

Why Sustainable Design Should Be in Accordance with a Participatory Design Approach – The 1st phase of Sustainable Kampong Model: Margamulya Village, Mauk, Tangerang

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Abstract

Sustainability has been becoming an important issue in recent years in architecture and design. On the other hand the practice has also seen new approaches that emphasize active participation of stakeholders. This research thus tried to consider both of these approaches, as needs within each other and aimed to develop a schematic sustainable design model for built environment. Margamulya Village, Mauk, Tangerang is the case study, as this kampong (village) represents a traditional informal kampong with its disarray and unplanned development, while on the other hand it has already been touched by a certain NGO specialized in providing decent housing. In this sense the research will use PAR (*Participatory Action Research*) as an umbrella for the research methodology, CBPR (*Community-Based Participatory Research*) as an approach and PD (*Participatory Design*) as the research tool. The research will be conducted in two stages: (a) the 1st year focusing on developing a schematic design model for a more sustainable Margamulya Village, Mauk, Tangerang, and; (b) the 2nd year focusing on developing a participatory model for the community everyday activities within their social, economic and cultural sphere. The research is

currently in the 1st phase.

Keywords: Sustainable Design; Participatory Design Approach; Schematic Design Model; Margamulya Village, Tangerang.

Abbreviations:

PAR	: Participatory Action Research
CBPR	: Community Based Participatory Research
PD	: Participatory Design

1. Introduction

Sustainability has been becoming an important issue in recent years in architecture and design. The fact that architecture and design practice - especially in terms of building construction - has been acknowledged as one of the major contributors to the deterioration of the environment has put both practices to the forefront of developing new approaches. Many approaches known as sustainable architecture or 'green' architecture have already been tested and implemented. On the other hand the practice has also seen new approaches that emphasized active participation of stakeholders. Architecture and Design that was once known as solely the domain of the architect or designer, is now becoming more and more fluid terrain promoting shared enterprise and the democratization of space in its production.

This research has proceeded from the recognition that both of these approaches were actually needs within each other. Sustainable design obviously would have a greater impact, while on the same time ensuring sustainability, if it was done using a participatory approach, whilst participatory design would have more wisdom and value if it put sustainability into its considerations. The research aim for this study was to develop a model of a sustainable kampong (village) through participatory design methods with Margamulya Village, Mauk, Tangerang, Indonesia as the case study.

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2. The Discussion

2.1 The relationship between sustainability and built environment

To ensure sustainability within the scope of built environment, many have already argued that the development of physical space must be done simultaneously with the development of its economic and cultural values. Lennard (2012) claimed that human settlement level of conformity should be justified by its physical, social, economic and psychological conformity [1]. Moreover, Gehl (2010) stated that in developing physical conformity within the built environment, one must also pay attention to developing healthy social conditions [2]. Hester (2010), on the other hand offered that in developing neighbourhoods one must have: (a) Enabling form, as it will reveal how interconnected we are to other people and to the landscape; (b) Resilient form as the pursuit of sustainable happiness; (c) Impelling form - the highest form that could be achieved in developing neighbourhoods with the goal to make a built environment that touches the people's hearts. Hester believed that the understanding of healthy, comfortable and liveable dwelling settlement areas are the most important things to be implanted in the community before any planned interventions take place. This understanding will evolve into the community's awareness and this will then increase their active participation in taking care of their own dwelling settlement areas [3].

To induce the inhabitants feelings of attachment to their dwellings, Srinaga (2010) concluded that this can be done by: (a) physically, aesthetically, historically, culturally, and functionally fulfilling the needs of the inhabitants (bounding to place); (b) designing the built environment with several good criteria - i.e.: healthy, comfortable and safe, friendly, and (c) creating a strong identity, hope and subjective beliefs or good image of their neighbourhoods. Srinaga showed that healthy neighbourhood planning requires continual preservation of its physical conditions, social, cultural, and economic conditions, thus perpetual trust, hope, and good image from the inhabitants concerning their neighbourhood are also essential parts [4].

Hubert and Theocharopoulou (2013) also argued that the concept of sustainability remains both a fundamentally political and moral term. As a basis for policy, sustainability is an explicit attempt to promote 'environmental justice', in which it addresses both physical and social issues. Thus sustainability in its fullest sense demands the recognition of inequalities and injustice, and requires a vision of built environment as places of social and environmental creativity [5].

2.2 Participatory Design Approach

Lee Stickels (2011) argued that issues of participation and empowerment have emerged more contextually than ever in architecture discussion and practices. Consequently,

architecture's entanglement with political, social, economic and cultural spheres is inevitable. Stickels saw this as potential to re-think spatial production as a shared enterprise, where everyone should participate in creative transformation of architectural design processes. Furthermore, Stickels proposed that the new role of architecture should be seen as a participatory collective construction process for emancipatory empowerment [6]. Petrescu (2005) offered 'design-action', in which there will be no border between design and use. Creativity will be the main generator where one has to find ways of adapting and reinventing everyday life contexts continually. 'Design-action' would be an interventionist design resulting from a mix of the designer's and user's aesthetics. It will take political positions and catalyze social processes where what she called 'life space' will start to emerge. Community participation would no longer be a question, as the participatory activities itself will define this ever changing, heterogeneous 'life space' [7].

In order to achieve what Stickels and Petrescu offered, it is valuable to note what Sanoff (2000) earlier advised, in which community participation in design should be *genuine participation*, where cooperation (its partnership and delegation of powers) and citizen control (relating to the issue of empowerment) must be assured. In short the experiences that should follow any participation should be building awareness, shaping perception, togetherness in decision-making and involvement in implementation [8].

In more specific and implementable notes, Joan Greenbaum and Daria Loi (2012) argued that PD (*Participatory Design*) was some kind of a hybrid between design, research and participatory activities, in which its ultimate goals would bring design research and action sincerely for the advantage of the targeted community. Moreover it would be design done collaboratively by, with, and for the community. Thus PD could be seen as democratization and emancipatory design practices that usually fall under the category of user-centered design or interaction design. In this sense PD worked in a wide ranging social embroidered spectrum with principles of: (1) balancing the power relations; (2) situation based action; (3) mutual learning; (4) emphasizing on tools and techniques potential; (5) alternative visions about technology, and; (6) democratic practices (Greenbaum & Kensing: 2012, in Greenbaum and Loi: 2012) [9].

3. The Discussion

3.1 The Research Context: Margamulya Village, Mauk, Tangerang, West Java, INDONESIA

A kampung is one of the characteristic traditional settlements in Indonesia, in which usually the development was unplanned and scattered according to the needs of the land owner. Margamulya Village, Mauk is no different. Located deep within the borders of Tangerang, the kampung is a scattered village with a lack of proper

infrastructure, facilities and disarrayed development of its settlement. The original dwellings are mostly improper dwellings with little concern for natural lighting and ventilation, hygiene, waste and drainage management. Yet what makes the kampong interesting as a case study is that it received enormous aid from Habitat, a non-governmental organization that specialized in providing decent housing for the needy. More than 60 dwellings there already received aid from Habitat. In doing this work, the NGO had fairly comprehensive strategies. Their first move is usually making physical improvements in the village, such as building a proper access, public utilities and other infrastructure needed. At the same time Habitat would arrange the villagers to work together and facilitate discussions on sensitive issues such as land use and ownership amongst the villagers, including decisions on who would get the housing aid. Habitat would build the house in accordance to the list, provided budget and on their standards. Participation space for the owner/villager also arranged by Habitat in terms of getting involved in the construction process or providing some specific materials that are deliberately left undone by the NGO. They also provided communal activities and consultation that was focused on building up environmental awareness. The improvements made by Habitat apparently had made the villagers proud of their kampong and become conscious of their own capabilities (see figure 1).



Figure 1 (a) the existing condition; (b) homes built by Habitat; (c) existing home; (d) existing interior

Nevertheless the research team believed that what had been a good initiation by Habitat could be elevated and improved if the participation space from the villagers broadened, particularly in the decision on how their dwellings and village structure physically should be transformed. In this sense the research would come into its place, as an evaluation and improvement initiative to the betterment of dwelling intervention, so as to make it more sustainable and in accordance with the needs of the villagers through participatory design methods.

3.2 The Research Methodology

Participatory Design (PD) is commonly related to Participatory Action Research (PAR). According to Taggart (1994, 2006) PAR worked based on theoretically informed practice - research based on exploration and objectification of experience and the disciplining of subjectivity as common features in any qualitative research model [10]. Rooted deeply within Critical Social Science (CSS) scope, PAR gained popularity, especially in the area of community

empowerment and community development [11]. In this sense PAR could be positioned as an umbrella for the research methodology as it has the flexibility of accommodating the research activities, design process and collaborative action within the research framework.

The research model adopted here follows Berg and Lune's (2012) model of collaborative partnership in terms of doing Action Research (AR), which is: 'A Practical/Mutual Collaborative/Deliberate Mode', whereas the researcher and the practitioner/the community members' representatives work collaboratively to reach a mutual understanding on identifying potential problems and issues, their underlying causes and possible interventions [12].

In terms of research ethics, the CBPR (*Community-Based Participatory Research*) approach will be used as it promotes everyday community values as the research ethics baseline, claims to be a method that involves all the stakeholders (including the researcher) in equal partnership and co-learning to produce certain collaborative action and leaning towards the production of empowering and liberating knowledge [13].

Jenkins & Forsyth (2010) provided research questions that must be asked during the implementation of participatory design activities, which are: (a) who is involved?, (b) which parts of the design activities could be shared collaboratively?, (c) how can social and technical participation tools be used in the design activities?, and, (d) what types of architecture can be done? [14]

According to Sanoff (2000) while undertaking community participation in design, one should be aware of these principles, where: (a) the professional's job is no longer to produce finished and unchangeable solutions, but to develop solutions from continuous dialogue with its users. It means *there is no "best solution" to design problems and "expert" decisions are not necessarily better than "lay" decisions*, (b) participation has a diversity of expression, thus (c) public forums should be convened, and participation by all members of the community should be encouraged, and; (d) participation in the design and planning process may involve technological issues, and as a result, specialists in various fields should gather and cooperate, (e) public comments and representation should be accepted into the process continuously. The final decision is not the end of the process. It must be managed, evaluated, and adapted to changing needs [8].

Colantonio & Dixon (2011) showed criteria that had been used by *Compagnia di San Paolo* to evaluate housing projects proposals, which are: physical renovation, social and cultural development, partnership model, budgeting and project management [15]. These criteria were then used accordingly in conducting the design 'research - action' for developing a more sustainable schematic design model in the case of Margamulya Village, Mauk, Tangerang (see figure 2).

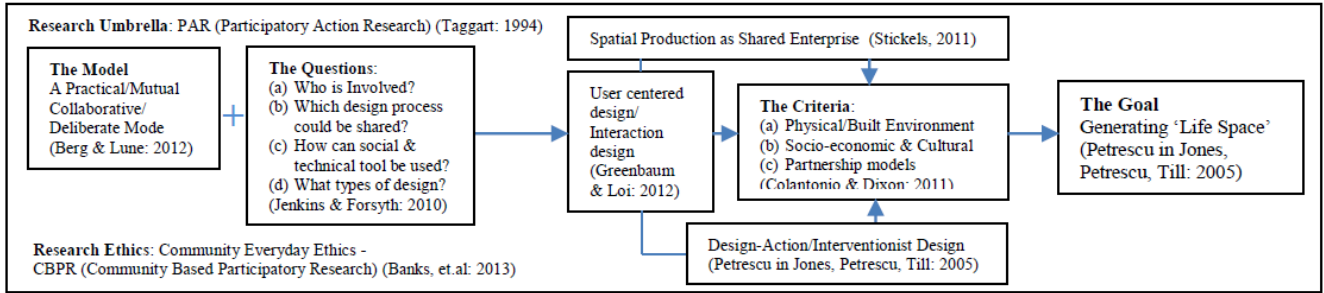


Figure 2 The Research Methodology

3.3 The Research Framework and its Current Position

This research is being conducted in two phases: (1) the 1st year focuses on developing a schematic design model for the more sustainable Margamulya Village, Mauk, Tangerang, and; (2) The 2nd year focuses on developing a participatory model for everyday community activities within their social, economic and cultural sphere (Fig 2.). Both models will then be developed and become the new model of a sustainable kampung (see figure 3).

The research is currently in the 1st phase which is developing the sustainable design model for the kampung’s built environment, following the data collection, data analysis, initial schematic design and feedback process through participatory methods between the researcher team and the community of Margamulya Village.

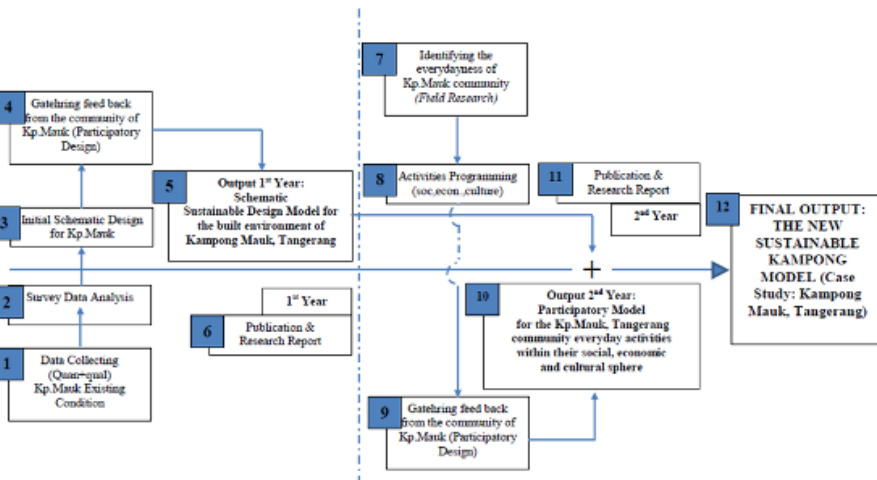


Figure 3 The Research Framework

3.4 The Participatory Inquiries Account

We developed a participative inquiry tool for studying the inhabitants’ needs, preferences, wishes and dreams based on the criteria discussed earlier. The tool was divided into four sections: (a) the 1st and the 2nd parts were intended to

learn more about the inhabitants feelings and hopes toward their dwelling (*room flexibility, local materials, health, safety, conformity and accessibility concerns*) and their environment (*infrastructure and public facilities, conformity, accessibility, safety and health concerns*), (b) the 3rd part was exploring the issues of socio-economic and cultural values within the community, while, (c) the last part was examining the community responses concerning partnership, especially with Habitat and regional government institutions. In undertaking the participative inquiry initiatives we deliberately selected community representatives from 3 allotted categories: 5 community members who had already received new dwellings from Habitat, 5 community members who were still living in their original dwellings and 5 community leaders from the targeted community (see figure 4).



Figure 4 (a) The participatory discussion; (b) The results of participatory discussion; (c) Gathering with community members

3.4.1 Dwelling

The first sub-criteria on dwellings that we analysed were about **room flexibility**. Chosen community members of Margamulya Village had received standard housing improvements from Habitat. The standard housing from Habitat would replace the existing dwellings that were deemed not proper. Habitats’ standard house was planned as a permanent ± 30 m² house. The building form, space programming, methods of

construction and materials used were already standardized and calculated by the institution, considering mostly budget and time of construction constraints. Habitats’ house is a modern dwelling that has also already taken into account health concerns such as openings for guaranteed sunlight and air circulation inside the standardized house. From our participatory discussion with the community members it

seemed that the space programming provided was not yet meeting the expectation of the dwellers, as the space program was given. In their existing building, although they were aware that the conditions were not proper, but in terms of space programming most of the inhabitants seemed to feel that it was sufficient, as they had independence to arrange it accordingly to their everyday dwelling activities and needs. Our participative inquiries showed that the community members needed more flexibility on arranging their own dwellings (see figure 5).



Figure 5 (a & b) Homes drawn and built by Habitat; (c) Original dwellings; (d) Room flexibility in the original dwelling

The second sub-criteria were about local materials. In building their house, Habitat used modern materials (i.e.: concrete, steel, plywood, roof tile, etc.) and decided to provide it from the material store outside the village (Sasak Village, Kampong Jati). This decision was taken mainly because of the effectiveness and the need to control the budget. Our participative inquiries suggested that within Margamulya village there were actually many local materials available, such as: coconut trees, red bricks, bamboo and bamboo mat, etc. and it was these local materials that were used by the community to build their existing dwellings. The community also seemed quite aware, and have more understanding when it comes to the techniques for building homes with these local materials. Yet from the community perspective, modern materials would be used to build modern homes and for them it is positive thing because it looked more permanent than their own existing dwellings. We believed this could be solved by proper design that shows potentialities of local materials and how it could be seen as an improvement to the community (see figure 6).



Figure 6 (a) & (b) Bamboo and Brick materials inside the kampong; (c) & (d) Local materials used for the original dwellings

Health concerns was our third sub-criteria, in which we examined the physical existing interior situations such as the building height, natural air circulation and natural light openings. Habitats' houses seemed to give more attention to these concerns and provided minimum requirements for it. On the other hand the existing homes were far from meeting the minimum expectancy of how a dwelling should provide good natural lighting and air circulation through openings and ventilation. In some dwellings we could sense immediate dampness and overwhelming humidity caused by minimal openings, yet the using of traditional bamboo

mats for the wall material coverings let the air come in especially in the extremely hot weather conditions. Regarding these concerns, again we found opportunities that might combine the modern approach with the traditional approach and response to the actual climate and weather conditions in the village (see figure 7).



Figure 7 (a) & (b) Poor ventilation and opening considerations for the original dwellings; (c) & (d) Opening considerations for Habitat homes

Other concerning findings from our participative inquiries, were that the behaviour of the community regarding how to deal with their domestic waste and garbage did not reflect any changes. They still responded by recklessly burning it or throwing it in any empty spaces. Our data also showed no differentiation in sickness frequencies measured between the community members that lived in the new houses or the ones who dwelled in the existing dwellings.

The last sub-criteria that we evaluated were **safety, comfort and accessibility concerns**. Regarding the safety and accessibility concerns, Habitat houses were deemed more proper than the original ones. This was mostly because of the modern materials and construction techniques implemented, which were more resistant to fire, flood and earthquake problems. The original dwellings also had more risks to the safety of its users, related to ceiling heights and floor finishings. However, when we discussed about comfort, the community responded that the new houses felt hotter than the original ones (essentially because of the more solid wall materials) and the space programming was deemed not sufficient to accommodate their daily dwelling activities (see figure 8).



Figure 8 (a) and (b) The new arrangement of dwellings built by Habitat; (c) Road accessibility built by Habitat

3.4.2 Environment

The first sub-criteria on analyzing environment were about **infrastructure and public facilities**. Our participative inquiries showed that what was most needed for the infrastructure were clean water availability, sewerage system, garbage disposal arrangement and public toilets (MCK - Mandi/Cuci/Kakus). Habitat's first intervention was a public road built using paving blocks and deemed

sufficient for the inhabitants as it opened their village accessibility. While public facilities most needed by the community were: health, sports and communal building facilities for their gathering activities. Educational and religious facilities were also deemed as important. However, open space for children or economic space such as traditional markets and space for security concerns (*pos ronda*) were deemed not too important (see figure 9).



Figure 9 (a) Posyandu; (b) Musholla; (c) Public toilet 'MCK' built by Habitat; (d) Pos Ronda

The second sub-criteria were about **health, safety, comfort and accessibility** concerns. Our participative inquiries showed that the community saw these concerns as individual responsibilities rather than communal concerns. For example the community expressed their needs for personal garbage dumping facilities, although when asked further they seemed not to know how to maintain it and on how the garbage would later be brought out of the village. Safety and comfort for the community were again related to individual concerns, while accessibility as mentioned earlier was now felt to be more proper since Habitat made public road infrastructure throughout the entire village.

3.4.3 Socio-Economic and Cultural Values

Analyzing socio-economic and cultural values were equally important in the participative inquiries. This knowledge will strengthen the planning of collaborative interventions to the targeted community. Our participative inquiries showed that Margamulya village community daily activities were as follows: The men would work as temporary farmers or fishermen at nearby paddy fields owned by others or sailing with someone else's fishing boat with a concession agreement usually 4:1. When there were no paddy fields or fishing boats that they could work with, they would do any job available (i.e.: motorcycle cab driver (*tukang ojek*) or building construction worker (*kuli bangunan*)). The women were mostly housewives and if they had extra savings they usually would open up temporal selling space (*warung*) in front of their terrace. The children would mostly go to school in a nearby village and spent time playing outside when they were home. The approximate income was mostly below IDR 1 million (USD 83)/month and was not stable. However the relationship between community members was solid and warm as they loved to gather informally outside the house and also have many religious or formal gatherings. This then brings attention to cultural values within the community. In the participative inquiries we found out that the community once had many cultural gatherings relating mostly to the celebration of the beginning and harvesting season as farmers or fishermen (called '*Sedekah Bumi*' and '*Ruwatan Bumi*') and marriage or

circumcision celebrations. However because of the financial limitations and the changing of land ownership, these traditions had now faded. The other form of cultural values that were still held up by the community nowadays are the ones that related to Islam's religious rituals (i.e.: celebrations of *Idul Fitri*, *Idul Adha*, *Maulidan*).

3.4.4 Community responses towards Partnership

Our participative inquiries had shown clearly that Margamulya village community was giving positive responses towards any partnership, especially with Habitat Indonesia. They felt that what Habitat had done for them had answered their primary needs of having decent and proper dwellings. Measuring from the physical changes that Habitat had brought to the village it seemed clear that the partnership had been successfully done as it also showed the closeness of the relationships between the community members and Habitat field representatives. The initial partnership also opened up other forms of partnership, especially with the local government through their own empowerment programs and with academicians or researchers who cared for the betterment of Margamulya village. Other positive values of these partnerships were the self-confidence and proud attitude shown clearly by the community.

4 The Design

After undertaking the participative inquiries research with the Margamulya village community, we developed a design for dwelling units and a public hall based on those findings. The dwelling design first impression was skeletal and used rough materials with minimum finishing. Yet if examined closely it shows that the materials used were local materials used and known by the locals, such as walls that used a combination of red bricks and bamboo mats (which also ensure the walls can breathe). The dwelling also ensured sunlight could come inside and air could circulate around the house as it has many openings. An innovative and different approach was used for the structure as it used hollow steel forming the skeletal frame of the building with primary consideration of budget, simple system of construction, and minimum use of other materials. Moreover the main idea of having hollow steel as the skeletal frame of the house would be the opening up of possibilities for the house to grow vertically or horizontally as shown in Fig.10 below. The dwelling would become very flexible in its development and let the user decide on how they wanted their dwellings to be (see figure 10).



Figure 10 The dwelling design and how it could grow vertically or horizontally

The second design that we proposed for Margamulya village community was a public hall. We chose this facility because our participative inquiries had shown that it was what the community needed, a place for communal gathering that could be used multi-functionally. In this design we used all the local materials known by the community (i.e.: coconut wood, bamboo, bamboo mat, red bricks, etc.) with only a small portion of concrete for the stairs and service floors. We wanted the community to build the hall by themselves using materials that they were familiar with. Moreover, we proposed that some of the materials were provided by the community itself (i.e.: bamboo mat for the floor and the windows, bamboo for roof and floor structural construction, etc.). To give local identity and the community ownership signature for the building, we proposed that the 4 main columns supporting the highest roof using the biggest coconut wood were to be provided by the community collaboratively and symbolically represent the community from all 4 corners of the village (see figure 11).



Figure 11 The Public Hall design

Both of the designs were then brought to the community to gain feedback (see figure 12). The design proved to be communicated well with the community as they could easily acknowledged the materials used by both of the designs and began to discuss enthusiastically about the dwelling especially in detail.



Figure 12 The Participatory Feedback Process

The community members could imagine how they could build the house and even gave detailed suggestions, especially on specific techniques and tools regarding how one would respond to the materials and the ways of constructing it. As for the dwelling, for instance, they were not too keen on using hollow steel and affirmed that coconut wood was actually sufficient enough and had the same structural capabilities for the base structure, allowing the proposed concept of the ‘growing house’ to be implemented. The community indeed loved the idea of having a ‘growing house’ as they related it with the size of the land that they owned, but preferred the horizontal expanded alternatives rather than the vertical ones. They could describe in detail how the space programming would be with the extra rooms and spaces that they would have with the expandable house. They also opted for the kitchen to be outside or at least connected directly outward (as in their existing dwellings mostly) because they felt it would be more safe regarding the risk of fires. For the communal building the only concern that the community had would be the land and its ownership. The design went well for them, although it seemed that the hall was too open for them and they suggested that the hall be more flexible in this case. What really amazed us was the enthusiasm and in how much detail the community could imagine and relate to the design we brought, yet it also proved that when the community have a say they actually know and were willing to actively participated in the design process.

5 Conclusion

The research discussions on the 1st phase of developing the more sustainable Margamulya Village have shown how a participatory design approach should be considered as an ultimate approach for making a more sustainable design. By doing participatory design and collaborating actively with the targeted users, all stakeholders eventually would learn and produce valuable knowledge with each other. Both the researcher and the community would become active designers enriching the design with detail from everyday lives values. Thus the ultimate finding of this research would be that sustainable design was not just merely creating physical design results that correspond to all building parameters and categories of such, but it must also reflect the identity of its user and his/her actual everyday activities through active and collaborative participation. Therefore design would inevitably and effortlessly become more sustainable, creating ‘life space’- where active participation would no longer be a question.

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