Spatial Characteristics of Core Housing Units Brought by Residents’ Extension Activities at Tung Song Hong Settlements in Thailand

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Abstract
This study clarifies the transformation of Core Housing units through residents’ extension at Tung Song Hong (TSH) Settlements. It was constructed by the National Housing Authority in late 1970s. The study focuses on three points such as transition of the settlements and residents, use of advantage of Core Housing and spatial characteristics of extended Core Housing. We found that settlements have been developed both physically and socially through residents continuous living. However there was lack of management system by the provider side to support residents’ self-build activities, residents did not understand the detail of devices of Core Housing nor follow the projected extension process. On the other hand, there are similarity among space composition through residents’ step by step extensions, even original core units were varied. We called it as multipurpose living room oriented plan. The multipurpose living room is frequently used for daily life but also very important at the ceremony and indicates residents’ recognition toward the houses in Thailand.

Keywords: core housing; extension; multipurpose living room; house unit planning; Thailand

1. Introduction
This study investigates transformation of the Core Housing at Tung Song Hong (TSH) Settlements by looking at residents’ extension activities. The Core Housing is defined as formally built houses that is incomplete at the initial occupation and expected to complete through residents’ self-build improvement activities. During 1970-80s, World Bank supported Site and Services which provide basic infrastructure at planned settlements with Core Housing in many developing countries.

The design of Core Housing is simple and not much different, however, its transformation varied with its management system, social and cultural background. There are several reports illustrated transformation of Core Housing. As a policy recommendation point of view, Tipple (2000) explains the transformation of government-built housing by using numerical data categorized as transformer and non-transformer and shows some plan of transformation in general1. Silas2 shows the transformation of core housing in Indonesia and one of the builder Freedom to Build has been succeeded to provide Core Housing to middle-lower income people in the Philippines3.

Core Housing is thought to be one of the unique housing planning which enables residents’ initiated building process. However Core Housing projects in Thailand is negatively evaluated by its inconsistent landscape due to incompleteness and vacancies. There are only few study to elucidate transformation of Core Housing in Thailand.

Niyom et al. (1988) evaluated TSH Core Housing project based on 202 household questionnaire survey conducted after 1 year provision4. It also provides sketch of extension, however it does not link to the data including residents' profile unfortunately. Tanaka (1998) described transition of TSH settlements in 19965.

This study makes clear the transformation of Core Housing in Thailand from three points such as transition of settlements and residents, use of advantage of Core Housing and spatial characteristics of extended Core Housing.

There are only 4 Core Housing projects constructed by National Housing Authority (NHA6) in Thailand (Table 1). The first project was 25 years rental basis at Rangsit in 1977. It is only one type of Core design, however 8 extension patterns were projected. Due to rental basis, it is prohibited to change major structure such as extension to 2-story buildings. It was less occupied due to the long distance from the city center.
of Bangkok.

The second project, Tung Song Hong, was provided nearer the city center as hire-purchase basis. It was also first time to introduce prefabricated bearing wall structure into the Core Housing (Fig.1). Due to inexperience of construction methods and difficulty of modifications, the later projects such as Bangplee and Ladkrabang were constructed with concrete post and beam structure with brick walls. Furthermore Core Housing at these sites have windows and doors from the first as completed housing. The NHA prepares a blueprint of extended Core Housing and sell it at the NHA site office in these projects.

2. Methods

Both primary and secondary data were collected. Primary data including interviews with NHA staff in charge of Core Housing, residents at Tung Son Hong on February 1996, January 1997 and July 2002 in order to make clear the transformation process from both sides of planner and residents. Physical measurements include land use pattern, extension of 158 plots at one of the subdistricts and 14 house units with different original types. The secondary data was obtained at NHA including Niyom report7. It elucidates TSH Core Housing in 1985 which is 1 year after provision and enables us to understand development over 10 years.

3. Tung Song Hong (TSH) Core Housing

3.1 TSH Settlements in 1985

TSH locates 17 km from the center of Bangkok and just 2 km south from the Dong Muang airport. The site area were 43 ha owned by NHA. There are community facilities and 30 subdistricts which contains 55 to 196 units (Fig.2). Each subdistrict has the community organization and community activities including meeting. There were 7 types of core units at TSH. Two-story houses are located along the main roads and smaller units are located inner area (Table 2, Fig. 3, 4).

3.2 TSH Settlements in 1996

The settlements is not changed drastically over 10 years but get lively (Fig.5). Not only fixed shops but also vendors and carts are seen on the roads. Shops are not frequently found inner settlements however variety of small-scale home industry are found. Furthermore specific hawkers such as noodle and sweets come into the bottom of the settlements almost everyday at the same time and support residents’ lives. The settlement is not exclusive for residential use but includes various activities and flexibility.

3.3 Residents’ Profile in 1985

The construction was started in 1978 and due to construction delay, residents could move into the site in 1984. According to the Niyom report8, average household size is 3.5 person/HH, household structure with couple and children (48.5%) is most frequently found and second major structure is couple and children with relatives or lodger (25.7%). More than half of the household head’s age are 30s. Contrary to age 50s are below 10%. The household after 1 year provision can be imagined relatively young couple and small children with or without relatives and lodger.

The average household income is 6,379 Baht/m and it is slightly less than that of average in Bangkok (7,000 Baht/m). The targeted household income level is between 4,000 to 9,000 Baht/m, and 55% of households are belong to this category. However 29% are below 4,000 Baht/m and 15% are higher than 9,000 Baht/m. There are much income differences among residents. Looking at the transferred case, 26.7% (54 out of 202 households) were not original right holder.

Although the report after 1 year provision described that R1 and R2 units were most transferred to the higher income people in their survey, but it is not true. Recalculating the ratio of transferred units from their sample units, the most transferred units are relatively large having space for commercial activities such as shophouses (R6: 39%) and 2-story houses (R7, 8: 29%). It cannot to be said that low-cost units are always transferred to

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Table 1. Core Housing Projects in Thailand

| Location* | Range | Tung Song Hong | Bangplee | Ladkrabang |
|-----------|-------|----------------|----------|------------|
| Site area(ha) | 25ha | 45ha | 71.5ha | 55ha |
| Year of construction | 1977 | 1978-1984 | 1976-1999 | 1976-2003 |
| Total No. Of Units | 1,428 units | 3,043 units | 25,000 units | 24,222 units |
| Intended Population | 5,000 | 18,000 | 120,000 | 121,110 |
| Method of Construction | RC post and beam | Prefabrication | RC post and beam | RC post and beam |
| Ownership Transfer | 25 years lease | hire-purchase | hire-purchase | hire-purchase |

Core Housing

- Type of Core
  - 1-story row house
  - Vacant Plot, Core with toilet, 1 or 2-story row house, semi-detached, shophouse

- Ownership Transfer
  - R1, R2: 77%
  - R3: 70%
  - R4, R5: 80%
  - R6: 80%
  - R7, 8: 80%

*Distance from center of Bangkok

Table 2. Type of Core Housing at Tung Song Hong

| Type* | No. of Units Provided | Building Site (sq.m) | Floor area of Core Housing (sq.m) | Target Household Income (Baht/m) | Price (Baht) |
|-------|-----------------------|----------------------|---------------------------------|---------------------------------|-------------|
| R1, R2 | 1,568 | 70-80 | 32 | Below 4,000 | 80,635 |
| R3    | 570  | 80  | 40 | Below 5,000 | 127,425 |
| R4, R5 | 386  | 80  | 41 | 5,000-7,000 | 111,325-141,770 |
| R6    | 159  | 80  | 63 | Below 9,000 | 220,205 |
| R7, R8 | 250  | 80  | 49 | Below 7,000 | 155,120-193,720 |
| R9    | 56   | 80  | 2.16 | Below 5,000 | 99,430 |
| R10   | 54   | 80  | 0  | Below 4,000 | 59,140-96,930 |

* Differences between R1 and R2, R4 and R5, R7 and R8 are whether facing on the road or not. Source: NHA data and Niyom (1988)
higher income people.
It is true that settlements were consisted of more various income level of households than targeted after 1 year of provision. The author thinks that major reasons behind these phenomena are limitation of selecting target household and housing shortage for low and middle income people in the market at that time.

3.4 Residents’ Profile in 1996
After surveyed the whole settlements and 312 subdistrict, we selected 14 households which thought to have typical extension pattern from the original core units.
Most frequently found household structure is couple and children, then couple and children with relatives or...
lodger. Household structure is not changed from that of
in 1985, however children are more than 15 years old
and household heads’ age are over 50s. More matured
nuclear families are found in the settlements. Household
income level is relatively high. However looking at
transferred case, 4 out of 14 households (28%) are not
first right holders. It is almost same ratio as that in 1985.
Most of households have been living within 2 years after
completion and mobility is not high.
In 1985, 63% of the residents were not satisfied with
their living environments due to the incompleteness of
houses. This is one of the main features of Core Housing,
however residents did not understand the idea of the
project.
In 1996, 10 out of 14 households are satisfied with
their living environments because of mutual-aid with
neighbors (5/10) and comfort to live (3/10) which
brought by continuous living. On the other hand
problems are concerning the car access such as narrow
road and insufficient parking plots. This is reflecting high
possession of automobile in Bangkok. In 2002,
residents’ strong desire to have car access road was
realized by politically and lane with gutter was paved
smoothly. Several residents made car parking in their
plots (Fig. 7).

4. Extension of Core Housing

4.1 Extension in 1985 and 1996
Regardless type of Core Housing units, most of the
units were extended horizontal direction (Table 3). Lookinat the builder of extensions (Table 4), residents
ask building contractors at 2-story units (R7,8) and
smallest units (R1,2). Self-build is more frequently seen
at R3, which has larger floor area than that of R1,2. It
can be understood that extension of 2-story house is more
difficult and required technical supports whereas
smallest type of R1,2 (22 sq.m) required more space for
living and needed heavy constructions.
In 1996, 134 out of 158 units (85 %) were extended
horizontally and few of units extended vertically (Fig.6).
Fig.8 shows a row of houses. The fence and other
exteriors are made of concrete brocks due to the building
rules by the NHA16, however many of households express
their houses by planting fruit trees and making open-air
terrace.
There are few of units (14 out of 158) newly
reconstructed. New buildings along the road are 2 or 3-
story flat complex with tenant shop on the ground floor.
Considering a convenient location, there is possibility
of redevelopment along the road. However inner plots
are still transferred to others through community network
at the settlements.

4.2 Role of Devices on Core Housing
According to the extended model plan at R1,2, R3
and R4,5, inner space is thought to be used for kitchen,
dinning and bedrooms. However, kitchen space at most
of units is semi-outdoor next to toilets. Semi-outdoor
kitchen is convenient and comfortable since they cook
with strong caloric force, smell and variety of
preparations.
There is a steel beam on 2.2m level for extension of
loft at R1,2 and R3 (Fig. 9). However this beam is not
actively used for extension. It is usually used for storage
and even units with loft complained the low ceiling.
There are open space between two core structures at R4,5
(Fig.3). The planner designed this space for lighting,
ventilations and extension for 2-story buildings. However
only 3 units were converted into 2-story in 1985 and
none of case in 1996. Residents cope with lighting and
ventilation by simple way such as setting up top light
and leaving semi-outdoor space.
These facts indicate that residents did not know the
structural devices. Residents (No.109) explained that
they did not know how to extend their units and how to
cope with concrete panel wall but no information and
no help were provided by the NHA Site office. Providing
core units and encouraging residents’

Table 3. Extension of Core Housing in 1985

| Structure             | R1 | R2 | R3 | R4,5 | R6 | R7,8 |
|----------------------|----|----|----|------|----|------|
| Renovation of Core   | 0  | 0  | 0  | 2    | 2  | 1    |
| Housing              |    |    |    |      |    |      |
| Extension by using   | 36 | 22 | 11 | 2    | 5  |      |
| Core structure       |    |    |    |      |    |      |
| Extension by adding  | 79(4)| 16(2)| 15(3)| 9(1) | 9(2)|      |
| new structure        |    |    |    |      |    |      |
| Total                | 115| 38 | 26 | 13   | 17 |      |

( ) No. of 2-story units
Summarised by author based on Niyoum (1988)

Table 4. Extension by Builders in 1985

| Structure              | R1 | R2 | R3 | R4,5 | R6 | R7,8 |
|-----------------------|----|----|----|------|----|------|
| Building Contractor   | 52 | 47 | *  | *    | 1  |
| Self-build+ Building  | 40 | 32 | *  | *    | 18 |
| Contractor            |    |    |    |      |    |      |
| Self-build            | 7  | 18 | *  | *    | 0  |
| Mutual aid            | 1  | 3  | *  | *    | 0  |

(%) * unknown
Summarised by author based on Niyoum (1988)

1: Steel beam for extension is used for only storage. 2: Residents cope with lighting and ventilation by simple way like placing windows at higher position.
extension are closely connected with each other in Core Housing scheme. In the case of Freedom to Build\(^{18}\), they organize workshops and support the residents to understand the Core Housing extension and to build their community network before moving in. Lack of management system to support residents’ extension activities brought delay and failure of extension and resulted discredit on Core Housing in Thailand.

Table 5. Residents’ Profile and Extension Process

| Unit | Placement** | Place for extension** |
|------|-------------|----------------------|
| Gate, fence | 1 | 1 1 1 1 1 1 1 1 1 |
| Planting | 1 | 1 1 1 1 1 1 1 1 1 |
| Outdoor working space | 1 | 1 1 1 1 1 1 1 1 1 |
| Terrace | 1 | 3 2 1 3 |
| Semi-outdoor kitchen | 1 | 1 1 1 1 1 1 1 1 1 |
| Semi-outdoor laundry | 1 | 1 1 1 1 1 1 1 1 1 |
| Place window and partitions | 1 | 1 1 2 1 1 1 1 1 1 |
| Fit out ceiling | 1 | 1 1 2 1 1 1 1 1 1 |
| Fit out kitchen | 1 | 1 1 1 1 1 1 1 1 1 |
| Alteration of toilet | 1 | 1 1 1 1 1 1 1 1 1 |
| Extension of commercial and working space | 1 | 3 2 1 2 1 |
| Extension of loft | 2 | 1 1 1 1 1 1 1 1 1 |
| Extension of 2nd floor | 1 | 1 1 1 1 1 1 1 1 1 |
| Extension of storage | 1 | 2 1 1 1 1 1 1 1 1 |
| Extension of bed room | 2 | 1 2 1 2 1 2 1 1 1 |
| Extension of multipurpose living room | 2 | 1 1 1 1 1 1 1 1 1 |
| Extension of space for Buddha Image Shelf | 1 | 2 1 1 1 1 1 1 1 1 |

**The first time, second time, third time extension is expressed as 1, 2 and 3 in this table.
Unit H own R3 and R10. Most of extension at R5 unit was done by previous residents. Residents built shop at R10.
Unit M: Head of Household is a subcontractor and supervise the work taking by his carpenters.
*** L type: L+H+N-K, BL-type: B+L+N-K (L: Multipurpose living room, B: Bedroom, N: Shower and toilet, K: Kitchen, W: Shop, Workspace)
5. Spatial Characteristics of Extended Core Housing

5.1 Step and Way of Extension

Table 5 shows year of extension, builder and place of extension (exterior, interior and extended floor area). Regardless the type of original core, fitting out floor, wall and kitchen are the first step and done within a year since kitchen was not built at initial occupation. The second step is taken 3 to 9 years after the first extension. It expanded multipurpose living room and bedrooms. Several units have third step such as extension of shop, working space and outdoor terrace (Fig.10). Even when they ask building contractor for extension, residents take initiative to prepare building materials.

Regardless period of residing in Bangkok, residents have strong connections with people in their hometown. As seen household structure, we can find rural people staying together. Residents often go back to their hometown to see their parents, families or to help farming and so on. It is not rare that extensions are done by cooperation with residents, relatives and friends from hometown.

5.2 Space Composition

Although original core housing varied, there are similar space compositions through residents’ step by step extensions. Similarity is brought partly because of rectangular shape of plots but reflection by their way of living. The basic rooms are kitchen, bedrooms, bath and toilet, multipurpose living room and open-air terrace.

There are two types of houses such as L-type and BL-type by looking at layout of multipurpose living room (Table 5, Fig. 11). L-type is fundamental where multipurpose living room is located on the top front and other rooms are lined behind. BL-type is one of the variation of L-type and has bedroom on the top front. It is seen when they need more independent bedrooms for their children.

It is more important that multipurpose living room is largest room in a house and has certain scale and similar functions regardless type of houses. Therefore both L and BL type can be called as “multipurpose living room oriented plan”.

5.3 Role of Multipurpose Living Room

Multipurpose living room is used for variety of daily activities. There are a sofa, a TV, a desk, photos and some display shelves. Residents use this space frequently for eating, relaxing, watching TV, taking a nap, inviting guests. This room also has a role to connect outside and inside or between rooms. It is remarkable that this room does not have specific name whereas other rooms have specific Thai name. Residents explained this room by expressing their activities carried out here such as “sort of living room we can do everything in here”, “guest room where we can eat and sleep”. These indicate that this room can not be defined simply but has variety of functions.

Multipurpose living room is used not only for variety
of daily activities but also very important at the ceremony. People at rural area have wedding and funeral ceremony at their houses by inviting several monks. Residents at TSH have funeral ceremony at the temple and wedding party at the club or hall outside houses. However they still invite monks to their houses on some occasions.

Residents invite monks at the wedding day, housewarming, and when their son become a trainee monk at the TSH. Although the number of invited monks varies in region, usually 9 monks are invited for the celebration at TSH. This number is believed as lucky number in Thailand.

Fig.12 shows two cases of using multipurpose living room when they had a ceremony. Both of them had a ceremony once after completion of multipurpose living room. When they held a ceremony, they need large space to set Buddha Image shelf and space for 9 monks sitting side by side. They put all the furniture away. In these case, the ceremony was held to cerebrate both being a trainee monk and house warming at once. As residents’ way of living is closely related with Thai Buddhism belief, they keep this space even ceremony is not often. Therefore multipurpose living room oriented plan has been brought through residents’ extension process. The same kinds of space arrangements are seen at rural houses and other urban houses19. These indicate residents’ recognition toward the houses in Thailand.

6. Conclusions
1) Looking at transition of the settlements and residents’ profile, residents’ mobility is not high and they have been created their living environments physically and socially.

2) There were originally 7 different types of Core Housing at TSH Settlements. They were well considered with devices for the extension. However residents did not know the structural advantages of core units and did not follow the projected extension process. Providing core units and encouraging residents’ extension activities are closely connected with each other in Core Housing project. However lack of management system to support residents’ building activities brought delay and failure of extension and resulted discredit on Core Housing in Thailand.

3) Residents managed by themselves to handle with lighting and ventilation of extended houses by simple way such as placing windows and top light or leaving semi-outdoor space.

4) It is quite unique that even original core housing units varied, there are similar space composition among extended Core Housing through residents’ initiated step by step extensions. This paper names as multipurpose living room oriented plan. The first extension is fitting out floor, wall and kitchen space. However it expanded multipurpose living room. Multipurpose living room is frequently used for daily activities including eating, relaxing, inviting a guest and also very important for the ceremony. This room does not have specific name in

Fig.12. Use of Multipurpose Living Room at the Ceremony
Residents had a ceremony after completion of multipurpose living room since this room has an important role to invite several monks. Usually 9 monks are invited for cerebration at TSH. The house should have enough space for arrangement of Buddha Image shelf and 9 monks sitting side by side. As residents’ way of living is closely related with Thai Buddhism belief, they keep this space even ceremony is not often. This is one of the main reasons that multipurpose living room with certain scale and similar functions has been kept, regardless house unit type and size.

5) Housing policy in Thailand stresses community development and citizen participation planning since 1990s. Management system to encourage residents’ building activities is one of the important issues for not only Core Housing but also future planning. It should be developed involving mutual interactions.

So called multistory model house which is suitable climatically and socially can not be realized in Thailand. The analyses indicate the spatial characteristics for the unit planning. The recognition of multipurpose living room would be a key for the sustainable unit planning in Thailand20.

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Notes:
1. Graham Tipple conducted surveys of transformation at government-built housing in developing countries including Bangladesh, Egypt, Ghana, Zimbabwe and other African countries (Reference3).
2. Professor J. Silas conducted various low-income housing survey. He designed multistory flat by interpreting his research analyses (Reference 1 and 10).
3. Freedom to Build was established by William J. Keys in 1976 to cope with housing for the low-income people in Philippines.
4. Reference 2.
5. The author described overall transitional process at Tung Song Hong settlements previously (Reference 4), however this study includes latest survey and analyses focusing on spatial characteristics of Core Housing and its background.
6. The role and contribution of NHA in Thailand is described in reference 6.
7. Reference 2.
8. Reference 2.
9. The ratio of transferred lower cost units R1 and R2, R3, R4 and 5, are 28%, 21% and 14% respectively (Reference 2).
10. The proof of earning is easily understated than that of actual earnings since this is written and signed by chief of applicants’ office. It is impossible to find out the truth without asking each of applicants’ office. NHA might allow to provide units to higher income people by considering recovery of the projects cost (Through NHA staff interview).
11. It was late 1980s when private companies started to provide low-cost housing in the market in Bangkok (Reference 6).
12. In this survey, more than half of household income are over 30,000 Baht/m since it includes salary of children. (The average starting salary of government employee is 4,500 Baht/m in 1996). Looking at their previous residence, most of them resided in a overcrowded community, evicted or lodger at relatives’ house. They are not high income from the first.
13. There is only one case of unsatisfied. Resident mentioned quite personal reason that he had a quarrel with people next door.
14. New car registration was 150,000 and 460,000 in 1988 and 1993 respectively. About 70% of them are in Bangkok (Pocket Thailand in Figures 1994, pp.42-43, Alpha research Co.ltd).
15. According to the residents, politician came to the community and new road pavement was done before the erection.
16. NHA prohibited to use wood for exterior because of fire prevention.
17. NHA improved management system after TSH project. They changed to construct by using concrete post and beam with brick wall for easy extension. They started to sell blueprint of extension model. However the author thinks these improvement are only from the provider side and not sufficient to support and encourage residents’ improvement activities. It should be more interactive.
18. For example, they have workshop and explain rule of extension to keep ventilation and create harmonious land scape at the Core Housing site. (Through interview and data from Freedom to Build)
19. “Multipurpose room” is found on the blueprint of other type of NHA housing, however NHA does not have clear definition of this room. Furthermore “Multipurpose room” in English is expressed by several Thai name such as “Pak pon (resting)” “Hon anekprason (multipurpose)” “Hon Pak asai” on the blueprint. It seems that this space is not clearly recognized at the planning. There are also space found with several names in traditional rural houses (Reference 5, 6, 9).
20. When we think about multistory unit planning in Thailand, common space sharing multipurpose living room would be one of the useful idea. We can see unique housing excises based on this kind of idea at prewar time (Reference 7, 8, 9).

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