UNIVERSAL DESIGN HOUSE MODEL FOR ELDERLY WITH LOW INCOME

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This paper demonstrates the Universal Design (UD) house for Thai elderly with low income under the budget of 100,000 Baht (approximately 2,662 USD). Houses of older persons and people with disabilities mostly cannot be easily renovated because the house architectural structures are extremely dilapidated. The budget from Thai government for house renovation is insufficient, so additional budget from local government and other organizations is required to renovate or rebuild the elderly’s houses for their better quality of life. To ensure sufficient budget, policy makers should expand the budget to 100,000 Baht per household with criteria of the urgency of construction improvement, which are 1) environment, 2) health, 3) society, and 4) overall opinion of the community.

The 100,000 UD house is designed and built as a 1:1 model that was first showed in Thailand Friendly Design Expo for satisfaction survey. Most of the participants agree that the budget should be increased (74.7%) and that the elderly’s house should be rebuilt (76.2%) rather than renovated (39.2%). The result on the 100,000 UD house model is that it should have at least the necessary zones, which are the sleeping area, bathroom, cooking area, area connected the sleeping area, and the multipurpose area that constitutes 30-40% of the total housing area.

This research would be beneficial for the government in improving the quality of life of elderly, underprivileged people.

Keywords: House improvement, Modular, Compact, Quality of life.

1 INTRODUCTION

100,000 UD HOUSE is from the result of research on housing for Thai poor families from the experiences of Thammasat University Universal Design Research Unit (UD.Tham) that designs more than 100 houses by using universal design concept (UD). Families with low income mostly live in houses of which the condition become extremely dilapidated and difficult to renovate because of the lack of financial means to maintain the house structure (TGRI 2022). In Thailand, the government supports house renovating budgets with a limit of 100,000 Baht per family (Ministry of Interior 2006). To assist with this policy, UD.Tham studied the basic and size requirements for a single-person residence that meet the requirements identified by related law and regulations within the budget of 100,000 Baht (DPT 2005, DPT 2021). This study also addresses the process of building, skill levels of workers, and material options which are important to the construction process in different contexts and conditions. The 100,000 UD HOUSE design was firstly presented at Thailand Friendly Design Expo 5 and garnered attentions from many investors, local government, and foundations. The knowledge from this research can be integrated into the decision-making process of these organizations. Recently, Access Israel also became interested in this project, and the author was invited to share the design in GAILS 2022 in Israel.
2 OBJECTIVES

This paper demonstrates the keys to a successful implementation of the universal design house for Thai elderly with low income.

3 LITERATURE REVIEW OF 100,000 UD HOUSE

Our designs of 3 UD houses for the elderly with low income in Thailand are presented in another proceeding. These houses, designed with concept of "Compact Modular House", have the following dimensions and projected budgets: 1) Type 1, 3.0m×6.0m area with 120,000 Baht budget, 2) Type 2, 6.0m×6.0m area with 170,000 Baht budget, and 3) Type 3, 9.0m×6.0m with 230,000 Baht budget.

3.1 UD House Design Type 1

The Type 1 house design for low-income seniors is suitable for those who live alone or with no more than 2 caregivers when the budget is only supported by a government agency. The area required for the construction is small, but if other improvements become necessary, the house can be easily expanded (Figure 1 and 2).

Figure 1. House design for low-income seniors, Type 1.
The Type 1 house design was built with a scale 1:1 for a demonstration in Thailand Friendly Design Expo 5. The satisfaction survey was conducted on the Type 1 house model to investigate real customer satisfaction on the design and area utilization in the house (Figure 3).

![Figure 3. Model of House Type 1 with 3.0m x 6.0m dimension built in a scale of 1:1 for showing at Thailand Friendly Design Expo 5.](image)

4 METHODOLOGY

Residential size standards specified by law and regulations are reviewed (Rojweerasingh and Phetchanon 2011), and area utilization in the houses of low-income elderly people are collected through interviewing, surveying, or 1-day direct observation. Obtaining real information on the living patterns of the elderly with low income can lead to appropriate home improvement design (Wongsununt 2016). The information is collected from 4 provinces, representing the 4 main regions in Thailand, which are Pathum Thani (central region), Chiang Mai (northern region),
Songkhla (southern region), and Khon Kaen (northeastern region). Moreover, in-depth interviews are also conducted on the successful house designs in all 4 regions.

After surveying and observing the target group which is older persons (≥60 years old) who are still active both physically and mentally, the data was analyzed by descriptive analysis. Three house designs are proposed in another study. The smallest design, house Type 1, with 3.0m x 6.0m dimension was built in a 1:1 scale for showing at Thailand Friendly Design Expo 5 and for satisfaction survey by seniors and people with disability.

5 RESULTS & DISCUSSION

5.1 Participation Process: Key People

In real operation, each area has different key people, such as community leaders or organizational leaders who contribute to the smooth operation (Sawangjaroen and Sirisali 2014). For example, in the Chiang Mai area, there are local sages who understand and are well respected in the area. They can encourage the community to participate in the operation. In the Khon Kaen and Pathum Thani areas, this role is replaced by community leaders or local government officials who help facilitate the operation. However, there can be challenges in coordinating across different functions due to organizational constraints and lack of understanding. If the project details can be communicated effectively to the community and local officials, it can ensure smooth project implementation. The last point to ensure successful implementation is to focus on local participation, by creating awareness, unity, and a shared commitment among stakeholders.

5.2 Participation Process: Community Cooperation Level

Rural communities, such as in Khon Kaen and Chiang Mai areas, have unique cultural traits, strong relationships, and mutual support, which may have an influence on the project's budget, material integration, and labor requirements. Projects in these areas demand substantial funding and time for improvements. However, areas with high levels of community participation can effectively reduce material costs and ensure better project management. In conclusion, a supportive community fosters increased participation, leading to effective project outcomes (Sawangjaroen et al. 2022).

According to the results of the study and analysis of the living patterns of the elderly with low income, most of the houses are in a very deteriorated condition. The criteria for urgent improvement construction are thus prepared for each area which has unique home selection criteria. The factors used for prioritizing the urgency can be divided into 4 issues, consisting of:

- **Issue 1 – Environment**: If the environment is very degraded, there will be an urgent need for improvement. The assessment will be done using a 2-part assessment form, namely 1) the deterioration assessment form and 2) the assessment form for the facilities in the house and the house area.

- **Issue 2 – Health**: The highest priority should be given to the elderly who are homebound, followed by those who are healthy but not willing to leave their home community, respectively. The elderly who are not willing to leave their home community but are still healthy and active may eventually need a caregiver if their health deteriorates. If their houses can be renovated to reduce the risk of accidents, it will help prevent them from becoming homebound, or even worse, bedridden (NAHB 2021). Therefore, the target group for home renovation should be the elderly who are homebound or active in the community because homebound elderly is more likely to be exposed to environmental hazards than bedridden elderly.
• **Issue 3 – Community involvement:** The weight of this factor should be given the least emphasis, considering that some elderly might not have had the chance to participate in the community previously. This could be due to several responsibilities, such as caring for a sick parent or child, which disadvantaged them in this regard. However, if the current home environment is severely degraded, affecting their health and income, it should take precedence to ensure their opportunities are not hindered. Improving their living conditions will foster volunteerism and community involvement.

• **Issue 4 – Overall opinion of the community:** Community opinions, such as through a vote, on the urgency of each case may be considered, but it should be given the least weight. However, presenting information and establishing criteria based on appropriate principles are crucial. Emphasis should be placed on providing clear information to the elderly concerning their environment and health and sharing this information with the community.

5.3 **Results from Satisfaction Survey on the Type 1 House Design**

Currently, the government annual budget for house renovation is 40,000 Baht for each family. From the survey, 74.7% of the participants agree that the budget should be increased. Participants prefer house reconstruction (76.2%) over house renovation (39.2%). The result on the 100,000 UD house model is that it should have at least the necessary zones, which are the sleeping area, bathroom, cooking area, area connected the sleeping area, and the multipurpose area that constitutes 30-40% of the total housing area.

6 **CONCLUSION & RECOMMENDATION**

The results of the study on the living patterns of low-income elderly individuals in deteriorating conditions at home can be categorized into three main topics: 1) participatory process, 2) belief and culture, and 3) society. To assess the urgency of construction improvement, specific criteria have been established, which are 1) environment, 2) health, 3) community involvement, and 4) overall opinion of the community. For the second objective which focuses on designing small home improvements suitable for low-income elderly individuals, new findings include: 1) community technology: Different areas exhibit variations in terms of innovation and technology, impacting the accessibility and selection of materials; 2) determination of zones for utilization of space (zoning): Factors such as accessibility, ease of area use, sunlight direction, residents' behavior, and occupation influence the location of zones; and 3) size. It was also found that international standards should be adapted to suit the behaviors of the local people both in natural and social contexts.

Based on the research summary and its objectives, the following recommendations can be made for future operations. Survey participants advocate for an increase in the budget limit for house renovation but not exceeding 120,000 Baht. This policy should also specify that requirement that the houses must be considered as severely dilapidated. The evaluation of houses deemed severely dilapidated should involve a collaborative effort between the local committee on social development and the provincial human security officers.

**References**


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