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# Contribution of income generation space (IGS) in row-type housing for sustainable housing enhancement

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**Abstract**

Income Generation Space (IGS) or Space for Creating Income (SCI) is a house space that plays an imperative role helping its user to gain income. In row-type housing in Khon Kaen, IGS has been found to be significant. The row-type housing projects can be categorized into two kinds, governmental row-type housing project and the private sector provision. Tawanmai community housing has been utilized as representative of governmental row-type housing. One middle income row-house nearby Khon Kaen University has also been selected as a case to be analyzed. It was explored that, IGS was found popular to be used for both of those two projects. Self-customization has been explored as a tool to achieve IGS. Another outlook such as lighting design in relation to architectural aesthetic for IGS has also been described. Natural lighting can be utilized for a front approach of each row-house but it is inconvenient to be utilized for an inner function/space of row-house. Therefore, lighting design should be designed to gain plenty of light and can answer the architectural aesthetic demand. About one third of the BMP row-house in the research area employed the IGS strategy. Additionally, about three fourths found IGS to be utilized for row-house for middle income row-house. Therefore, IGS should be the essential issue for sustainable strategy of the row-type housing both for housing policy and design outlook.

**Keywords**: Income Generation Space (IGS), Row-type housing, Self-customization, Spatial utilization, Strategy

## 1. Introduction

Since it can be major categorized as two kind of row-type housing in Khon Kaen Province; government provision and private sector provision.Tawanmai community under the supervision of Community Organizations Development Institute (CODI) [1 & 2] has been utilized as a representative of governmental provided row-type housing case. Middle income row-type housings located near Khon KaenUniversity also have been selected as representative for private sector's row-type housing provision. Apart from acting as a residing purpose, space is able to support its user to generate income where is called Income Generation Space (IGS) or Space for Creating Income (SCI) [3 - 5]. In order achieve the IGS, user utilized self-customization as a tool to get IGS. Another outlook for IGS also has been analyzed such as lighting design in relation to architectural aesthetic.

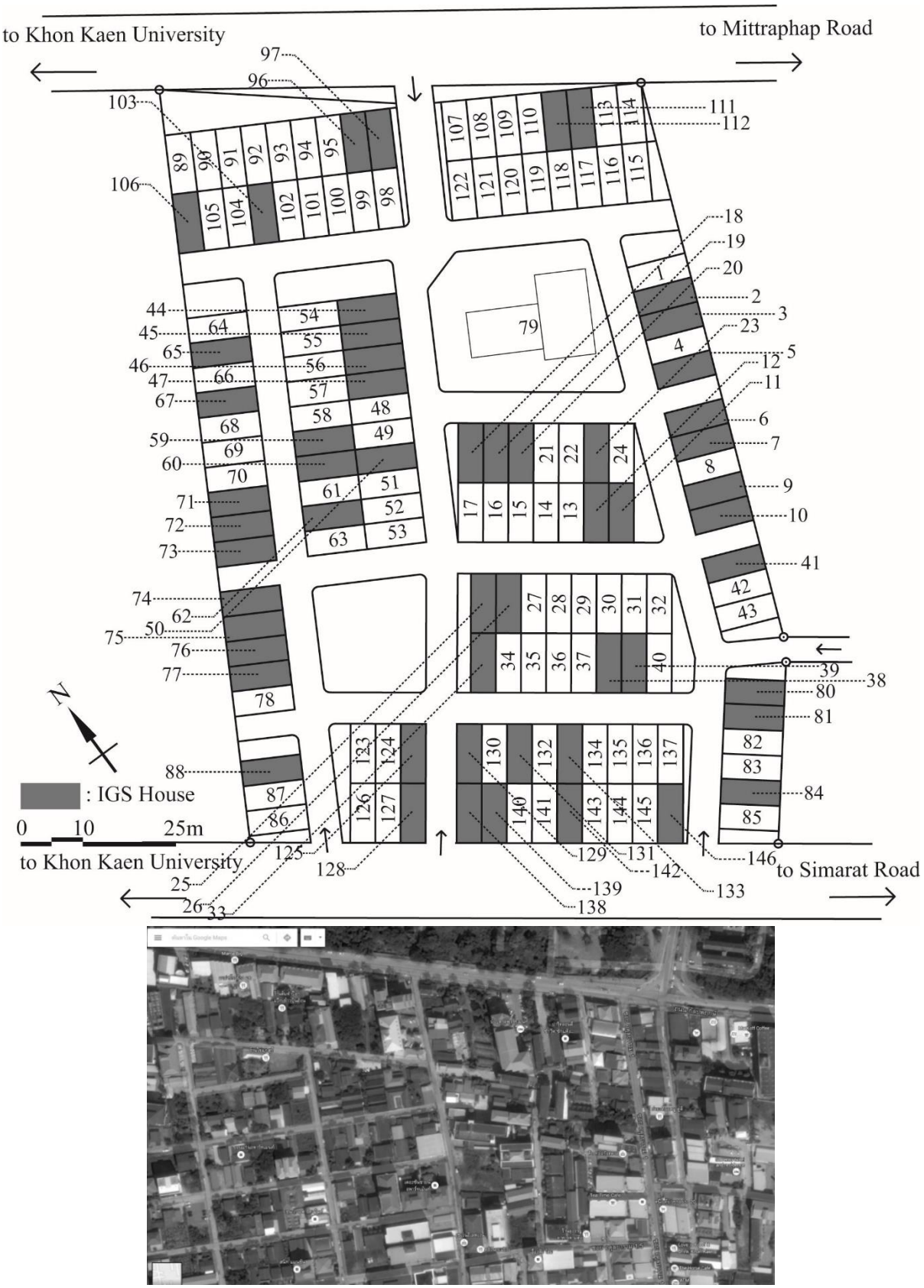


**Figure 1** Tawanmai community housing layout (top), middle income row-type housing aerial photograph (below) (source: adapted from Google Maps)

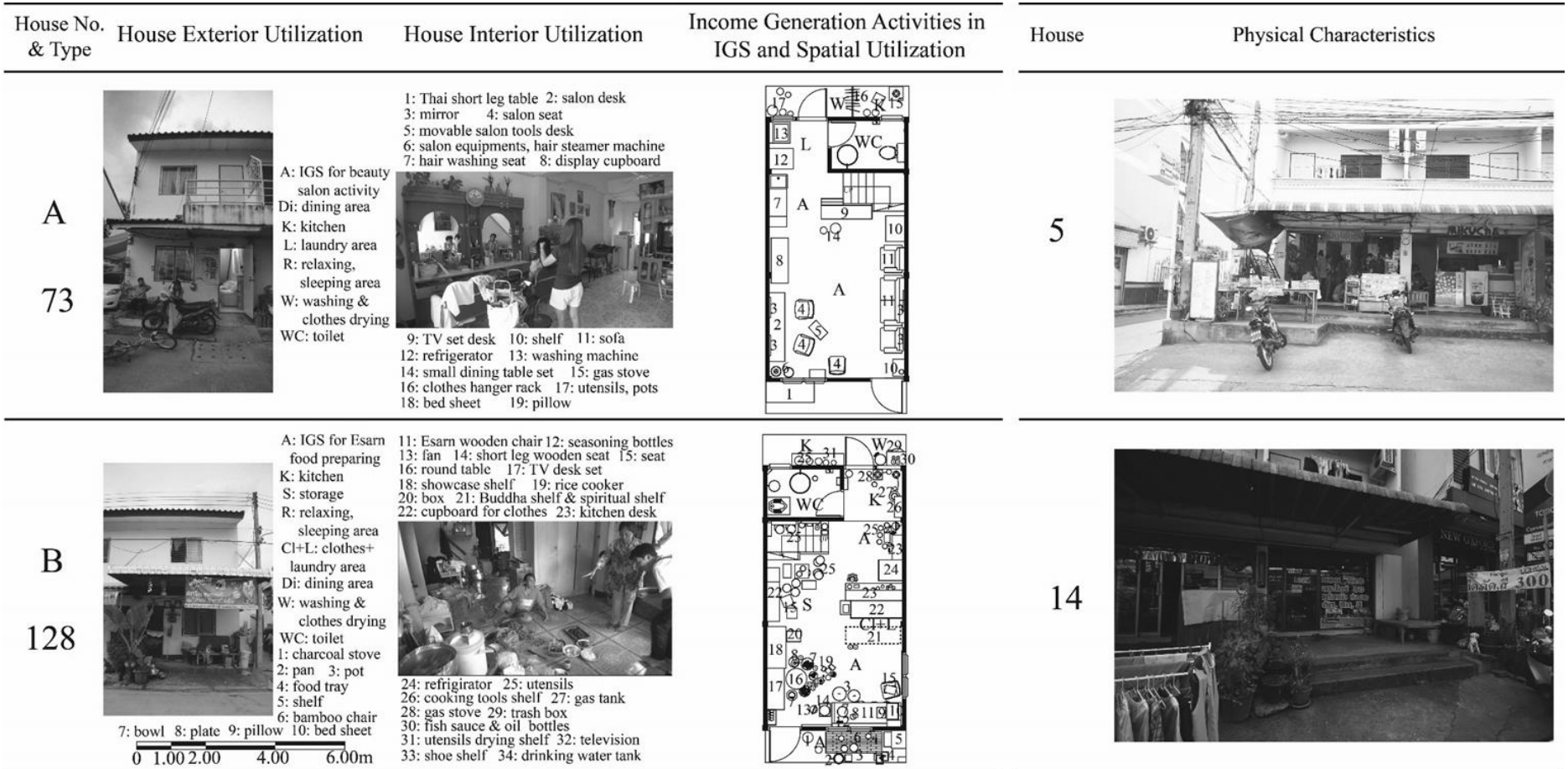


**Figure 2** Tawanmai community IGS utilizing household and its spatial configuration

## 2. Research context and gap

Tawanmaicommunity as well as middle income row-type housing near Khon Kaen University have been utilized as case for an analysis. Tawanmai community is located on srimarat road connected to the road near Khon Kaen University. There are 145 housing units plus one community center as shown in Figure. 1 (top). IGS utilizing households have been illustrated in grey on the layout map of the community. While the middle income row-type housing aerial photo has been shown in Figure.1 (below).

This paper clarifies two above mentioned communities through following objectives and means;-Clarify IGS utilizing household and its spatial utilization.
-Delineate categorization of that IGS.
-Finding related factors that help to enhance IGS for row-type housing.

## 3. IGS utilizing household and spatial configuration

### *3.1. IGS in Tawanmai row-type housing*

As for Tawanmai community housing, the household has been designed in a form of row-type housing by utilizing participatory design approach. This approach means strategy to bring stakeholders all together to have critical discussion and find out the final master plan to be built. There are major two types of houses in the community. Most of them 138 housing units are designed in a form of a two-storey row-type housing. Therefore only 7 housing units are considered to be one-and-a-half-storey row-type housing. This has to be followed the participatory design action. Owners have to make decision to choose the type of a row-house to suit their demand and monthly installation affordability. In order to achieve IGS, dwellersutilized self-customization as a tool to get IGS. House is able to be utilized apart from aresiding function, it can be utilized to support its owners to generate income for an income generating activities. Since its space is considered to be a compact living environment. On the other hand, there is not a plenty of space to make an extension. Self-customization has been employed to achieve IGS. The spatial configuration can be seen as shown in Figure. 2 (left). Equipment for income generating activities have been introduced to the IGS, furniture arrangement is also has flexibility in order to suit practical purpose of the users. It was found that more than one-third of the research area has made self-customization for IGS. Exterior and interior spatial organization atmosphere are illustrated in Figure. 2 (left).

### *3.2. IGS in middle income row-type housing located near Khon Kaen* University

The practical survey has been carried out, on-site graphic recording techniques have been utilized in collaboration with semi-structure proposed questions to the users. As for middle income row-type housing, 30 households were randomly selected to be analyzed. About two dwellers per household, therefore about 60 people involved in the research area. User utilized self-customization approach as a tool to achieve IGS. Only an awning in a front approach of the row-house that was extended using extension.Spatial organization is also flexible due to its compact living area.About three fourths of row-house in the research area is self-customized space for IGS to suit each of the owner's income generating purpose as shown in Table 1 on the second column which is purpose of occupation. This means about the availability of 75 percent of the houses in the research area have the house customized for IGS.

Although there is 25 percent of unavailability of IGS that can be explored, but within this number there are positive trends of the need for having IGS in dwellers' possession as shown in Table 1 third column (availability of IGS). Additionally, if looking straight inside into the outlook of how much of the income that can be monthly generated, there is a range of generated income from 16,000- 45,000 baht as shown in Table 1 at the last column. Income generating activities of academic and service activities that utilizes technology gained higher income in comparison to selling food activities. This phenomena of popularity of IGS utilization implied and showed the demand of IGS in row-type housing that is very essential and should be integrated in row-type housing, both for the housing policy level and design point of views. IGS should be provided and included at the initiate state of the design processes.

**Table 1** IGS and related factors to IGS enhancement

| House | Purpose of Occupation | Availability of IGS | Categorized type | Generated income |
|---|---|---|---|---|
| 1 | selling made-to-order food | present | A, B | 22,000 |
| 2 | fashion (wear/ clothes) shop | present | A, B | 18,000 |
| 3 | coffee shop | present | A, B | 18,000 |
| 4 | residing only | - | - | - |
| 5 | book shop | present | A | 18,000 |
| 6 | noodle shop | present | A, B | 16,000 |
| 7 | beverage shop | present | A | 19,500 |
| 8 | language learning center | present | A | 45,000 |
| 9 | rental row house | present | A | 18,000 |
| 10 | residing only | - | - | - |
| 11 | residing only | - | - | - |
| 12 | rental row house | present | A | 20,000 |
| 13 | gift shop | present | A | 17,000 |
| 14 | barber shop | present | A | 16,000 |
| 15 | restaurant | present | A, B | 35,000 |
| 16 | beauty salon | present | A | 25,000 |
| 17 | residing only | - | - | - |
| 18 | doll selling shop | present | A, B | 17,000 |
| 19 | residing only | - | - | - |
| 20 | clothes shop | present | A | 18,000 |
| 21 | pharmacy | present | A | 40,000 |
| 22 | residing only | - | - | - |
| 23 | internet service shop | present | A | 35,000 |
| 24 | stationery | present | A | 25,000 |
| 25 | mobile selling shop | present | A, B | 32,000 |
| 26 | residing only | - | - | - |
| 27 | eye glasses shop | present | A | 44,000 |
| 28 | grocery store | present | A | 30,000 |
| 29 | flower shop | present | A, B | 35,000 |
| 30 | copy shop | present | A | 42,000 |

## 4. IGS categorization

### *4.1. Categorization of IGS in Tawanmai row-type housing*

As for categorization of IGS in Tawanmai row-house, it can be major categorized into two types sorted by income generation characteristics. First type (type A) is generating task at home and gaining income at home. While the second type (type B) is generating task at home, while gaining income outside the home. Two types of IGS are illustrated in Figure. 2 (left), for instance type A, dweller utilizes IGS for a beauty salon activities, therefore space has been organized to suit the salon purpose. Salon desk, chair, mirror set has been set and equipments have been introduced to IGS.As for sample of type B shown in Figure. 2 (left), dwellers used IGS for selling food activities. Food has been prepared at home before going to sell outside the home after the preparation has been accomplished.

### *4.2. Categorization of IGS in middle income row-type housing located near Khon Kaen University*

It can be categorized into two types of IGS for this row-type housing; open air IGS/ none of close ventilation and air-conditioned IGS/ close ventilation IGS as shown in Figure. 2 (right).It can be majorly categorized into two types which have the similarity to the previous low-income row-type housing. As for this case, it can be found two types of spatial utilization which depend on characteristics of usage as illustrated in Table 1 fourth column; type A and type A, B. Type A, B means there are opportunities that sometimes users themselves utilized two strategies.

## 5. Lighting design and IGS

As for lighting design in Tawanmai low-income community and middle income row-house, front porch of first floor of IGS can be entered by natural lighting, while if it is gradually become rear space of the IGS first

floor, artificial lighting design is needed due to no plenty of natural light that is able to come into the space. Just only through the rear small openings of the row-house.Lighting should be designed to have plenty of brightness according to lighting standard. Additionally, architectural aesthetic is also imperative to simultaneously consider with the brightness of the lighting design space. It was normally found that fluorescence type was in the most popularity to be utilized for IGS in the row-house type. Lighting source also can be varied or change for instance LED type but the brightness and efficient of the lighting have to be at least equal to fluorescence type. Moreover IGS lighting design can be designed by utilizing natural lighting integrated with the utilization of artificial light.

## 6. Conclusions

Apart from functioning as a residing purpose, row-type housing can be utilized for supporting to generate income for its user named IGS.It was explored that, IGS was found its popularity to be used for both of Twanmailow-income community housing, as well as middle income row-type housing located near Khon Kaen University. Self-customization has been explored as a tool to achieve IGS. Integration with self-extension were found to be used as a tool to get IGS. Lighting design should be designed to gain plenty of light and can be answered the architectural aesthetic demand. About more than one third of the BMP row-house in the research area employed IGS strategy. Additionally, about three fourths found IGS to be utilized for row-house for middle income row-house. It therefore IGS should be the essential issue to be implemented for sustainable strategy for row-type housing that should be made an integration both for housing policy level, as well as design outlook.

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