different floor level (Figure 6b).

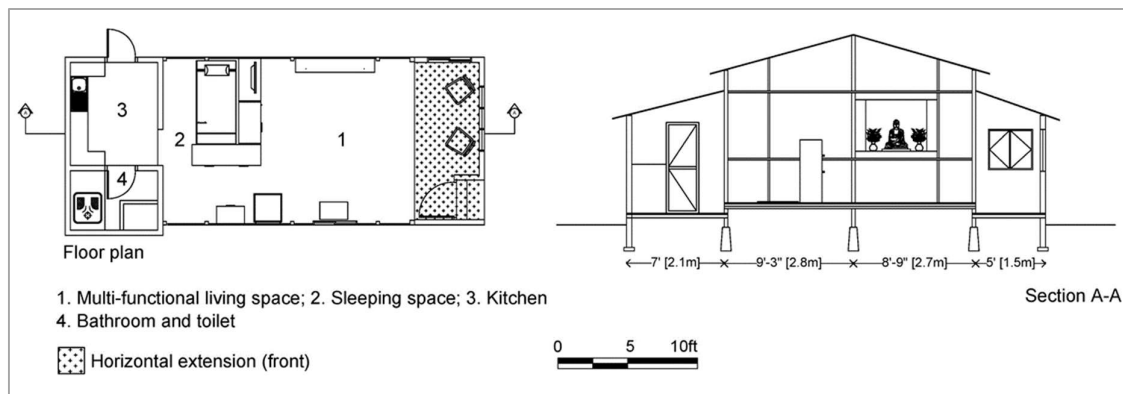


Figure 5: Front expansion in house no.4 at site-1

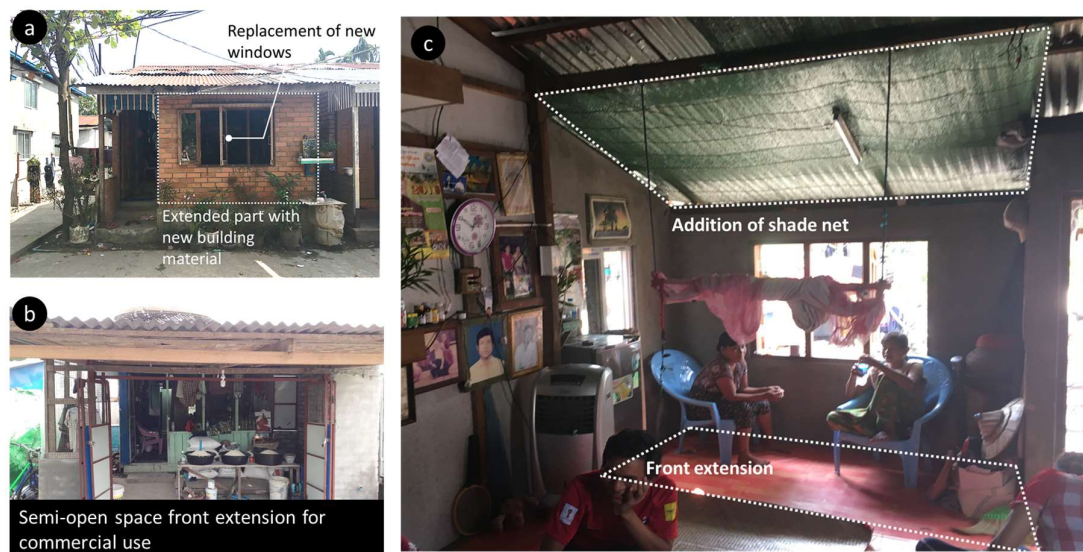


Figure 6: Front extension (a & b) exterior, (c) interior including shading net

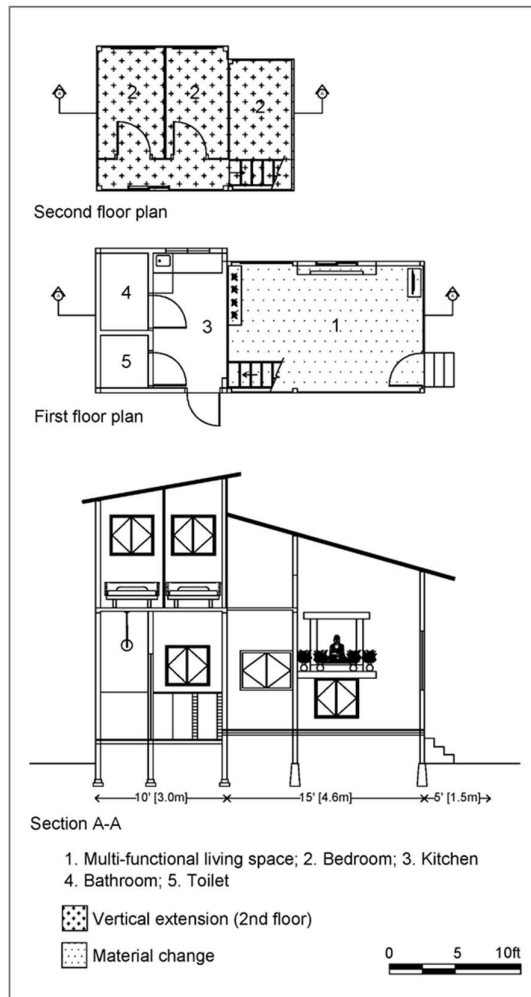


Figure 7: Addition of 2nd floor in house no.18 at site-1

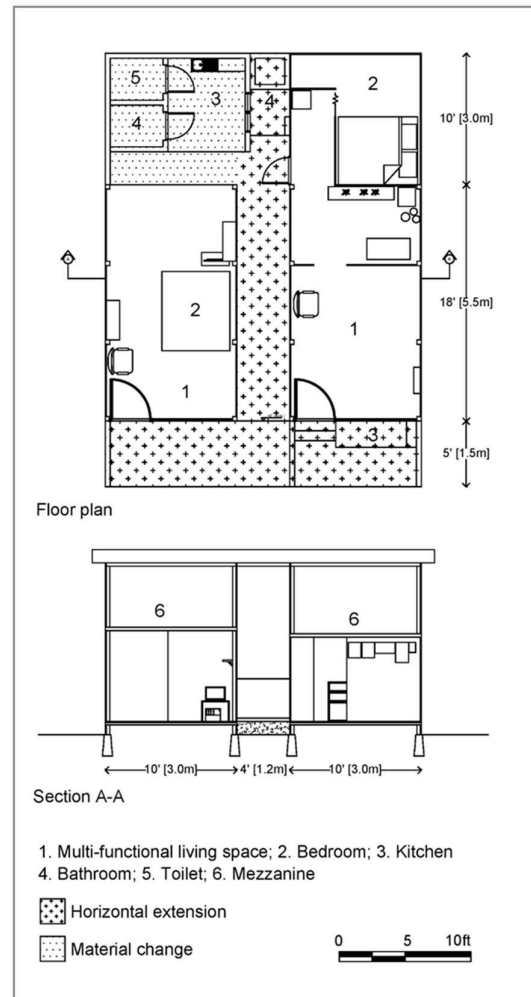


Figure 8: Front and side extension in house no.62 and 63 at site-2

(ii) Changes of building materials

It is found that the previous indigenous building materials were replaced with more durable and modern materials to signify the change in preferences. At the same time, these changes show that the residents learned the importance of using durable materials for long-lasting houses. Overall, 19 houses from site-1 and 24 houses from site-2 were changed the building materials and the building elements that have done the most changes are external wall, floor, window, entrance door and the structural system (Figure 9).

Due to material wear, 19 houses in site-1 and 11 houses in site-2 replaced their initial bamboo external walls with more durable and rainwater resistance materials. As shown in Figure 9, cement board was the most popular material in both sites (18 units), followed by masonry (8 units), a combination of cement board and masonry (7 units) and timber (1 unit). In this context, cement board was commonly used for side external walls (Figure 10) while masonry was mostly utilized in front façade (Figure 6a), kitchen and toilet. For flooring, original bamboo floor was replaced in 12 houses in site-1 and 14 houses in site-2 due to its damaged condition. Different floor materials were

found in both sites including masonry (11 units), timber (9 units), plywood (3 units), a combination of masonry and timber (2 units) and cement board (1 unit). Such selections of building materials were influenced not only by their durability and affordability but also the users' preferences to suit the urban setting and the fellow community members' recommendations. Other changes include the use of timber/PVC slide windows in place of metal net fixed windows and timber doors for previous CGI doors. The reason behind these changes of windows and doors is largely related to social factors such as security, aesthetics and change of preference to modern materials. Only three houses in site-1 transformed their structural system from timber to steel structure to withstand the additional load exerted on the structure due to the addition of a second floor.

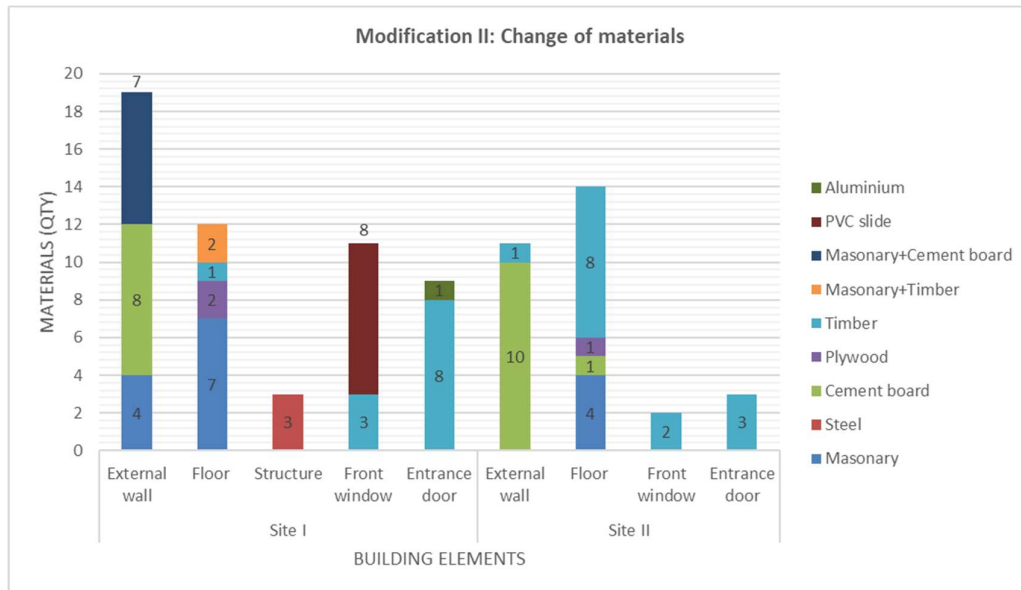


Figure 9: Changes of materials in site-1 and site-2

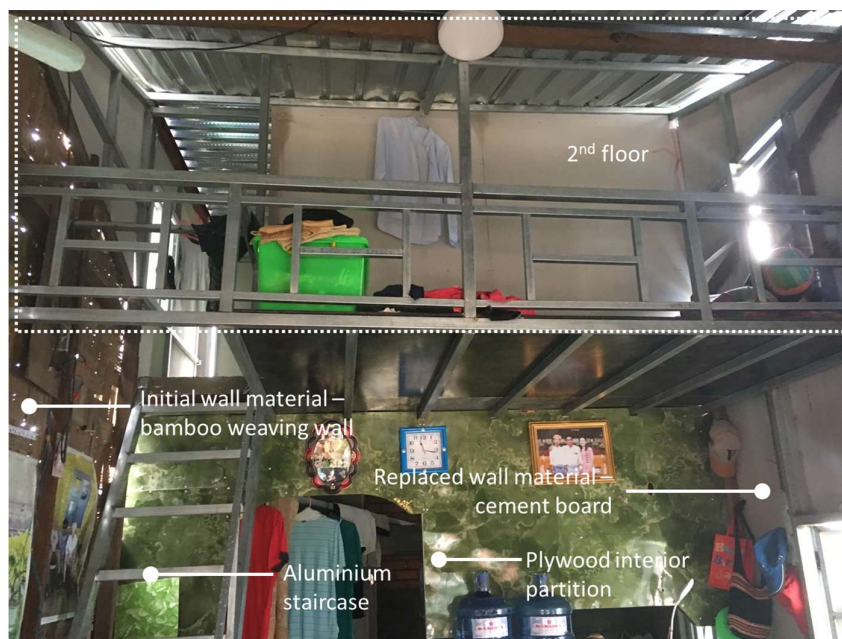


Figure 10: Interior of modified two-storeyed house (house no.18 at site-1)

(iii) Changes in building elements

Figure 11 shows the changes in building elements in both sites and these changes are as follows: the renovation of existing building elements such as septic tank, front porch and ceiling height, and the addition of elements such as mezzanine, bathtub, window, interior partition, tarpaulin sheet at external wall and shading net inside.

The renovation of septic tank was one of the first modification activities in both sites and 27 houses in site-1 and 45 units in site-2 have done the renovation due to the damaged structure and the unpleasant smell inside their houses. The tanks were renovated and modified from shared to individual system. Following is the modification of front porch to improve the aesthetics of the houses where the original timber entrance stair was rebuilt using masonry material and the floor of front porch was filled in either concrete or stones (Figure 12a). Another renovation pattern is the increase in ceiling height for better ventilation inside. However, only one household in site-1 had done it.

Even though two units in site-1 added a mezzanine, 26 houses in site-2 added to their houses (Figure 12b). Mezzanine was added to create additional space for growing children or for storage and additionally to reduce the heat transmission from CGI roof. It is a custom of people from rural areas to bathe outside the house. However, due to the influence of the urban setting and better privacy, a total of 13 houses in both sites renovated their bathrooms and added bathtub inside the houses (Figure 12c). Another change observed is the installation of interior partition to divide the private (sleeping space) and semi-private space (living space) for better privacy, with the materials such as plywood or objects such as furniture or curtain (Figure 10).

In addition, different environmental measures were observed in both sites. To counter high indoor temperature, especially in summer, shading net was placed under the roof to reduce the heat transmission from roof (Figure 6c), which was commonly found in site-1 (7 units). In site-2, mezzanine was used for countering indoor high temperature. Windows were also added at the sides of houses (12 houses in site-1 and 22 houses in site-2) for better indoor ventilation. Another was the addition of tarpaulin sheets to the external walls (Figure 12d) to prevent direct rainwater to the bamboo walls but it had blocked airflow from outside and affected air quality and ventilation inside the houses.

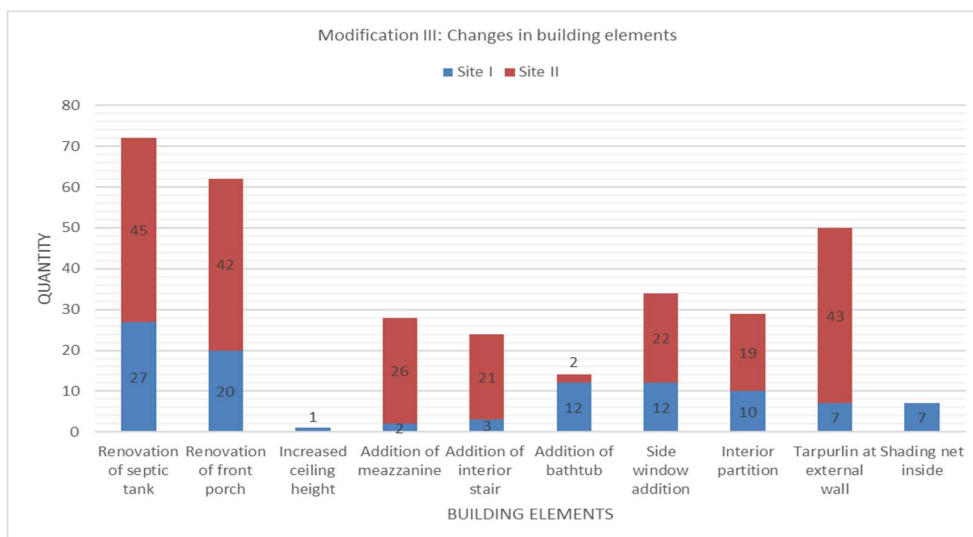


Figure 11: Changes in building elements in site-1 and site-2



Figure 12: Changes in building elements (a) front porch, (b) mezzanine, (c) bathtub, (d) tarpaulin sheet

CONCLUSIONS AND RECOMMENDATIONS

Based on the original housing design features, this study examines the self-modification patterns and their responsible reasons in CLHs in Yangon, Myanmar. Firstly, spatial expansion was observed as a response to the limited interior space, economic reasons or as the housing improvement from increased income. The extensions were mostly done at the front by taking over the initial front porch, which could flexibly turn into the extended living and sleeping space, storage or even commercial space. Side extension had little impact due to the land availability while the vertical expansion was limited by the initial structural capacities which need to be upgraded that is costly. Materials wear was the major factor behind the material changes, following the preference changes and security issue. Instead of initial indigenous materials, durable and modern materials were more preferred in which the cement board and masonry were the most preferred materials for wall, the timber for living and bedroom, the masonry for kitchen and bathroom and the PVC window for front window. In addition, there were changes in building elements which included various measures from the renovation of existing structures to the addition of new elements in order to suit the needs, preferences and also adapt to the environment.

The fact that the houses were modified gradually to the available resources indicates the residents' changes in housing needs and preferences over the time as well as their willingness to invest in their houses. Moreover, by the look of different modification patterns in each house, it can be said that the families have different needs and preferences depending on their livelihood, culture and background structures. It, therefore, brings an awareness that the low-income mass housing like CLH needs an element of flexibility that could allow one to personalize his/her space and provide opportunity to make housing changes over time. From the study, it is also learnt that the residents'

housing preferences have become more urban-oriented and the need of consideration of local climate impacts to the structures and the residents for liveable housing provision. This study contributes to the body of knowledge on CLHs from the design aspect in terms of modification patterns and reasons. It, thus, provides information about the occupants' housing needs, preferences and design issues in the existing housing system while also raises the awareness of the need of the flexibility and the indoor environmental quality in low-income housing design. Such information will be used in developing design guidelines for CLH to support the community, NGOs and developers in planning, construction and management of CLHs. It is pursuant to the SDG 11 through ensuring safe, adequate and affordable housing for low-income residents. Even though the study is primarily aimed for CLH development in Myanmar, the findings could also be applicable in similar developing countries in Asia.

It is therefore suggested that the initial design should consider the future modifications and the flexibility of housing design should be increased accordingly with adequate land lot, structural capacity and spatial planning. Consideration of such needs and future changes might increase the development cost, thus it could be planned by phasing the cost over an extended period. The initial phase would provide the basic needs or priorities, with the opportunities to expand and upgrade the standards of their dwellings in later phases according to needs and affordability. This states the consideration of incremental development approach in design guidelines, with this study providing the priority of the needs and preferences required in spatial development process and a list of materials with their uses. In addition to that, passive design strategies should be considered by reflecting the local climate for better indoor comfort and environmental quality. Poor indoor conditions can affect the occupants' health and under COVID-19 situation, this pre-health condition could determine the person's vulnerability level to get infected. Moreover, 'stay home' makes those living in inadequate housing have high risk of infection from poor indoor air circulation while living in close proximity to others and share already crowded spaces, including water and sanitation facilities. The present study might be complemented by further analysis of the cost and financial mechanism in relation with the housing modifications process for better financial planning and management of community-led housing.

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