



TECHNISCHE  
UNIVERSITÄT  
WIEN

Vienna University of Technology

DIPLOMARBEIT

**EVALUATION OF THE TRANSITIONAL SHELTERS  
IN BANTAYAN ISLAND, PHILIPPINES**

ausgeführt zum Zwecke der Erlangung des  
akademischen Grades eines Diplom-Ingenieurs

unter der Leitung von

**Univ.-Prof. Dipl.-Ing. Dr. Techn. Ardeshir Mahdavi**

E 259-03 Abteilung für Bauphysik und Bauökologie

Institut für Architectural Sciences

**eingereicht an der Technischen Universität Wien**

Fakultät für Architektur und Raumplanung

von

**Robert B. Malayao, UAP, LEED Green Assoc.**

Matrikelnr. 11833894

Ziegelhofstraße 84A House 11, 1220, Wien

Wien, November 2020

# KURZFASSUNG

Die durch den Super-Taifun Haiyan verursachten Verwüstungen ließen Hunderttausende Filipinos in Evakuierungszentren und später in Übergangunterkünften leben. Jahre später leben die Opfer immer noch in denselben Unterkünften, und die Hoffnung, im Laufe der Jahre in ein dauerhaftes Zuhause verlegt zu werden, schwindet bei einer Vielzahl der Bewohner. Ihre Situation veranlasste sie jedoch, Strategien zu entwickeln und Änderungen an diesen Übergangunterkünften vorzunehmen, um den Ansprüchen an eine dauerhaftere Wohnsituation gerecht zu werden. Die Studie zielt darauf ab, eine Post-Occupancy-Bewertung, d.h. eine Bewertung der Wohnqualität der Übergangunterkünfte in den beiden Gemeinden auf der Insel Bantayan in Cebu durchzuführen. Es bewertet die Wahrnehmung der Bewohner ihrer Unterkunft, die von ihnen vorgenommenen Renovierungsarbeiten und die räumliche Gestaltung der Unterkünfte. Die Daten werden qualitativ bewertet, indem etablierte Theorien aus der Architekturforschung verwendet werden, um die Antworten zu organisieren und zu gruppieren. Außerdem erfolgt eine quantitative Bewertung durch Anwendung einer modifizierten Variante der Raumsyntax-Theorie, um die räumliche Qualität und Anordnung der Unterstände zu bewerten. Die Renovierungen werden nach den "Prinzipien der 6 S" gruppiert, einer Herangehensweise aus der "Theorie der Übergänge und der geschichteten Konstruktion von Architekturobjekten". Diese werden mit permanenten Unterkünften und mit Ergebnissen anderer einschlägiger Literatur auf diesem Gebiet verglichen. Am Ende soll die Studie ein begrenztes Bild der Situation in einem Übergangsheim sieben Jahre nach dem Taifun zeichnen.

# ABSTRACT

The devastation caused by the Super Typhoon Haiyan left hundreds of thousands of Filipinos to live in evacuation centers and later in transitional shelters. Years after, victims are still living in the same shelters with the hope of being transferred to a permanent home dwindling by the years. Their situation however pushed them to develop strategies and made changes to those transitional shelters for a more permanent-like living condition. The study aims to conduct a post occupancy evaluation to the transitional shelters in the two communities in Bantayan Island, Cebu. It assesses the resident's perception of their shelter, the renovations they have made and the layouts of the shelters. Data are qualitatively evaluated through the use of established theories in architecture to organize/group their responses. Quantitative evaluation on the other hand through the application of the space syntax theory, albeit a modified one, is done to assess the layouts of the shelters while the renovations are grouped according to the principles of 6 S' of the 'theory of transitions and a stratified construction of architectural objects'. These are compared against the responses of the residents in the permanent houses as well assessed alongside other related literature in the field. In the end, the study is expected to paint, though a limited but a picture nonetheless of the situation in a transitional shelter, seven years after the typhoon.

## Keywords

user-initiated renovations, transitional shelters, post occupancy evaluation, space syntax, Building Use Study, 6 S' – how buildings learn, Typhoon Haiyan

# ACKNOWLEDGEMENTS

I owe the completion of this research to the support and advices of my advisers Prof. Ardeshir Mahdavi and Ms. Helene Teufl and the Department of Building Physics and Building Ecology.

I would like to thank the Commission on Higher Education (CHED), the University of San Carlos and the KUWI Grant for their financial support. The organizations Habitat for Humanity, the Young Pioneer's Disaster Response and the Justice Peace and Integrity of Creation, Inc. for trusting me to conduct the evaluation in their projects, Odessa of IPD and Mr. Leaman of BUS. The colleagues at the USC – Fr. Gaut, and the SAFAD especially to Dean Rosario, Ar. Menjares, Ar. Presas, and Ar. Crisostomo and the OFS, Ar. Gultia, IDr. Del Monte, Ar. Ulila and Ar. Lastimoso.

Finally, this achievement is most especially dedicated to my parents, Errol and Bleselda, my siblings, niece – Carys, and relatives especially to Nanay Paz and Johanna for their continued support and trust to this endeavor. To Nheil and the Bottega 8290 Office – Kenneth & Rezi, thank you. To the new family and friends I made here in Vienna especially to the Pagsinohin Family & Tanty Judith, the Castillo Family, the Filipino Community and the Philippinische Gottesdienst Gemeinde (PGG) especially to Fr. Ron, Fr. Tany, and Ate Liza and the 'Gwapings', especially to Edy, Mike, Carlos and April. And finally, to the colleagues and friends in the program – Benedikt, Nandor, Sara, Tanja, Ana, Adrien, Florian, Oliver, Hager, Caro, Ereze,

*We shape our buildings,  
and afterwards our buildings shape us.*

*Winston Churchill*

# CONTENTS

1	Introduction .....	8
1.1	Overview .....	8
1.2	Motivation.....	9
1.3	Background.....	10
1.3.1	Overview.....	10
1.3.2	Research Environment.....	10
1.3.3	Philippine culture and architecture .....	14
1.3.4	Types of Shelters: Transitional Shelters.....	16
1.3.5	Post Occupancy Evaluation .....	18
1.3.6	Qualitative Evaluation of renovations .....	19
1.3.7	Quantitative Evaluation – space structure.....	22
2	Method.....	25
2.1	Overview .....	25
2.2	Hypothesis .....	25
2.3	Research Procedure .....	25
2.3.1	The research methodology .....	25
2.3.2	The research questionnaire .....	28
2.3.3	The research samples.....	33
3	Results.....	39
3.1	Overview .....	39
3.1.1	Space Syntax.....	39
3.1.2	User-initiated renovations .....	45
3.1.3	Survey on user perception .....	50
3.1.4	Critical Literature Review .....	65
4	Discussion.....	67
4.1	Level 1 Assessment: Shelter vs. House .....	67
4.1.1	Space Syntax.....	67
4.1.2	User-initiated Renovations .....	68

4.1.3	Survey on user perception .....	69
4.2	Level 2 Assessment: Shelter/House vs. Other types.....	74
4.2.1	Critical Literature Review .....	74
5	Conclusion .....	78
5.1.1	Overview.....	78
5.1.2	Limitations of the research .....	78
5.1.3	Conclusion .....	79
6	Index .....	84
6.1	List of Figures .....	84
6.2	List of Tables.....	86
6.3	List of Equations.....	86
7	Literature.....	87
8	Appendix .....	91
A.	Definition of Terms.....	91
B.	List of activities and the domestic chores.....	92
C.	Space Syntax.....	94
D.	Combined Responses of Respondents .....	98
E.	Histogram of Ratings .....	106
F.	User-initiated Renovations.....	109
G.	GPS Locations of Survey Sample .....	112
H.	Build back Safer – Design Infographics.....	113

# 1 INTRODUCTION

## 1.1 Overview

After Typhoon Haiyan locally known as Super Typhoon Yolanda (sustained wind speed at 195 mph and gusts up to 235 mph (Reid, 2018)), wreaked havoc to central Philippines in November 7, 2013, 6000 died, 1800 were missing and 27000 were injured (CNN Staff, 2013) while hundreds of thousands of Filipinos were left without a home.

Several local and international government and non-government organizations responded to the plea of the Filipino people. Aids, both to help the immediate needs of those affected and assistance to help them rebuild their homes and lives were received. Among them were technical expertise and designs for the different kinds of shelters. In reference to the Humanitarian Shelter Working Group of ShelterCluster.org, recovery shelters can roughly be grouped according to (1) Emergency Shelters, (2) Temporary Shelters and (3) Permanent Houses (Hodgkin, et al., 2013). Implementation and use of the different shelters depend on the urgency, the accessibility of the materials and the duration of expected use. Of the three, the temporary or transitional shelters serve as the intermediary shelter. It is aimed to facilitate the transition of the evacuees from living in an emergency shelter right after the disaster to a permanent house.

As of November 2019, the National Housing Authority (NHA) and the Inter-Agency Task Force Yolanda (IATF), the agencies tasked by the Philippine National Government on the rebuilding efforts for the victims of that typhoon, only managed to build 2491 out of the 11125 houses allotted to the victims of Haiyan in Bantayan Island (Sabalo, 2019). According to a news article in SunStar Cebu by Sabalo (2019), NHA targets to complete the construction of the remaining houses by 2020. When a linear construction trend of 415 houses per year is assumed, it will still take both agencies 20 more years to finish building all the 11125 units. One could therefore surmise that people in those transitional shelters will remain an “evacuee” for one generation. And with the Covid-19 pandemic, that completion by 2020 is now guaranteed to be an impossible feat. It is of interest therefore how those evacuees adjusted the transitional shelters and adopted their lives to attain a certain level of constancy after the typhoon displaced and placed their lives on a limbo.



## 1.2 Motivation

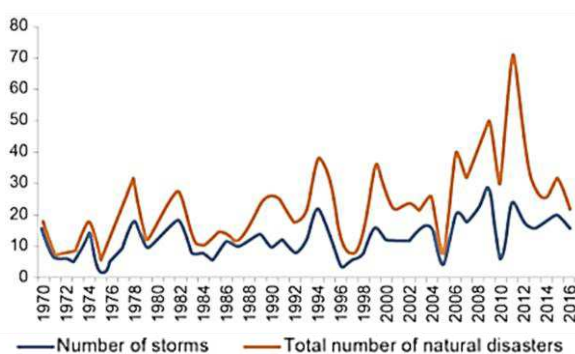
Experiencing the strength of Haiyan and seeing the devastation it is the primary motivation for pursuing the topic. Having had the chance to help pack rice and other essential goods for their immediate needs as well as join and lead the construction and planning of some transitional shelters and their communities allowed some grasp of the extent of the damages: physically, emotionally and psychologically.

Seven years after the typhoon, the government's efforts for the victims have waned and they are left to tend to themselves. Seven years after the typhoon, evacuees are still living in shelters that are supposedly to transition them from a life of temporary to permanence. Seven years after the typhoon they are still evacuees.

However, those similar seven years with those same people achieved some form of normalcy in their lives. Along with it are the changes they have made to their transitional shelters to support their personal efforts to transcend an ephemeral life to something that resembles permanence. The study therefore aims to:

- (1) Identify and document the areas of the transitional shelters being renovated or "improved-on" by its residents.
- (2) Understand the reasons and the user-initiated renovation "practices" to the shelters and how they defer to those implemented in a permanent shelter

By these objectives, the efforts of the residents which are a testament to their resiliency may guide the design of future transitional shelters in making them more adaptable for permanent living. Further, as climate change only exacerbates the country's high exposure to natural calamities especially to typhoons (normally 20 per year) coupled with high vulnerable communities, the need for emergency shelters, and transitional shelters specifically, are not expected to decrease albeit its demand will only continue to rise. It is imperative therefore that the development of future transitional shelters take into consideration its previous experiences, the behavior of its occupants, and the things that did and did not work.



Note: Disasters covered include drought, earthquakes, epidemics, floods, mass movements (dry and wet), storms, and volcanic eruptions.

Figure 1: Occurrence of Natural Disasters in the Philippines, 1970-2016 (Jha, et al., 2018)

## 1.3 Background

### 1.3.1 Overview

The background is divided into four parts. The first part is on the research environment and the architecture in the Philippines particularly those of the Nipa Hut or “*Payag*” in Cebuano. It is focused on presenting the “vernacular” architecture of central Philippines: the Visayas region. It also dealt with the culture and the beliefs related to the building of the “*payag*.” Although the resources used were quite old, they however are one of the very few researches done on the architecture of the Visayan region and those of the “*payag*.” The Philippine culture in general and how these influenced the architecture of the region is also presented.

The second portion is focused on the concepts of post occupancy evaluation particularly the Building Use Studies (BUS) survey tool. This is followed by the third part on the transitional shelters built and deployed after emergencies/ disasters.

The final part is on the materials used to assess the data gathered in the fieldwork. The qualitative evaluation is primarily on the ‘abstract’ and the architectural theories. On the other hand, the quantitative evaluation refers to the scientific means of assessing the layouts of the spaces according to generally accepted paradigms and practices in the architecture field.

### 1.3.2 Research Environment

#### PHILIPPINES

The Philippines is an archipelagic nation composed of roughly 7,641 islands and islets in the southeastern part of Asia. The 2017 census pegged its population at roughly 107 million with a “household consist[ing] of an average of 4.2 people” (Philippine Statistics Authority (PSA) and ICF, 2018, p. 4). From these, 57% resided in the northern portion of the country or collectively the Luzon regions, 23% in the central part or the Visayan regions and 20% in the southern part or the Mindanao regions (UNDRR, 2019).

Organizationally, the country is divided into 17 administrative regions (equivalent to States in a federal form of government). Physically, the country has a tropical climate with four climatic zones that were traditionally “classified from a rain-gauge network using the Modified Coronas Classification (MCC)” (Corporal-Lodangco & Leslie, 2017, p. 1) with a mean annual temperature of 26.6°C, excluding the Cordillera Administrative Region in Luzon (PAG-ASA, n.d.). The average relative humidity varies between 71% in March to 85% in September with a mean annual rainfall between 965

to 4064 millimeters. Considering rainfall and temperature as reference, the Philippines generally has two seasons: (1) rainy season and (2) dry season (a) cool dry (b) hot dry (PAG-ASA, n.d.). On the other hand, the prevailing winds in the Philippines are the northeast monsoon, locally known as '*amihan*' (November to February), the southwest monsoon or '*habagat*' (July to September) and the trade winds. The presence of the trade winds vary throughout the year and "whenever [the] Northeast monsoons are weak" (BFAR and FAO/UNDP, 1983)

In the report published by the United Nations' World Risk Report in 2019, the country ranks as the 9<sup>th</sup> most risk prone country with a risk percentage of 20.69%. It is a 7.29% improvement from the 2015 World Risk Report where it ranked 3<sup>rd</sup> following Vanuatu (1<sup>st</sup>) and Tonga (2<sup>nd</sup>).

According to the United Nations Office for Disaster Risk Reduction "the geographical location of the Philippines makes the country uniquely exposed to a plethora of hazards (Figure 2), including recurrent typhoons, earthquakes and 53 active volcanoes" (UNDRR, 2019, p. 9).

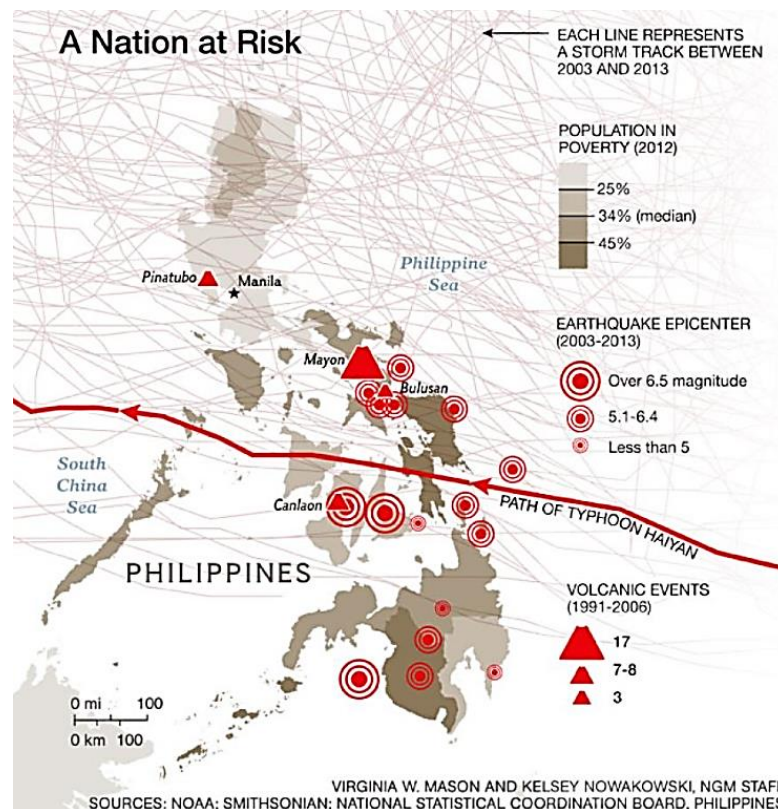
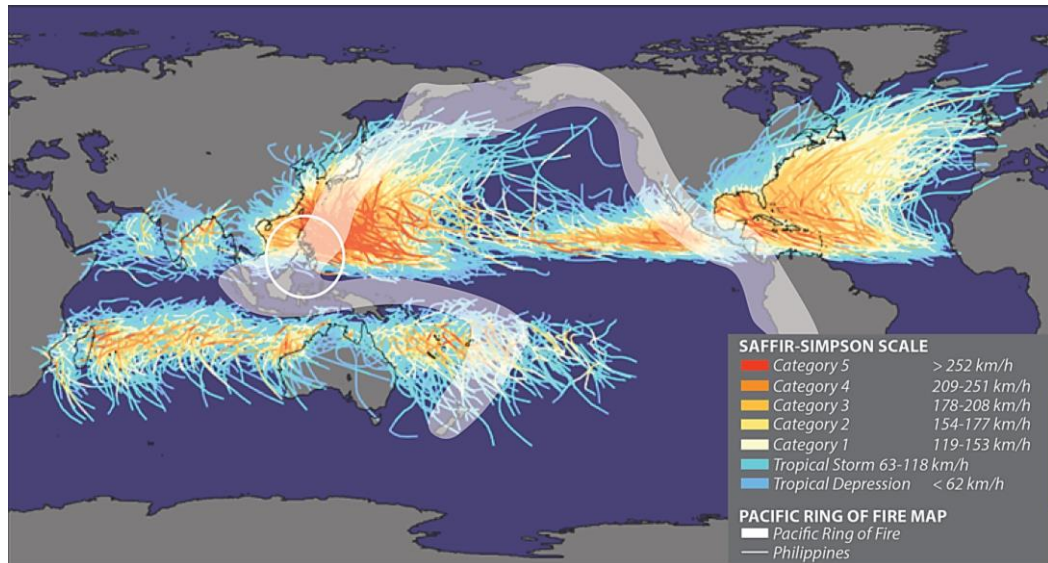


Figure 2: Map showing some of the recent disasters in the Philippines (Vergano, 2013)

These are partly due to the country not only sitting between the Eurasian and the Philippine tectonic plates but is also along the Pacific Ring of Fire and the busiest 'typhoon belt' in the world (Figure 3).



Note: the map is a composite of the storm tracks between 1850s-2006 from NASA and the Pacific Ring of Fire map from the Asian Disaster Reduction Center.

Figure 3: Composite map of the storm path & the Pacific Ring of Fire

The country's weather bureau, PAGASA, recorded an average of 20 typhoons enter the Philippine Area of Responsibility a year. Five of which are usually destructive (Padagdag, 2018). Other hazards documented were floods, landslides, tsunamis & wildfires.

### TYPHOON HAIYAN

On November 8, 2013, Typhoon Haiyan locally known as Typhoon Yolanda tore through the central Philippines (Figure 4). At its peak and prior to landfall, it recorded a windspeed of 170 knots (314.84 km/h) with a pressure of 895 mb (Knapp, et al., 2010); (Knapp, et al., 2018).

The typhoon exited the Philippine Area of Responsibility on November 9, 2013. A state of national calamity was declared on November 11, 2013 which also signaled the request of the Philippines for aid from the international community.

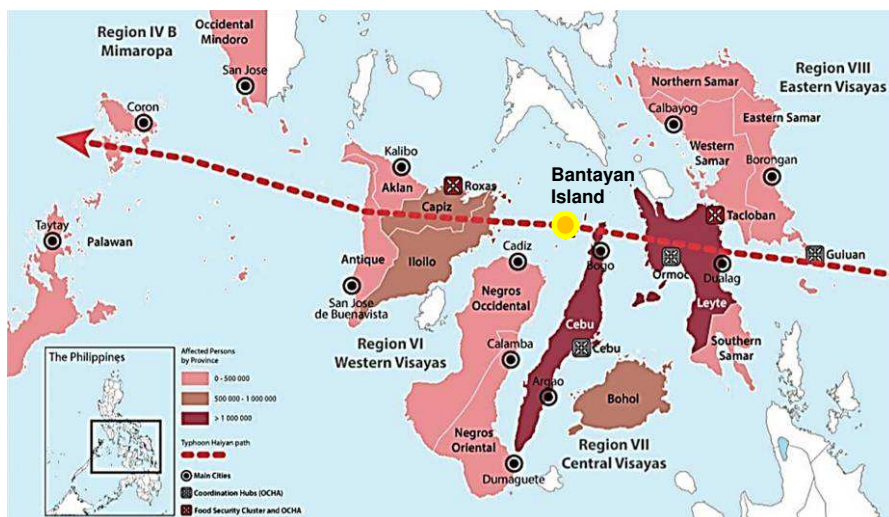


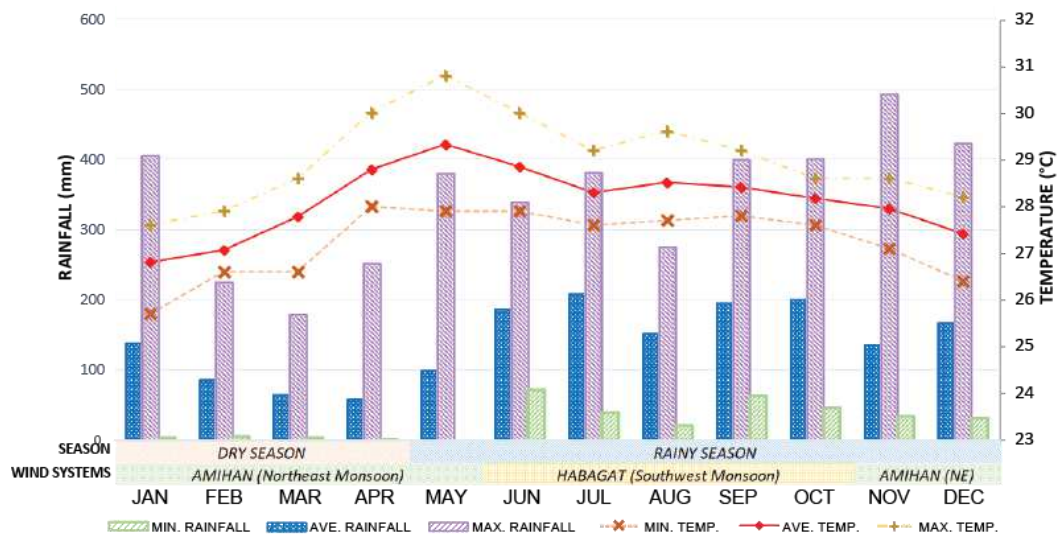
Figure 4: Typhoon Haiyan Track (FAO, 2013)

Apart from Tacloban and Ormoc City in the eastern part of the Visayas, the typhoon also barreled through Cebu. While generally the province sustained “relatively little damage, [the] municipalities in the north were directly in the path of Haiyan and sustained heavy losses” (Opdyke, et al., 2016, p. 14).

### BANTAYAN ISLAND

Bantayan Island is located 146 km from Cebu City. Administratively, the island with a population of 120,447 from the 2015 census, is divided into three municipalities/towns: (1) Bantayan (southwest), (2) Madrideojos (north), and (3) Santa Fe (southeast).

The whole island has an area of approximately 113 km<sup>2</sup> with the highest elevation of ~75 m amsl. It has an average temperature of 28 °C. According to the MCC, the island has a Type III climatic zone. The type is characterized by a short dry season and a rainy season between May to December (Figure 5). The average annual precipitation is recorded at 1580 mm (Angus Jr. & Jaque, 1996).



Note: the data used for the amount of rainfall and temperature are based on the readings at Mactan Cebu weather station as supplied by PAGASA between 1990-2018. (PAGASA, 2020).

Figure 5: Composite diagram of the climate of Bantayan and the seasons of the Philippines

According to a research by DiFilippo et.al. (2018), the water resources in the island is characterized as “de-centralized from the municipalities and serve roughly 20% of the population” (DiFilippo, et al., 2018, p. 2). The rest however rely on hand dug wells.

The island’s location at the tip of the largest marine protected area in the Philippines, the Tañon Strait Protected Seascape, meant an abundant food source as well as tourism opportunities. In fact, one of the primary livelihoods of the residents are deep-sea fishing and seaweed farming (Estacaan & Oxfam, n.d.). The island is also protected as a “Wilderness Area” declared in 1981 by President Marcos which was later reinforced in 1992 by the Philippine Senate (Opdyke, et al., 2016).

This severely complicate the rehabilitation efforts after Typhoon Haiyan (Figure 6) as private land ownership is 'limited'. A revision of the designation of the island which only placed 5.3% as "Wilderness Area" were put forward to the Senate in 2014 (Agua, 2014). Its approval is still pending to this day. With the status still in place, private individuals 'owned' lands (pre- and post-Haiyan) in the island through a tax declaration and a deed of sale but not land titles. From the ruling of the Philippine Supreme Court in the case of Republic of the Philippines vs. Del Sol (G.R. 211698, May 30, 2016), "although a tax declaration by itself is not adequate to prove ownership, it may serve as sufficient basis for inferring possession" (Supreme Court of the Philippines, 2016)



Figure 6: Aftermath of Haiyan in Sta. Fe, Bantayan Island. Photo by delos Reyes (Ranada, 2013)

### 1.3.3 Philippine culture and architecture

Going back to the arrival of the Spaniards to the Philippines in 1521, Ferdinand Magellan's chronicler, Antonio Pigafetta documented the houses of the natives in Cebu (Pigafetta, 2013):

*Their houses are constructed of wood, and are built of planks and bamboo, raised high from the ground on large logs, and one must enter them by means of ladders. They have rooms like ours; and under the house they keep their swine, goats, and fowls.*

This kind of architecture known in Cebuano as "*payag*" are still prevalent in the islands albeit, majority are in the rural areas. Houses of stone such as coral stones were introduced by the Spaniards later. Over time, the "*payag*" have been associated with the poor and those of stone were of the wealthy and the civilized (Yamaguchi, 2017).

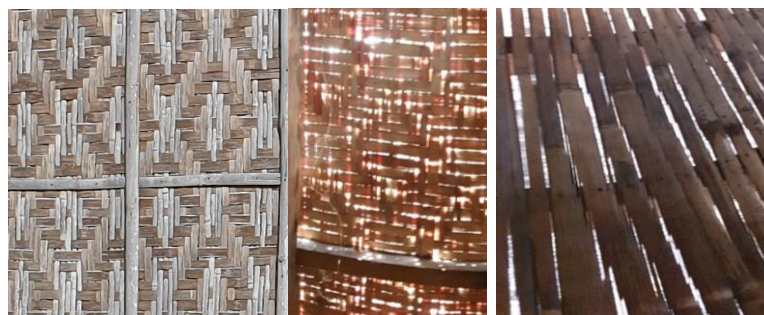
The settlement patterns in the Philippines especially in the Visayan region have individual houses that are detached and never coalesced as are the cases in the ancient Middle East (Klassen, 2010).

In an anthropological research and documentation done by Hart (1959) of the 12 floor plans of a "*payag*," in one of the major islands in central Philippines was the consistency of the way the floor plans were laid apart from the fact that they are built

on stilts. His research showed two main spaces (1) a *sala* (large hall) which mixes a living, dining, and sleeping areas without partitions; and the (2) *kocina* or kitchen. However, “many residences have a third room, and a combined sleeping and storage room (*sulod*)” (Hart, 1959, p. 84). The kitchen was documented to be integrated into the main part of the house and not separated. This contrasts with the research of Yamaguchi (2017) where the “kitchen and *kainan*” (dining space) are in a separate structure. She also noted that the toilet and the bath are usually constructed in a structure separate from the main structure. In a 2000 report, between 1990-1995, houses in the country have an average area of 22.8 sq.m. per person (The United Nations Department of Economic and Social Affairs, Population Division, 2000).

### CONSTRUCTION OF A VISAYAS HOUSE

Apart from replacing the organic ligaments into nails or bolts to tie elements together (Klassen, 2010), nothing much has changed in the construction methodology of the “*payag*”. The elevated floor is still made of bamboo slats (“*lipak*”) presumably for ventilation with woven bamboo (“*amakan*”) for the walls with a roof from the Nipa or “*cogon*” plants (Yamaguchi, 2017) (Figure 7). Floor boards (usually of hardwoods) are used in the living areas, while bamboo slats or “*lipak*” with a gap of about 1.0 to 1.5 cm were used in the sleeping areas (Klassen, 2010).



a) ,*amakan*' viewed from the outside & inside      b) ,*lipak*, used as flooring material  
Figure 7: Images of the a) woven bamboo mat or ,*amakan*' and b) bamboo slats or ,*lipak*'

The enlargements of the “*payag*” were usually done either through the addition of posts or more volumes (Klassen, 2010). Therefore, it can be said that the former is more cohesive while the latter is “patchier.” The upside is it costs less and the time to construct it is relatively shorter.

### BELIEFS ASSOCIATED WITH HOUSE CONSTRUCTION

The primary superstition that guided the construction of the houses documented by Hart was for the main door of the house to face east. A belief which “if the main doorway faces west the house occupants will be sickly” (Hart, 1959, p. 61). Apart from this, “Most Filipino homeowners want their stairways to face east...” (Hart, 1959, p. 63). The origin of this belief is hard to trace, however, the orientation of the Catholic Churches contrary to what many locals believed can be ruled out since in the

Philippines, Spanish period churches usually face the sea primarily for defense against marauders than the typical east-west orientation in Europe.

A house dedication is also common in rural areas prior to construction. When the houses are already done, palm leaves blessed on Palm Sunday, are placed in the various parts of the house to 'invoke' protection (Klassen, 2010). The reason for the observation of these is primarily for the protection of the inhabitants from evil spirits rather than for the protection of the house itself (Klassen, 2010).

### 1.3.4 Types of Shelters: Transitional Shelters

Designs for emergency shelters are based on key indicators developed by different organizations considering various factors and criteria. Often, those criteria are only limited to the material, the ease of the construction and/or the construction cost. Consideration of those factors are important and practical due to the limited logistical and financial capacities of the organizations.

Transitional shelters are intended to bridge emergency with permanence. The duration of how long they are ideally 'allowed' to remain before donees are transferred to a permanent shelter remains on which "paradigm" one is following.

In the report of Rohwerder for the UK Government's Department for International Development (DFID), she highlighted three approaches to transitional shelter from different organizations. Each have not only distinctively defined the transitional shelters differently, but they also have varying processes for the transitional shelter's sheltering process. However, they generally adhere to the minimum standards set forth in the Sphere Handbook: "Minimum [of] 3.5 sq.m. of living space per person, excluding cooking space, bathing area and sanitation facility" (Sphere Association, 2018, p. 254). Therefore, with an average household of 4.7 back in 2013, shelters in the Philippines should have a minimum area of 16.45 sq.m.

#### SHELTER CENTRE, IOM: TRANSITIONAL SHELTER GUIDELINES

The consortium of Shelter Centre and the International Organization for Migration (IOM) has defined the transitional shelters as "an incremental process rather than a multi-phased approach, whereby the shelter is built using all the shelter materials distributed" (Rohwerder, 2016, p. 2). This means that a transitional shelter process that follows the concept of IOM "should be used only as part of an integrated and comprehensive shelter, settlement and reconstruction strategy" (IOM, 2012, p. 199).

Shown in Figure 8, the difference of the incremental process over the multi-phased approach is the former can be: "(i) upgraded [to be] part of a permanent house; (ii) reused for another purpose; (iii) relocated ... to a permanent location; (iv) resold [for]



... income to aid with recovery; and (v) recycled for reconstruction” (IOM, 2012, p. 2).

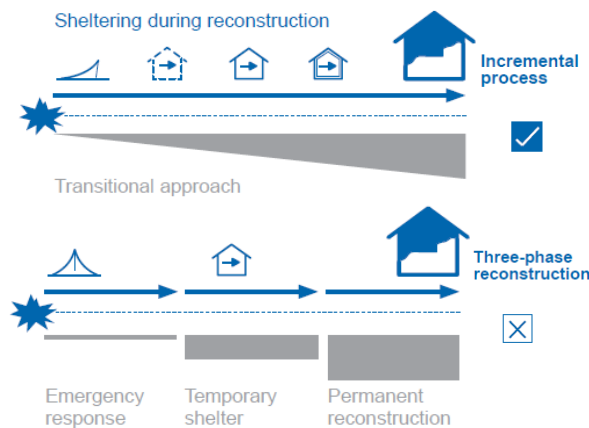
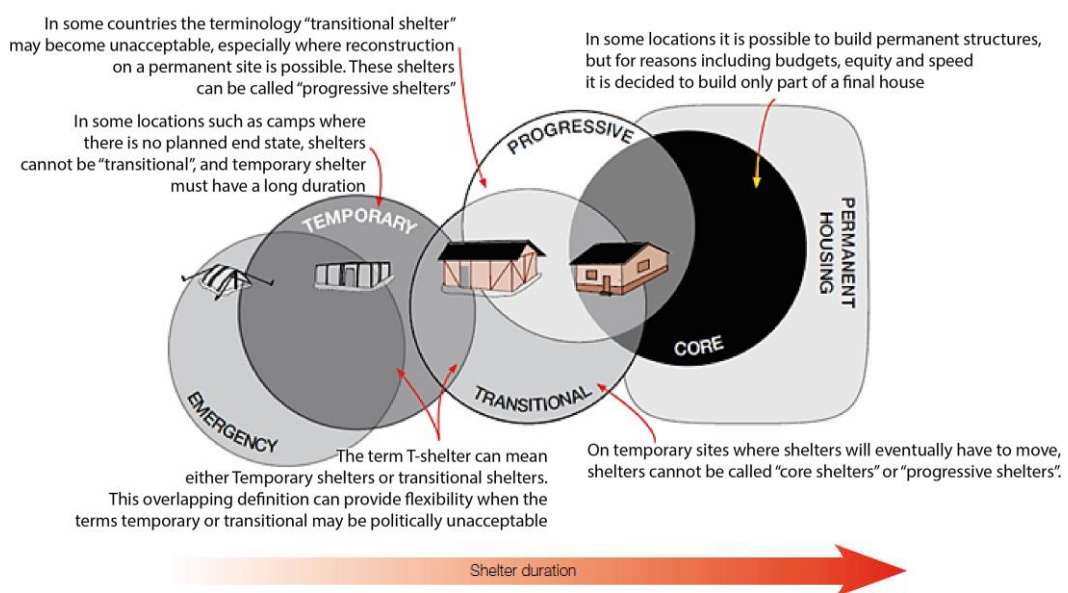


Figure 8: IOM's Transitional shelter (IOM, 2012)

According to Maynard, et.al., many instances have found the application of the concept of IOM “difficult to apply in practice” (Maynard, et al., 2016, p. 10). This could be because of the fact that no matter the requirement of the guidelines, some transitional shelters may not have been built [or designed] to be upgraded (Rohwerder, 2016).

### IFRC: POST-DISASTER SHELTER

Headed by the International Federation of Red Cross and Red Crescent Societies (IFRC), shelter “after [a] disaster involves an overlapping process of emergency, temporary, transitional, progressive, core and permanent housing” (Rohwerder, 2016, p. 2). One of the tenets of this principle is the possibility of re-using the materials from which the post-disaster shelters were made from to permanent structures (Figure 9).



Caption: Illustration of overlaps between some of the different shelter terminologies in use. Remember that individual designs might fall into many of the categories, it is the context that is important in agreeing the terminology.

Figure 9: Overlapping definitions and processes of shelter (IFRC, 2013)

## USAID: TRANSITIONAL SHELTER

In contrast to the first two, transitional shelter through the lenses of USAID “is intended to address short to medium term needs – up to three years – of disaster affected households ... [complementing] emergency shelter assistance” (USAID, n.d., p. 1). Part of the activities is the re-engagement of those “...disaster-affected households into the longer-term incremental housing development process that was disrupted by a disaster or crisis, thereby accelerating the transition to recovery and reconstruction” (USAID, n.d., p. 2) e.g., guidance on turning a transitional shelter into a permanent house. “Integrat[ing] disaster risk reduction measures to reduce the social and economic impact of future disasters and to consider the needs of the most vulnerable” (Rohwerder, 2016, p. 6) are important tasks in USAID’s definition of the process.

All in all, one can say that though the concept of a transitional shelter is straightforward, its application is quite arbitrary. One may refer to the building-up from the previous design concept (IOM) or to the idea of materials from the previous shelter as supplemental material for a permanent house (IFRC).

In the research however, these concepts are considered but were not strictly used as aside from the absence of the general concept followed by the National Government, the shelters themselves were built by different NGOs who may have followed one of the three or none at all.

### 1.3.5 Post Occupancy Evaluation

Considering the current situation of the evacuees and the rate of the construction of the permanent shelters are at a snails’ pace, it would have been very beneficial and essential to the psychological recovery of the evacuees if the transitional shelters given to them are easily adaptable. The paper on the effects of homeless shelter designs that considers the occupants’ possessions supported this when it concluded how those designs “can assist [a] homeless persons’ psychological recovery and reengagement with the society” (Pable, 2013, p. 267).

Studies on the perception and motivation of occupants that lead to their decisions to conduct renovations to their homes abound. But most are only about normal-situation-built residential buildings whose residents bought and owned the houses or apartments. An example is in a case study in Norway where motivation to pursue renovations is anchored primarily on the need to minimize operational costs among others (Klößner & Nayum, 2017). A factor which may not be the primary motivating factor to the situation in Bantayan Island.

Post Occupancy Evaluations are meant to evaluate buildings in a “systematic and rigorous manner after they have been built and occupied for some time” (Preiser, et al., 1988). Of which the occupants play a vital role. Since the pioneering works of Van der Ryn and Silverstein in UC-Berkley and Hsia in the University of Utah as they “carried out case study evaluations of dormitories” (Preiser, et al., 2018, p. 3) at their respective universities in 1967, different methodologies have since been developed.

On the milestones in the evolution of Post Occupancy Evaluations (POE) and Building Performance Evaluations (BPE) from 1967 to 2017, Preiser et.al. compiled POEs and BPEs between those years. Results showed assessments in various building types e.g. student dormitories, schools, offices, hospitals, military and government facilities (Preiser, et al., 2018) but not in any form of emergency shelters.

Some research assessing disaster shelters in any stage (emergency, transitional, permanent) are available such as the work of Sener et.al. (2003) for the temporary shelters built after the 1999 Marmara Earthquake in Turkey, Felix et.al. (2013)’s survey of temporary housing after disasters and Tuladhar et.al.’s research on improving thermal safety and comfort in relief shelters, among others.

### 1.3.6 Qualitative Evaluation of renovations

The researches grouped under the “qualitative evaluation” are primarily focused on the established theories in the architecture community. The theories mentioned have contributed in one way or the other to the interpretation of the behavior and intents of the user-initiated renovations.

#### BUILDING USE STUDIES (BUS)

The Building Use Studies (BUS) Occupant Survey was developed in 1985 as part of the groundbreaking ‘Office Environment Survey’ by Wilson et.al. (Leaman, 2011). The refinement and reduction of redundant questions thus shortening the 16-page long questionnaire to the current 2-3 questionnaire was done in the 1990s. This is when it was used as one of the tools for the government funded PROBE building performance evaluation studies project (Cohen, et al., 2010). Aside from “gaug[ing the] occupant satisfaction with the building and its internal conditions” (Cohen, et al., 2010, p. 87), it also utilized tools such as Energy Assessment and Reporting Methodology (EARM) & Office Assessment Method (OAM) for the analysis of energy use.

Originally, the information collected were divided into twelve groups ranging from background information, questions pertaining to how design meets perceived needs, to personal control, speed & effectiveness of response, temperature, air movement, air quality, lighting, noise, overall comfort, health and productivity at work (Cohen, et

al., 2010). Basing on the groups/ modules, the responses were assessed based on (1) comfort – air quality, lighting, noise & overall comfort; and (2) satisfaction – design, productivity, and health. This meant that “buildings may score highly for satisfaction but less well for comfort; or well on both (Cohen, et al., 2010).

Since then the questionnaire had gone through a series of updates and revisions while as much as possible “[sticking] to the standard questionnaire sets for backward compatibility reasons” (Leaman, 2011, p. 5). This is to allow revisiting previously surveyed buildings and compare the results.

In 2010, a domestic version was introduced in parallel with the original non-domestic version. The domestic version, however, has fewer questions than the latter but the modules/groups remained the same.

Since the inception of BUS, it was able to assess numerous buildings except any type of emergency shelters thus the need to make changes to the original material. This also meant that although BUS has established benchmarks for responses from numerous building types, none can be used to reference the responses of the respondents in Bantayan Island. Therefore, the study only evaluated the mean of the occupant’s responses (‘relative value’) and its overlap with the ‘relative range’ of the other structure. According to the guidelines mentioned by Cohen et.al. on their description of the PROBE process where BUS was used (Cohen, et al., 2010);

- If a mean („relative value“) for a particular building intersects the range („relative range“) of another, then they are not different from each other.

The relative range is derived through the identification of the 97.5 percentile of the standard error of the mean (Equation 1; Equation 2)

*Equation 1: Relative Value (m)*

$$m = \frac{\Sigma \text{ of rating}}{\# \text{ of responses}}$$

*Equation 2: Standard Error of the mean*

$$SE = \frac{\sigma}{\sqrt{n}}$$

$\sigma$  = sample standard deviation

$n$  = number of samples

## THEORY OF TRANSITIONS AND A STRATIFIED CONSTRUCTION OF ARCHITECTURAL OBJECTS

It revolves around the premise that buildings should not be built to reflect an architect’s “trademark” alone. Stewart Brand thinks that “buildings are put up for people who will use them, and from the moment they are ready they are subject to constant transformations and changing needs of the users, which result from the influence of

technological changes, lifestyle, ontogenetic changes in life, and the influence of fashion” (Niezabitowska, 2018, p. 53). In short, technology, money, and fashion.

The concept proposed by Brand is that if they have the money to spare, residents of a structure, “will mess with their building, at [a] minimum to solve the current set of frustrations with the place, at maximum to show off their wealth...” (Brand, 1994, p. 5). The latter as a prelude to the need to change simply because one wants to go along the fashion of the “day”.

The presumption is that all building grow or “have” to grow. “Most grow even when they’re not allowed to” (Brand, 1994, p. 10) sometimes disregarding height limits or at times party walls. How the building grows and what part of the building grows is the central of the theory proposed by Brand. It revolves around the six indicators where transformations occur: (1) site, (2) structure, (3) skin, (4) services, (5) space plan, and (6) stuff (Brand, 1994). These are touted as the “6 S’s.” The layered structure of such and their specific “life spans” are detailed in Table 1.

Table 1: The layered structure of the building with the life cycle, the so-called “6S” (Brand, 1994)

<i>LAYERS</i>	<i>DESCRIPTION</i>	<i>DURATION</i>
<b>SITE</b>	The geographical setting, ... legally defined lot, whose boundaries outlast generations of ephemeral buildings.	„Site is eternal“
<b>STRUCTURE</b>	The foundation and load-bearing elements are perilous and expensive to change.	Structural life ranges from 30 to 300 years. Some buildings last 50 to 60 years.
<b>SKIN</b>	Exterior surfaces.	At an average change every 20 years of so, for fashion or technology
<b>SERVICES</b>	„Working guts of building“ e.g., communications wiring, electrical wiring, plumbing, HVAC, etc.	They wear out or obsolesce every 7 to 15 years.
<b>SPACE PLAN</b>	The interior layout“ walls, ceilings, floors, and doors.	... exceptionally quite homes might wait 30 years.
<b>STUFF</b>	Chairs, desks, phones, pictures, appliances, furniture, lamps, etc.	They modify around daily to monthly.

The layers along with its lifespans was their influence of ‘when’ the changes are usually made by residents without many interruptions into their day to day living because of the renovations. Considerations at the design stage is vital to supporting an occupants’ projected action. However, it is a fact that the needs of the occupants towards the buildings are often times neglected by the architects and other “professionals” in the built environment sector such as the building material suppliers (Brand, 1994) e.g., construction jargons (Table 2).

The duration by which a particular indicator is enacted defines if it’s a “slow” or a “fast/rapid” component. The insight of the theory is “slow constrains quick; slow controls quick. ... the lethargic slow parts are in charge, not the dazzling rapid ones” (Brand, 1994, p. 17). In other words, although ‘Site’ dominates the ‘Structure’ changing the site cannot be done without influencing the structure or at the very least a part of it. For example, constantly repairing/changing a floor finish may prompt the

occupants to change the material which may call for the need to change the construction method of the floor system.

Table 2: Comparison between the approach/ beliefs of the suppliers and occupants (Brand, 1994)

FEATURE	SUPPLIER	OCCUPANTS
<b>QUALITY</b>	<i>Formal and technical qualities and features of the building in form of an artifact</i>	<i>Relations between the building and the activity</i>
<b>FINANCES</b>	<i>Suppliers receive money (directly or indirectly from occupants) for technical/ professional counseling and services</i>	<i>They pay money (directly or indirectly) for occupying the building.</i>
<b>MARKET FORCES</b>	<i>They generate the supply. They compete with other suppliers and expect demand on own services.</i>	<i>They generate demand. ...tendency to take what is offered.</i>
<b>WHAT IS DONE FOR THE BUILDING</b>	<i>Work/ carrier development connected with the construction of the building</i>	<i>the building exists because it creates specific conditions that enable work and other types of activity.</i>
<b>REALITY</b>	<i>The present view on the reality that is being maintained by professional practice, mental associations, and tradition resulting from a specific and individual way of thinking and acting.</i>	<i>The view on reality based on direct experiences in contacts with buildings. ...perceiving buildings to be „the background“ for everyday activities.</i>
<b>LANGUAGE USED</b>	<i>Technical, often jargon, narrow, precise lexicon</i>	<i>Non-technical, free, diverse, sensitive</i>
<b>BASE OF KNOWLEDGE ABOUT THE BUILDING</b>	<i>Received, formal, documented combination of education and the formal vocational training.</i>	<i>Based on experience, informal, undocumented.</i>
<b>PERCEPTION OF ONE'S OWN VALUE AND OF OTHERS</b>	<i>Own knowledge and experience is of high value: „we know best.“ Low value is attached to the knowledge of the occupants.</i>	<i>Value attached to the knowledge of suppliers is estimated to be moderate or high: „they must know better.“</i>
<b>OWN IMAGE</b>	<i>Certainty of value and correctness in terms of one's own beliefs and knowledge: „expert image“</i>	<i>Uncertainty of value and correctness in terms of beliefs.</i>
<b>DECISIVE FORCE</b>	<i>Attached or presumed power based on expertise.</i>	<i>Minimal, close to zero contribution in the design decisions during the phases of delivering the building...</i>

Of the six, the 'Space plan' and the 'Stuff' are the components most often dealt with by the users. As a matter of fact, on a daily basis. Thus they are more prone to change as "they [the users] rapidly grow bored, frustrated, or embarrassed by what they see" (Brand, 1994, p. 20).

In the end, "a design imperative emerges: *An adaptive building has to allow slippage between the differently-paced systems of Site, Structure, Skin, Services, Space plan, and Stuff*" (Brand, 1994, p. 20). In his concept, this will prevent maladaptive practices which in turn make the retrofit of one component easier to perform.

### 1.3.7 Quantitative Evaluation – space structure

In contrast to the more abstract concepts used to interpret the responses of the respondents in qualitative evaluation, architectural theories discussed here are on the assessment of the structure of the spaces.

#### SPACE SYNTAX

The theory of space syntax was originally a program research in the 1970s headed by Bill Hillier at the University College London. It operates on the "proposition that the

human society holds integrated spatial information and that the spatial environment or inhabited spaces is embedded with social information” (Asif, et al., 2018, p. 521). Therefore, space syntax primarily deals with the configuration of spaces through numerical and graphical analyses. This allows the quantification of spatial properties and extract the relevant information through mathematical models.

Tracing how the spaces are arranged to serve human needs reflects the distinct trait of a society (Aspinall, 1993) (van der Voordt, et al., 1997). Thus one can clearly say that the key aspects of the building’s layout are how its spaces are related to the axes of movement, flexibility, suitability, and safety (Asif, et al., 2018) (Mustafa & Hassan, 2013).

Spatial configurations are usually assessed according to the degree of efficiency. Spaces evaluated are measured to a limited degree through the identification of the “depth” a person needs to be able to fully roam the configuration as well as the degree of integration of the spaces within the system (Figure 10).

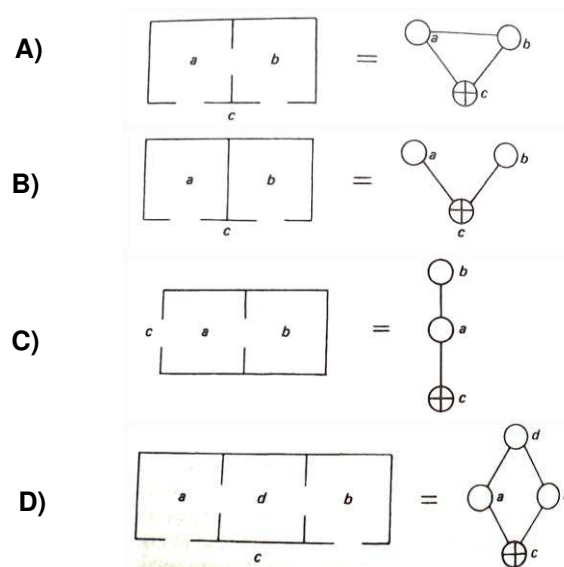


Figure 10: Space Syntax diagram corresponding to a given floor plan (Hillier & Hanson, 1984)

Since its introduction, several “modifications” had been introduced by other researchers thereby expanding its application. One such case is the use of activities to analyze the spatial pattern of a home (Monteiro, 1997) or a laboratory (Sanni-Anibire, et al., 2018). Regardless of the method, means of syntactically analyzing the spaces or activities as well as the terminologies (Table 3) used remain the same.

Table 3: Conceptual explanation of the terminologies in syntactical analysis (Asif, et al., 2018)

Terminologies	Higher value	Lower value
Depth	Further away from the root space	Nearer to root space
Mean Depth (MD)	Deep system	Shallow system
Relative asymmetry (RA)	Less integrated with the system	More integrated with the system
Integration	More integrated with the system	Less integrated with the system

In the study, the assessments done by finding the (1) Total Depth (*Equation 3*); (2) the

Mean Depth (Equation 4); (3) the Relative Asymmetry (Equation 5); (4) Integration (Equation 6); and the Space-Link Ratio (R) (Equation 7).

Equation 3: Total Depth (TD)

$$TD = \Sigma (D_1 * \#A) + (D_2 * \#A) + \dots + (D_n * \#A)$$

$D$  = Depth

$\#A$  = total number of activities along the same depth

Equation 4: Mean Depth (MD)

$$MD = \frac{TD}{(k - 1)}$$

MD = Mean Depth

TD = Total Depth

$k$  = total number of functions in the system

Equation 5: Relative Asymmetry (RA)

$$RA = \frac{2(MD - 1)}{k - 2}$$

MD = Mean depth

$k$  = total number of spaces/functions in the graph/system.

For RA, the result is between 0 and 1, with “low values indicating a space [with a shallow] system... that is a space which tends to integrate the system, and high values a space which tends to be segregated from the system” (Hillier & Hanson, 1984).

Equation 6: Measure of Integration

$$Integration = \frac{1}{RA}$$

Results in the measure of integration are interpreted as the higher the Integration value, the more integrated and connected the functions in the shelter are.

On the otherhand, the distributedness or non-distributedness of the nodes (activities/spaces) is measured through the space-link ratio ( $R$ ). It is „evaluated based on the value of 1, where values greater than 1 correspond to a higher degree of ‚ringiness‘ and distributedness of a spatial system vis-a-vis, a high degree of flexibility and functional efficiency...“ (Sanni-Anibire, et al., 2018, p. 6). The opposite, values that are less than one, will mean more depth of the spaces/activities and therefore a reduced functional efficiency.

Equation 7: Space-link ratio (R)

$$R = \frac{L + 1}{k}$$

$L$  = number of lines of the link between spaces/activity

$k$  = number of spaces/activity



## 2 METHOD

### 2.1 Overview

The methods used to extract data and information are detailed in the chapter. Also included are the cases studied from two transitional shelter types. The chapter also discussed how the information and the retrieved data were evaluated and assessed.

### 2.2 Hypothesis

In relation to the objectives of the study, it is hypothesized that the transitional shelters studied from the two non-government organizations experienced varying degrees of “user-initiated” improvements by its owners. These were assumed to stem out from their need to provide a more stable and homely environment for their families despite the uncertainties of their situation. Actions which by itself could reflect their recovery from the trauma they experienced from the typhoon.

Comparing to a permanent house, the evaluation of the transitional shelter is posited to show similar responses to some degree although the concerns of the residents may have changed already. This is assumed to reflect Maslow’s “Hierarchy of Needs” where one cannot reach the next level without fulfilling the previous one (Maslow, 1943). Thus, a permanent house is assumed to fulfill the occupants’ perception of what a house should be and can start to focus on other things.

### 2.3 Research Procedure

#### 2.3.1 The research methodology

The research was conducted following a six-stage methodology:

##### *Stage 1 (Identification of study area & cases to study)*

Selection of the study area and the identification of organizations who built the transitional shelters and the permanent houses.

##### *Stage 2 (Literature review)*

A review of information on the topics: shelter renovations, typical renovations, post occupancy evaluations, behavior of evacuees and its variations were conducted. Information gathered from these were used as reference in the crafting of the research design. It was also used to refine the objectives and identify the methodologies that best accomplishes the objectives set. Further,

information from this review were used to identify relevant theories that can streamline the assessment as well as support the interpretation of the results.

The related literature review was both a desktop and a physical search of the virtual and physical libraries of the Vienna University of Technology, the Österreichische Nationalbibliothek, the library of the University of San Carlos & the Cebuano Studies Center in Cebu, Philippines and the recommendations from ResearchGate and Academia.com.

### Stage 3 (Developing the outline methodology and the theoretical framework)

As shown in Figure 11 the research is conducted on the premise of evaluating the perception of the occupants toward the building's performance and the renovations they did. The raw data from the fieldwork were gathered through direct observation and photographic documentation (for the layout of spaces & the list of renovations done) and the use of the BUS survey tool.

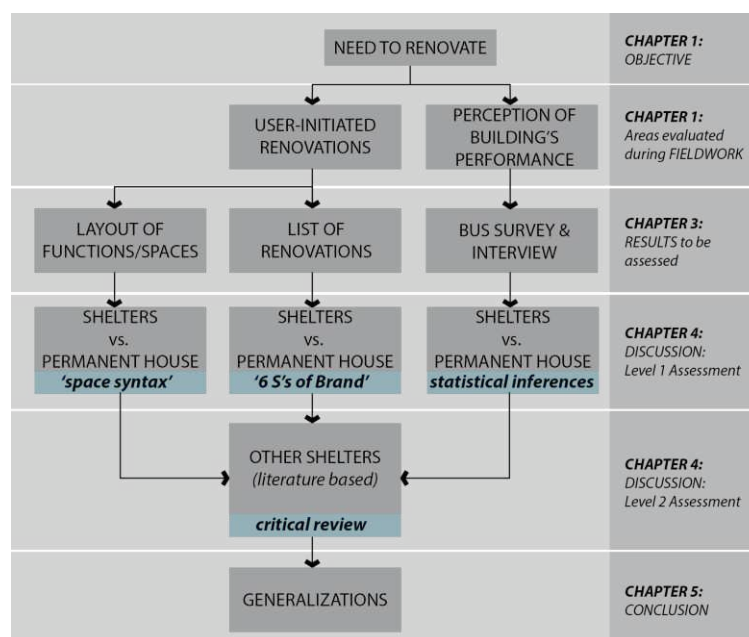


Figure 11: Outline Methodology & Theoretical Framework

The means of assessing the data may vary depending on whether the quantitative or qualitative concepts were used. The analysis of the data were done following two levels of assessment as shown in Figure 11. The first level is on assessing the shelter's layout, the renovations done or the perception of building performance against those of the permanent house. These are then reviewed against literatures written for other shelters. While focusing on the issues of occupant-driven changes in shelters, the conclusions are drawn out to answer the tenets or the objectives of the study.

### Stage 4 (Constructing the questionnaire)

The interview part of the research used the standard questionnaire developed

by the Usable Buildings Trust: the Building Use Studies (BUS). However, changes in the original BUS survey were made to make the tool more adapted to the scenarios of the building type of interest. In the end, the BUS survey tool served as the framework for the development of the open-ended questions. Those questions although not part of the original BUS tool, aims to elicit responses from occupants and serve as a constant “script” in the interviews.

The semi-structured interviews, though following some form of a script, is done through an ‘attitudinal’ and ‘exploratory’ research where some deviations are introduced during the interview. The intention is to generate the opinion of the residents to the shelters as well as their perception of the performance of the building enough to deduce a diagnosis of their situation and the reasons behind the renovations.

#### *Stage 5 (Fieldwork: surveys & interviews)*

The interview was physically conducted to the 39 recipients of the transitional shelters and 20 recipients of the permanent houses. After each interview, the renovations of the houses were documented, through direct observation and photographs.

The GPS location of the residences were recorded using Garmin eTrex 30x. Although not primarily used in the study, this information could be useful when future research is conducted to see how the respondents are faring five or 10 years from now. The accumulated GPS data for the YPDR, JPIC shelters and the Habitat for Humanity houses were recorded under Annex G.

#### *Stage 6 (Analysis of the results and findings)*

The original research design and how the analysis of the results are to be done were revised to adjust to the logistical complications in the conduction of the fieldwork brought about by the Covid-19 pandemic.

The spatial configurations of the shelters are assessed through the space syntax approach. However, in contrast to the standard theory, the study instead assessed the layout through the evaluation of the activities being performed in the shelters. The approach is similar to those researches done by Monteiro (1997) and Sanni-Anibire, et.al. (2018)<sup>0</sup>. The activities are defined by determining the functions that are associated to certain furniture or equipment which allows the creation of the ‘convex spaces’. Following this, the activities listed are grouped under the categories that “represent[s the] different sets of domestic actions: household chores (HS), extended chores

(EC), [Inter]active (IL) and passive (PL) leisure and personal/private (PN) and communal (CN) needs” (Monteiro, 1997, p. 20.3).

The creation of a justified graph from the ‘convex spaces’ using the AGRAPH software (Manum, et al., n.d.) allows the analysis of the depth of the activities, its degree of integration/segregation, and its relationship with the links. The graph places the ‘root’ or the start of the sequence of activities at the ‘access road’ which leads to the yard. The inclusion of the yards with the activity as “walking” presents the number “spaces” leading to the main structure.

Shelters that have been abandoned already or used only as a storage space as well as those that limited the entry of the researcher to certain spaces were excluded in the analysis. This ensures a complete comparability of the results.

The survey and interview results were translated by the researcher from Cebuano to English prior to analysis. This is since the survey and interviews had to be done in the vernacular language (Cebuano) as majority of the respondents have limited understanding of the English language.

The responses/ comments are grouped according to common “themes”. The statements are presented in the positive form as perceived by the researcher. Positive comments are tallied under the ‘Agree’ column while negative comments are counted in the ‘Disagree’ column. These responses are compiled under Appendix D. The ratings are assessed using Excel and the Add-In “Real Statistics Resource Pack” by Dr. Zaiontz.

Meanwhile, the user-initiated renovations are collated through observation and the photo-documentation during the fieldwork were grouped according to the 6 S’s developed by Stewart Brand. The ‘future plans’ are collated from the interview questions 28 and 29. The frequency of the user-initiated renovations are tallied once per household and not on the number of instances the renovations are applied in the structure.

The final level of assessment is the critical review of literature on renovations being done in other shelters. Evaluation will focus on highlighting the learnings from the first level of assessment against those done in the same field albeit on a different scenario and community in a different part of the world.

### 2.3.2 The research questionnaire

The BUS survey combined with the interview questions were grouped to four categories. In the following survey questions, italicized words are the questions in the vernacular language of Cebuano. Its inclusion is intended to allow future researchers

to be able to phrase the questions as how it was phrased during the fieldwork:

#### A. Background

The category (Table 4) establishes the demographics of the residents, their place of abode, surroundings, and community, both before the typhoon and at the present. The interview questions also asked their knowledge on the stipulations given by the organizations who donated the shelters on the things they are allowed and not allowed to add/change to the shelters.

Table 4: Interview questions under the background category

1. What is your age ( <i>Pila imong edad?</i> )	<input type="checkbox"/> 30 above	<input type="checkbox"/> 30 below
2. What is your gender? ( <i>Unsa imong kasarian?</i> )	<input type="checkbox"/> Male	<input type="checkbox"/> Female
3. Of the people living here, how many are..? ( <i>Sa mga nagpuyo diri, pila kabuok ang ...</i> )	<input type="checkbox"/> above 18	<input type="checkbox"/> below 18
4. Do you have any plans of transferring to another house? ( <i>Naa pa ba moy plano nga mubalhin ug lain nga balay?</i> )		
5. Are you living in a ... ? ( <i>Paminaw nimu nagpuyo ka sa usa ka... ?</i> )		
<input type="checkbox"/> Densely populated community ( <i>Komunidad nga daghan ug tawo</i> )	<input type="checkbox"/> Sparsely populated community ( <i>Komunidad nga gamay ra ug tawo</i> )	
6. Do you feel you are the shelter's...? ( <i>Paminaw ba nimu ikaw kay ... sa balay?</i> )		
<input type="checkbox"/> Tenant ( <i>Nag-abang</i> )	<input type="checkbox"/> Owner ( <i>Tag-iya</i> )	

#### B. Influence of the shelter to the residents' circumstance

The core of these questions (Table 5) determines the perception of the occupants on their current situation since living in the transitional shelter. It is largely focused on how the physical limitations of the shelter given to them and its location has shaped the way their family lived and behaved.

This contains the bulk of the information to generate the information to determine the intents behind the user-initiated renovations or improvements.

Table 5: Interview questions on the user perception on the performance of the shelter (category 2)

7. Rate the overall location of your neighborhood ( <i>Unsa ang grado nga imong mahatag sa kinatibuk-an nga lokasyon sa inyung komunidad?</i> )	
Poor ( <i>Dili Maayo</i> )	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 ] Very Good ( <i>Maayo kaayo</i> )
8. Comments ( <i>Unsay imong masulti?</i> )	
9. Rate the space between the shelters ( <i>Unsay grado ang imo mahatag sa wanang sa taliwala sa mga payag?</i> )	
Poor ( <i>Dili Maayo</i> )	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 ] Very Good ( <i>Maayo kaayo</i> )
10. Comments ( <i>Unsay imong masulti?</i> )	
11. Rate the layout of your neighborhood ( <i>Unsay grado nga imong ihatag sa pagka han-ay sa mga balay sa inyung komunidad?</i> )	
Poor ( <i>Dili Maayo</i> )	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 ] Very Good ( <i>Maayo kaayo</i> )
12. Rate the overall location of your shelter ( <i>Pila imong mahatag nga kinatibuk-an nga grado sa inyung lugar?</i> )	
Poor ( <i>Dili Maayo</i> )	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 ] Very Good ( <i>Maayo kaayo</i> )
13. Comments ( <i>Unsay imong masulti?</i> )	
14. Rate the size of your shelter ( <i>Unsa ang grado nga imong mahatag sa gidak-on sa balay?</i> )	
Poor ( <i>Dili Maayo</i> )	<input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4 <input type="checkbox"/> 5 <input type="checkbox"/> 6 <input type="checkbox"/> 7 ] Very Good ( <i>Maayo kaayo</i> )
15. Comments ( <i>Unsay imong masulti?</i> )	

Table 5: Interview questions on the user perception (category 2) - Continuation

16. Rate the layout of the spaces in the shelter ( <i>Unsa ang grado nga imong mahatag sa pagkahan-ay sa mga lugar sud sa inyung balay</i> ) Poor ( <i>Dili Maayo</i> ) [ 1 2 3 4 5 6 7 ] Very Good ( <i>Maayo kaayo</i> )
17. Comments ( <i>Unsay imong masulti?</i> )
18. Rate the amount of space for storage ( <i>Unsa ang grado nga imong mahatag sa gidak-on sa lugar nga mahipusan sa mga gamit?</i> ) Poor ( <i>Dili Maayo</i> ) [ 1 2 3 4 5 6 7 ] Very Good ( <i>Maayo kaayo</i> )
19. Comments ( <i>Unsay imong masulti?</i> )
20. Rate the appearance of the shelter from the outside ( <i>Unsa ang grado nga imong mahatag kabahin sa hitsura sa balay kung tan-awon sa gawas?</i> ) Poor ( <i>Dili Maayo</i> ) [ 1 2 3 4 5 6 7 ] Very Good ( <i>Maayo kaayo</i> )
21. What makes a house look good? ( <i>Unsay makapanindot sa usa ka balay?</i> )
22. Rate the personal safety during a typhoon ( <i>Unsa ang grado nga imong mahatag sa personal nga seguridad sa sulud ug sa palibot sa balay?</i> ) Poor ( <i>Dili Maayo</i> ) [ 1 2 3 4 5 6 7 ] Very Good ( <i>Maayo kaayo</i> )
23. How were you and your family during Typhoon Ursula? Do you feel safe during that typhoon? Were you afraid that the shelter will be destroyed? ( <i>Kamusta man mo atong bagyong Ursula? Wala ra ba ka nakuyawan atong panahuna? Paminaw ba nimo nga maguba ang inyung balay atong bagyuha?</i> )
24. Rate the overall design of the shelter ( <i>Unsa ang grado nga imong mahatag sa kinatibuk-an nga laraw sa inyung balay?</i> ) Poor ( <i>Dili Maayo</i> ) [ 1 2 3 4 5 6 7 ] Very Good ( <i>Maayo kaayo</i> )
25. Comments ( <i>Unsay imong masulti?</i> )
26. How well do the facilities meet your needs? ( <i>Unsa imong masulti sa mga kahimanan diri para sa inyung mga panginahanglan?</i> ) Poor ( <i>Dili Maayo</i> ) [ 1 2 3 4 5 6 7 ] Very Good ( <i>Maayo kaayo</i> )
27. What are the parts of your shelter that you really like and which are the areas that helped you in your chores? ( <i>Unsa ang parte sa balay ang imong ganahan ug paminaw nimo nakatabang sa inyung mga buluhaton?</i> )
28. What are the areas of the shelter that really need to be repaired? ( <i>Unsang mga dapit sa balay ang kailangan na gyud ayuhon?</i> )
29. What are the areas of the shelter that need to be improved/renovated? ( <i>Unsay mga plano ninyung usbunun sa inyung balay?</i> )

### C. Occupants' perception of the performance of the building

The focus of the questions (Table 6) was to determine the occupants' perception towards the building's performance. Criteria: acoustic, illumination and noise have the middle range as the "best" rating while the rest have "7" as the best. The respondents were asked to rate the level of comfort they felt in the building with regard to temperature and the quality of the air twice: first was in "general situation", and then in the "monsoon periods" (both rainy & dry seasons).

Table 6: Interview questions on the performance of the shelter (category 3)

30. Rate the temperature in the shelter based on the given criteria ( <i>Unsa ang grado nga imong mahatag sa temperatura sulud sa balay base sa mga pulong?</i> ) Uncomfortable ( <i>Dili kumportable</i> ) [ 1 2 3 4 5 6 7 ] Comfortable ( <i>Kumportable</i> )
31. Rate the temperature in the shelter based on the given criteria ( <i>Unsa ang grado nga imong mahatag sa temperatura sulud sa balay base sa mga pulong?</i> ) Too Hot ( <i>Alimuot kaayo</i> ) [ 1 2 3 4 5 6 7 ] Too Cold ( <i>Tugnaw kaayo</i> )

Table 6: Interview questions on the performance of the shelter (category 3) - Continuation

32. Rate the temperature in the shelter based on the given criteria (Unsa ang grado nga imong mahatag sa temperatura sulud sa balay base sa mga pulong?) Stable ( <i>Balanse</i> ) [ 1 2 3 4 5 6 7 ] Varies ( <i>Mag-usab usab</i> )
33. Rate the quality of the air in the shelter based on the given criteria (Unsa ang grado nga imong mahatag sa temperatura sulud sa balay base sa mga pulong?) Still ( <i>Kalmado</i> ) [ 1 2 3 4 5 6 7 ] Draughty ( <i>Lamigsing</i> )
34. Rate the quality of the air in the shelter based on the given criteria (Unsa ang grado nga imong mahatag sa temperatura sulud sa balay base sa mga pulong?) Dry ( <i>Uga</i> ) [ 1 2 3 4 5 6 7 ] Humid ( <i>Umog-umog</i> )
35. Rate the quality of the air in the shelter based on the given criteria (Unsa ang grado nga imong mahatag sa temperatura sulud sa balay base sa mga pulong?) Fresh ( <i>Presko</i> ) [ 1 2 3 4 5 6 7 ] Stuffy ( <i>Igang</i> )
36. Rate the quality of the air in the shelter based on the given criteria (Unsa ang grado nga imong mahatag sa temperatura sulud sa balay base sa mga pulong?) Odourless ( <i>Walay baho</i> ) [ 1 2 3 4 5 6 7 ] Smelly ( <i>Baho kaayo</i> )
37. Rate the overall condition of the temperature and ventilation (Unsa ang kinatibuk-an nga grado nga imong mahatag sa temperatura ug hangin sa sulud sa balay?) Unsatisfactory ( <i>Dili kumportable</i> ) [ 1 2 3 4 5 6 7 ] Satisfactory ( <i>Kumportable</i> )
38. Comments about the temperature and/or ventilation? (Naa kay masulti kabahin sa temperatura ug bentilasyon sa hangin?)
39. What can you say on the amount of noise heard in between rooms? (Unsay imong masulti sa saba nga madungug sa sud sa balay?) Too little ( <i>Hinay ra</i> ) [ 1 2 3 4 5 6 7 ] Too much ( <i>Kusog kaayo</i> )
40. What can you say on the amount of noise heard from the outside? (Unsay imong masulti sa saba nga madungug gikan sa gawas sa balay?) Too little ( <i>Hinay ra</i> ) [ 1 2 3 4 5 6 7 ] Too much ( <i>Kusog kaayo</i> )
41. Rate the overall performance of the building towards noise ( <i>Unsa ang kinatibuk-an nga grado nga imong mahatag sa ka-saba nga imong madungug?</i> ) Too little ( <i>Hinay ra</i> ) [ 1 2 3 4 5 6 7 ] Too much ( <i>Kusog kaayo</i> )
42. Comments on noise? ( <i>Naa kay masulti kabahin sa saba?</i> )
43. Rate the natural illumination ( <i>Unsa ang grado nga imong mahatag sa natural nga kahayagun?</i> ) Too dark ( <i>Ngitngit kaayo</i> ) [ 1 2 3 4 5 6 7 ] Too bright ( <i>Hayag kaayo</i> )
44. Rate the artificial illumination ( <i>Unsa ang grado nga imong mahatag sa kahayagun sa suga?</i> ) Too dark ( <i>Ngitngit kaayo</i> ) [ 1 2 3 4 5 6 7 ] Too bright ( <i>Hayag kaayo</i> )
45. Rate the overall performance of the building towards illumination ( <i>Unsa ang kinatibuk-an nga grado nga imong mahatag sa kahayagun sulud sa balay?</i> ) Not contented ( <i>Dili kontento</i> ) [ 1 2 3 4 5 6 7 ] Contented ( <i>Kontento</i> )
46. Comments on illumination? ( <i>Naa kay masulti sa kahayag sa balay?</i> )
47. Rate the overall comfort felt inside the shelter ( <i>Unsa ang kinatibuk-an nga grado nga imong mahatag sa kahupayan nga imong nabati sa sud sa balay?</i> ) Not contented ( <i>Dili kontento</i> ) [ 1 2 3 4 5 6 7 ] Contented ( <i>Kontento</i> )
48. Comments on overall comfort? ( <i>Sa kinatibuk-an unsa imong masulti kabahin sa kahupayan sa sud sa balay?</i> )
49. Rate how healthy you feel while living in the shelter compared to the previous house ( <i>Unsa ang kinatibuk-an nga grado nga imong mahatag sa imong pamati sa panglawas diri kumpara sa inyung gipuy-an nga balay sauna?</i> ) Sicklier ( <i>Mas masakiton</i> ) [ 1 2 3 4 5 6 7 ] Healthier ( <i>Mas himsog</i> )
50. Comments on overall health ( <i>Sa kinatibuk-an unsa imong masulti kabahin sa imong pamati sa panglawas?</i> )

Table 6: Interview questions on the performance of the shelter (category 3) - Continuation

51. Which of the following is necessary for you to have a control of? ( <i>Sa mga pili-anan, asa nila ang importante gayud nga aduna kay kontrol</i> )	<input type="checkbox"/> Cooling ( <i>pag pabugnaw</i> ) <input type="checkbox"/> Ventilation ( <i>pag pahangin</i> ) <input type="checkbox"/> Lighting ( <i>suga</i> ) <input type="checkbox"/> Noise ( <i>ka-saba</i> )
52. Rate the level of control for cooling ( <i>Unsa ang lebel sa kontrol para sa pagpabugnaw sa balay</i> ) No control ( <i>Walay kontrol</i> ) [ 1 2 3 4 5 6 7 ] Full control ( <i>Hingpit nga kontrol</i> )	
53. Rate the level of control for ventilation ( <i>Unsa ang lebel sa kontrol para sa bentilasyon?</i> ) No control ( <i>Walay kontrol</i> ) [ 1 2 3 4 5 6 7 ] Full control ( <i>Hingpit nga kontrol</i> )	
54. Rate the level of control for lighting ( <i>Unsa ang lebel sa kontrol para sa suga sa balay</i> ) No control ( <i>Walay kontrol</i> ) [ 1 2 3 4 5 6 7 ] Full control ( <i>Hingpit nga kontrol</i> )	
55. Rate the level of control for noise ( <i>Unsa ang lebel sa kontrol para sa ka-saba sa balay</i> ) No control ( <i>Walay kontrol</i> ) [ 1 2 3 4 5 6 7 ] Full control ( <i>Hingpit nga kontrol</i> )	
56. Comments on personal control ( <i>Sa kinatibuk-an unsa imong masulti kabahin sa butang nga kailangan nga aduna gayud kay personal nga kontrol?</i> )	

#### D. Lifestyle changes

The following questions (Table 7) were geared towards the determination on the changes of their and their family's lifestyle since the time they transferred to the transitional shelter. Further, the question also assessed any changes on the expenses of the family brought about by the change of location/ residence.

Table 7: Interview questions on the changes in the way of living (category 4)

57. Since living here, are there any changes to your way of living? ( <i>Sukad nga nabalhin mo diri, nausab ba ang inyung pama-agi sa pagpuyo?</i> ) <input type="checkbox"/> Yes ( <i>Oo</i> ) <input type="checkbox"/> No ( <i>Wala</i> )
58. Describe the changes related to work ( <i>Unsa ang mga kausaban sa panarbaho?</i> )
59. Describe the changes related to leisure ( <i>Unsa ang mga kausaban sa mga kalingawan?</i> )
60. Describe the changes related to diet ( <i>Unsa ang mga kausaban sa mga pagkaon?</i> )
61. Describe the changes related to travel ( <i>Unsa ang mga kausaban sa pagbiyahe?</i> )
62. Describe the other changes not mentioned ( <i>Unsa pay uban nga kausaban?</i> )
63. Do you have a waterline installed now? ( <i>Naa ba moy linya sa tubig karun?</i> ) <input type="checkbox"/> Yes ( <i>Naa</i> ) <input type="checkbox"/> No ( <i>Wala</i> )
64. Do you have a waterline installed before? ( <i>Naa ba moy linya sa tubig sauna?</i> ) <input type="checkbox"/> Yes ( <i>Naa</i> ) <input type="checkbox"/> No ( <i>Wala</i> )
65. Do you have an electricity installed now? ( <i>Naa ba moy kuryente karun?</i> ) <input type="checkbox"/> Yes ( <i>Naa</i> ) <input type="checkbox"/> No ( <i>Wala</i> )
66. Do you have an electricity installed before? ( <i>Naa ba moy kuryente sauna?</i> ) <input type="checkbox"/> Yes ( <i>Naa</i> ) <input type="checkbox"/> No ( <i>Wala</i> )
67. How did your electric bill fared compared with your previous house? ( <i>Kumusta ang inyung bayrunun sa kuryente karun kung i-tandi sa inyung gasto sauna?</i> ) Much lower ( <i>Mas niubos</i> ) [ 1 2 3 4 5 6 7 ] Much higher ( <i>Mas nitaas</i> )
68. How did your water bill fared compared with your previous house? ( <i>Kumusta ang inyung bayrunun sa tubig karun kung i-tandi sa inyung gasto sauna?</i> ) Much lower ( <i>Mas niubos</i> ) [ 1 2 3 4 5 6 7 ] Much higher ( <i>Mas nitaas</i> )



Table 7: Interview questions on the changes in the way of living (category 4) - Continuation

69. What are the things that you did for „cooling“ to keep the bills low? ( <i>Unsa ang inyung mga gipangbuhat sa pagpabugnaw para dili musaka ug maayu ang inyung mga bayrunun sa kuryente?</i> )
70. What are the things that you did for „lighting“ to keep the bills low? ( <i>Unsa ang inyung mga gipangbuhat sa panuga para dili musaka ug maayu ang inyung mga bayrunun sa kuryente?</i> )
71. What are the things that you did for your „appliances“ to keep the bills low? ( <i>Unsa ang inyung mga gipangbuhat sa pagpabugnaw para dili musaka ug maayu ang inyung mga bayrunun sa kuryente?</i> )
72. What are the things that you did for your water consumption to keep the bills low? ( <i>Unsa ang inyung mga gipangbuhat sa inyung konsumo sa tubig para dili musaka ug maayu ang inyung mga bayrunun sa tubig?</i> )

### 2.3.3 The research samples

#### CASE STUDY

The research is focused on the transitional shelters built in the two of the three towns in the island of Bantayan: Santa Fe and Bantayan. The decision was based on the data from Global Shelter Cluster (ShelterCluster.org, 2014) where majority of the shelters built in the island are located. However, from that list, only one organization, the Young Pioneer Disaster Response or YPDR was listed to have built a transitional shelter. The other organizations built permanent houses (e.g., Habitat for Humanity). The second transitional shelter included in the study was identified from the records of the Municipality of Santa Fe (Municipality of Bantayan claimed to have not received any data turned over to them from the previous administration). From that list and through an online search, organizations such as the Islamic Relief Worldwide, the Dansk Folkehjelp, the Aktion Deutschland Hilft, and the Society of the Divine Word (also known as the Steyler Missionaries) were contacted to seek permission. Of which, only the Steyler Missionaries and their community extension arm: The Justice, Peace, and Integrity of Creation (JPIC) responded in time.

Therefore, the transitional shelters included in the study were from the organizations of Young Pioneer Disaster Response (YPDR) and the Steyler Missionaries' Justice, Peace, and Integrity of Creation (JPIC). The permanent shelter used to compare the data from the transitional shelters were from those built by the consortium of Habitat for Humanity and the March for Christ (Faeldonia, 2020).

#### YOUNG PIONEER DISASTER RESPONSE (YPDR)

The grassroots organization was established by Christopher P. White, Joseph Ferris III, Marshall Mayer, and Katlyn Murray in the aftermath of the Typhoon Haiyan. Its collaboration with other organizations particularly the Polish Humanitarian Action (PAH) provided the funds for their work (YPDRMedia, 2014).

Its functions revolve around the (1) housing program, (2) school rehabilitation program

(3) WASH (Water, Sanitation, and Hygiene, (4) joint medical missions, (5) distribution program, (6) community outreach, and (7) emergency response.

YPDR developed three types of shelter for their relief efforts to the island. They are aptly named Phase 1, Phase 2, and Phase 3 (Figure 12). They were built after the learnings of the preceding design and improved network with local professionals and organizations. It also “utilize[d] a typhoon and earthquake resistant design endorsed by the UN Shelter Cluster... and meets all of the international SPHERE standards for humanitarian shelter projects” (YPDRMedia, 2015, p. 5); (Appendix H).

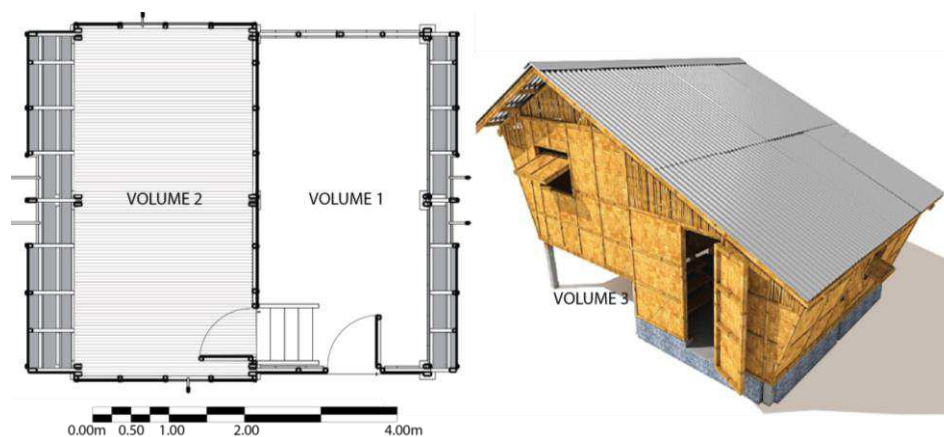


Figure 12: YPDR Phase 3 model house with material specifications (Vickea, 2014)

The focus of this research is the Phase 3 transitional shelter based on the original design (Figure 13) developed by the Institute for Planning and Design of the University of San Carlos in Cebu City, Philippines.

According to the brochure obtained from the organization, the Phase 3 shelter was “ingeniously designed with [~21sq.m. of floor space and] two rooms designed for ample airflow, [making them] comfortable, dignified, beautiful and strong.” (YPDRMedia, 2015, p. 5). It has a width of 4.80m and a depth of 4.50m. Technically the shelter only has two volumes: volume 1 is the one directly on the natural grade line and volume 2 is the elevated portion. However, in the research, the crawl space underneath volume 2 is considered as another space for use by the recipients therefore labelling it as ‘volume 3’. This is also in conjunction with the original design shown in Figure 13 were the crawl space is intended to be used.

The design named “‘I-siguro Da-an” (“to secure first” in English) Transitional Shelter’ referenced by the Phase 3 design of YPDR was conceived as a contemporary interpretation of a traditional Nipa Hut.

Its canted walls which were the hallmark of its design were seen to (1) reduce wind resistance, (2) longer walls that shades itself from the sun, (3) reduction of overhangs and the subsequent stress from wind updraft, and (4) creation of a wider interior

space, volume-wise (Ravina, 2015). From the inside, they offer chances for a fixed bench that does not interfere with the small floor area (12 sq.m.).



Figure 13: "I-siguro daan" Transitional Shelter (Ravina, 2015)

The crawl space below the shelter, similar to the original intention of the Nipa Hut, protects the residents from floods, and either serve as pens for the family's livestock or a shaded play area for the children (Ravina & Shih, 2017). The space is ventilated by the windows on all sides of the space.

Apart from the design, the other thing similar to the "I-siguro daan" Transitional Shelter was the use of coconut lumber as the primary structural element. Furthermore, the organization has also taken the liberty to modify certain aspects of the Phase 3 shelter such as the structural system e.g., structural brackets & straps over bolts in favor of the organization's objectives.

The Phase 3 shelter of YPDR has walls (perimeter walls and interior wall separating Volume 1 & 2) clad with a mixture of woven bamboo mats or "*amakan*" and bamboo slats or "*lipak*". Both materials however were only used on the exterior side, therefore in the interior of the shelter, the framing system of the walls are visible. The floor of Volume 1 is made of lean concrete with one or two layers of unplastered concrete hollowblock (CHB) in the lower portion of the walls. The floor of Volume 2 also used the bamboo slats as the only floor finish material. Volume 3 on the other hand do not have any walls or any flooring material. The roofing material covering Volumes 1 and 2 is a corrugated galvanized iron sheet without any thermal insulation underneath.

#### JUSTICE, PEACE & INTEGRITY OF CREATION (JPIC)

The organization that built the JPIC Transitional Shelters was the Justice, Peace & Integrity of Creation-Integrated Development Center (JPIC-IDC), Inc. It is a "faith-based Non-Government Organization ... [that is] started with the efforts of the Society of the Divine Word (SVD/Steyler Missionaries) priests." (JPIC-IDC, 2018). Its overarching work is based on one of the four characteristic dimensions of the SVD religious organization: (1) biblical apostolate, (2) mission animation, (3) Justice, Peace, and Integrity of Creation (JPIC) and (4) communication.

From the unpublished project completion report acquired from the project coordinator,

the efforts of JPIC-IDC were funded not only by the SVDs but also by Aktion Kleiner Prinz and the International Hilfe Für Kinder in Not (JPIC-IDC, 2015).

The work of the organization after the typhoon apart from building the transitional shelters also include the conduction of a disaster risk reduction management seminars, and distribution of goods and other services to the survivors.

On the transitional shelter intervention, the recipients were required to give their counterpart through labor in what is referred to as „sweat equity“. They were also asked to commit not to sell and/or lease the transitional house they received from the organization (Burbos & Salas, SVD, n.d.).

From an interview with the project director, Fr. Anthony Salas, SVD, the transitional shelter was intended to show a typical form of a house. Psychologically this will “ensure higher user acceptance as the form is already familiar” (Salas, SVD, 2020).

The JPIC Transitional Shelter has a total length of 4.40m and a depth of 3.20m (14.08sqm) (Figure 14). The two volumes of the shelter as seen in Figure 14 is distinguishable only through the material used in its walls. Volume 1 has bamboo slats or “*lipak*” with woven bamboo mats or “*amakan*” in some parts. Meanwhile, the walls of Volume 2 including the interior wall that divide it with Volume 1 only has the “*amakan*”. In all instances, the materials in the walls were only in the exterior as the wall framing system can be seen in the interior of the shelter. Furthermore, the lower portion of the walls have a two or three layer of unplastered concrete hollow blocks.

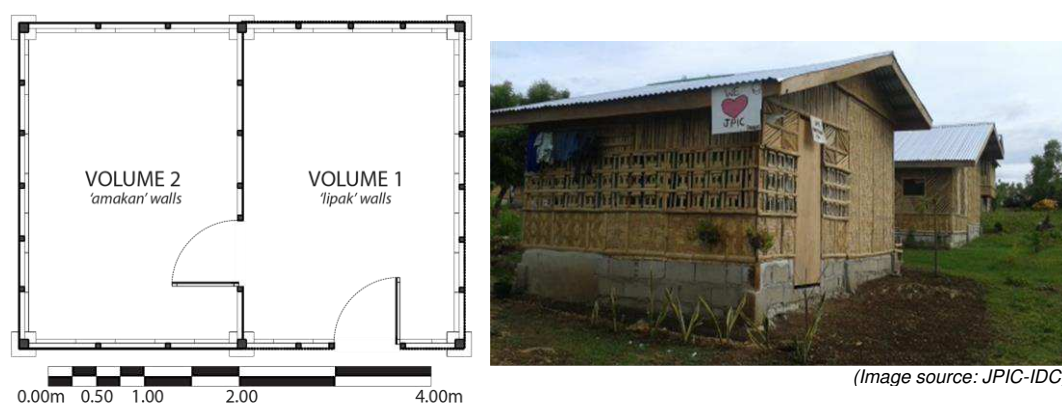


Figure 14: Floor Plan & Photo of JPIC Transitional Shelter

Coconut lumber was used in the main structural elements and the framing system of the walls while the roof has corrugated galvanized iron without any thermal insulation underneath. Materials for items not included in the donation e.g., windows and the concreting of the floor in Volume 1 had to be done and/or shouldered by the recipients.

On the construction of the shelter, the organization gave the donees the opportunity to specify the location of the doors as they desired. Furthermore, it was also designed

with the assumption that residents will build their own kitchen outside the shelters as is typical in the rural areas (Salas, SVD, 2020).

## RESEARCH SAMPLE

In Table 8 are the sample sizes against the population size of the cases. Of interest is the varying number of shelters built from the records of the government, the Global Shelter Cluster, and from the organizations. Further, the population size for YPDR did not sort the number of shelters built using the Phase I, Phase II or Phase III designs. It only presented an aggregated number of the shelters they built in the areas.

Table 8: Research sample size & margin of error

	Pop'n Size	Sample Size	Confidence Level	Margin of Error
<i>Transitional Shelters</i>				
YPDR	861*	19	90%	19%
JPIC	354**	20	90%	18%
	63***		90%	15%
<i>Permanent Shelter</i>				
Habitat for Humanity	216*	20	90%	18%
	372***		90%	18%

\* data from Global Shelter Cluster (ShelterCluster.org, 2014)

\*\* data from the Disaster Risk Reduction Management Office of the Municipality of Sta. Fe

\*\*\* data from organization

The specific shelters from each organization were done randomly. But the “randomness” was limited to either the proximity of the shelters to the road or by ‘word-of-mouth’ from residents. These were employed as standard random sampling methods were not possible as the organizations at best, only have the barangays (equivalent to the ‘Bezirk’ term in Deutsch) where they built their shelters. At worst, either there are no records at all, or they are all lost.

From Figure 15 JPIC shelters included in the study were concentrated in the south-east, in the Barangays of Baigad in the municipality of Bantayan and Balidbid in Santa Fe. This is contrary to the accomplishment report retrieved from the JPIC-IDC organization that their shelters are built in the Barangays Okoy and Balidbid in Santa



Figure 15: Location of the research samples

Fe. Meanwhile, the YPDR shelters are dispersed in the southern part with March Village by Habitat/ MARCH for Christ were clustered in the southwest in Barangay Sulangan, Municipality of Bantayan.

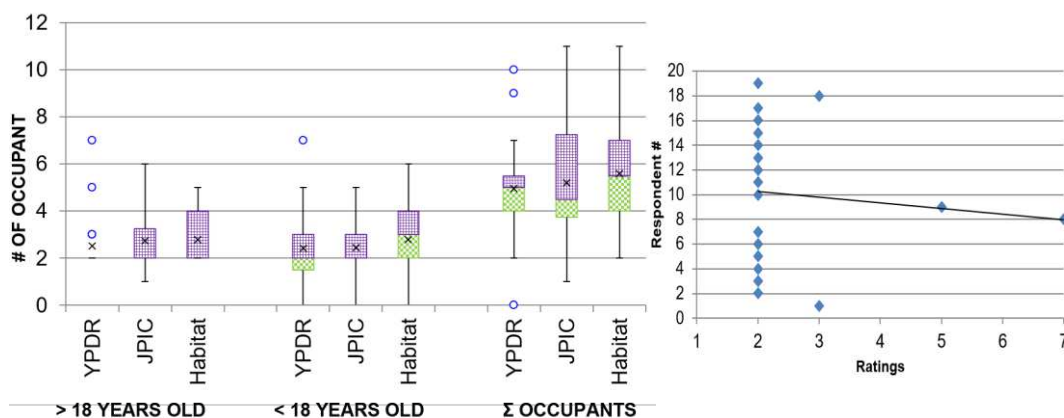
### COMPOSITION OF THE RESEARCH SAMPLE

The respondents to the survey were limited to the head of the households (father or mother). The research sample as reflected in Table 9 shows the higher percentage of female respondents in all of the shelters. However, the head of the households in the YPDR transitional shelter are younger at only 58% of over 30 years compared to the 85% of JPIC and 95% of Habitat for Humanity.

Table 9: Composition of Research Sample

	AGE				GENDER			
	<30		>30		MALE		FEMALE	
<i>Transitional Shelter</i>								
YPDR	8	42%	11	58%	3	16%	16	84%
JPIC	3	15%	17	85%	3	15%	17	85%
<i>Permanent Shelter</i>								
Habitat for Humanity	1	5%	19	95%	4	20%	16	80%

The average total occupant of the transitional shelters were 10.5 residents with the YPDR shelter as the host of the highest number of residents in both the above 18 and below 18 age brackets (*Figure 16*). However, most JPIC shelters have total occupants higher than four residents compared to either the YPDR shelters or the Habitat houses even if their medians are higher than JPIC's.



\*Colors of the box plot represent the quartiles (green = lower quartile to median; violet = median to upper quartile)

	>18 YEARS OLD			<18 YEARS OLD			TOTAL OCCUPANTS		
	YPDR	JPIC	HAB.	YPDR	JPIC	HAB.	YPDR	JPIC	HAB.
MEAN	2.5	2.75	2.8	2.4	2.45	2.8	4.9	5.2	5.6
MEDIAN	2.0	2.0	2.0	2.0	2.0	3.0	5.0	4.5	5.5
Most #	7	6	6	7	5	6	10	11	11

Figure 16: Number of residents/ occupants (a) box plot; (b) scatter plot for >18 y.o. in YPDR

## 3 RESULTS

### 3.1 Overview

Presented within the chapter are the diagrams showing the spatial syntax of the layouts of the shelters/ houses as well as the results of the documentation of the user-initiated renovations. Following these are the survey and interview results. The detailed and the frequency of the responses/comments mentioned are in Appendix D. A portion of the “background” category of the survey was presented in the previous chapter under the “research sample” while the rest are presented here.

#### 3.1.1 Space Syntax

The activities that is used in the analyses of the spatial configuration of the cases are identified from the furniture (Appendix B), its layout and the activity encountered during the fieldwork. The study however assumes that the function is done where the furniture is found/ located at the time the data is gathered even if in essence, they can be moved somewhere else. The furniture with the same activity is categorized under the same ‘name’. Multiple occurrences are recorded according to the number of instances they are encountered.

Shown in (Figure 17) is an example of the diagrams for a shelter from YPDR. The house plan broken down to form the ‘convex spaces diagram’ and their connections are the basis for the production of the justified graph with the nodes representing the spaces or the ‘squares’ and the connections as the links to/from the nodes.

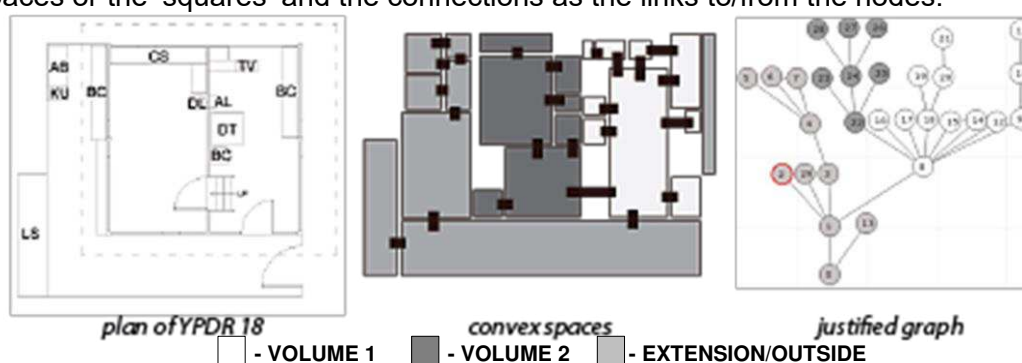


Figure 17: Sequence of diagrams to produce a justified graph for YPDR shelter #18

The activities that occurred at least 10% in all the cases studied were included in the analysis (Appendix B). This reduced the number of activities to be evaluated from 96 to 56. Furthermore, those activities that occurred ‘zero’ times in at least one of the shelter or houses were also removed from the roster bringing down the total activities to be compared against each other to 48.

### INTEGRATION OF ACTIVITIES

For the YPDR shelter, the activity with the highest integration are the passive leisure as shown in Figure 18. This is apart from activities of walking/transiting the spaces either in Volume 1, 2 or the Extensions. Most passive leisure activities with the highest integration include ‘lounging’ and ‘listening to the radio’ followed by ‘storing the livelihood paraphernalia’ (HC) and ‘dining’ (CN). On the lower end, ‘bathing’ and ‘defecating’, both Private Needs (PN) have the least integration.

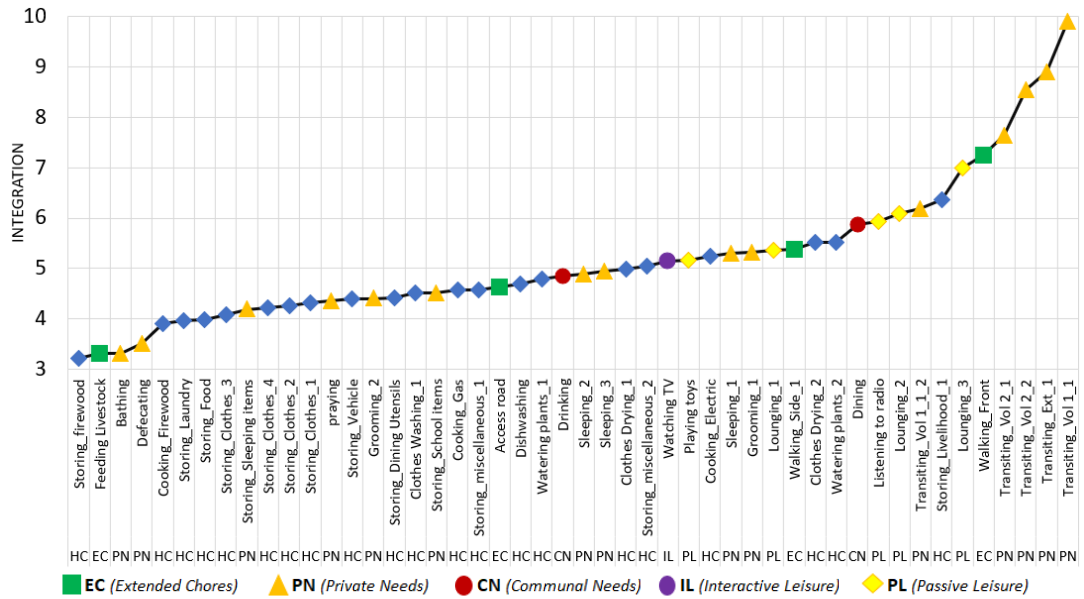


Figure 18: Degree of Integration of the Activities in YPDR

The activities under the Passive Leisure domestic chores are spread throughout the whole spectrum (Figure 19). However, ‘watching television’, an interactive leisure activity along with ‘dining’ were among those in the most integrative activities. Meanwhile, ‘clothes drying’, ‘defecating’ and ‘dishwashing’ are among the least integrated activities whereas those that involve ‘storing’ items have an average to below average degree of integration.

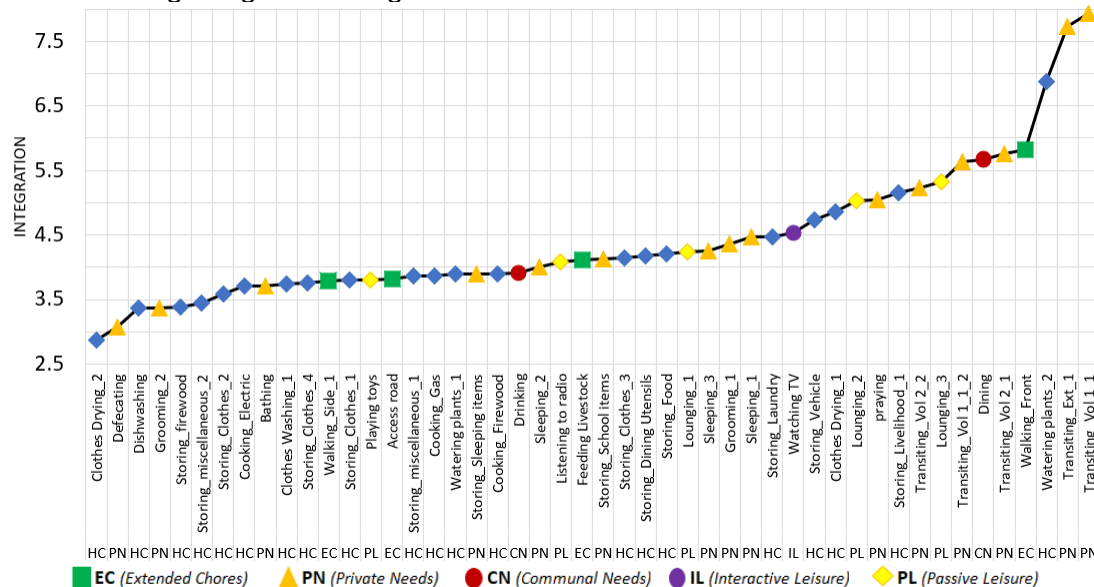


Figure 19: Degree of Integration of the Activities in JPIC



For Habitat houses, the communal activities are mostly highly integrated while the external chores (EC) such as the 'feeding of the livestock' or 'watering of plants' are not (Figure 20). Aside from this, apart from walking/transiting the volumes, 'dining' is the most integrated activity.

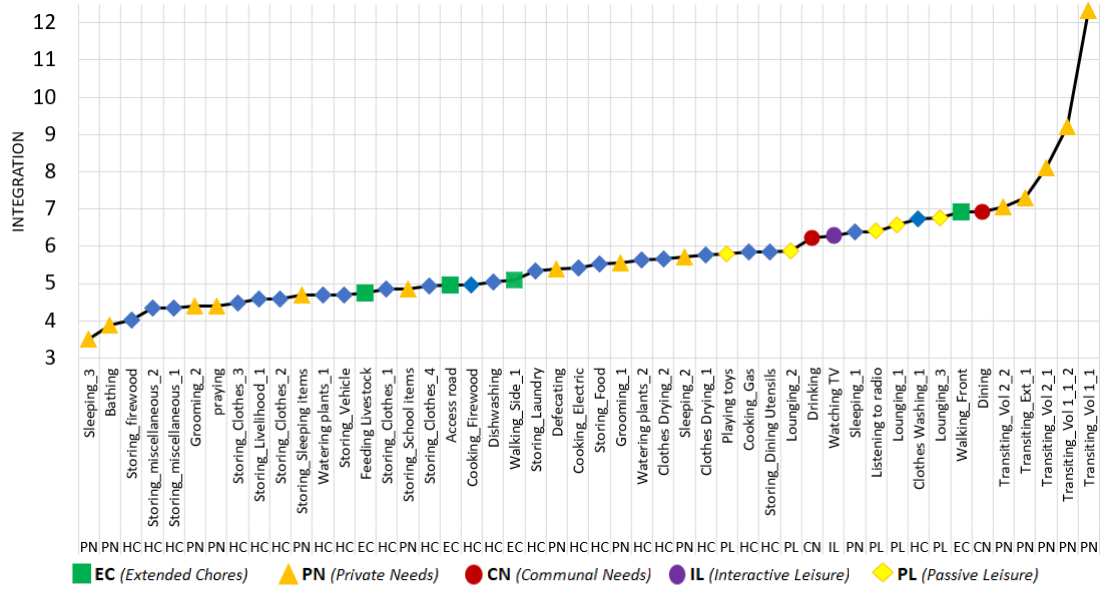


Figure 20: Degree of Integration of the Activities in HABITAT

In both the shelters and the houses, the activity that involves 'storing' has lower integration than those that involves Passive Leisure. On the other hand, 'watching TV' in JPIC appears to be more integrated to the other spaces than that in YPDR while 'storing' is highly integrated in YPDR than in JPIC (Figure 21).

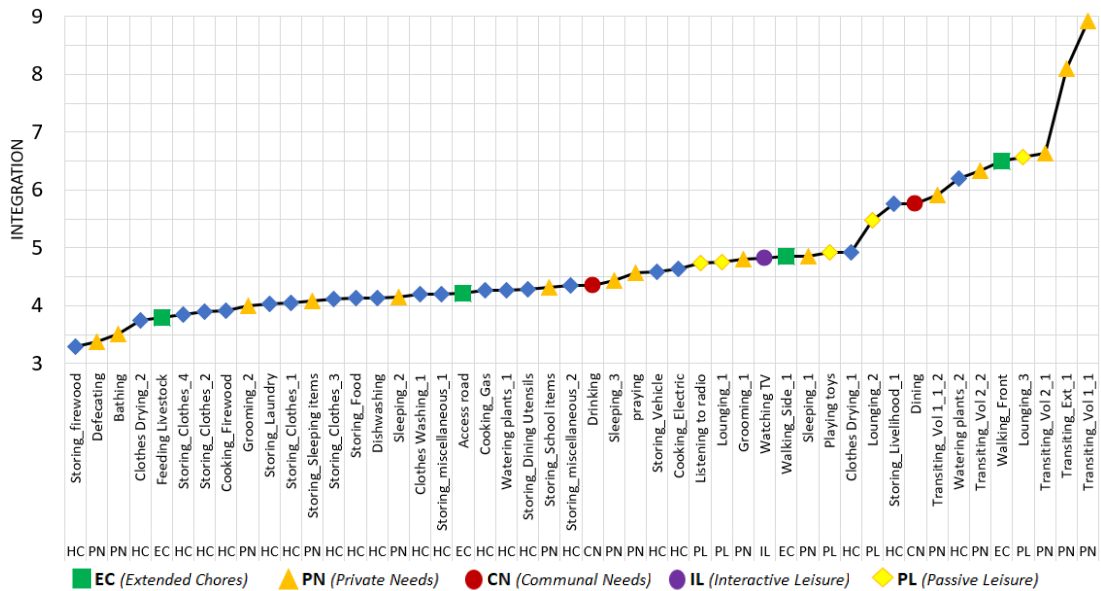


Figure 21: Degree of Integration of the Activities in all cases

### DEPTH OF ACTIVITIES

The depth of the activities in YPDR can be grouped into 'six' clusters shown by the plateauing and the constant 'increase' of their Depth values (Figure 22). From these clusters, the upper three deepest clusters are predominantly household chores that

involves ‘storing’. The shallowest activities are either ‘lounging’, ‘dining’, ‘grooming’, and ‘sleeping’.

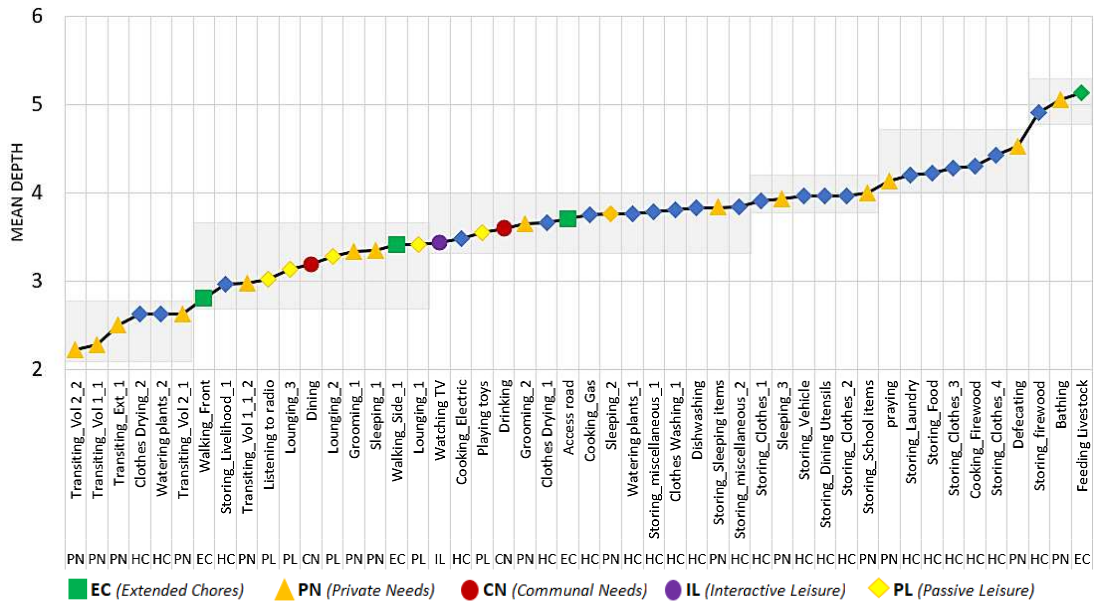


Figure 22: Depth of the Activities in YPDR

The activities in Figure 23 can be categorized into four categories. Those in the third category are mostly household chores. The activities with the lowest depths are ‘dining’ followed by ‘lounging’ and ‘clothes drying’ apart from transitioning between volumes. ‘Sleeping’ also have lower depth compared to ‘dishwashing’ or ‘defecating’. Whereas the deepest is the ‘storing of miscellaneous items’ and ‘grooming’.

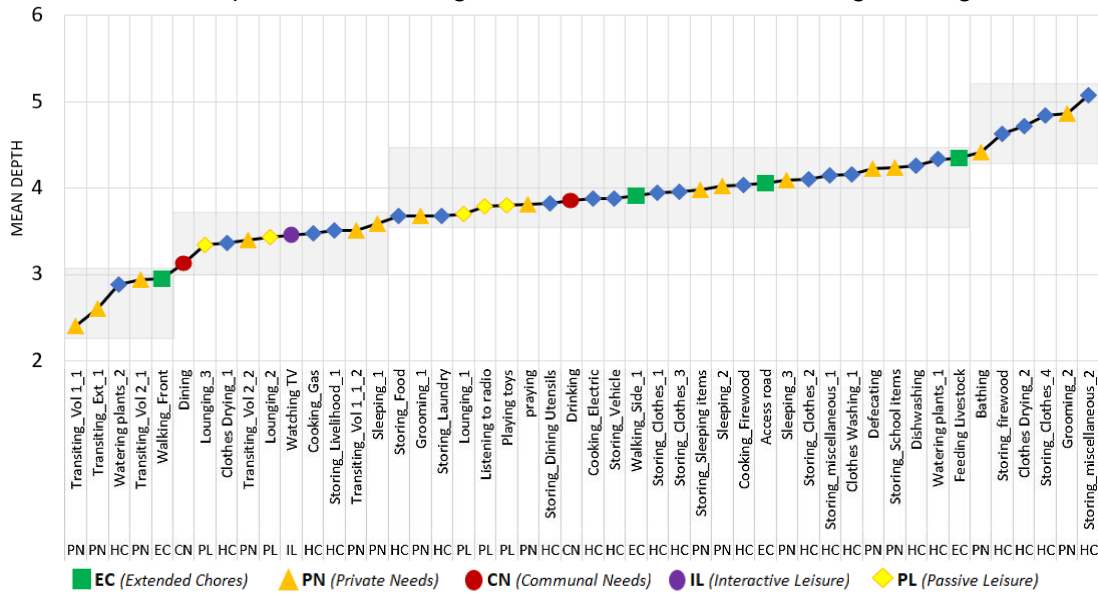


Figure 23: Depth of the Activities in JPIC

For the Habitat houses, Figure 24 shows a relatively gentle slope with steep slopes at the shallowest and deepest activities. From these, the activities ‘dining’, ‘lounging’, ‘washing of clothes’, and ‘sleeping’ are the shallowest whereas ‘grooming’, ‘praying’, ‘storing clothes’, and ‘sleeping’ are the deepest.

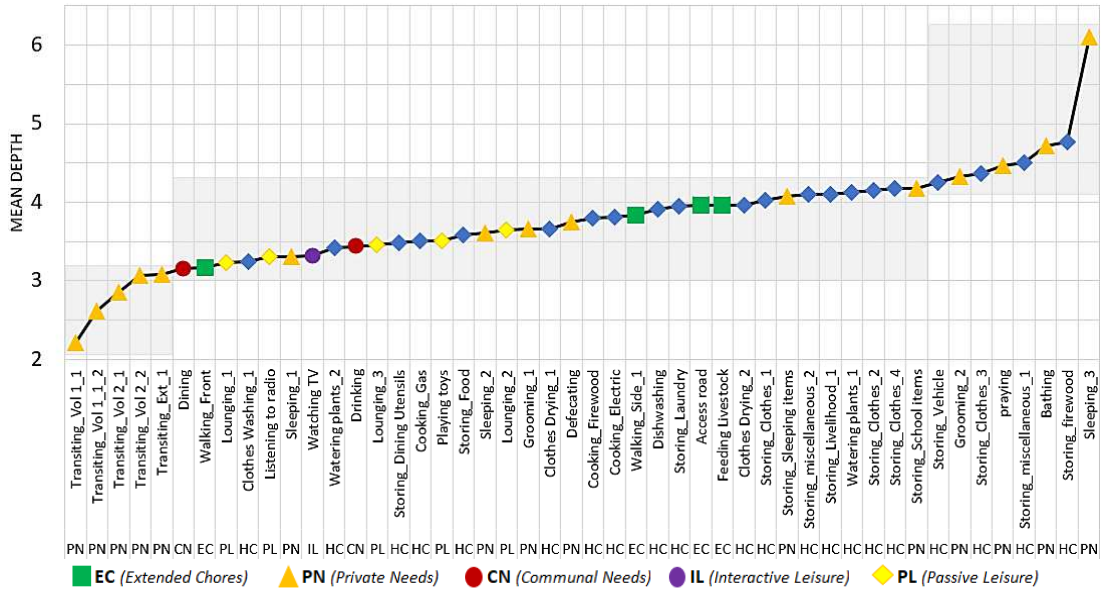


Figure 24: Depth of the Activities in HABITAT

The aggregated depth of the activities for all the cases (Figure 25) shows that generally, ‘dining’ is the shallowest activity following the ‘transitioning/walking’ along with ‘cooking using gas’ and ‘cooking using electricity’. In contrast, defecating and bathing are the deepest as well as ‘grooming’, and ‘praying’.

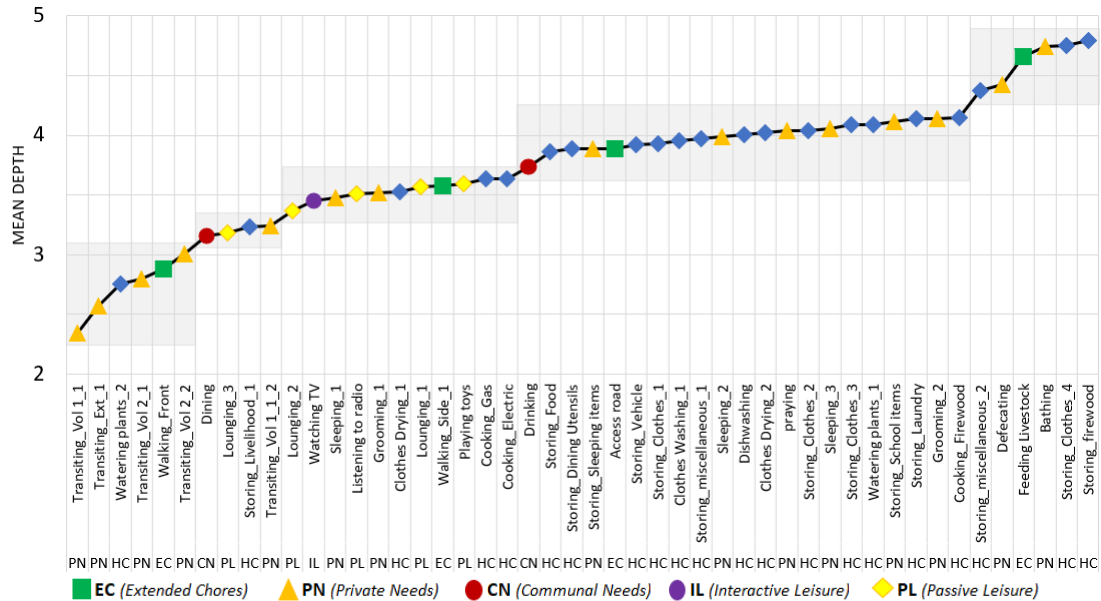


Figure 25: Depth of the Activities for all cases

CORRELATION

The scatter plot diagram (Figure 26) shows that both the shelters have a lower slope of the trend line compared to that from Habitat. However, of the two, YPDR have a relatively similar trend line slope with Habitat than JPIC.

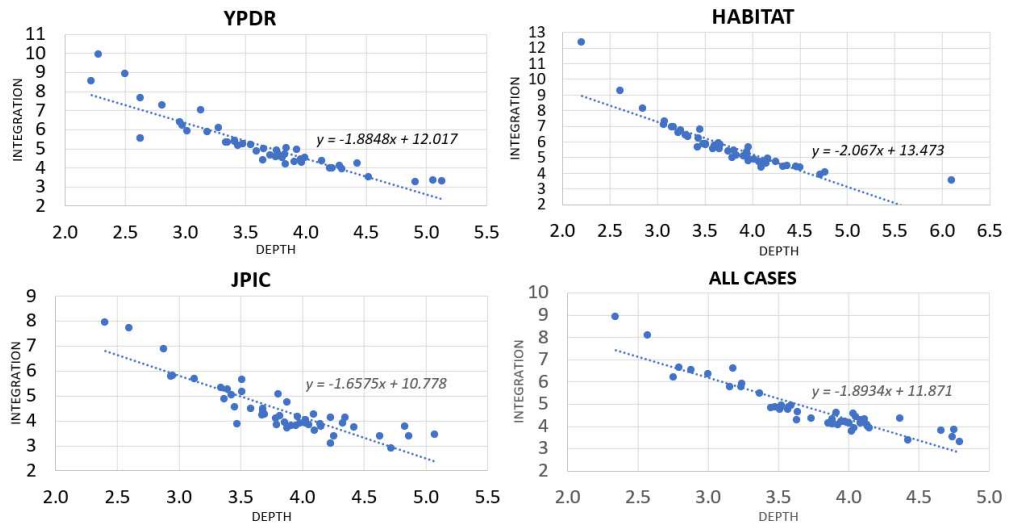


Figure 26: Integration vs. Depth

### SPACE-LINK RATIO

Figure 27 shows that generally, both YPDR and Habitat have a ratio that is in the proximity of '1' than JPIC. The degree of the distribution of the data also shows similar results except those from JPIC. Finally, apart from JPIC, the data of YPDR and Habitat are both skewed towards the value of '1'.

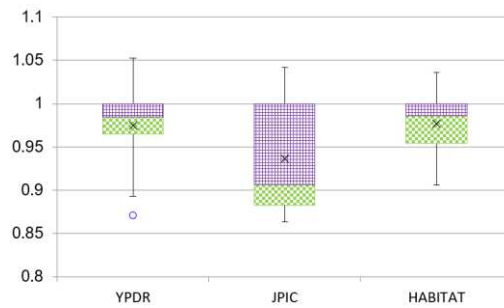


Figure 27: Space-Link Ratio

### SPACE USAGE

The percentage of the division of the activities per volume (Figure 28) shows that the ratings are mostly in the middle range with those in the Extension/Outside space in the upper-middle. It is also showing that the percentage of the activities in the shelters are wider compared to that of Habitat, regardless of the location (Vol 1, 2, Extension). But the overall spread of the ratings has those in Vol 2 to be more condensed than those in other locations (Vol 1 & Extension), irrespective of respondent background (YPDR, JPIC, Habitat).

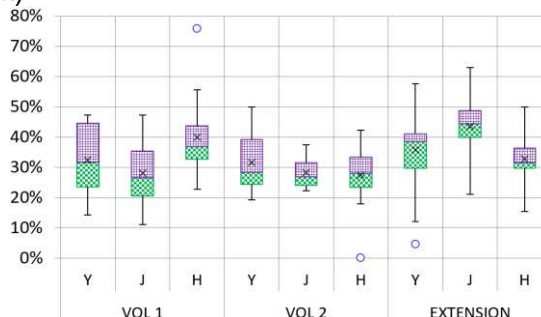


Figure 28: Division of activities per volume

The activity with the highest number of connections are mostly seen in Volume 1 (Figure 29). However, in the shelters, the gap between Vol 1 against the other spaces are quite narrow compared to those in Habitat.

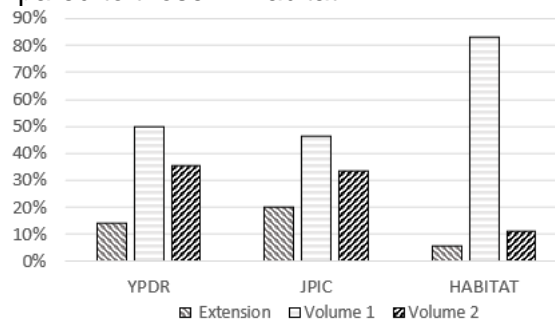


Figure 29: Location of the most connected activity

The most connected activity (Figure 30) in all spaces are related to the “transitioning”/ “walking” within the volume. In Volume 2 this is followed by “sleeping” while in the Extension, it is either “lounging” or “vehicle storage”. Also, of importance is the high connectivity of the “Front Yard” especially in the shelters.

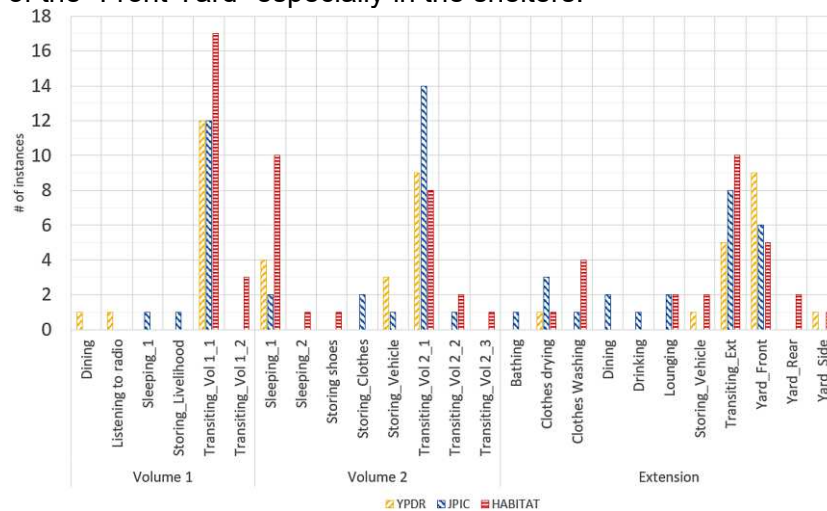


Figure 30: Activities with most connection per Volume

### 3.1.2 User-initiated renovations

The renovations are grouped according to the renovations that are already in the shelters as observed by the researcher and the responses of the respondents to Questions 28 and 29. The former were under the term “Current Renovations” while the latter are under “Future Renovations”. In each cluster, renovations are further grouped according to the 6 S’s of the theory of Stewart Brand. The evaluation also assessed all structures regardless of their current occupancy or its absence.

#### CURRENT RENOVATIONS: SITE

Using plants to define boundary is relatively common in all the groups (Figure 31). However, it is apparent that in the shelters, less costly demarcations are more favored e.g., clearing of grass and plants. This is compared to those in the permanent houses where apart from plants, they also prefer to use *‘lipak’*, corrugated G.I. sheets or nets.

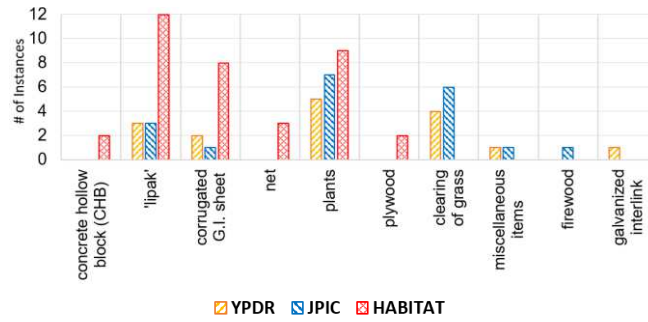


Figure 31: Fencing Material

CURRENT RENOVATIONS: STRUCTURE

The extensions are constructed using either coconut lumber or bamboo as the structural system. These elements are often fastened using nails and rarely by lashing techniques or tying them together using nylon or ropes (Figure 32).

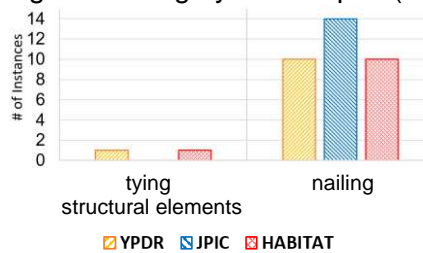


Figure 32: Structural connections of extended volumes

CURRENT RENOVATIONS: SKIN

Changes to the original walls are mostly seen in the transitional shelters particularly to those in the YPDR. It also has the highest in the shelters without any physical walls at the extensions. Meanwhile, those in JPIC and Habitat used mainly corrugated G.I. sheets. Also, Habitat residents are seen to have a higher preference to CHB over 'lipak' even if the latter is cheaper than the former (Figure 33).

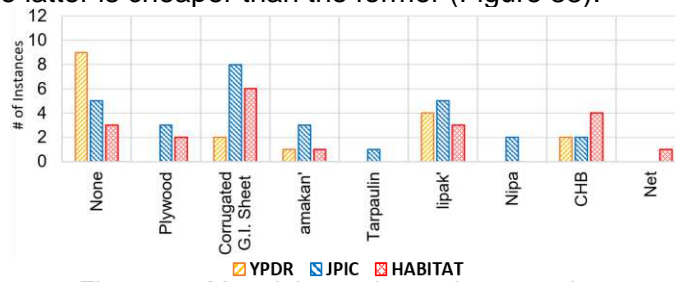


Figure 33: Materials used to at the extensions

Shown in Figure 34, dividing spaces are mostly achieved by using materials such as 'lipak', fiber cement board ('ficem')/plywood, or corrugated G.I. sheets. But curtains are still the most common material employed by the residents in the three groups.

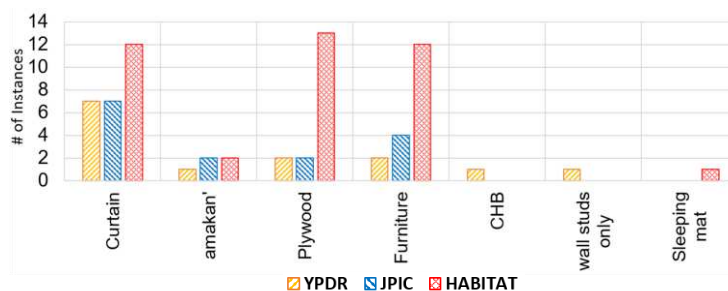


Figure 34: Space divider materials

For privacy purposes (Figure 35), screening of spaces is commonly achieved by using curtains. This is followed by plywood (JPIC and Habitat) or tarpaulins (YPDR).

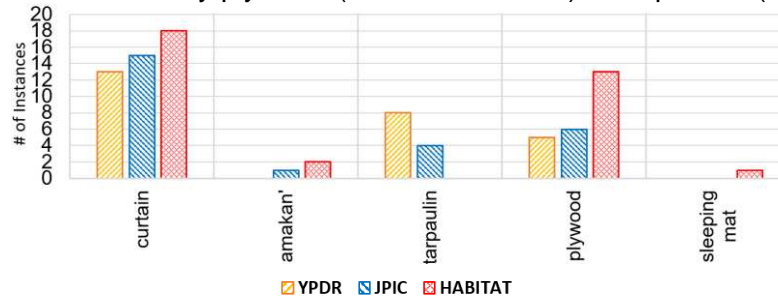


Figure 35: Materials used to screen spaces for privacy

For YPDR, changing the standard material of '*amakan*' is commonly seen in Vol. 1 than in Vol. 2 while for JPIC, in the absence of a window during project handover, residents prefer glass window using the jalousie system when they place one. The addition of windows are mainly seen in the Vol. 2 than in Vol. 1 (Figure 36). So, it can be said that for the shelters, glass jalousie blades using the jalousie window system is the most common material to replace the 'standard' material used by the donors.

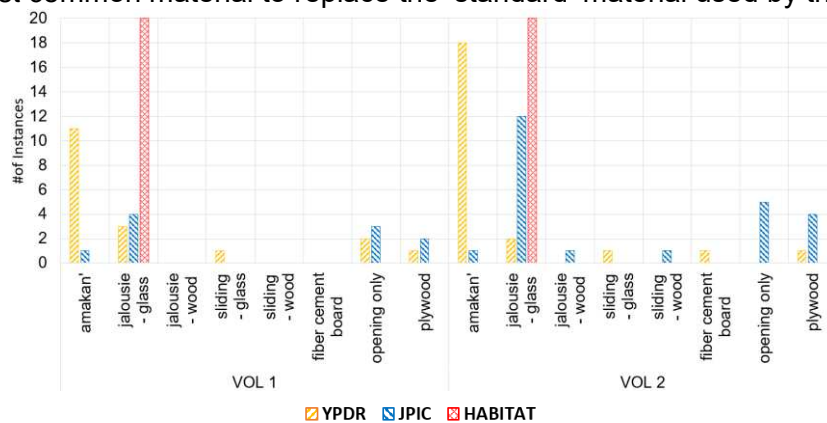


Figure 36: Materials used in the windows

Other common practice is in most transitional shelters, the concrete floor in volume 1 extends to the front of the main door at approximately 0.50 sq.m. or less. On these spaces, commonly seen are 'entry rugs' or slippers. At times, these are also polished the way the floor in Volume 1 is taken cared of.

Shown in Figure 37 are the roofing materials in the extension spaces regardless of whether the spaces are in the front, side or rear of the main structure. Most roofs used by the respondents from the three groups are corrugated G.I. sheets followed by either Nipa (JPIC) or tarpaulin (YPDR).

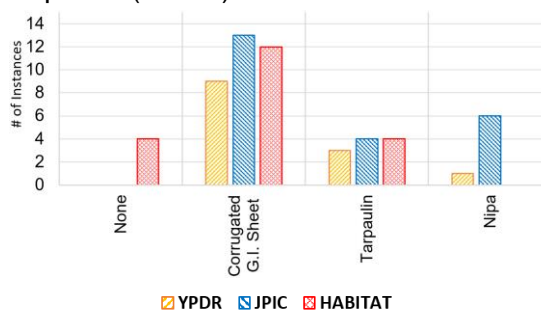


Figure 37: Materials used for the roofs of the extended volumes

## CURRENT RENOVATIONS: SERVICES

On wirings (Figure 38), although there are instances when the wires are fastened to the walls/framing system, many still just let the other wires hang. Fastening wires is also not as prevalent in the permanent houses than in the shelters. As for the water lines, those with one just kept the pipes exposed. Although, these are only seen in the permanent houses as most shelter residents are not connected to the water grid.

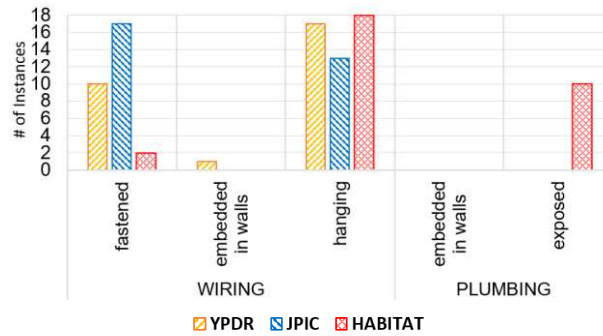


Figure 38: Electrical wirings and plumbing

## CURRENT RENOVATIONS: SPACE PLAN

The use of the volumes and the extensions (Figure 39) showed that Vol 1 is mainly used as a public or semi-public space. The presence of beds in Vol 1 meant that it is treated as a private space. Vol 2 is primarily a private space. Meanwhile, the extensions mix the three uses with Habitat residents usually using it for private activities while those in JPIC treat it as a public space.

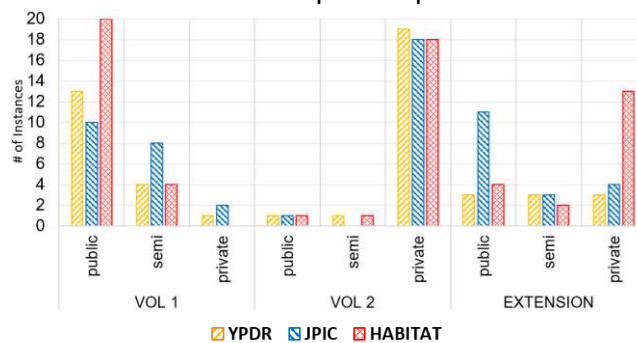


Figure 39: Functional designation of the volumes and extensions of the shelters/houses  
Leaving the slippers outside of the porch (Figure 40) is mostly done by the residents of YPDR. Although they are also seen to do the same thing outside of Vols. 1 & 2. However, for JPIC residents, only a small portion of the respondents were seen to leave their footwear outside any volumes except in volume 1.

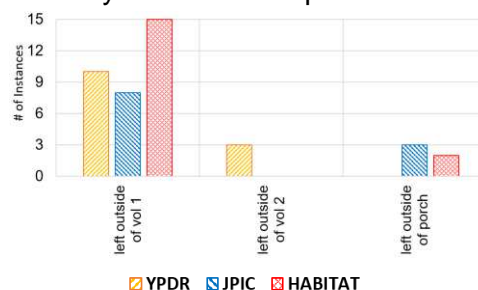


Figure 40: Behaviour of leaving slippers outside the spaces



## CURRENT RENOVATION: STUFF

The ornamentations (Figure 41) mostly used by the respondents are either family photos, academic achievements such as medals, or religious images. Learning aids are also commonly seen in Habitat residents than in the shelter residents.

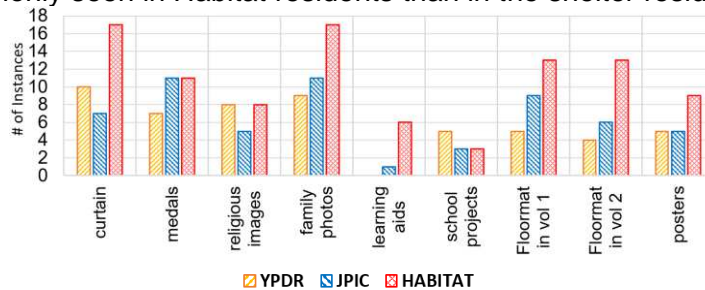


Figure 41: Ornamentations used by the respondents

Shown in Figure 42, many residents of YPDR and Habitat sleep directly on the floor while those in JPIC use a bamboo bed. There are also those that use a thermal protection for sleeping on the floor e.g., plywood (Habitat/JPIC).

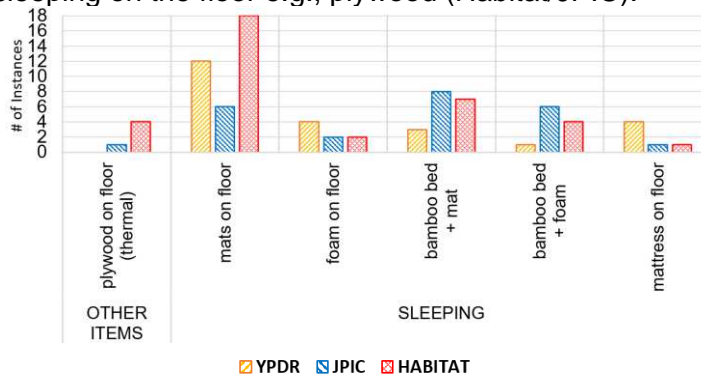


Figure 42: Means of sleeping

## FUTURE RENOVATIONS: SITE

JPIC residents did not disclose any plans on the renovations they intend to do related to 'SITE'. But YPDR residents are wary of making major changes as apart from not owning the lot, it is not possible to move the whole house, as is typical in the rural areas, due to a small access road. On the other hand, Habitat residents plans on securing the boundary of their property by repairing broken or non-existent fences.

## FUTURE RENOVATIONS: STRUCTURE

The concerns of the residents in the different groups related to 'STRUCTURE' are varied. JPIC residents intend to replace the rotten wood parts while those in YPDR plan on lowering Volume 2 to the same level as Volume 1 and to straighten the canted walls. Meanwhile, those in Habitat plans on creating a septic tank specifically for grey water from the activity of dishwashing.

## FUTURE RENOVATIONS: SKIN

Plans of changing the 'amakan' walls to either plywood, fiber cement board or concrete hollow blocs for rain protection is common to both YPDR and JPIC shelters.

For Habitat, they are mostly focused on placing ceilings, placing floor tiles or changing the roof in the extension space from tarpaulin to corrugated G.I. sheets (Figure 43).

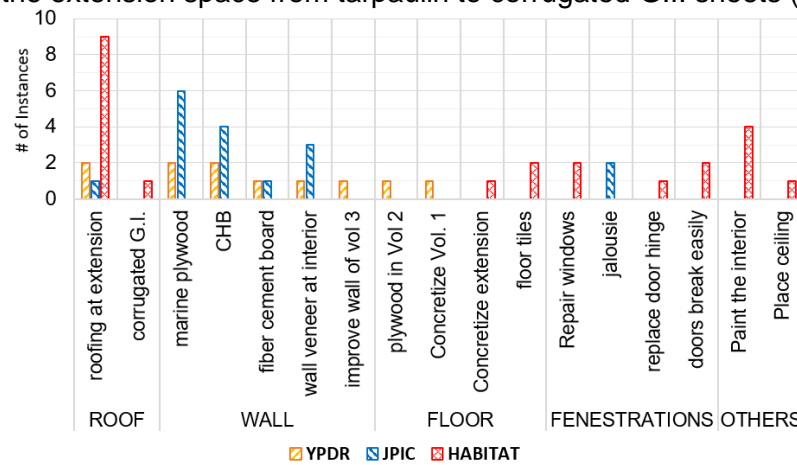


Figure 43: Future changes to the 'Skin' of the structure

FUTURE RENOVATIONS: SPACE PLAN

Residents from YPDR did not mention any future renovations related to 'SPACE PLAN'. But many from JPIC wants to extend the area of the house further. Meanwhile, Habitat residents are planning on installing proper room divisions.

FUTURE RENOVATIONS: STUFF

On 'Stuff', all responses are from Habitat residents with concerns related to improving the security of the house by adding more padlocks.

3.1.3 Survey on user perception

BACKGROUND

The responses of the respondents whether they are living in a densely populated or sparsely populated community are shown in Figure 44. From there almost half of the respondents in YPDR thinks they are living in a sparsely populated community while majority of those from JPIC believes that they are in a densely populated environment.



Figure 44: Question 5: Perceived community density

The responses of the occupants on the perceived family's ownership against the actual situation (Figure 45) showed the occupants' lower perception of themselves as owners of the shelters (YPDR = 79% & JPIC = 90%) versus the actual situation (YPDR = 89% & JPIC = 100%).

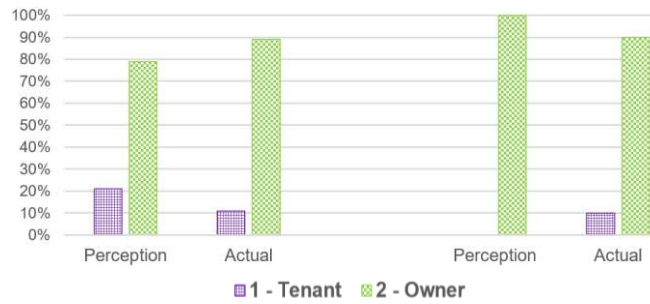


Figure 45: Question 6: Tenancy perception and situation

In Figure 46, 10% and 16% of the residents of JPIC and YPDR shelters, respectively, are unsure of their situation while 80% (JPIC) and 68% (YPDR) of them have professed their intention of staying at the current location.



Figure 46: Question 4: Occupancy plans

THE SHELTER & THE USER’S CIRCUMSTANCE

The category primarily deals with the identification of the perception of the residents towards the overall impact of the shelter and its location to their way of living. This is seen to give a picture of the degree of satisfaction the residents felt to their houses.

*Neighborhood Location*

Most of the respondents in the three cases find the location of the neighborhood generally to be in the above average range of the scale (Figure 47). For both shelters, the data are more dispersed compared to that of the permanent house based on their Inter Quartile Ranges. The relative range of YPDR intersects with that of Habitat thus their responses are not considered to be different. As for the comments, they are mostly related to the quality of the neighborhood’s roads being muddy after a rain.

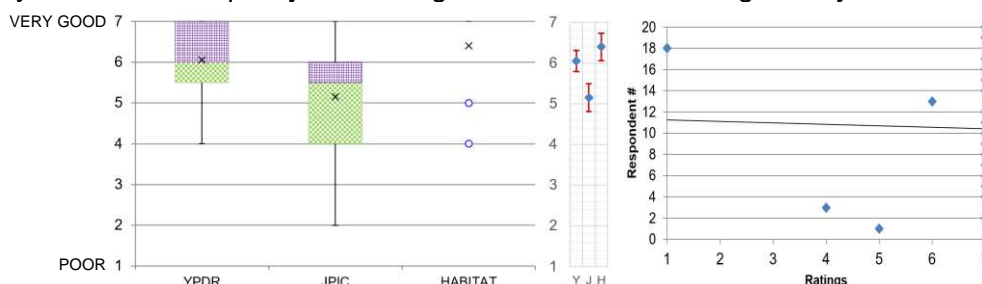


Figure 47: Question 7: Neighborhood Location (a) box plot; (b) relative range; (c) scatterplot of Habitat

*Neighborhood Space*

The degree of dispersion of the ratings of the shelter’s residents became more

compact when the ratings of those who are in a sparsely populated community were removed (Figure 48). Normalizing the data this way is perceived to produce a more representative result on the criteria at hand. This also increased the parallelism of the shelter residents and further emphasized their differences with the houses.

Majority of the comments, especially those from Habitat, are more negative and are on the 'proximity of the structures with the neighbors', the 'limitations on space to plant vegetables' and the 'restrictions for raising livestock'.

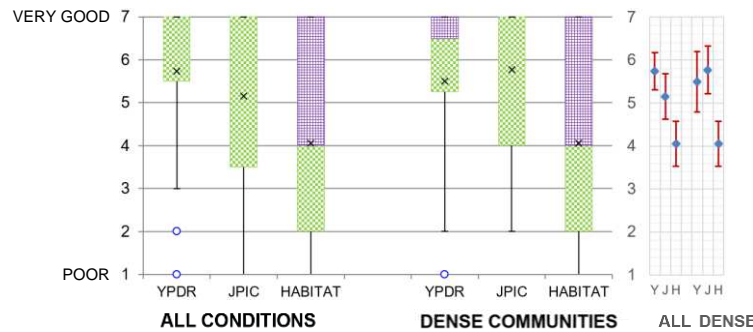


Figure 48: Question 9: Neighborhood Space (a) box plot; (b) relative range

*Neighborhood Layout*

Most of the ratings (Figure 49) are in the upper half of the scale with a more dispersed lower IQR for JPIC. However, the overlap of the relative value and relative ranges of the structures meant that the ratings are similar to each other. But JPIC resembles Habitat more than YPDR is.

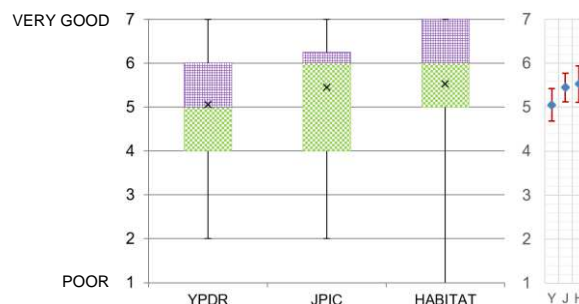


Figure 49: Question 11: Neighborhood Layout (a) box plot; (b) relative range

*Shelter Location*

In Figure 50, JPIC has a very dense lower half of the IQR which is the opposite of Habitat. It also presents that the distribution of the data by the YPDR residents is mostly in the upper half range. The high kurtosis of the data of Habitat than the shelters meant a very unpredictable response from the respondents.

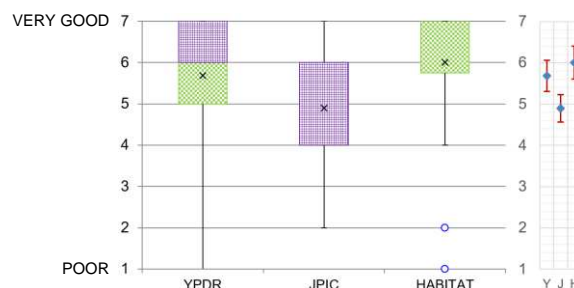


Figure 50: Question 12: Shelter Location (a) box plot; (b) relative range

### Shelter Space

The overlap of the relative range (Figure 51) from YPDR with JPIC & Habitat signifies that residents in both shelters & the houses perceive space similarly. Furthermore, the spread of the data in the lower half of the IQR of JPIC is very large compared to those from YPDR and Habitat but the distribution of data (Appendix E) of YPDR closely resembles that of Habitat.

Most comments pertain to the (1) size, (2) users e.g., number, gender, (3) number of possessions or activities possible and (4) just contented because it was given. Majority of the comments, both positive and negative, had something related to the users. Space abundance or lack of it influenced by the 'number of possessions' or 'possibilities for activities' is a factor in the Habitat for Humanity house and only viewed negatively in JPIC while absent in YPDR.

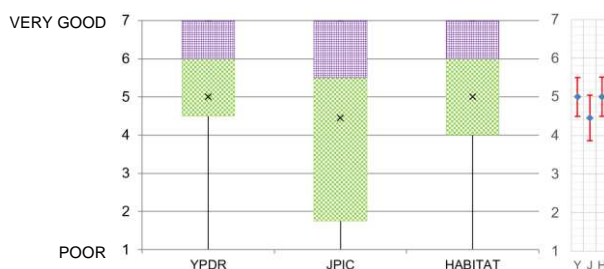


Figure 51: Question 14: Shelter Space (a) box plot; (b) relative range

### Shelter Layout

The distribution of the data (Figure 52) supports the similarity of the ratings from the shelters with those from Habitat. However, the difference in the skews (negative for shelters, positive for houses) meant that most of the residents in the shelters find their layout more favorable compared to those living in the permanent houses. This is also supported by the comments. Specifically, those that pertain to the orientation of the building. For shelter residents, the building's orientation is due to superstition while for Habitat residents, though it is 'mentioned', positively and negatively, it is in conjunction with the regulations set forth by the donor.

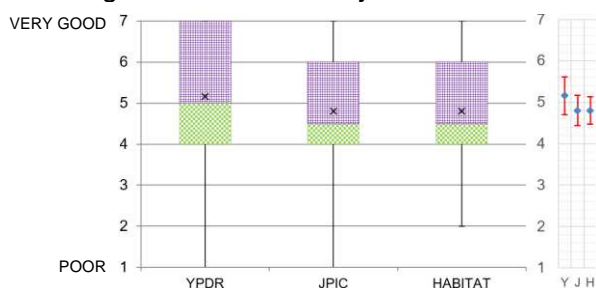


Figure 52: Question 16: Shelter Layout (a) box plot; (b) relative range

### Shelter Storage

All three structures have most of their data in the lower range of the scale (Figure 53). Moreover, the wide lower half of the IQR meant that the responses in the upper half are clustered in one or two ratings in the mid-range of the spectrum. However, though

the responses of the shelter residents varied, those in YPDR nonetheless is parallel to the residents of Habitat.

On the comments, aside from the lack of space to store their valuables, many also think that storage is dependent on the number of items/valuables a person/family has.

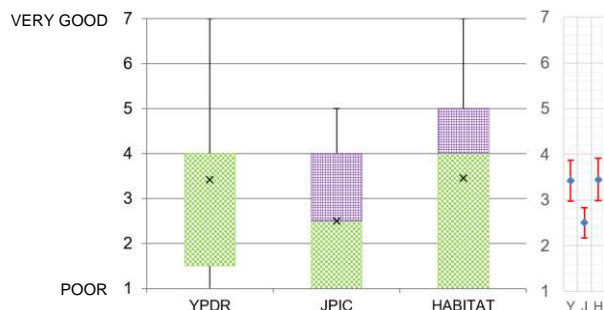


Figure 53: Question 18: Shelter Storage (a) box plot; (b) relative range

### *Shelter Appearance*

Aside from a very dense lower half, the upper half of the IQR for both the YPDR and Habitat residents are more dispersed than JPIC (Figure 54) where the IQR is “squeezed” in the “7”. The absence of an overlap in their ranges is not augmented by the IQRs in the upper half of the scale. In fact, it is even more obvious by YPDR’s bi-modal graph (refer to Appendix E ) and JPIC’s moderately positive skew.

But, when queried on the things that makes their place “beautiful”, most responses are on the choice of material especially noting concrete walls. Those in the shelters wished to have one while those in the houses appreciated having one. This is followed by the size of the space and then the aesthetic elements, e.g., paints/varnish and tiles. Form is only mentioned by six respondents from YPDR.

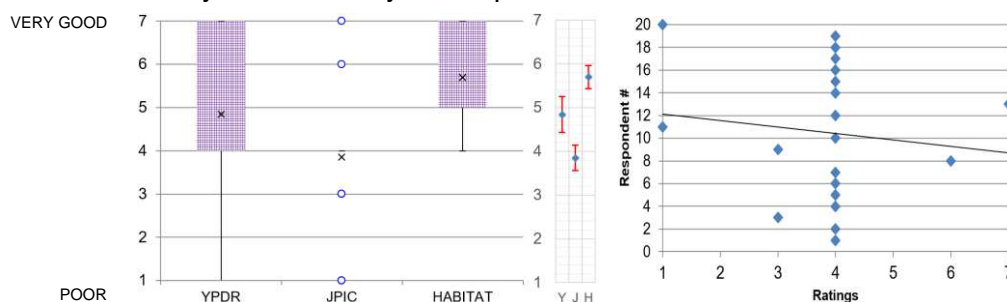


Figure 54: Question 20: Shelter Appearance (a) box plot; (b) relative range; (c) scatterplot of JPIC

### *Shelter Safety*

For context, the respondents were asked about their perception of safety (Figure 55) during the last typhoon that directly hit the island: Typhoon Phanfone (local name: Ursula, Category 2 in the Saffir-Simpson scale) with a wind speed of 150 kph. This is planned to provide them with a more tangible grasp of the intention of the question.

The more dispersed lower half of the IQR of YPDR than the upper half contrasts with JPIC but is like Habitat. But the degree of the disparity in the structures may be inferred by the obvious gap on the relative ranges of the shelters and the house.

This is also evident on the comments by the respondents. Responses from YPDR revolved around the instances of rain driven inside the shelter. Thus, the conduction of the last-minute interventions: tarpaulin barriers. Those respondents also reported of being afraid during that typhoon but, many are confident of the construction method of the shelter and that it can withstand the storm. This contrasts with JPIC respondents were most statements are about evacuation. As a matter of fact, of those who talked about evacuating, almost half managed to relocate. Furthermore, they also reported that they are not confident of the construction method used and its capacity to withstand the typhoon. Meanwhile, the residents of the houses were mostly saying that they were just fine even if the rain leaked and was driven by the wind inside. Others also said that they were not scared during the typhoon.

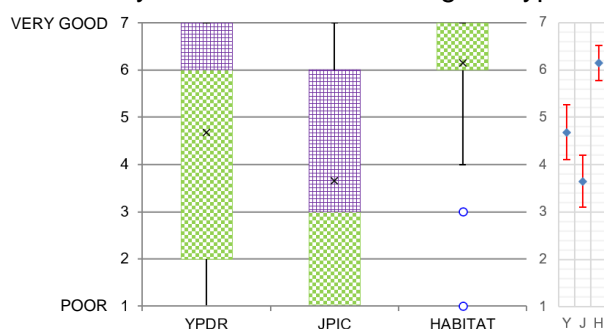


Figure 55: Question 22: Shelter Safety (a) box plot; (b) relative range

### Overall Design

In Figure 56, the shelters have a similar degree of dispersion in the lower half of the IQR. Moreover, the responses are primarily in the upper half of the scale.

Most responses by shelter residents are on the intrinsic properties of the form (e.g., “it’s unique form makes it beautiful”, “it is like the way typical houses are built”). But those in the houses mostly commented on the renovations that improves comfort or aesthetics, albeit phrased negatively. Furthermore, materials are talked about how they can aid or deter renovations/improvements

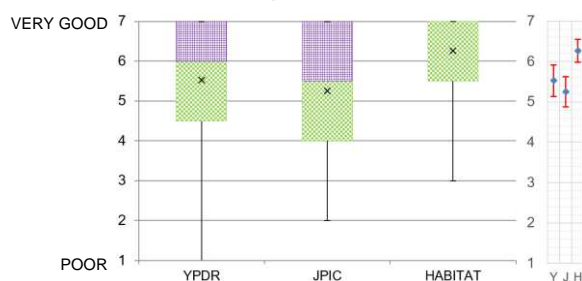


Figure 56: Question 24: Overall design (a) box plot; (b) relative range

### Things that worked well

For this criterion, both shelters have a relatively similar distribution of data in its IQR despite the lack of overlap in their medians/relative value and the relative ranges. Although most ratings in all the structures are in the above average range of the scale.

Comments on the things that worked for them are varied but with a pattern (Appendix D). Like, most positive responses on the performance of the material/shelter (“the whole house is airy”, “the whole house is cold”) were by YPDR respondents. They also think that functionally, Volume 2 worked well for them. On the other hand, most respondents from JPIC and Habitat talked about the functionality of the spaces. Those from Habitat are concerned with the location of the kitchen (outside/inside), the absence of a drainage system, or doing the laundry at the back yard. Meanwhile, JPIC responses were on the lack of space thus the need to expand.

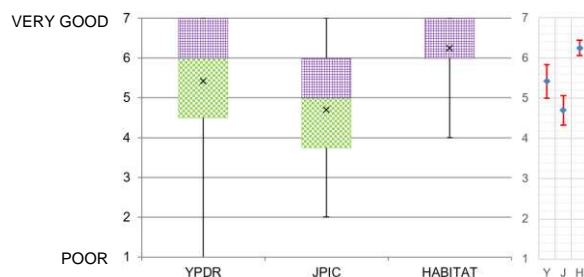


Figure 57: Question 26: Things that worked well (a) box plot; (b) relative range  
*Overall Health*

Both YPDR and Habitat have distributions skewed to the upper half that peaks at the highest scale (7). This contrasts with JPIC residents where it peaks at the middle scale (4). Nonetheless, both JPIC and Habitat have data distributed across the whole scale compared to those by YPDR residents. This concurs with the overlap in their relative ranges and medians.

Meanwhile, YPDR residents mostly equate health with the performance of the shelter as evidenced by the common responses that includes (1) bigger space and (2) better illumination. On the other hand, those in JPIC see it as related to their environment and food. Although environment is phrased negatively, food is somehow seen by the residents positively due to the possibilities of being able to grow them in their backyard. For Habitat residents, most comments are framed negatively primarily because of the distance to the fresher food source they were accustomed to than the processed and canned goods in their current location.

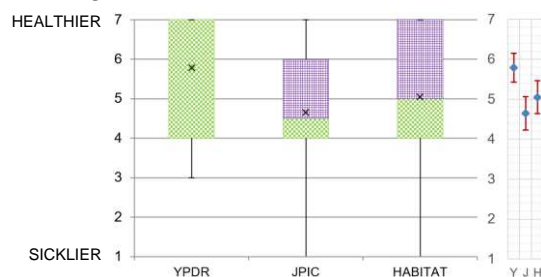


Figure 58: Question 49: Overall Health (a) box plot; (b) relative range

## PERCEIVED BUILDING PERFORMANCE

### *Temperature Quality*



Ratings from groups in the 'General Situations' are on the upper half with others (JPIC) skewing towards it (Figure 59). Meanwhile in the 'Monsoon Periods', responses are skewed towards the 'uncomfortable' rating. Additionally, IQRs of the shelters are shorter in the 'General Situations' than in the 'Monsoon Periods'.

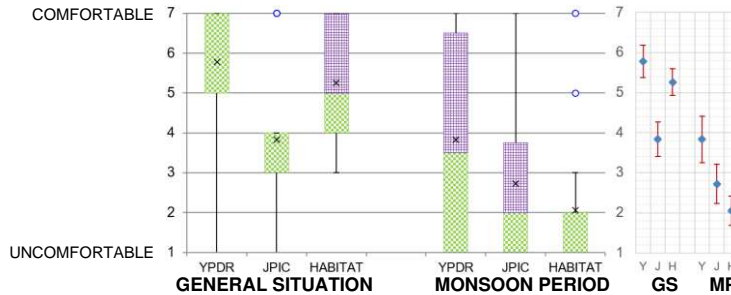


Figure 59: Question 30: Comfortable temperature (a) box plot; (b) relative range

Figure 60 has the degree of coldness (7) or hotness (1) of the temperature in the 'General Situation' are relatively the same between YPDR and Habitat with an analogous length of IQR, its location in the scale, and the overall spread of the data. But JPIC and Habitat residents perceive temperature in the 'Monsoon Periods' similarly. This is especially seen in the skew towards 'too hot' and the dispersion of the overall data.

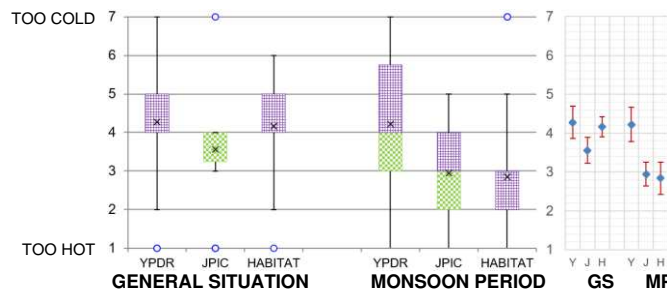


Figure 60: Question 31: Temperature (a) box plot; (b) relative range

*Ventilation*

The criterion (Figure 61) intends to measure not only the quality but also the perceived "bulk" of air entering the space. In both situations, the responses either skew towards the 'varies' (7) rating or the very condensed IQR that evidently fell directly on the highest scale (JPIC). The very wide IQR of YPDR meant the perceptions are manifold even if it is negatively skewed in both instances.

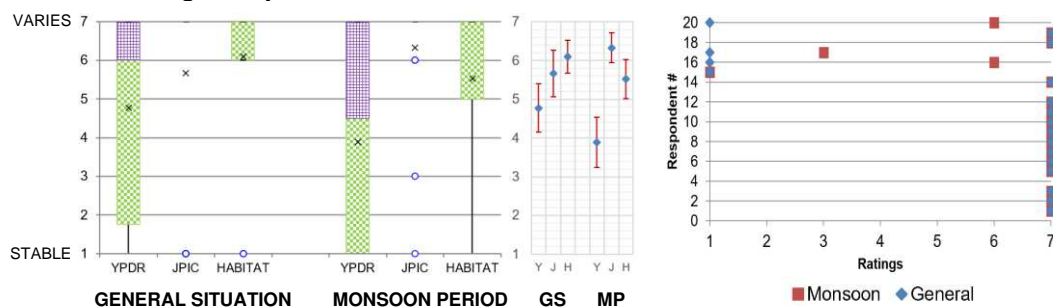


Figure 61: Question 32: Ventilation stability (a) box plot; (b) relative range; (c) scatterplot for JPIC

In Figure 62, most data in the ‘General Situation’ are in the lower half with Habitat and YPDR skewing towards the “still” (1) rating. The trend is also the same in the ‘Monsoon Periods’ with JPIC respondents more inclined to perceive a “drafty” air.

Among the situations, an obvious difference is the wide total spread of the responses in the ‘Monsoon Period’ than in the ‘General Situation’.

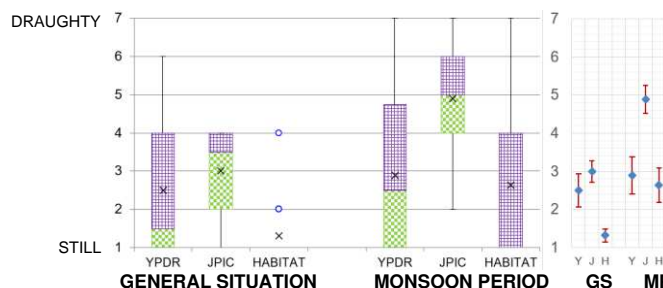


Figure 62: Question 33: Air stillness/draftiness (a) box plot; (b) relative range

50% of the reactions (Figure 63) have all groups view the air as “humid” (7) than “dry” (7) in both instances. But this is more common in the ‘Monsoon Periods’ when the responses skews more left even if it also has more propensity for wider overall spread.

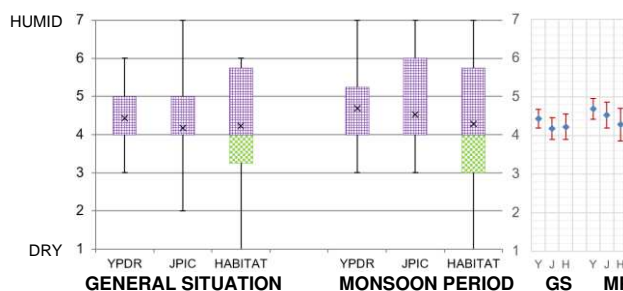


Figure 63: Question 34: Air humidity (a) box plot; (b) relative range

The observation of “fresh” (1) air varied greatly in the ‘General Situation’ than in the ‘Monsoon Periods’ where responses are mostly skewed to “stuffy” (7), except YPDR. The similarity of the responses by JPIC and Habitat in the ‘Monsoon Periods’ is in the overlap of their ranges even if the overall spread of their IQRs are wider (Figure 64).

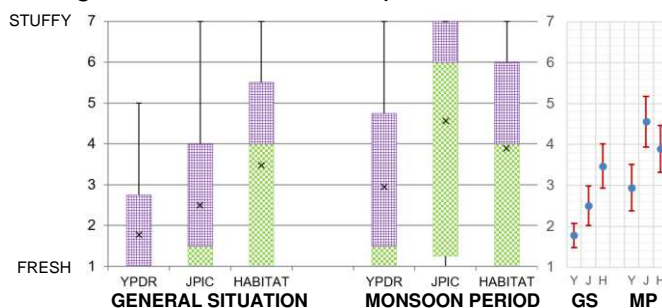


Figure 64: Question 35: Air freshness/stuffiness (a) box plot; (b) relative range

In Figure 65, the data in the two situations are all skewed positively towards the “odorless” rating with most respondents in JPIC saying that the air does not smell bad. The outliers in JPIC and Habitat and the wider IQRs of YPDR for both situations meant that in some instances it is otherwise. These cases substantially surge in the ‘Monsoon Periods’.

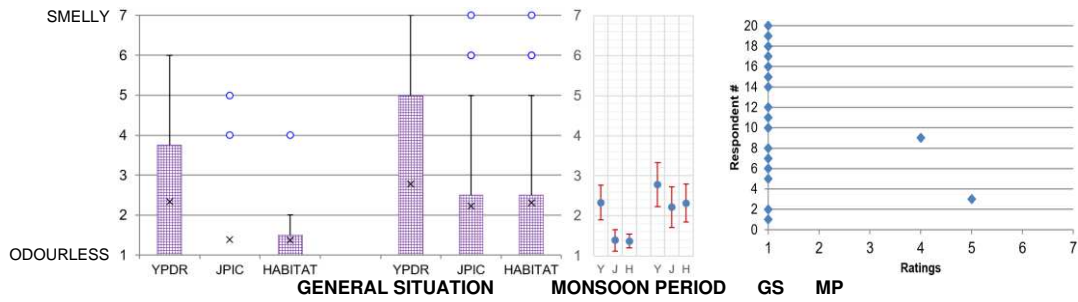


Figure 65: Question 36: Smell of Air (a) box plot; (b) relative range; (c) scatterplot of JPIC Temperature/Ventilation Overall

The size of the IQRs (Figure 66) remained relatively the same in the ‘Monsoon Periods’ overall. The change in the satisfaction of the shelter residents between the situations is discernible with the change of the skew of the IQRs. For example, the lowering of the high satisfaction rates to ‘average’ in the ‘Monsoon Period’.

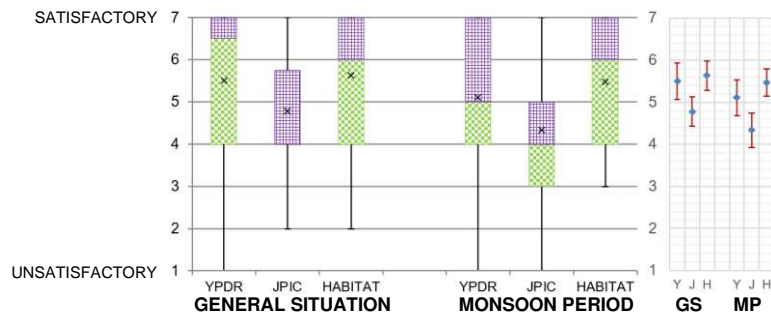


Figure 66: Question 37: Temperature/Ventilation: Overall (a) box plot; (b) relative range Many find their places to be “comfortably cold” and “uncomfortably hot” in the ‘Monsoon Periods’. There are also those who find Volume 2 in YPDR (mostly sleeping area) to be ‘uncomfortably cold’ while some Habitat residents experienced ‘hot nights’. Most YPDR residents think that the structure is well ventilated. So much so that there are those who already had to place floormats in Volume 2 to “protect their backs from the wind while sleeping”. This contrasts with JPIC and Habitat residents where they feel their places are not ventilated well.

**NOISE**

Results on the noise transmission between the rooms/volumes (Figure 67), have their medians in the lower half with a relatively similar overall spread. They also are positively skewed towards the “too little” rating. YPDR’s longer right tail meant a higher probability of extreme outcomes despite the wider dispersion of the IQR of Habitat.

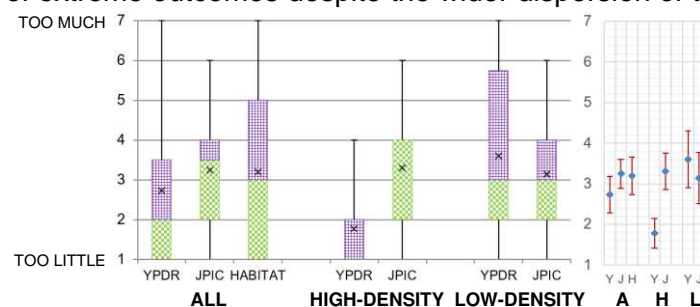


Figure 67: Question 39: Noise in between rooms (a) box plot; (b) relative range

The noise infiltration from the respondents' neighbors (Figure 68) with the denser upper quartile in the upper half of the scale for JPIC and Habitat meant that the data is negatively skewed in favor of the "too much" rating.

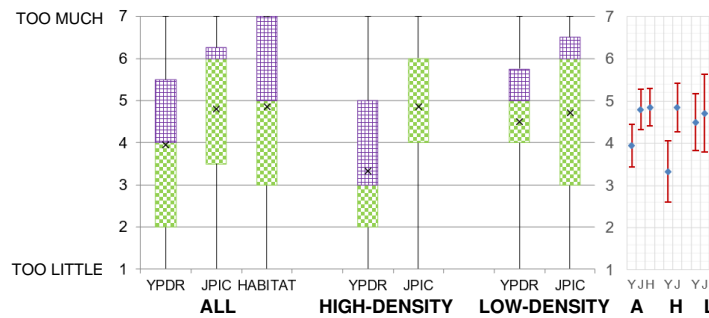


Figure 68: Question 40: Noise from neighbors (a) box plot; (b) relative range

When the responses (Figure 69) are compared against those coming from either high/low density communities, both shelters have responses in the upper half that skews negatively except for YPDR's low-density community. The most prominent difference is the IQRs location for the high-density versus the low-density subgroup and vice versa for JPIC. Nonetheless, the low-density subgroups have shorter IQRs than high-density. But the similarity of the distributions is consistent between JPIC and Habitat irrespective of density. YPDR's similarity is only with the low-density subgroup. As for the comments, the respondents see the noises by their neighbors as the most common source of unwanted sound. Shelter residents also think that the materials, e.g., 'amakan', do not inhibit noises from permeating into their interior spaces. Apart from this, Habitat residents also observed the materials amplifies the noise further when it already enters their houses.

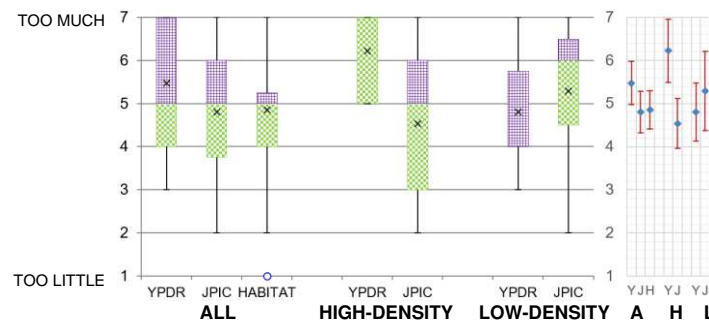


Figure 69: Question 41: Noise: overall (a) box plot; (b) relative range

*Illumination*

Responses (Figure 70) show a positive skew for YPDR and the reverse for JPIC towards the "too dark" rating. The distribution of the data sets from the cases are also relatively similar.



Figure 70: Question 43: Natural Illumination (a) box plot; (b) relative range

The lack of similarity of the groups (Figure 71) is due to the dense distribution of JPIC's overall data over the other groups. Regardless of the differences, most responses are in the middle range of the scale that skews negatively towards the “too bright” rating.

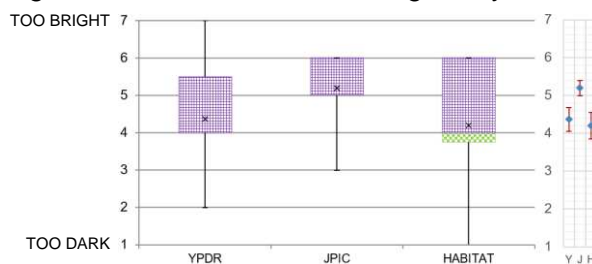


Figure 71: Question 44: Artificial Illumination (a) box plot; (b) relative range

Although most of the data (Figure 72) are in the upper half, the IQR of JPIC & Habitat have a more balanced upper and lower quartile than YPDR. Furthermore, some residents from Habitat thinks that increasing the wattage of the luminaire will improve the illumination levels which contrasts with the perception of the shelter residents.

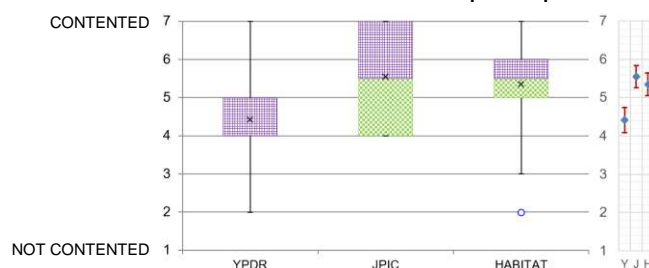


Figure 72: Question 45: Overall Illumination (a) box plot; (b) relative range

Aside from being fine with the artificial illumination levels, they are also in the opinion that their places are naturally illuminated well. Turning off the light in the private spaces (Volume 2) in YPDR for privacy also offers an interesting point of view for those with an ‘*amakan*’ wall.

### Personal Control

The sense to control cooling (Figure 73) is varied especially between YPDR and Habitat against JPIC. In fact, 85% of JPIC residents compared to only 63% (YPDR) and 70% (Habitat) gave a positive response. These along with the negative skew of their data sets.

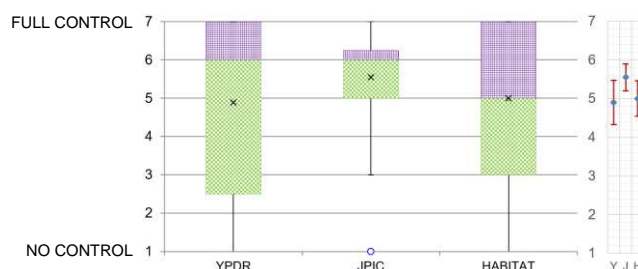


Figure 73: Question 52: Control for cooling (a) box plot; (b) relative range

The three data sets are positively skewed away from the “full control” rating (Figure 74). Their location, despite the width of the IQRs, together with a very short right tail, presents that more than half of the respondents rated between 1 and 3 (59% YPDR,

75% JPIC and 65% Habitat). This means that they do not see the need to control air ventilation as a priority.

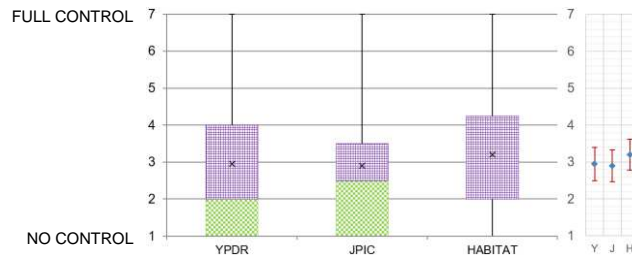


Figure 74: Question 53: Control for ventilation (a) box plot; (b) relative range

Majority of the responses particularly those from JPIC and Habitat are positive on the need to control illumination (Figure 75). The negatively skewed and very dense distribution of their data despite the long tail of the data in YPDR proves the case.

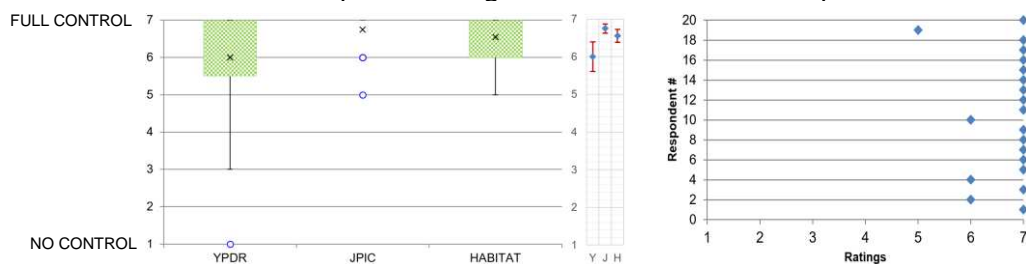


Figure 75: Question 54: Control for lighting (a) box plot; (b) relative range; (c) scatterplot for JPIC

The congruence of the responses of the shelter residents (Figure 76) in a positive skew towards the “no control” (1) rating contrasts the relatively above average rating of Habitat residents and the negative skew of its data.

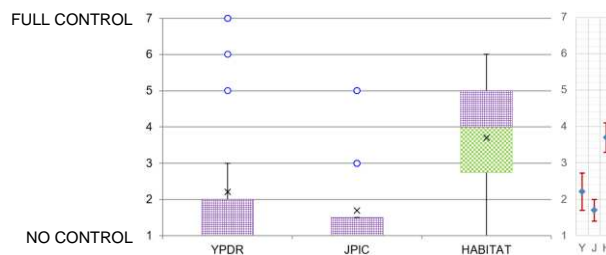


Figure 76: Question 55: Control for noise (a) box plot; (b) relative range

The relationship of the means of the responses with the number of respondents who prefers a personal control of a utility (Figure 77) cements the ratings in the previous criteria. Ranking the preferences from highest to lowest resulted in (1) lighting, (2) cooling, (3) ventilation, and (4) noise. The final two are tied by YPDR and Habitat.

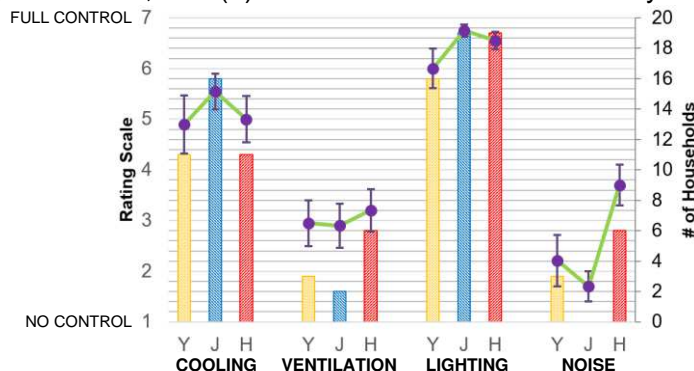


Figure 77: Mean of the responses (Questions 52-55) & the number of votes on personal control (Question 51)

This meant that the responses may vary but the preference are however the same, especially between Habitat and YPDR.

The responses also demonstrated that although ceiling fans are understood by the public to cool spaces (Habitat), it is likewise used as the children are accustomed to having them (YPDR) while also serving as an alternative mosquito repellent.

Artificial illumination is seen by YPDR residents for its functionality particularly for their children. However, for those in Habitat, aside from its utilitarian uses, it also has its psychological function of putting the residents at ease.

#### Overall Comfort

On the perceived overall comfort (Figure 78), nearly all ratings are in the upper half towards the “contented” rating. The shelters have similar overall spread of their data and the apparent profile of the upper and lower quartiles.

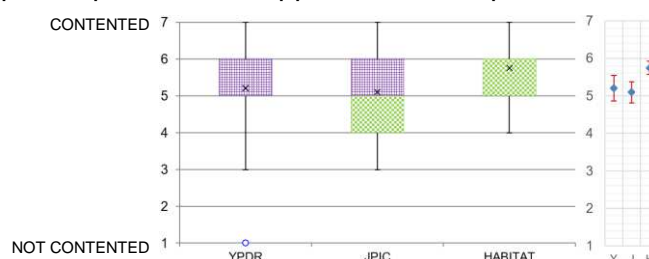


Figure 78: Question 47: Overall Comfort (a) box plot; (b) relative range

Comments by the shelter residents are largely on the well-being brought by the structure (YPDR) e.g., the workmanship, and the quality of the material or their security of tenure (JPIC). Alternatively, those by the Habitat residents are on comfort driven by the situation e.g., the high cost of living is higher than in the islets, air is fresher in the previous residence, and security during typhoons.

#### WAY OF LIVING

Figure 79 presented that majority of the residents from Habitat believes of a change while a significant number of shelter residents feels otherwise.

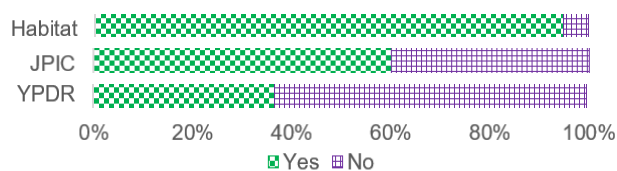


Figure 79: Question 57: Perceived change in lifestyle

The changes in shelter residents' work or source of income are on the possibility of “backward” farming, poultry raising, and better job opportunities. Meanwhile Habitat residents also cited the higher cost of living in their current place. This is also seen in their lamentations to the remoteness of the source for fresh sea foods unlike before. For the shelter residents, many said that they can now afford better food, e.g., from milled corn to rice and from soy sauce or oil to meat or hotdogs.

Changes on leisure were on their capacity and higher motivation to buy household items. This contrasts with the Habitat residents which revolves around community activities e.g., community meetings or the lack of “barrio fiesta” or community festival. The shelter residents also commented that they “can now focus on other needs such as food” and are “more motivated now than before.”

UTILITY SITUATION

In Figure 80, almost all respondents managed to be connected to the electric grid but very few connected to the water grid especially from the shelter residents. Assessing the current and previous status, one can infer that residents prioritize electricity partially because of the presence of the wells which do not cost them much.

The study however did not explicitly differentiate the connection: direct to the grid or tapping to the neighbor’s line.

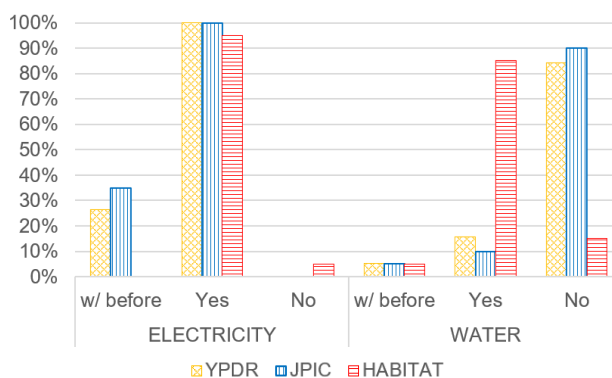


Figure 80: Questions 63-66: Households with electricity & waterline

Majority of the perceptions to electric cost (Figure 81) are in the upper half of the scale. But, aside from the positive skew of the IQR of YPDR, those from JPIC and Habitat have ratings in the middle and in the “too much” scales, respectively.

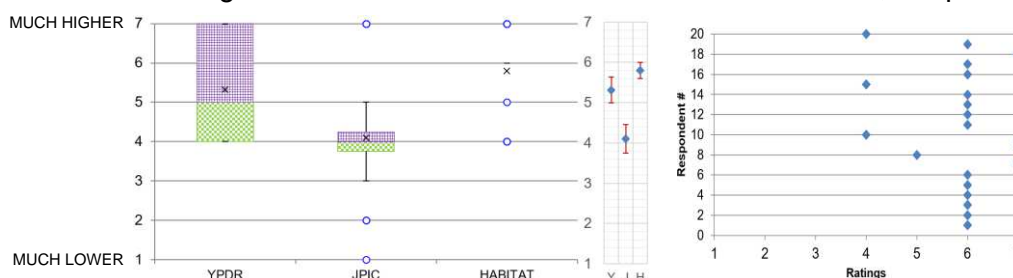


Figure 81: Question 67: Electric consumption (a) box plot; (b) relative range; (c) scatterplot of Habitat

However, shelter residents reduce cost by reducing the time the ceiling fans, the lights and the appliances are used while residents from Habitat have varying responses depending on what ‘item’. For example, for cooling, they just open the fenestrations first to allow air to circulate and ‘turning the fans off when the children are already asleep’. For illumination, they have a solar powered light but is only used for power outages. Residents also think that though a gas lamp, is cheaper, it is not as safe as the electric-powered light.



The distribution of the data (Figure 82) of the shelters are relatively similar than Habitat. The similarities are seen in the data being in the middle of the scale with a very dense IQR but very high kurtosis.

When asked, most respondents especially those from JPIC said that they prefer bottled purified water than drinking from the tap or the well. However, several shelter residents in general are fine with using the water from the well or the tap for cooking. Moreover, a higher number of respondents claimed that they use the well for all their needs and that they also practice storing water just for the sake of it. Comparing this to the residents of Habitat were storing water is due to a frequent water interruption.

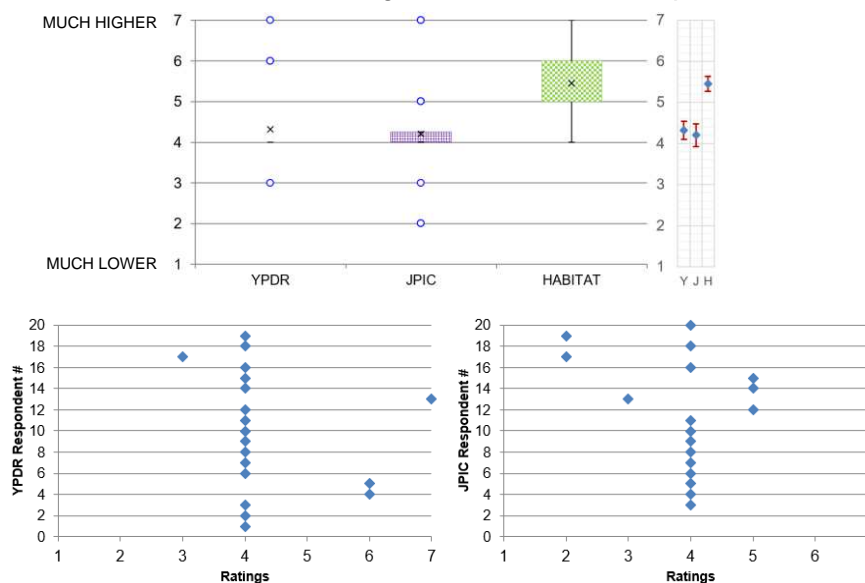


Figure 82: Question 68: Water consumption (a) box plot; (b) relative range; (c) scatterplot of YPDR; (d) scatterplot of JPIC

### 3.1.4 Critical Literature Review

The researches from which the assessment results and learnings are compared and reviewed against (Table 10) the „Transformability as a factor of sustainability in post-earthquake houses in Iran: the case study of Lar city“ by Parva & Rahimian (2014), Need for Adaptation. Transformation of Temporary Houses by Wagemann (2017), Diversity and Adaptation of Shelters in Transitional Settlements for IDPs in Afghanistan by Ashmore, et.al., (2003), „‘Transition to What?’ Evaluating the transitional shelter process in Leogane, Haiti“ by Doninger (2013), and the „Learning from Residents’ Adjustments in Self-built and Donated Post Disaster Housing after [the] Java Earthquake [in] 2006 by Marcillia & Ohno (2012).

The researches were conducted on a variety of methodologies with the aim of documenting and identifying the extent, and the how the residents managed to conduct renovations to their shelters.

Table 10: General information of reviewed researches

Authors	(Parva & Rahimian, 2014)	(Wagemann, 2017)	(Ashmore, et al., 2003)	(Doninger, 2013)	(Marcillia & Ohno, 2012)
Research Area	Lar City, Iran	Chile and Peru	Herat, Afghanistan	Leogani, Haiti	Java, Indonesia
Objective	Investigation of the modification process of the houses specially the architectural features and the motivations behind them.	Illustrate the modifications of the shelters with or without external support.	Assess renovations and adaptations done by the IDPs to improve the provided shelters.	Illuminate the effectiveness of the transitional process or how and why it is not. Also assessed are the extent to which NGOs are facilitating the process.	Understand the importance of cultural background and how different post-disaster housing designs affect resident's lifestyles
Community studied	Longitudinal survey (full lifecycle of 1 generation)	Multiple cases studies from two countries	Five IDP transitional settlements of five tent manufacturers	Shelters from three different NGOs	self-built and donated post disaster housing
Method	Interviews	semi-structured interviews with residents	Unstructured & semi-structured interviews	interview with beneficiaries	self-built houses - 2 surveys in the span of 2 years
	Systematic observations	surveys of the houses (dimensions and materials)	Comparative analysis of shelters and tent manufacturers	visual observation	'dome house' - interview & documentation
	Content analysis	observation of the houses (on-site drawings and photographs)		interviews with NGO staff	field observations
	Archival document review	archival document review			
Primary Result	the design for the houses should address transformability of structures into pre-earthquake patterns & lifestyles while also adaptable to the new parts. Finally, be capable to reflect different requirement for indoor spatial circulations.	the comparison showed three stages in the process of adaptation: (1) day 1, (2) Year 2, (3) Year 5.  Guidance must be given on how to suitably alter the shelters to ensure safety and properly incorporate the temporary solutions into the permanent structure.	specifications of the tents from agencies varied greatly.  Afghan internally displaced persons (IDPs) improved their shelters mostly by building inside and around the existing tents given to them.	The reality is many t-shelters have not transitioned. and NGOs have done little if anything to facilitate the process. Except for a few who managed to transition by upgrades or rebuilding, many have been limited by lack of finances and have not done so safely.	residents adjust their physical behavioral aspects to maintain previous lifestyles, but evaluations indicate dissatisfaction with the unchangeable donated housing design.

## 4 DISCUSSION

### 4.1 Level 1 Assessment: Shelter vs. House

#### 4.1.1 Space Syntax

##### INTEGRATION

On YPDR (Figure 18), the low level of integration of ‚defecating‘ and ‚bathing‘ could be inferred from the distant location of the toilet from the entrance to the structure. This is in cases where the shelter has any toilet at all. As based on interviews, in its absence, residents had to resort to going to the grasslands at the back of the house. Meanwhile, on ‚bathing‘, although some had this ‚feature‘ however those who don't just bathe beside the well on their way to fetch water for the family.

The higher integration and lower depth of sleeping areas in the JPIC (Figure 19) sponsored shelters meant that some sleeping areas are readily accessible by the non-inhabitants of the residence. This explains the lack of a ‚proper‘ distinction between the private and public spaces of the core of the shelter.

##### DEPTH

Assessing the functions in the shelters shows that in most instances, the deepest activity in YPDR (Figure 22) is ‚sleeping‘ while in JPIC (Figure 23), it is either ‚sleeping‘ or the ‚storing of clothes‘. A case which is similar with those in the permanent houses. This meant that in the transitional shelters, in going to the private spaces, the residents will first have to pass through the clothes storage before reaching the sleeping areas. On the otherhand, the case is reverse in the permanent house (Figure 24): sleeping areas then clothes storage.

##### INTEGRATION VS. DEPTH

The higher integration and lower depth of the ‚sleeping‘ activity in the transitional shelters (Figure 26) especially meant that some sleeping areas are readily accessible by the non-inhabitants of the residence. This further strengthens the argument earlier of the lack of ‚proper‘ distinction between the private and public spaces of the shelter.

##### SPACE-LINK RATIO

The box plot in the space-link ratio (Figure 27) meant that the two structures (YPDR and Habitat) have a higher degree of flexibility and functional efficiency than JPIC. On the other hand, the high degree of dispersion of the data in JPIC could be attributed

to the higher variation in the way the shelters in JPIC are used compared to those in YPDR and Habitat.

#### OTHER USE OF SPACE

For the YPDR sponsored shelter, although the space underneath, Volume 3, was originally intended as an additional space to be used by the residents, only 6 of the recipients or 32% of the total YPDR respondents have in fact used the space.

Finally, of the two transitional shelters, 84% of YPDR respondents and 100% from JPIC have activities/functions done outside of the original volume. Of these figures, only 12.5% or 2 users from YPDR and 5% or 1 from JPIC conducted their activities without putting up extensions such as roofs. However, 58% from YPDR and 68% from JPIC users have made extensions that is physically connected to the original volume.

### 4.1.2 User-initiated Renovations

#### CURRENT RENOVATIONS

Current renovations done by the residents are mainly on the determination of the boundary of the household. In the permanent houses, the boundaries are defined already, so majority of the changes are on ensuring the security of the household. However, for the shelter residents where boundaries are not properly distinguished, the perceived perimeter are mostly defined by the materials or existing plants.

Meanwhile, the use of nails in connecting structural elements in the extension spaces for all the groups despite the introduction of better fastening methods endorsed by ShelterCluster.org was unexpected to see. This is especially true to extensions done in YPDR where residents have a first hand experience on the effectivity of the brackets especially during typhoons. Furthermore, these extensions have slope of the roofs that starts at the end of the roof of the original volume particularly in the transitional shelters. This meant a lower head room in the extension spaces were as shown in the renovations, are treated at times as a private space.

YPDR shelters recorded more cases of residents removing a part of the wall for a better ,connection' of the extension space with the original volume. This is compared to JPIC residents where they just kept the walls of the original volume.

With regard to services, the inclusions in Habitat for Humanity houses with some wiring and plumbing systems helped in keeping these utilities ,tidy'. However, as evidenced by the low ,fastening' of electrical wires in Habitat houses compared to those in the transitional shelters, the ,habit' of doing this was probably not followed

because the walls are made of concrete and most attachments done by the residents in Habitat are to the wooden parts e.g., dividers.

One of the most prominent ‚stuff‘ is the residents behaviour of leaving their slippers outside of the porch or Volume 1. However, with the shoe storage located quite deep in the space, at times, the resident must pass through at least the ‚transition space‘ in volume 1 to get to the storage.

## FUTURE RENOVATIONS

True to the idea of ‚Site‘ and ‚Structure‘ defined by Brand, most big changes to the shelters related to these categories are mentioned in the ‚future renovations‘ part. For example, YPDR residents‘ plans of leveling Volume 2 with Volume 1 could perhaps be a reflection of being fed up with ‚too much‘ ventilation coupled with the constant need to change the flooring material. Another is for those in Habitat, the residents‘ plan of placing another septic tank for the dishwashing water refuse should have been no longer necessary if the drainage system was provided before or is already present. A fact which also concerns the laundry activities of the residents: „where to throw?“.

Finally, the renovations showed the different priorities of the respondents. Those in the shelters are renovating to protect themselves from the elements while those in the permanent houses are doing it to improve the level of comfort.

### 4.1.3 Survey on user perception

With a limited sample size, notions generated by assessing the data obtained from them will have to be treated cautiously. Nonetheless, generalizations made can provide a window to the previously unknown situations of the victims of Haiyan albeit constrained.

## THE NEIGHBORHOOD

On the space within the neighborhood, the lower median and the more dispersed responses of the residents in the houses (Figure 48) may be inferred as due to the limitations imposed to the residents. The restrictions, as commented, may be through the expansion guidelines or through the spaces allotted to them which places a cap to the activities they can perform outside of their houses. Although the size of the permanent house is bigger (30sqm) compared to the shelters (14sqm for JPIC and 21sqm for YPDR), the distance between their neighbors are generally perceived as closer.

This must however be taken cautiously as the elimination of the ratings of those who are in a sparsely populated community, greatly reduced the sample size thereby increasing the margin of error further.

Meanwhile, the result of the assessment on the shelter's location showed a parallelism of the ratings of the YPDR and the Habitat residents. An interpretation backed by the relative similarity of the positive take on factors pertaining to proximity, either to relatives or to an amenity such as a tree for shade.

## THE SHELTER/HOUSE

The degree by which users are contented with the layout in their spaces may be influenced by the fact that in the permanent houses, the recipients entered into an agreement on the limitations of the renovations they can do. This contrasts with those in the transitional shelter where they are told that they can make renovations to the house however they want as long as they do not sell it or have it rented. And with this, the latter made "improvements" to their shelters with more freedom than the former. Furthermore, the lack of monitoring in the transitional shelters by either the donor or fellow recipients, as they are mostly spread out, may have also contributed to their responses and their renovation behavior.

Another important point about layout is the need to follow 'proper' orientation as dictated by superstition. In this case, this idea is appreciated and noticed in the permanent houses, but they are not as important as following the regulations set forth by the donors. It is therefore safe to assume that in cases where the recipients have very limited options and the regulations are properly implemented and checked, function and regulation will trump superstition.

On a slightly different perspective, in some cases like the canted walls of the YPDR shelter, the non-application of the intention of the canted wall as a storage space to free the floor area may stem from the lack of guidance or information of this possibility to the recipients when the shelter was handed over. However, for situations where recipients are informed of this possibility but still opted for the standard cabinet forms, it may be best for the designers to reassess their intents and analyze how the residents used the cabinets e.g., barriers to define territory of a specific function. Further, as seen in the distribution of data, no matter the inclusion of a storage space, albeit in the design, almost all of the residents in all cases are still not very much contented with the space to store their items and/or valuables.

Regarding appearance, the perception of 'what makes a house beautiful,' varied tremendously. For one, most of the comments by YPDR residents are on how 'good' can a material deter rain/glare penetration or the material's inherent lower need for

repair and rehabilitation. On the other hand, remarks by JPIC residents were primarily on the size of the shelter and the things that they lack e.g., a toilet. Finally, those from Habitat are more concerned with ornamentations that they can do to their house as well as the divisions that they must make. In all of these, one thing is clear, a concrete house is surely beautiful as it requires less rehabilitation and maintenance apart from the perceived safety the material brings.

A fact which is very much the case when the respondents were asked about how safe they felt in their current place during a typhoon. Apart from this, responses by the respondents showed that the shelters can generally sustain a Category 2 typhoon with manageable damages. Although most shelter respondents trusted the structural integrity of their structures, the performance of the materials to deter rain and wind from being driven to the inside of the shelter is a different matter. In those cases, many opted to stay in a specific part of the shelter e.g., in YPDR, in the Volume 1 because according to them, Volume 2 shakes. This meant that though the shaking/creaking of the shelter is the system's way for resisting the typhoon without breaking, the lack of technical understanding by the lay can instead stroke fear than assure them. Furthermore, the perception of safety by the residents could also be reinforced by explaining to the occupants what makes their shelter more storm resistant and the "special" mechanisms added to it e.g., straps and bracings over just nails.

The completely different perception of the respondents towards the overall design of the shelter against those in the permanent houses and the kinds of 'problems' that they are raising, cements the notion that the shelter residents are still in the "rebuilding stage" while the permanent house residents are already in the "moving forward phase". In other words, while the residents of the transitional shelters are focused on "security" by improving the periphery of their shelters, those in the permanent houses are already focused on the improvement of their comfort and the aesthetics of their houses.

#### OVERALL HEALTH

Apart from the environment the most important factor discussed by residents towards health is on food source. The positive response of JPIC towards being able to grow fresh foods is contrasted by the more negative responses from Habitat residents. Their point of view is always assessed against the very accessible fresh sea foods in their previous place than the current location as well as the limited space to grow their vegetables. A story shared by a respondent that if they want, they can just go down their house and glean for shellfish presents the degree of accessibility they meant.

This is in comparison to the current place where the most accessible foods are processed and canned goods.

#### TEMPERATURE

The similarity of the ratings of JPIC and Habitat residents against those of YPDR, though supported by the responses in the interviews, presents a behavior common to all. This is in particular on the use of the ceiling fans and/or staying underneath the shade of a nearby tree. However, the addition of a ceiling regardless of the material e.g., plywood, tarpaulin or sleeping mat, which is reported only by the residents of JPIC and Habitat shows their understanding of heat radiated by the corrugated galvanized iron sheets used in their roofs.

#### VENTILATION

Shelter designs that were particularly conceptualized with passive ventilation in mind such as YPDR, achieved the utilitarian aspect of the concept but failed in the functional characteristic as it is evidently perceived by some as a problem that needs remediation through the placing of floor mats. Meanwhile, the quality of air is generally seen by the residents as relatively “neutral/average” in all criteria but is somehow taken more positively in the ‘General Situations’. But in the ‘Monsoon Periods’, the responses are quite erratic with most ratings decreasing into a more unfavorable condition. A result which may have been due to the fusing in of the rainy season and the dry season under the Monsoon Periods causing the high dispersion of both the IQR and the overall data distribution.

#### NOISE

The construction methodologies in the country usually include limited protection from noise infiltration and the previous houses of the shelter recipients were assumed to have none at all. This situation may have influenced their higher tolerance against noise. However, when comparing noises from outside and between rooms, most rated the noises from outside as noisier those generated from between the rooms. This may be due to some biases of the “sounds” they produced against those by their neighbors, or “noise annoyance” which was defined by Anderson as one’s point of view or “bias” towards a certain noise (Anderson, 1971).

Comparing the responses of those living in a high-density community against the low-density community dwellers showed the similarity when the ratings of both communities are aggregated. This meant that the perception of noise is not dependent on the density of their communities.

#### ILLUMINATION



The parallelism of the responses of both of the shelters on natural illumination regardless of the manner of expansion (transverse – YPDR; circumscribed – JPIC) meant that this do not affect and reduce the way the respondents perceived the level of the natural illumination of the spaces. But the more favorable ratings by the YPDR residents to natural illumination than JPIC may be attributed to the way the expansions are laid.

Meanwhile, the similar ratings of YPDR and Habitat residents to artificial illumination may be due to the area the luminaires are supposed to illuminate compared to those in JPIC. This together with the general proclivity of the residents to only place at least one artificial light per volume or division.

#### PERSONAL CONTROL

The high perceived need for control on cooling is seen as a reaction to the “hot dry season” more than the “cold dry” or “rainy seasons” of the Monsoon Periods as evidenced by the comments of the residents. The lower need to control noise infiltration through the installation of building systems versus tolerating it or reprimanding the neighbors on the other hand, can reflect their preference to actions that will cost them less even if it entails some discomfort.

#### COMFORT

The parallelism of the ratings and the topics of the comments by the shelter residents cements the strong connection of their perception towards comfort despite the difference in building form and size. From these, it can be unequivocally said that the factors that influence comfort to shelter residents vary greatly to those defined by the residents of the permanent house. In short, shelter residents see comfort in conjunction with the structure itself, e.g., size, workmanship, and material. Meanwhile, permanent house residents perceive comfort through the situation that they are i.e., cost of living, the locality, and the safety from calamities especially typhoons.

#### UTILITY SITUATION

Assessing the distribution of the responses that is connected to the electric and water grid versus their previous situations, presents a pattern where residents, especially those in the shelters, are prioritizing electricity over water lines. This is also seen on the degree by which respondents place to personal control on artificial illumination both for its functional and psychological use. Moreover, the prevalent presence of wells around the islands could have also played a role on their preferences.

The higher electric bills by Habitat residents compared to those in the shelters could be from the frequent use of the ceiling fans even if the indoor air quality does not call

for it. Also, reserving the use of the solar powered lights only for power outages and favoring instead the use of the electric grid decreased the possibility of reducing their energy consumption.

Finally, the expenses related to water consumption by the shelter residents that is relatively similar as before against the 'very high' water bills of the permanent houses could be due to the higher percentage of houses in the latter that is already connected to the water grid. The connection to the water grid in turn makes it more accessible thereby also increases the frequency and quantity of use. As Fan, et.al. (2013) pointed out, "households with intermittent water supply or public tap access consumed less water than did those with continuous water supply" (Fan, et al., 2013, p. 7).

## 4.2 Level 2 Assessment: Shelter/House vs. Other types

### 4.2.1 Critical Literature Review

The assessments presented are the results of the aforementioned literatures grouped under and assessed against the common themes produced from the assessments in Chapter 4.1.

#### *Communal vs. individual*

The creation of settlements from transitional shelters meant the creation of not only communities but also the provision of systems and problematizing about layout patterns that does not usually occur in individual shelters. With its pros and cons however, particular care must be given to ensure that social and community structures are not ignored. As is the case in the city of Lar were many are "laid out on a rectangular grid, ignoring topography and social and community structures." (Ashmore, et al., 2003, p. 284)

#### *Materials & construction*

The type of material for use in a particular shelter is a key consideration especially in situations where the 'speed' of project handover is understandably of paramount importance. However, overlooking essential aspects to the communities may be tolerated in the short term but in the long run may be the primary reason of the residents' distaste. A similar situation detailed by Parva & Rahimian (2014), "although this rapid construction assisted people by providing them with some immediate shelters, the low attention to previous qualities of the pre-earthquake houses was the most important reason that people mostly did not like the post-earthquake houses."

After a disaster, one usually sees a plethora of organizations, both government and non-government alike, with the same goal: helping the victims. But in the absence of a strong, central figure to coordinate their efforts, there will really be an “uneven and unsatisfactory use of resources” (Ashmore, et al., 2003, p. 283). Similar to the experience in Iran, “while some agencies were constructing earthquake - resistant houses, other were providing only tents” (Ashmore, et al., 2003, p. 283). Although there were organizations that stepped up during the 2013 typhoon such as the ShelterCluster.org, many organizations are not included in their roster, e.g., JPIC. In other words, the varying degree of activities by the uncoordinated organizations (Ashmore, et al., 2003) equates to ‘chaos’ in every sense of the word.

In the end, donors will just go around implementing “stop-gap” projects even if the situations no longer call for them. For those more “organized” groups, “it seems likely that if donor funding had fewer stipulations, NGOs would be able to implement more diverse programs based on need” (Doninger, 2013, p. 46). This is also true to shelter designs and something the sheltering process can employ.

In the research of Parva & Rahimian (2014) for the post-earthquake houses, “the study recommends that the design of post-disaster accommodation should address: transformability (to suit local patterns and lifestyles), adaptability (the addition of new parts), and capability to reflect different requirements (indoor circulation)” (Parva & Rahimian, 2014, p. 431). Although its applicability to the Philippines need to be verified, it is important to keep in mind that “shelter responses should be need driven, not donor driven” (Doninger, 2013, p. 46). And the fact that in the rebuilding process, professionals and people “trained” in the field are spread out too thin that construction practices must either be easily replicable or if a new system is introduced, is properly explained to both the recipients and the laborers.

Properly explaining scenarios and purposes of certain activities both in the construction of the shelter and the transitional sheltering process can not only save both groups time and money but also ensure that intended outcomes are achieved. For example, the “discrepancies of the NGOs account of their shelter program activities and the beneficiaries ... has appeared to have stifled t-shelter transitioning” (Doninger, 2013, p. 44) in Haiti. Although in those instances, the decades old history of the NGOs in the country played a role, but, even if people are capable of doing things, if the organizations promised them something, the tendency is most will wait for the NGOs to do it for them or if they do them, they are haphazardly done (Doninger, 2013). Probably a similar state of mind in Bantayan when some respondents said that the organization promised a toilet just like their neighbors.

For Haiti, the deep-rooted history of NGOs in the country in the end has resulted in an unprecedented amount of dependency on outside assistance. Regardless of people's abilities to make changes to their t-shelter, most will not make them if they are expecting NGOs to do it (Doninger, 2013). A mindset that is presumed to be starting in Bantayan as experienced during the fieldwork when neighbors of the shelter of interest gather around to check if the interview will yield the handing out of a shelter or house.

### *Renovation & current use*

#### **Renovation**

The way the houses are formed, the plot of lot they are given and the elements and materials used to make the structures all influences the way the renovations are done and the need for them (Wagemann, 2017); (Parva & Rahimian, 2014). In some shelters in Peru and Chile, it was observed that the floor planks were reused by the residents as walls of the extensions or if the expansion is done vertically, as floors of the upper level (Wagemann, 2017).

In some instances, the expansions or improvements revolve on the cultural need. A case in point are the shelters in Indonesia where residents are documented to place high regard to communal life (Marcillia & Ohno, 2012). In these instances, perhaps the culture of hosting social gatherings at home creates the need to house a large number of people, thus the expansion; properly separating the public and private spaces, therefore the division; and embellishing the public spaces with knick-knacks - hence the need to decorate or paint. A notion which is very much manifested in the transitional shelters and the permanent houses in Bantayan Island. There, the common spaces, usually Volume 1, is filled with ornamentations such as medals and other achievements of the children, posters, painted walls etc. while Vol. 2 which is mostly used for private activities has a more subdued environment.

In other times, transformations are done in order to 'regain' and 'fit' the current place to their previous lifestyle (Parva & Rahimian, 2014). But sometimes, they are done "if beneficiaries believed it was critical enough (i.e., necessary to the security and habitability of the t-shelter) and if they are able to pull the resources together to make small changes or upgrades" (Doninger, 2013, p. 43). Renovations are also done to "improve environmental performance... [which are] indicative of the environmental conditions to which transitional populations will be exposed [to]" (Ashmore, et al., 2003, p. 284).

Looking at the way the renovations are done already presents how effective the design is and the things in it. For example, “the insertion of new doors ... [to] connect new rooms to the house ... underlined the inflexibility of the design (Wagemann, 2017, p. 839) in a shelter in Haiti. In Bantayan, covering the floor with floormat to limit ventilation is the same case.

### *Perceptions*

Wagemann (2017) reported that “the temporary houses... in Peru were ... recycled and reused because families viewed them as an investment, or an endowment, as well as an object awash with emotions and memories” (Wagemann, 2017, p. 841). Seeing the shelter as an endowment is a common feature in the responses of the respondents of both the shelter and permanent houses residents. It is usually said along the lines of “we are grateful especially since it was given” (*mapasalamaton mi, hinatag baya*). However, it was only in the permanent houses were responses related to “bequeathing the structure to the children” is heard.

### *Post hand-over activities*

After the structure is handed over to the recipients, many shelter respondents reported that they can do whatever they want with the shelters as long as they do not sell it or have it rented out. However, as Doninger (2013) would put it, “upgrading is not the only way to transition a t-shelter” (Doninger, 2013, p. 46). In fact, they are so vast that Mahmud (2007) categorized them under (1) slight adjustment, (2) addition & division, (3) total conversion, (4) reconstruction, and (5) rebuilt (Mahmud, 2007).

It is understandable that given the limited resources of the organizations, those shelters are the “best possible solution for the worst possible situation” (Doninger, 2013, p. 45). That something, is still better than nothing, and a leaky roof is still a roof over their head. But with a transition plan beyond the provision of a shelter would at least give the victims of Haiyan and all other disasters in the future, some form of a “road map” to recovery for which they can follow at their own pace.

## 5 CONCLUSION

### 5.1.1 Overview

The chapter, aside from dealing with the results and evaluations of the research also discusses the limitations encountered especially in the gathering of the data. It also presents the recommendations on research directions following this endeavour.

### 5.1.2 Limitations of the research

#### DATA GATHERING

Certain challenges were encountered in the conduction of the research particularly in the gathering of the pertinent data and information. For example, the Covid-19 pandemic has reduced the time possible to gather such information in the field. Consequently, this lowered the possibility of being able to document shelters that would make the conclusions statistically representative of the population. Another is the documentation by the organizations in those times were 'messy' thus locating the data for the study either takes time or they cannot find the data anymore. Moreover, some organizations have the files stored in their office and would not get the chance to retrieve them right away due to the imposed lockdowns. The unstable political climate in the area especially in the Municipality of Bantayan where some data are said to be 'lost' further exacerbates the challenges. According to the current mayor's staff, the documents had not been turned over by the previous administration. The data requested for the research was their record of organizations and the number of shelters built in their town, like the one retrieved in the Municipality of Sta. Fe.

Documenting the respondents shelters also has its challenges as some users only allowed the documentation of the public and semi-public spaces in their place and not the private spaces such as the bedrooms/sleeping areas. Therefore, the research had to rely on the respondents' description of those spaces.

#### EVALUATION

In assessing the morphology of the shelters using the principles of "space syntax", this study has made modifications in terms of how to conduct the evaluation. It foregoes the "standard" of using walls to furniture in defining the boundaries for the functions. Although the former allowed the measurement of distance between the functions, the situation in the shelter is deemed too different that it calls for the implementation of the latter. Another deviation from the "standard" is the consideration of the functions in the immediate vicinity of the shelter as they were deemed to reflect the limitations of the space in the shelters that expanding outward is the only way.

### 5.1.3 Conclusion

#### RESEARCH OBJECTIVES

##### *Communal vs. individual*

As evidenced by the waterline and the electric lines in the March Village of Habitat for Humanity, those that are built within a community makes it easier for companies to sponsor items to them at a lower cost but with a more “tangible” impact for both the recipients and the company’s “image”. However, living in these communities entails the creation of policies that is acceptable for all residents and should be properly implemented. As is the case in the March Village where noise is supposed to be regulated as agreed by the community but is not properly policed and followed by the residents. Thus, the ratings of the respondents. Although, the research also showed that those living in sparsely populated communities have higher expectations for their place to be quiet compared to those who are living in a densely populated community.

Another important consideration in grouping shelters in a community is the relegation of the site development e.g., drainage system, road concreting/asphalting, etc. as the least priority. Although tabling this activity is understandable at the start but prolonging the delivery of the proper facilities and utilities will rapidly cause the deterioration of the living conditions of the whole neighborhood. For instance, in the permanent houses, the ‘front’ may look neat, but the rear of the houses is already muddy because that is where residents usually did their laundry. Furthermore, layout patterns must also take into consideration social community structures and how the developers, which in these instances the donors, intend their inhabitants to socialize.

##### *Materials & construction*

Meanwhile, during the construction, the research showed that in the transitional shelters, its orientation is mostly directed by the owners and sometimes by the carpenters but not the donors or the designers. Similar to what happened in Iran where the absence of established post-earthquake housing policy caused the reconstruction and rehabilitation approaches to rely mainly on the local experiences of the skilled and unskilled laborers on the field (Parva & Rahimian, 2014). The absence of the so-called “experts” in the construction of these shelters can lead to certain problems such as carpenters leaving the work half-way done (YPDR Shelter #15) or residents changing the design according to their preference (JPIC Shelter #7). Considering these, it may be best if shelters are designed with some leeway or better yet, explain to the carpenters and the residents the importance of certain aspects of the designs and why it should not be changed out of whim.

Moreover, as the influence of orientation traceable to the superstition of facing east or the rising sun, adjustments in the designs to make way for these should be readily available. Otherwise, shelters, the same as how they are at present, will have its rear face the main road and in the end becomes its main façade.

#### *Renovation & current use*

On the renovation practices, the non-usage of the residents especially those living in YPDR shelters with the brackets to tie the structural systems of the extension spaces meant one of the two things. Either the residents did not understand its importance especially during typhoons or the mechanism itself is not readily available in the market.

Expansions are done not only due to the number of inhabitants but also for other reasons such as cultural and according to their core beliefs. All of which play an important role in 'moving on'. But without considering how the residents 'expands' may make the building's form as more of an obstacle than aids their growth. Case in point, most extensions have roofs that starts at the end of the lowest roof of the original structure. This meant that head rooms in the extensions have at most 2.40m or less in height on one side with a very low head room at the other end.

Looking at the way the spaces are ventilated, one can infer too much ventilation of the space will be seen by the residents as a nuisance than a blessing. This is especially true if wind is replaced by rain during the rainy season.

#### *Perceptions*

The perception of the residents towards their eating habits and the opposing views of those in JPIC against those in Habitat are primarily due to the latter being more used to eating fresh sea food products in their previous place. Although the respondents of the permanent houses are more accustomed to eating fresher foods, their children which many are already born in the current place, are seen to prefer the processed foods. The latter is more accessible in their current location and are sometimes even cheaper than the former. Therefore, long term activities that can be taught to the residents to improve their eating habits are practices such as hydroponics and/or aquaponics which can allow them to grow their foods even with a limited space.

The respondents' perception on "beauty", contrary to what is understood by designers and the "trained" professionals are very different from the residents for which those shelters were designed for. In their point of view and based on their experiences, beauty equates to safety and consequently safety equates to the type of material used in their shelters. Although, in some instances residents are seen to prefer



'appearance' over 'performance'. This is evidenced by the common occurrence of placing tarpaulins for rain protection inside the interior space particularly in the sleeping areas even if ideally, they can better repel the rain while preserving the integrity of the '*amakan*' walls far longer if it is placed outside.

On the perception of comfort, the differences between shelter residents against those from the permanent houses reflects the influence of the shelter to the way the residents perceive comfort. Meaning, people living in a transitional shelter treats the problems caused by the environment as a factor that can be remediated if they have a "proper" house.

#### *Post hand-over activities*

Although the provision of electricity is no longer included in the items donated by the organizations to the recipients, assuming longer use of the shelters, it must be considered that the residents will strive to be connected to the power grid. Therefore, an important training for the recipients could be on the information that it is not just the 'wattage' of the luminaire that influences illumination levels but also its location, number and height from which they are hung. Apart from this, other 'hand-over' instructions could include space layout training activities, educating the residents on the natural reaction of materials when subjected to stress e.g. wind – creaking/shaking, and the reaction of corrugated G.I. sheets to salt water especially since they are on an island.

From those studied, it can be unequivocally said that the transitional shelters in the Philippines, more often than not, did not meet its job of transitioning the victims of Typhoon Haiyan. The residents are forced to adapt and when this is no longer possible, they make the structures adopt. Currently however, the shelters' tolerance to adopt to the expansive needs of most of its residents are already way over its capacity. Thus, chaos ensues: the disordered layout, use of the space and renovation practices, in other words, 'a wishy-washy renovation on a whim'.

With these in mind, it may be best for future shelters, be it an emergency, transitional or even a permanent house, to have designs that already include concepts about how the residents 'make' and 'shape' the shelters several years after the disaster. All while considering that the need to expand is a reaction to a person's "core belief", which may vary depending on their previous experiences - Personal Construct Theory, of a discrepancy between what he/she observes in their shelters against what they perceived as an acceptable state of affairs (Stevenson, 2019).

Moreover, it is also imperative that part of the commitment is the inclusion of the "post hand-over activities" such as the training and the education of the residents on how

to properly manage their places. This will prevent maladaptive renovation practices and allow the structure to “grow” properly without limiting and sacrificing the integrity and quality of future renovations.

Finally, organizations and donors alike must already define the sheltering process they are following so they can help map out the transitioning process of their shelter’s residents. As of the moment, it appears that nobody was informed on what to do with the shelters when its residents managed to transfer to a more permanent place when those 11125 houses are done, whenever that may be.

#### RECOMMENDATIONS ON THE CONDUCTION OF THE RESEARCH

Based on the experiences in the gathering of data, going to the office of the organizations even if without an appointment, can yield more information than just waiting for responses from emails, at least in the Philippines. This is most especially tricky if the organization is no longer existing as queries can take a while or even unanswered.

Unannounced visits in the gathering of data may allow the researcher to document the “raw” situation of the shelters and how the residents really used the space. However, in some instances, occupants are reluctant for the researcher to enter and document some parts of the shelter, especially the bedrooms. According to them, it is still chaotic, and they are shy on letting a visitor in when the room is untidy.

Another hurdle is in surveying the perception of the users to temperature. It may be best to ask the residents’ opinions according to the specific seasons instead of lumping the seasons under ‘monsoon periods’ and ‘general situations’. For the case of the Philippines, the groupings could be (1) regular periods/general situations, (2) rainy season (3) dry season. This way, the concept is more tangible for the respondents especially if their level of understanding to these concepts are limited.

#### FURTHER RESEARCH

Although the research tried to make sense of the situations in those shelters in Bantayan Island, many aspects are still missing. For example, as the research is primarily based on the context of Bantayan Island, certain facets may not be applicable to other areas in the country. Therefore, the methodology used in this research along with the evaluation procedures used can be done to other areas. Similar to the concept of the Building Use Studies of the Usable Building Trust, if more research are done following the methodology used in this research to different areas, a benchmark may be developed which will benefit not only the organizations but most importantly the future occupants themselves.

On the otherhand, off-shoot researches can also be done particularly on tracing those who left or ceased to use the shelters given to them. Their reasons could give more insight as to the situation in the shelters. Another aspect which could be further studied is the documentation of spaces with multiple function (e.g., single space but is used as a dining and living area during the day and a sleeping area in the evening). Also, studying if the multiplicity of function is brought about by the limited space or if it was just a reapplication of a usual behaviour the family practiced even before the disaster happened will shed light on the changes of the behaviour.

With regard to building technology, research pertaining to the ‚*amakan*‘ wall and its effect towards rain, light, wind penetration as well as its effect to privacy, will not only be an offshot to this research but most importantly prove or disprove the claims in this study. Furthermore, the research and the shelters evaluated have used only one weaving pattern of the ‚*amakan*‘, of which in a typical vernacular ‚*payag*‘, there exists many variations of the pattern and the materials used.

## 6 INDEX

### 6.1 List of Figures

Figure 1: Occurrence of Natural Disasters in the Philippines, 1970-2016 (Jha, et al., 2018).....	9
Figure 2: Map showing some of the recent disasters in the Philippines (Vergano, 2013) .....	11
Figure 3: Composite map of the storm path & the Pacific Ring of Fire .....	12
Figure 4: Typhoon Haiyan Track (FAO, 2013).....	12
Figure 5: Composite diagram of the climate of Bantayan and the seasons of the Philippines .....	13
Figure 6: Aftermath of Haiyan in Sta. Fe, Bantayan Island. Photo by delos Reyes (Ranada, 2013).....	14
Figure 7: Images of the a) woven bamboo mat or ,amakan' and b) bamboo slats or ,lipak' .....	15
Figure 8: IOM's Transitional shelter (IOM, 2012) .....	17
Figure 9: Overlapping definitions and processes of shelter (IFRC, 2013) .....	17
Figure 10: Space Syntax diagram corresponding a given floor plan (Hillier & Hanson, 1984) .....	23
Figure 11: Outline Methodology & Theoretical Framework.....	26
Figure 12: YPDR Phase 3 model house with material specifications (Vicke, 2014) .....	34
Figure 13: "I-siguro daan" Transitional Shelter (Ravina, 2015).....	35
Figure 14: Floor Plan & Photo of JPIC Transitional Shelter.....	36
Figure 15: Location of the research samples .....	37
Figure 16: Number of residents/ occupants .....	38
Figure 17: Sequence of diagrams to produce a justified graph for YPDR shelter #18 .....	39
Figure 18: Degree of Integration of the Activities in YPDR.....	40
Figure 19: Degree of Integration of the Activities in JPIC .....	40
Figure 20: Degree of Integration of the Activities in HABITAT .....	41
Figure 21: Degree of Integration of the Activities in all cases .....	41
Figure 22: Depth of the Activities in YPDR .....	42
Figure 23: Depth of the Activities in JPIC.....	42
Figure 24: Depth of the Activities in HABITAT .....	43
Figure 25: Depth of the Activities for all cases.....	43
Figure 26: Integration vs. Depth.....	44
Figure 27: Space-Link Ratio.....	44
Figure 28: Division of activities per volume.....	44
Figure 29: Location of the most connected activity.....	45
Figure 30: Activities with most connection per Volume.....	45
Figure 31: Fencing Material .....	46
Figure 32: Structural connections of extended volumes .....	46
Figure 33: Materials used to at the extensions .....	46
Figure 34: Space divider materials.....	46
Figure 35: Materials used to screen spaces for privacy.....	47
Figure 36: Materials used in the windows.....	47
Figure 37: Materials used for the roofs of the extended volumes .....	47
Figure 38: Electrical wirings and plumbing.....	48
Figure 39: Functional designation of the volumes and extensions of the shelters/houses .....	48
Figure 40: Behaviour of leaving slippers outside the spaces.....	48

Figure 41: Ornamentations used by the respondents.....	49
Figure 42: Means of sleeping.....	49
Figure 43: Future changes to the ‚Skin‘ of the structure.....	50
Figure 44: Question 5: Perceived community density.....	50
Figure 45: Question 6: Tenancy perception and situation.....	51
Figure 46: Question 4: Occupancy plans.....	51
Figure 47: Question 7: Neighborhood Location.....	51
Figure 48: Question 9: Neighborhood Space.....	52
Figure 49: Question 11: Neighborhood Layout.....	52
Figure 50: Question 12: Shelter Location.....	52
Figure 51: Question 14: Shelter Space.....	53
Figure 52: Question 16: Shelter Layout.....	53
Figure 53: Question 18: Shelter Storage.....	54
Figure 54: Question 20: Shelter Appearance.....	54
Figure 55: Question 22: Shelter Safety.....	55
Figure 56: Question 24: Overall design.....	55
Figure 57: Question 26: Things that worked well.....	56
Figure 58: Question 49: Overall Health.....	56
Figure 59: Question 30: Comfortable temperature.....	57
Figure 60: Question 31: Temperature.....	57
Figure 61: Question 32: Ventilation stability.....	57
Figure 62: Question 33: Air stillness/draftiness.....	58
Figure 63: Question 34: Air humidity.....	58
Figure 64: Question 35: Air freshness/stuffiness.....	58
Figure 65: Question 36: Smell of Air.....	59
Figure 66: Question 37: Temperature/Ventilation: Overall.....	59
Figure 67: Question 39: Noise in between rooms.....	59
Figure 68: Question 40: Noise from neighbors.....	60
Figure 69: Question 41: Noise: overall.....	60
Figure 70: Question 43: Natural Illumination.....	60
Figure 71: Question 44: Artificial Illumination.....	61
Figure 72: Question 45: Overall Illumination.....	61
Figure 73: Question 52: Control for cooling.....	61
Figure 74: Question 53: Control for ventilation.....	62
Figure 75: Question 54: Control for lighting.....	62
Figure 76: Question 55: Control for noise.....	62
Figure 77: Mean of the responses (Questions 52-55) &.....	62
Figure 78: Question 47: Overall Comfort.....	63
Figure 79: Question 57: Perceived change in lifestyle.....	63
Figure 80: Questions 63-66: Households with electricity & waterline.....	64
Figure 81: Question 67: Electric consumption.....	64
Figure 82: Question 68: Water consumption.....	65

## 6.2 List of Tables

<i>Table 1: The layered structure of the building with the life cycle, the so-called "6S" (Brand, 1994).....</i>	<i>21</i>
<i>Table 2: Comparison between the approach/ beliefs of the suppliers and occupants (Brand, 1994).....</i>	<i>22</i>
<i>Table 3: Conceptual explanation of the terminologies in syntactical analysis (Asif, et al., 2018).....</i>	<i>23</i>
<i>Table 4: Interview questions under the background category.....</i>	<i>29</i>
<i>Table 5: Interview questions on the user perception on the performance of the shelter (category 2).....</i>	<i>29</i>
<i>Table 6: Interview questions on the performance of the shelter (category 3).....</i>	<i>30</i>
<i>Table 7: Interview questions on the changes in the way of living (category 4).....</i>	<i>32</i>
<i>Table 8: Research sample size &amp; margin of error.....</i>	<i>37</i>
<i>Table 9: Composition of Research Sample.....</i>	<i>38</i>
<i>Table 10: General information of reviewed researches.....</i>	<i>66</i>
<i>Table 11: Combined responses of respondents in relation to their neighborhood.....</i>	<i>98</i>
<i>Table 12: Combined responses of respondents in relation to the shelter (part 1).....</i>	<i>98</i>
<i>Table 13: Combined responses of respondents in relation to the shelter (part 2).....</i>	<i>99</i>
<i>Table 14: Comments to overall design (part 1).....</i>	<i>99</i>
<i>Table 15: Comments to overall design (part 2).....</i>	<i>100</i>
<i>Table 16: Things that worked well (part 1).....</i>	<i>100</i>
<i>Table 17: Things that worked well (part 2).....</i>	<i>101</i>
<i>Table 18: Combined responses of respondents on perceived comfort (part 1).....</i>	<i>101</i>
<i>Table 19: Combined responses of respondents on perceived comfort (part 2).....</i>	<i>102</i>
<i>Table 20: Combined responses of respondents on overall comfort.....</i>	<i>103</i>
<i>Table 21: Combined responses of respondents on overall health.....</i>	<i>103</i>
<i>Table 22: Combined responses of respondents on personal control.....</i>	<i>104</i>
<i>Table 23: Combined responses of respondents on utility costs.....</i>	<i>104</i>
<i>Table 24: Lifestyle changes.....</i>	<i>105</i>

## 6.3 List of Equations

<i>Equation 1: Relative Value (m).....</i>	<i>20</i>
<i>Equation 2: Standard Error of the mean.....</i>	<i>20</i>
<i>Equation 3: Total Depth (TD).....</i>	<i>24</i>
<i>Equation 4: Mean Depth (MD).....</i>	<i>24</i>
<i>Equation 5: Relative Asymmetry (RA).....</i>	<i>24</i>
<i>Equation 6: Measure of Integration.....</i>	<i>24</i>
<i>Equation 7: Space-link ratio (R).....</i>	<i>24</i>

## 7 LITERATURE

Agua, J., 2014. *DENR forms TWG to review town's management plan for protected area*. [Online] Available at: <https://www.philstar.com/the-freeman/cebu-news/2014/09/14/1369003/denr-forms-twg-review-towns-management-plan-protected-area>

[Zugriff am 15 August 2020].

Anderson, C., 1971. *The Measurement of Attitude to Noise and Noises*. s.l.:G.B. National Physical Laboratory.

Angus Jr., P. & Jaque, D., 1996. Bantayan Island water resources study. *Transactions on Ecology and the Environment*, Band 12, pp. 111-120.

Ashmore, J. et al., 2003. Diversity and Adaptation of Shelters in Transitional Settlements for IDPs in Afghanistan. *Disasters*, 27(4), pp. 273-287.

Asif, N., Utaberta, N., Sabil, A. B. & Ismail, S., 2018. Reflection of cultural practices on syntactical values: An introduction to the application of space syntax to vernacular Malay Architecture. *Frontiers of Architectural Research*, Band 7, pp. 521-529.

Aspinall, P., 1993. Aspects of spatial experience and structure. In: B. Farmer & H. Louw, Hrsg. *Companion to Contemporary Architectural Thought*. New Fetter Lande, London: Routledge, p. 334.

BFAR and FAO/UNDP, 1983. *Brackishwater Aquaculture Development and Training Project*. [Online] Available at: <http://www.fao.org/3/ac061e/AC061E16.htm>

[Zugriff am 28 September 2020].

Brand, S., 1994. *How buildings learn: what happens after they're built*. 1st Hrsg. New York(New York): Viking.

Burbos, M. S. E. & Salas, SVD, A., kein Datum *Transitional Houses for the Survivors of typhoon Yolanda (Haiyan) Project*, Cebu: Justice, Peace & Integrity of Creation - Integrated Development Center, Inc..

Climate-Data.org, kein Datum *Bantayan Climate (Philippines)*. [Online] Available at: <https://en.climate-data.org/asia/philippines/cebu/bantayan-19957/>

[Zugriff am 15 August 2020].

CNN Staff, 2013. *Typhoon Haiyan death toll tops 6,000 in the Philippines*. [Online] Available at: <https://edition.cnn.com/2013/12/13/world/asia/philippines-typhoon-haiyan/index.html>

[Zugriff am 30 October 2019].

Cohen, R., Standeven, M., Bordass, B. & Leaman, A., 2010. Assessing building performance in use 1: The Probe process. *Building Research and Information*, October, 29(2), pp. 85-102.

Corporal-Lodangco, I. L. & Leslie, L. M., 2017. Defining Philippine Climate Zones Using Sargace and High-Resolution Satellite Data. *Procedia Computer Science*, Band 114, pp. 324-332.

DiFilippo, R., Smout, I. & Bosher, L., 2018. *Implementation of a Freshwater Lens Assessment Protocol on Karst Islands*. Nakuru, Kenya, 41st WEDC International Conference, Egerton University.

Doninger, A., 2013. *'Transition to What?': Evaluating the transitional shelter process in Leogane, Hait*. Oxford: Oxford Brookes University.

Espada, R., 2018. Return Period and Pareto analyses of 45 years of tropical cyclone data (1970-2014) in the Philippines. *Applied Geography*, Band 97, pp. 228-247.

Estacaan, G. & Oxfam, kein Datum *Back to the sea: The Seaweeds Farming Project in Bantayan, Northern Cebu*. [Online]

Available at: <https://philippines.oxfam.org/latest/stories/back-sea-seaweeds-farming-project-bantayan-northern-cebu> [Zugriff am 28 September 2020].

- Faeldonia, E. K., 2020. *March Village* [Interview] (3 February 2020).
- Fan, L. et al., 2013. Factors Affecting Domestic Water Consumption in Rural Households upon Access to Improved Water Supply: Insights from the Wei River Basin, China. *PLoS One*, 8(8).
- FAO, 2013. *Typhoon Haiyan - Map of affected persons by province*. [Online] Available at: <http://www.fao.org/emergencies/resources/documents/resources-detail/en/c/209181/> [Zugriff am 15 August 2020].
- Felix, D., Branco, J. M. & Feio, A., 2013. Temporary housing after disasters: A state of the art survey. *Habitat International*, October, Band 40, pp. 136-141.
- Groat, L. & Wang, D., 2013. *Architectural Research Methods*. Second Hrsg. New Jersey: John Wiley & Sons, Inc..
- Hart, D. V., 1959. *The Cebuan Filipino dwelling in Caticugan: its construction and cultural aspects*. s.l.:Yale University Southeast Asia Studies.
- Hillier, B. & Hanson, J., 1984. *The social logic of space*. Cambridge: Cambridge University Press.
- Hodgkin, D., Dodds, R. & Dewast, C., 2013. *Recovery Shelter Guidelines*. [Online] Available at: <https://www.sheltercluster.org/sites/default/files/docs/Recovery%20Shelter%20Guidelines.pdf> [Zugriff am 11 November 2019].
- IFRC, 2013. *Post-disaster shelter: Ten designs*, Geneva: International Federation of Red Cross and Red Crescent Societies.
- IOM, 2012. *Transitional Shelter Guidelines*, Geneva: Shelter Centre.
- Jha, S. et al., 2018. *Natural Disasters, Public Spending, and Creative Destruction: A Case Study of the Philippines*, Tokyo: Asian Development Bank Institute.
- JPIC-IDC, 2015. *Transition Houses for the Survivors of typhoon Yolanda (Haiyan) Project - Project Completion Report*. s.l.:s.n.
- JPIC-IDC, 2018. *About Us*. [Online] Available at: <http://pic-idc.org.ph/about-us/> [Zugriff am 14 August 2020].
- Klassen, W., 2010. *Architecture in the Philippines: Filipino buiding in a cross-cultural context*. Revised Hrsg. Cebu City, Philippines: University of San Carlos Press.
- Klöckner, C. A. & Nayum, A., 2017. Psychological and structural facilitators and barriers to energy upgrades of the privately owned building stock. *Energy*, pp. 140, 1005-1017.
- Knapp, K. et al., 2018. *International Best Track Archive for Climate Stewardship (IBTrACS) Project, Version 4. 2013 Super Typhoon HAIYAN (2013306N07162)*. s.l.:NOAA National Centers for Environmental Information.
- Knapp, K. et al., 2010. The International Best Track Archive for Climate Stewardship (IBTrACS): Unifying tropical cyclone best track data.. *Bulletin of the American Meteorological Society*, Band 91, pp. 363-376.
- Leaman, A., 2011. *The Building Use Studies (BUS) Occupant Survey: Origins and Approach Q&A*. [Online] Available at: <https://www.usablebuildings.co.uk/UsableBuildings/Unprotected/BUSOccupantSurveyQ&A.pdf> [Zugriff am 23 August 2020].
- Mahmud, S., 2007. Identity Crisis Due to Transformation of Home ENvironment: The Case for Two Muslim Cities, Dhaka and Hofuf. *METU JFA*, Band 2, pp. 37-56.
- Manum, B., Rusten, E. & Benze, P., kein Datum *Software for Drawing and Calculating Space Syntax "Node-Graphs" and Space Syntax "Axial-Maps"*. s.l.:s.n.
- Marcillia, S. R. & Ohno, R., 2012. Learning from Residents' Adjustments in Self-built and Donated Post Disaster Housing after Java Earthquake 2006. *Procedia - Social and Behavioral Sciences*, Band 36, pp. 61-69.



- Maslow, A., 1943. A theory of human motivation. *Psychological Review*, 50(4), pp. 370-396.
- Maynard, V., Parker, E. & Twigg, J., 2016. *The effectiveness and efficiency of interventions supporting self-recovery following humanitarian crises: An evidence synthesis protocol*, Oxford: Oxfam GB.
- Monteiro, C. G., 1997. *Activity Analysis in Houses of Recife, Brazil*. London, Proceedings.
- Mustafa, F. A. & Hassan, A. S., 2013. Mosque layout design: An analytical study of mosque layouts in the early Ottoman period. *Frontiers of Architectural Research*, December, 2(4), pp. 445-456.
- Nesbitt, K., 1996. *Theorizing a new agenda for architecture: an anthology of architectural theory 1965 - 1995*. 1st Hrsg. New York: Princeton Architectural Press.
- Niezabitowska, E. D., 2018. *Research Methods and Techniques in Architecture*. New York: Routledge.
- Opdyke, A., Javernick-Will, A. & Koschmann, M., 2016. *Typhoon Haiyan: Shelter Case Studies*, s.l.: s.n.
- Pable, J., 2013. Possessions in the Homeless Shelter Experience: The Built Environment's Potential Role in Self-restoration. *Interior Design*, November, 4(3), pp. 267-293.
- Padagdag, J. M., 2018. *The Philippine Disaster Risk Reduction and Management System*, Kobe, Japan: Asian Disaster Reduction Center.
- PAGASA, 2020. *Typhoon paths and intensity, and damages in cost*. Philippines: PAGASA.
- PAG-ASA, kein Datum *Climate of the Philippines*. [Online] Available at: <http://bagong.pagasa.dost.gov.ph/information/climate-philippines> [Zugriff am 14 August 2020].
- Parva, M. & Rahimian, F. P., 2014. Transformability as a factor of sustainability in post-earthquake houses in Iran: the case study of Lar city. *Procedia Economics and Finance*, Band 18, pp. 431-438.
- Philippine Statistics Authority (PSA) and ICF, 2018. *Key Findings from the Philippines National Demographic and Health Survey 2017*, Quezon City, Philippines, and Rockville, Maryland, USA: PSA and ICF.
- Pigafetta, A., 2013. *The Project Gutenberg EBook of The Philippine Islands, 1493-1898, Volume XXXIII, 1519-1522, by Antonio Pigafetta*. s.l.:s.n.
- Preiser, W. F. E., Hardy, A. E. & Schramm, U., 2018. *From Linear Delivery Process to Life Cycle Phases: The Validity of the Concept of Building Performance Evaluation*. 2nd Hrsg. s.l.:Springer International Publishing AG 2018.
- Preiser, W. F. E., Rabinowitz, H. Z. & White, E. T., 1988. *Post-occupancy evaluation*. New York: Van Nostrand Reinhold.
- Ranada, P., 2013. *A family's bid to help Bantayan Island rise from Haiyan*. [Online] Available at: <https://rappler.com/nation/bantayan-island-yolanda-bangon-bantayanon> [Zugriff am 19 September 2020].
- Ravina, D., 2015. Cebu: Joseph Michael P. Espina.
- Ravina, D. & Shih, R. R., 2017. A Shelter for the victims of the Typhoon Haiyan in the Philippines: the design and methodology of construction. *Pollack Periodica*, 12(2), pp. 129-139.
- Reid, K., 2018. *2013 Typhoon Haiyan: Facts, FAQs, and how to help*. [Online] Available at: <https://www.worldvision.org/disaster-relief-news-stories/2013-typhoon-haiyan-facts> [Zugriff am 15 August 2020].
- Rodriguez-Java, M., 1981. *The Cebuano House as an intersection of anthropological and architectural: A study of Lusaran Watershed housing practices, Cebu*. Cebu City: s.n.
- Rohwerder, B., 2016. *Transitional shelter in post-disaster contexts*, Birmingham, UK: GSDRC Helpdesk Research Report 1387.

- Sabalo, W., 2019. *NHA vows to complete all houses for Yolanda survivors in 2020*. [Online] Available at: <https://www.sunstar.com.ph/article/1831057/Cebu/Local-News/NHA-vows-to-complete-all-houses-for-Yolanda-survivors-in-2020?ref=rss&format=simple&link=link> [Zugriff am 8 November 2019].
- Salas, SVD, A., 2020. *JPIC-IDC Transitional Shelter* [Interview] (6 August 2020).
- Sanni-Anibire, M. O., Hassanain, M. A., Mahmoud, A. S. & Ahmed, W., 2018. An evaluation of the functional performance of research and academic laboratories using the space syntax approach. *International Journal of Building Pathology and Adaptation*, 36(5), pp. 516-528.
- ShelterCluster.org, 2014. *Typhoon Haiyan 2013*. [Online] Available at: <https://www.sheltercluster.org/typhoon-haiyan-2013/documents/20141003-hswg-database-website> [Zugriff am 10 August 2020].
- ShelterCluster.org, 2017. *8 Build Back Safer Key Messages (english)*. [Online] Available at: <https://www.sheltercluster.org/pacific/documents/8-build-back-safer-key-messages-english> [Zugriff am 15 April 2020].
- Sphere Association, 2018. *The Sphere Handbook: Humanitarian Charter and Minimum Standards in Humanitarian Response*, Geneva, Switzerland: s.n.
- Stevenson, F., 2019. *Housing fit for purpose*. London: RIBA Publishing.
- Supreme Court of the Philippines, 2016. *Philippine Supreme Court Jurisprudence*. [Online] Available at: <https://www.chanrobles.com/cralaw/2016maydecisions.php?id=379> [Zugriff am 19 August 2020].
- The United Nations Department of Economic and Social Affairs, Population Division, 2000. *Charting the Progress of Populations*, New York: United Nations Department of Public Information.
- UNDRR, 2019. *Disaster Risk Reduction in the Philippines: Status Report 2019*, Bangkok, Thailand: United Nations Office for Disaster Risk Reduction (UNDRR), Regional Office for Asia and the Pacific.
- USAID, kein Datum *Description of Humanitarian Shelter and Settlements Sector Activities*. Washington D.C.: USAID.
- van der Voordt, J. M., Vrielink, D. & van Wegen, B. R., 1997. Comparative floorplan-analysis in programming and architectural design. *Design Studies*, January, 18(1), pp. 67-88.
- Vergano, D., 2013. *5 Reasons the Philippines Is So Disaster Prone*. [Online] Available at: <https://www.nationalgeographic.com/news/2013/11/131111-philippines-dangers-haiyan-yolanda-death-toll-rises/> [Zugriff am 19 September 2020].
- Vicke, 2014. *Young Pioneer Disaster Response (YPDR)*. [Online] Available at: <http://ucf.org.au/young-pioneer-disaster-response-ypdr/> [Zugriff am 14 August 2020].
- Wagemann, E., 2017. Need for Adaptation. Transformation of Temporary Houses. *Disasters*, October, 41(4), pp. 828-851.
- Yamaguchi, K., 2017. *Poblacion Houses in Cebu. Urban Architecture in the American Colonial Period*. Cebu City, Philippines: University of San Carlos Press.
- YPDRMedia, 2014. *Young Pioneer Disaster Response Program Overview (As of 3/17/2014)*. [Online] Available at: [https://issuu.com/ypdr/docs/ypdrbrochure\\_1692d42bc7ea9e](https://issuu.com/ypdr/docs/ypdrbrochure_1692d42bc7ea9e) [Zugriff am 14 August 2020].
- YPDRMedia, 2015. *YPDR Programs and Achievements (December 2013 - December 2014)*. [Online] Available at: [https://issuu.com/ypdr/docs/ypdr\\_brochure\\_2015\\_01\\_09\\_v1](https://issuu.com/ypdr/docs/ypdr_brochure_2015_01_09_v1) [Zugriff am 10 August 2020].

## 8 APPENDIX

### A. Definition of Terms

Abuhan (Cebuano)	-	also known as a “dirty kitchen” that is outside the house
	-	colloquial language in the Philippines that generally refers to a cooking area where a “sug-angan” is placed to cook food with the use of charcoal or firewood
Amakan (Cebuano)	-	woven bamboo mat (English)
	-	usually used as wall veneer
Barangay (Filipino)	-	“Bezirk” (Deutsch)
	-	smallest administrative region in the Philippines
Cebuano/Bisaya	-	language generally spoken in the Central Visayas Region of the Philippines, particularly in Cebu.
CR	-	a jargon in the Philippines that refers to a space with a water closet. Generally referred to as “comfort room”
Filipino	-	national language of the Philippines
	-	a citizen of the Philippines
Lipak (Cebuano)	-	bamboo slats (English)
	-	usually used as either wall veneer or flooring
Payag (Cebuano)	-	Nipa Hut (English)
	-	a typical stilt house in the rural Philippines which are usually made from indigenous materials such as bamboo and Nipa palm ( <i>Nypa fruticans</i> )
Sari-sari store (Cebuano)		A Filipino term referring to a neighborhood sundry store in the same level as a “mom-and-pop” form of businesses
Sug-angan (Cebuano)	-	a cook stove that uses charcoal. If referred alone, in this research it is meant to denote of the cook stove placed directly on the ground.

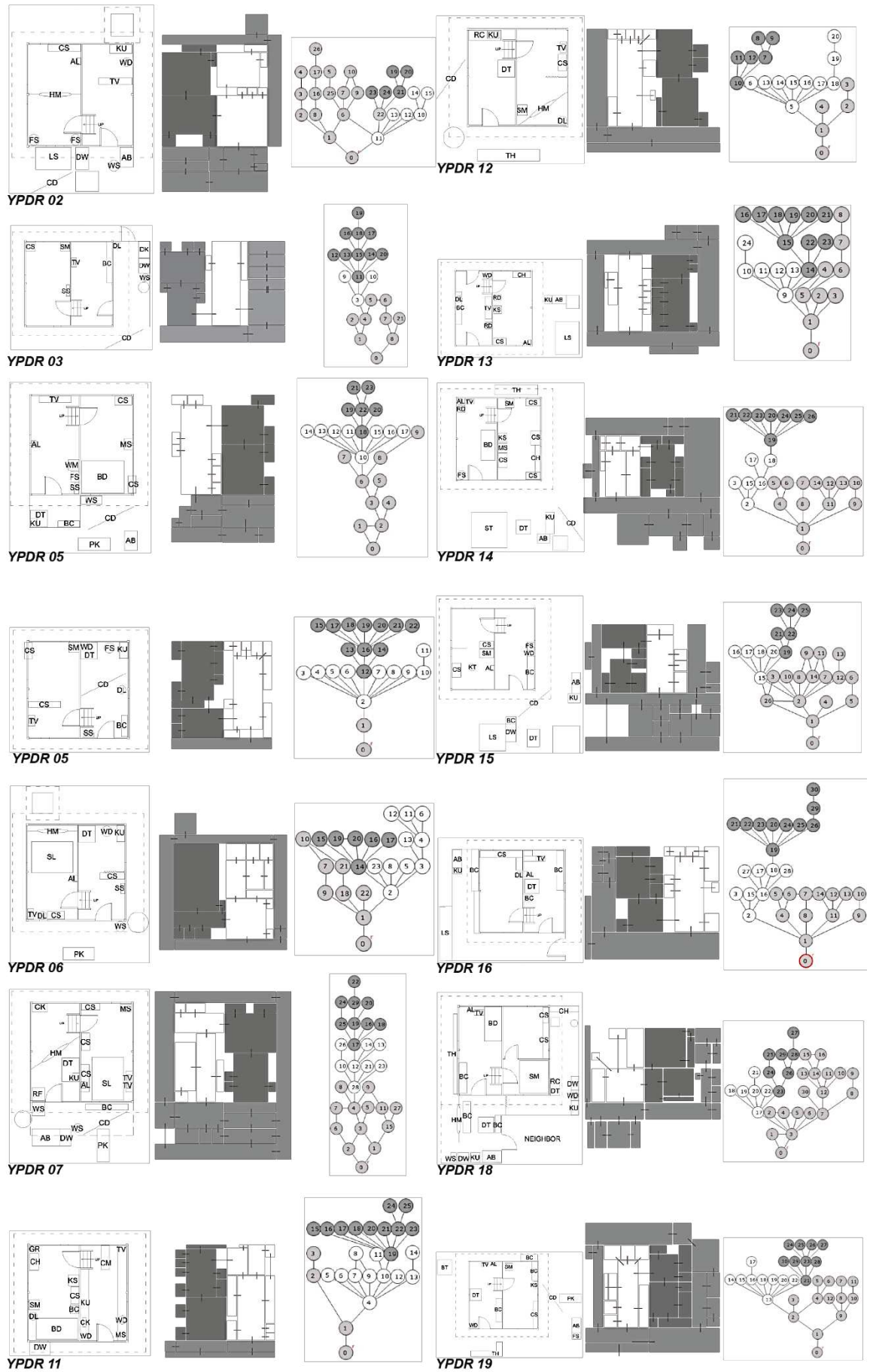
## B. List of activities and the domestic chores

ACTIVITY	FURNITURE/AREA	CODE	CHORES	# OF OCCURENCES			
				ALL	YPDR	JPIC	HAB.
Access road	Access Road	AR	EC	100%	30%	32%	38%
Bathing	Bath	BT	PN	51%	6%	6%	38%
Calling	Telephone	TP	PL	2%	0%	0%	2%
Clothes Drying	Clothesline	CD	HC	68%	23%	19%	26%
				11%	2%	4%	4%
Clothes Washing	Laundry Area	LD	HC	66%	21%	17%	28%
				11%	0%	0%	11%
Cooking_Electric	Rice cooker	RC	HC	26%	13%	9%	4%
	Water heater	WH	HC	4%	2%	2%	0%
Cooking_Firewood	Abuhan	Ab	HC	64%	21%	28%	15%
Cooking_Gas	Butane	CK	HC	47%	9%	6%	32%
				2%	0%	0%	2%
Defecating	Toilet	TL	PN	45%	4%	2%	38%
Dining	Dining Table	DT	CN	77%	21%	19%	36%
				6%	4%	0%	2%
Dishwashing	Dishwashing Area	DW	HC	43%	15%	11%	17%
Drinking	Water Dispenser	WD	CN	55%	17%	19%	19%
Drinking Coffee	Coffee	CF	CN	19%	2%	0%	17%
Feeding Livestock	Livestock Enclosure	LS	EC	15%	4%	6%	4%
				4%	0%	4%	0%
Grooming	Hygiene	HY	PN	57%	15%	17%	26%
	mirror	MR	PN	19%	6%	4%	9%
Ironing	Iron	IR	HC	6%	6%	0%	0%
Listening to radio	Radio/Speaker	RD	PL	47%	11%	19%	17%
				2%	2%	0%	0%
Lounging	Bench	BC	PL	85%	23%	28%	34%
				47%	11%	15%	21%
				17%	6%	2%	9%
				4%	2%	0%	2%
				6%	4%	0%	2%
Playing instrument	Guitar	GR	PL	6%	4%	2%	0%
Playing toys	Kid Toys	KD	PL	36%	19%	4%	13%
				4%	2%	0%	2%
				2%	2%	0%	0%
Praying	Altar	AL	PN	45%	19%	9%	17%
				2%	0%	2%	0%
Preparing Food	Food Preparation	FP	HC	4%	0%	2%	2%
Receiving guests	Receiving Area	RA	IL	9%	0%	4%	4%
Selling	Store	ST	IL	15%	2%	0%	13%
Sleeping	Bed	BD	PN	98%	28%	32%	38%
				55%	4%	23%	28%
				11%	2%	6%	2%
				2%	0%	2%	0%
Storing_Office files	File storage	FS	HC	2%	2%	0%	0%
				2%	2%	0%	0%
Storing_Clothes	clothes cabinet	CS	HC	100%	30%	32%	38%
				89%	26%	30%	34%
				51%	11%	17%	23%
	Clothes Hang	CH	HC	19%	2%	9%	9%
				4%	0%	2%	2%
Storing_Dining Utensils	Dining Utensil Storage	KU	HC	94%	26%	30%	38%
				4%	0%	2%	2%
				2%	0%	0%	2%
Storing_firewood	firewood storage	FS	HC	23%	11%	6%	6%
				2%	2%	0%	0%
				2%	2%	0%	0%

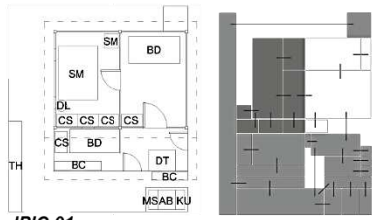
Storing_Food	pantry (food storage)	FS	HC	26%	6%	13%	6%
	Refrigerator	RF	HC	2%	2%	0%	0%
Storing_Laundry	Dirty Laundry	DL	HC	32%	15%	2%	15%
				2%	0%	0%	2%
Storing_Livelihood	livelihood storage	LS	HC	23%	2%	2%	19%
				4%	0%	2%	2%
				2%	0%	2%	0%
Storing_miscellaneous	Miscellaneous Storage	MS	HC	62%	21%	23%	17%
				19%	9%	9%	2%
				9%	4%	4%	0%
				9%	4%	4%	0%
Storing_School items	School Items Storage	KS	PN	26%	6%	9%	11%
				2%	0%	0%	2%
Storing_Shoes	Shoe storage	SS	HC	36%	13%	0%	23%
Storing_Sleeping items	Sleeping Mat Storage	SM	PN	51%	19%	11%	21%
				2%	0%	0%	2%
Storing_Trash	Trash bin	TB	HC	2%	2%	0%	0%
Storing_vehicle	Parking	PK	HC	38%	9%	11%	19%
				2%	0%	0%	2%
Storing_Water	Water storage	WS	HC	40%	15%	0%	26%
				2%	0%	0%	2%
Transiting_Vol 1	Hallway	HW	PN	96%	28%	28%	36%
				30%	4%	4%	21%
Transiting_Vol 2	Hallway	HW	PN	83%	28%	32%	23%
				23%	2%	6%	15%
				2%	0%	0%	2%
Transiting_Ext	Hallway	HW	PN	55%	11%	23%	21%
				11%	0%	9%	2%
				4%	0%	4%	0%
Urinating	Chamber pot	CP	PN	4%	0%	4%	0%
Using Computer	Computer	CM	PN	2%	2%	0%	0%
Walking_Front	Front yard	YF	EC	94%	28%	30%	36%
Walking_Rear	Rear yard	YR	EC	21%	13%	0%	9%
Walking_Side	Side yard	YS	EC	57%	17%	6%	17%
				11%	11%	0%	0%
Watching TV	TV	TV	IL	91%	26%	32%	34%
Watering plants	Ornamental Plants	TH	HC	47%	13%	13%	21%
				11%	2%	2%	6%
				2%	0%	0%	2%

HC = Household Chores; PL = Passive Leisure; PN = Private Needs;  
 EC = Extended Chores; IL = Interactive Leisure; CN = Communal Needs;

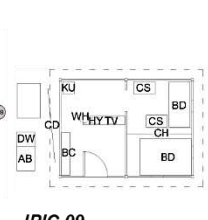
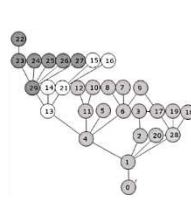
### C. Space Syntax



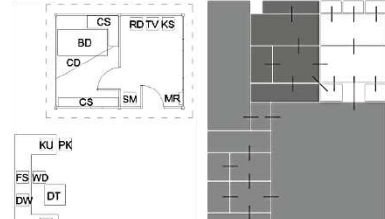
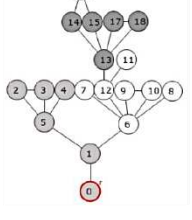
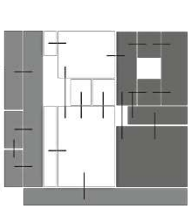
Die approbierte gedruckte Originalversion dieser Diplomarbeit ist an der TU Wien Bibliothek verfügbar.  
The approved original version of this thesis is available in print at TU Wien Bibliothek.



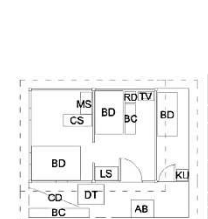
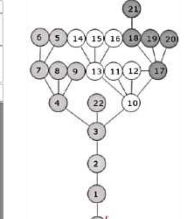
JPIC 01



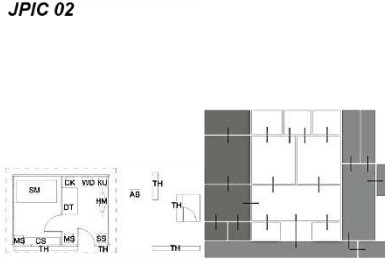
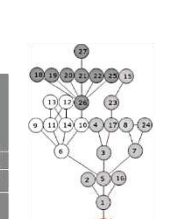
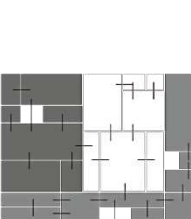
JPIC 09



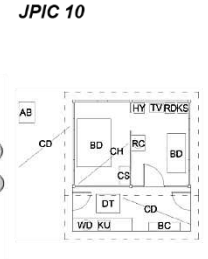
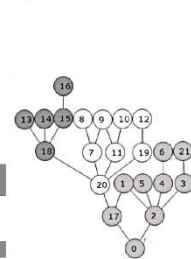
JPIC 02



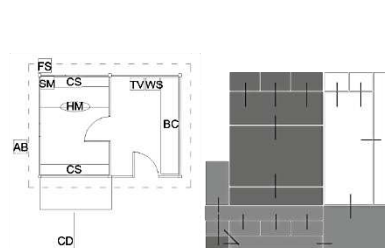
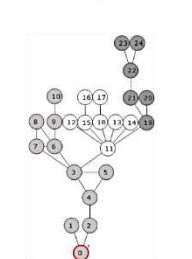
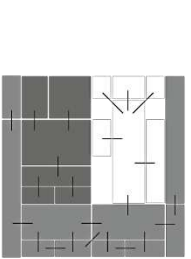
JPIC 10



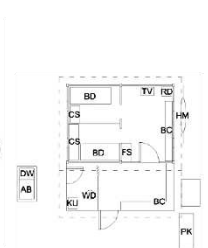
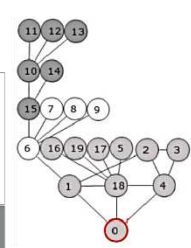
JPIC 03



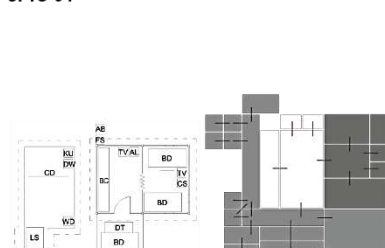
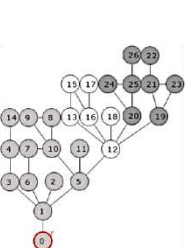
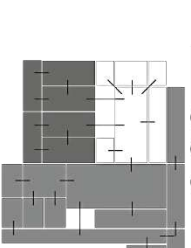
JPIC 11



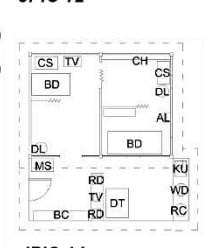
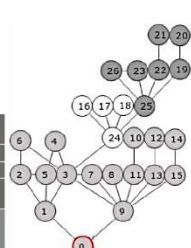
JPIC 04



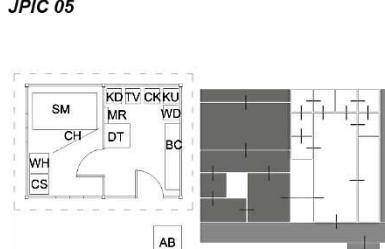
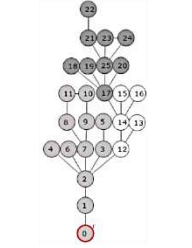
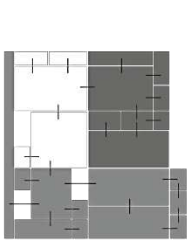
JPIC 12



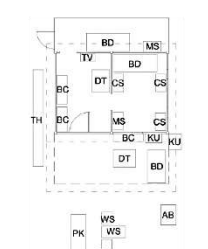
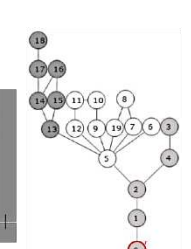
JPIC 05



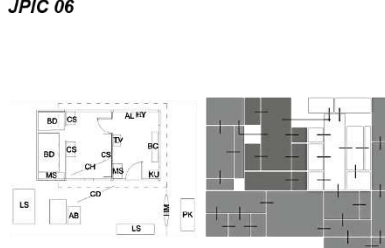
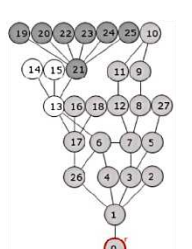
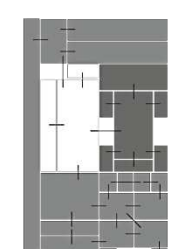
JPIC 14



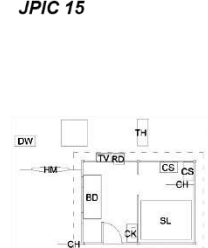
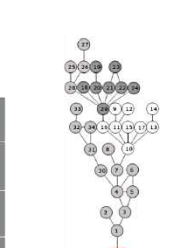
JPIC 06



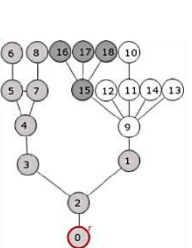
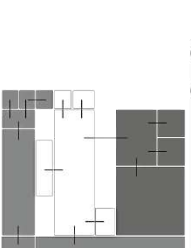
JPIC 15



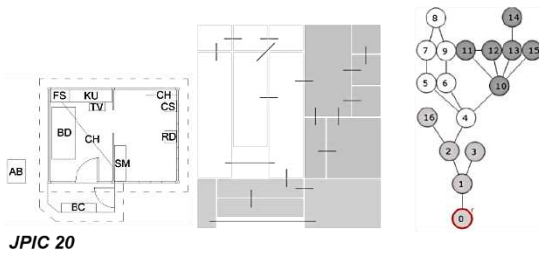
JPIC 07



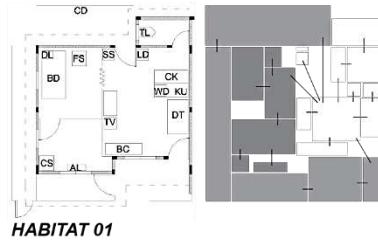
JPIC 19



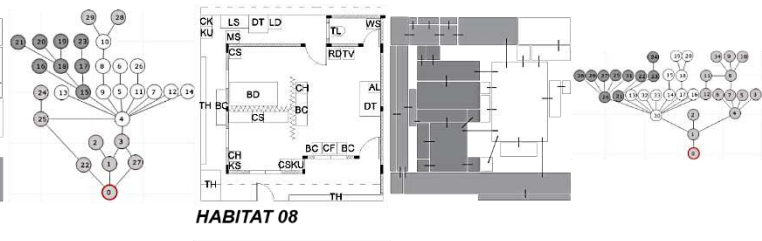
Die approbierte gedruckte Originalversion dieser Diplomarbeit ist an der TU Wien Bibliothek verfügbar.  
The approved original version of this thesis is available in print at TU Wien Bibliothek.



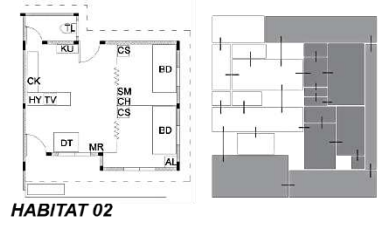
JPIC 20



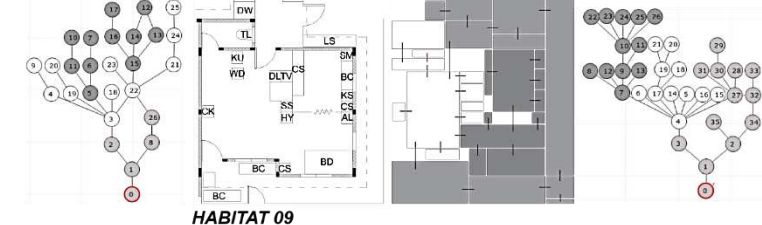
HABITAT 01



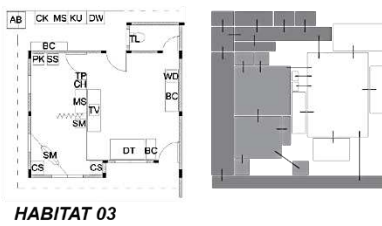
HABITAT 08



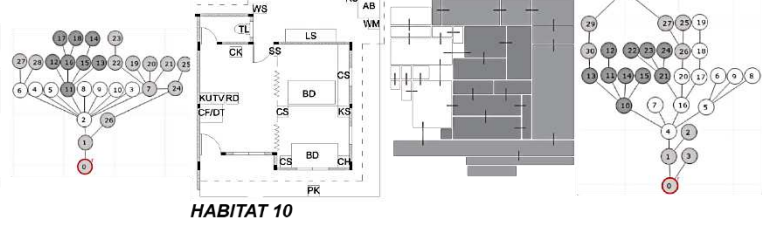
HABITAT 02



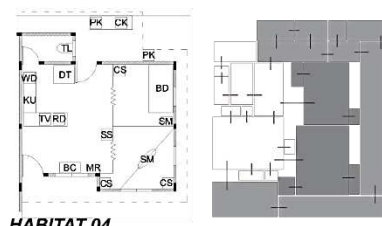
HABITAT 09



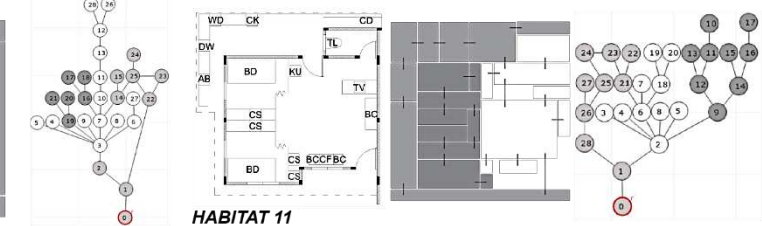
HABITAT 03



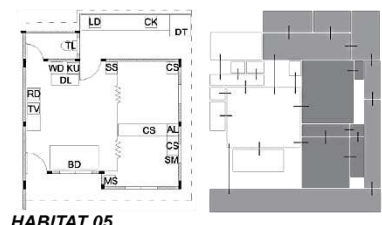
HABITAT 10



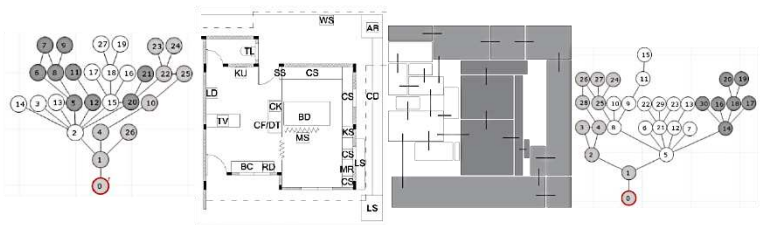
HABITAT 04



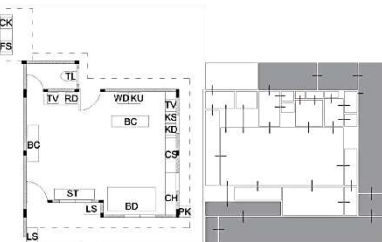
HABITAT 11



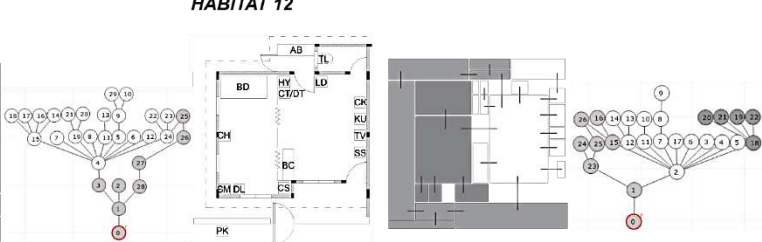
HABITAT 05



HABITAT 12



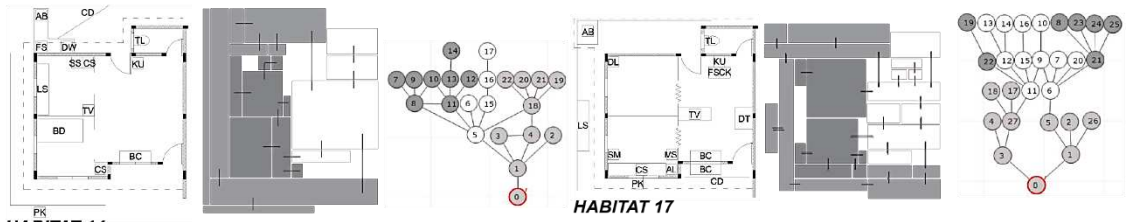
HABITAT 06



HABITAT 13

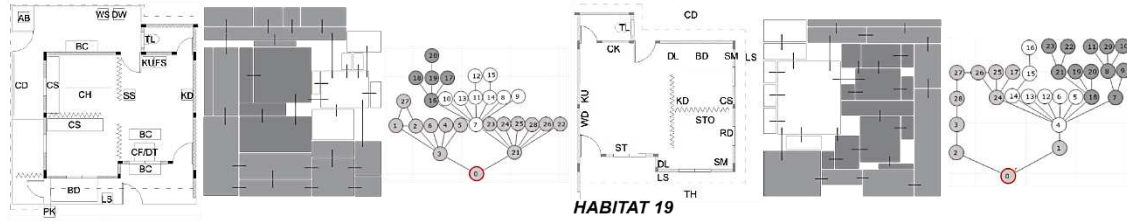
Die approbierte gedruckte Originalversion dieser Diplomarbeit ist an der TU Wien Bibliothek verfügbar.  
The approved original version of this thesis is available in print at TU Wien Bibliothek.





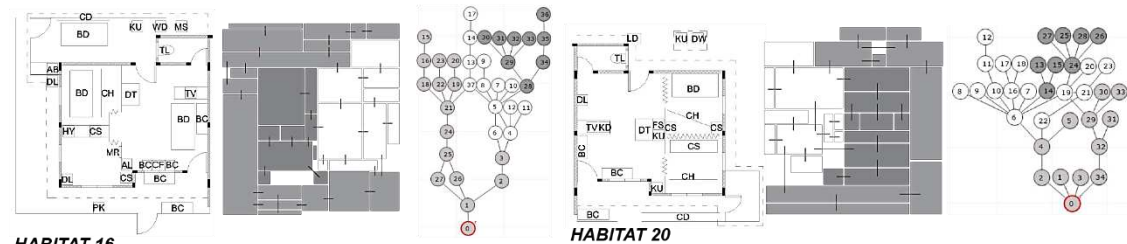
**HABITAT 14**

**HABITAT 17**



**HABITAT 15**

**HABITAT 19**



**HABITAT 16**

**HABITAT 20**

## D. Combined Responses of Respondents

Table 11: Combined responses of respondents in relation to their neighborhood

		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>Question 8. NEIGHBORHOOD LOCATION</b>							
1	Preference in due to beliefs (superstition)	1	-	-	-	-	-
2	Preference in due to proximity of "amenity" (shaded area)	-	-	-	-	3	-
3	Preference in due to density (crowdedness)	-	-	-	-	1	1
4	Preference in due to proximity to transportation	1	-	-	-	1	-
5	Preference in due to proximity to relatives	-	-	-	-	-	1
6	Preference from familiarity with neighbors and customs	-	-	-	-	1	-
7	Preference in relation to facility (muddy road, flooding)	-	-	-	-	2	3
<b>Question 10. NEIGHBORHOOD SPACE</b>							
1	Proximity of shelter to other houses	2	-	-	1	-	2
2	Proximity of houses augmented by relatives as neighbors	-	-	1	-	-	-
3	Cannot complain as the location had been assigned for us	-	-	-	1	-	1
4	Limitations on what can be done (livestock, planting space)	-	-	-	-	-	2
5	Lot size	-	-	-	-	1	1

Table 12: Combined responses of respondents in relation to the shelter (part 1)

		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>Question 13. SHELTER LOCATION</b>							
1	Probability of being flooded	-	2	-	-	-	-
2	Contented due to circumstance (given, land ownership, no other option, area leader)	1	1	-	4	3	-
3	Absence of facilities (communal CR/WC)	-	1	-	-	-	-
4	Proximity to relatives	1	-	-	-	-	-
5	Indifferent	5		-	-	1	-
6	Comfort (ventilation, privacy, safety, density, noise)	1	-	4	1	6	-
7	Accessibility to key establishments & facilities (school, workplace, electric & water supply)	-	-	1	-	4	-
8	Quality facility (concrete/asphalt road)	-	-	-	-	-	2
<b>Question 17. SHELTER LAYOUT</b>							
1	owner's preference influenced by superstition	3	1	3	-	-	1
2	Just contented with the layout	4	-	3	-	1	1
3	Carpenter's workmanship	-	1	-	1	-	1
4	Completeness of facilities (conc. floor, CR/WC)	-	1	-	2	-	1
5	indifferent (just thankful)	1	1	-	-	-	-
6	owner directed layout	-	-	1	-	2	-
7	owner's preference influenced by perception of appropriateness	-	-	-	-	-	2
8	House orientation by carpenters/donor according to superstition (main door facing the rising sun)	1	-	-	-	1	1
9	House orientation by owner according to surroundings (neighbor-sibling, personal preference, road, see passersby)	2	-	1	-	-	-
10	House orientation by carpenter based on the surroundings (neighbor-sibling, personal preference, road, see passersby)	-	1	-	-	2	-
11	House orientation/layout according to the agreed regulations of the donor	1	-	-	-	1	2
12	House orientation as preferred by the carpenter	-	-	2	-	-	-
13	Preference of safety over comfort	-	-	-	-	1	-
<b>Question 19. SHELTER SPACE</b>							
1	Size	2	-	-	4	1	-
2	According to users (number, gender segregation)	7	3	7	2	5	3
3	Contented due to circumstance (given)	1	1	-	-	-	-
4	number of possessions/activities (furniture, planting)	-	-	-	1	2	2

Table 13: Combined responses of respondents in relation to the shelter (part 2)

		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>Question 19. SHELTER STORAGE</b>							
1	Space to store things	3	3	1	4	2	5
2	Dependent on the number of users	1	-	1	-	-	-
3	Storage area gets wet when it rains	-	2	-	-	-	-
4	User provided storage areas	-	3	-	-	-	5
5	Dependent on the number of items	2	-	1	-	3	1
6	No other choice	-	-	-	1	-	-
7	Dependent on the layout of spaces	-	-	1	1	-	1
<b>Question 21. SHELTER APPEARANCE</b>							
1	Problems from material used (rain, glare)	-	3	-	1	-	-
2	Uniqueness of form	6	-	-	-	-	-
3	Additional space to support activity (terrace)	-	1	-	1	-	-
4	Ornamentations, paints, varnish, floor tile	-	1	-	2	-	3
5	repair, rehabilitation of structure needed (dilapidated, termite infestation)	-	3	-	1	-	-
6	No other choice (given)	-	2	-	-	-	-
7	Type of material used (concrete)	-	7	-	10	6	-
8	area of shelter	-	-	1	2	-	1
9	indifferent (just thankful)	-	1	3	-	3	-
10	well-organized interior	-	-	1	-	-	-
11	Inclusion of necessary spaces (divisions, storage, CR)	-	1	-	1	-	2
12	Perceived safety	-	-	-	-	1	-
<b>Question 23. SHELTER SAFETY [during Typhoon Phanfone (Ursula)]</b>							
1	Not scared because of the situation (typhoon)	3	3	-	-	9	1
2	Not scared that the house will be destroyed	10	2	6	5	9	-
3	Was able to fall asleep properly	2	3	1	-	3	-
4	We did not get soaked from rain penetrating the shelter	1	7	2	2	1	-
5	stayed at the perceived safest part of the shelter (AGREE- common area; DISAGREE-bedroom)	2	-	1	-	1	-
6	Covered the walls to deter rain penetration (blankets, tarpaulins)	4	-	-	-	-	-
7	Was able to evacuate	2	1	6	7	-	-
8	Trusted the effectivity of the construction method (bolts, "a lot of nails")	7	3	3	3	4	1
9	Preferred to evacuate	-	4	1	7	-	12
10	Preparing in case there is a need to evacuate	1	-	-	-	-	-
11	The shelter was not shaking/creaking	2	4	-	2	-	1
12	The cover placed to deter rain penetration remained	-	1	-	-	-	-
13	No part of the shelter was blown off	-	1	-	1	1	-
14	Tied the house down	-	-	1	1	-	-
15	The surroundings helped	-	2	1	4	1	1
16	No rain leaked to the shelter	-	5	1	3	-	10
17	We just prayed	-	-	1	-	-	-
18	We were fine here/ I am very contented here	2	-	2	-	7	-
19	We did not notice the strength of Ursula	-	-	-	-	-	1

Table 14: Comments to overall design (part 1)

		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>Question 25. OVERALL DESIGN</b>							
1	We like the material used as it allow air to flow	1	-	-	-	-	-
2	The material used is not problematic	-	1	-	-	-	2
3	We like the way the structural frames are built	1	-	-	-	-	-
4	We think they built it really well	2	-	-	-	1	-
5	Its unique form makes it beautiful	4	-	-	-	-	-
6	Its form do not make it hard to make changes	-	2	-	-	-	-
7	It is like the way houses before are built	1	-	-	-	-	-
8	The height is enough	-	-	-	1	-	-
9	We were asked for our preferred design (layout of bamboo slats)	-	-	2	-	-	-

Table 15: Comments to overall design (part 2)

		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>Question 25. OVERALL DESIGN (continuation)</b>							
10	The design is not causing problems (rain going inside)	-	-	-	1	-	1
11	The design is really good	-	-	-	-	1	-
12	Plants were planted to help with the shade	-	-	-	-	1	-
13	We do not need to make renovations to improve comfort	-	-	-	-	-	3
14	The material used do not make it hard to make changes	-	-	-	-	-	3
15	There are fewer things that need to be done	-	-	-	-	-	3
15	The completeness of needed things makes it fine	-	-	-	-	-	1
16	The cost of the original material used do not matter when making changes/repairs	-	-	-	-	-	2
17	The material used is really strong	-	-	-	-	3	1
18	The material used makes it unnecessary to keep on changing	-	-	-	-	2	-
19	We do not need to make renovations for aesthetics	-	-	-	-	-	1
20	We do not need to make renovations for our livelihood	-	-	-	-	-	1
21	There are places where we can hang our clothes	-	-	-	-	1	-

Table 16: Things that worked well (part 1)

		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>Question 27. THINGS THAT WORKED WELL</b>							
1	Lower level of the bedroom for storage (firewood, nets)	1	-	-	-	-	-
2	Bedroom - wind flow through spaces from "amakan" walls and "lipak" floors	2	-	-	-	-	-
3	Bedroom - possibility to view the outside	-	-	-	-	-	1
4	The whole house is airy	3	-	-	-	-	2
5	The whole house is comfortable	1	-	-	-	-	2
6	The whole house is cold	2	-	-	3	-	1
7	An elevated bedroom maintains windflow	1	-	-	-	-	-
8	An electric fan is no longer needed	1	-	-	-	-	-
9	Elevated part - sense of security if elevated	1	-	-	-	-	-
10	I do not mind the decaying material	1	3	-	-	-	-
11	Place to congregate (watch television, people)	1	-	-	-	2	-
12	The structure looks like it can resist strong winds	2	-	-	-	1	-
13	It is sturdy because of the material used (size, quality)	1	1	-	-	5	-
14	Neutral	4		3		1	
15	Bedroom - the rain that penetrates the shelter just goes through the flooring	1	-	-	-	-	-
16	Interior of the house - was built pretty well	1	-	-	-	-	-
17	sleeping/bedroom areas	3	1	2	-	1	-
18	They provided the WC/CR	-	3	-	16	8	-
19	They provided the Bathing area	-	1	-	2	-	-
20	The height is just enough (bedroom floor, roof height)	-	2	-	-	-	-
21	The construction was done well	-	1	-	-	-	-
22	The enclosure prevents the rain from entering the house	-	3	-	-	-	-
23	They provided the kitchen inside the house	-	1	-	-	-	1
24	A ceiling is no longer needed	-	1	-	-	-	-
25	Placing a veneer (interior side of wall) is unnecessary	-	1	-	-	-	-
26	Rainwater do not pool inside the house	-	1	-	-	-	-
27	The material used prevented glare from outside from penetrating the interior	-	1	-	-	-	-
28	I like the additional space because it is airy/cold (extra space, terrace)	-	1	2	-	2	-
29	The material used is termite-proof	-	1	-	-	-	-
30	The surrounding trees do not pose harm to the users	-	1	-	-	-	-
31	Part of the shelter had to be adjusted to ensure safety	1	-	-	-	-	-
32	The space downstairs (living area/common area)	1	-	2	-	-	-
33	Indifferent	-	-	3	-	1	-
34	Space to plant outside	-	-	1	-	-	-
35	We used all the areas of the shelter as sleeping areas	-	-	1	-	-	-

Table 17: Things that worked well (part 2)

		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>Question 27. THINGS THAT WORKED WELL (continuation)</b>							
36	We can make extensions because it is our lot	-	-	1	1	-	-
37	Making a window is unnecessary because it is included	-	-	-	1	-	-
38	Changing the original material is not necessary	-	-	-	1	-	-
39	Going to the nearby well for laundry is not necessary	-	-	-	2	-	-
40	Expansion of spaces is necessary	-	-	3	-	7	-
41	property of the surroundings do not limit the renovations	-	-	-	1	-	-
42	The children does their assignment in the common area	-	-	1	-	4	-
43	I like the area of the house usually hit by the winds	-	-	-	1	-	-
44	Everything is enough	-	-	-	-	1	-
45	we were able to place up room divisions/ roof extensions	-	-	-	-	1	-
46	We do the laundry inside the house not at the back	-	-	-	-	1	4
47	The space to hang clothes is enough	-	-	-	-	-	2
48	We hang our clothes on the rafters at the back	-	-	-	-	1	-
49	We hang our clothes on the rafters at the side	-	-	-	-	2	-
50	The kitchen do not fill the whole house with smoke	-	-	-	-	-	1
51	The septic tanks provided were deep enough that it does not really smell	-	-	-	-	-	1
52	I like that our kitchen is inside the house	-	-	-	-	-	1
53	There are no rats in the area	-	-	-	-	-	1
54	The door of the cr facing the main door is fine by us	-	-	-	-	-	2
55	We do not need to place a divider so the door of the cr will not be seen from the main door	-	-	-	-	-	1
56	A drainage system is provided so water from the laundry & kitchen do not puddle	-	-	-	-	-	4
57	An extension at the front is not necessary to be comfortable/entertain guests	-	-	-	-	-	1
58	we do not need to construct a kitchen at the back	-	-	-	-	-	2
59	The extensions do not need to be improved	-	-	-	-	-	1
60	I like the interior of the house	-	-	-	-	-	1
61	I do not do the laundry in the front as the excess water dries faster	-	-	-	-	-	1
62	The inside of the house do not feel messy	-	-	-	-	-	1

Table 18: Combined responses of respondents on perceived comfort (part 1)

		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>Question 38. PERCEIVED COMFORT: TEMPERATURE/VENTILATION</b>							
1	The wind is calm in the living area	1	-	-	-	-	-
2	In monsoon season, the area upstairs is comfortably cold	-	2	-	-	-	-
3	We do need to do anything (floormats) to limit the wind from blowing at our backs while sleeping	-	1	-	-	-	-
4	The surroundings block the wind from getting to our place	1	-	1	-	-	-
5	The wind that enters through the crawl space pass to the bamboo slat floors and cools the upper floor	1	-	-	-	-	-
6	The whole house does not get uncomfortably hot (even in the dry season)	2	4	-	2	2	9
7	The house is comfortably cold in the monsoon season.	5	-	-	2	1	6
8	The whole house does not get uncomfortably hot even at lunch time	-	4	-	-	-	1
9	Generally, the temperature in the evening is comfortable	4	-	1	-	-	2
10	Some parts of the house do not get really cold	-	-	-	1	-	-
11	When it gets really hot, we usually just stay at the common area since it is not as hot as in the sleeping area	3	-	-	-	-	-
12	The trees help shade the building from the heat	2	-	1	-	2	-
13	When it gets really hot, we usually just stay outside of the house (terrace, under the trees, back of the house)	2	-	3	-	9	-
14	It is not always hot inside	1	-	1	-	-	-
15	Opening the doors/fenestrations allows cross ventilation	1	-	-	-	1	-
16	Temperature inside do not require ceiling fans	-	5	-	2	-	5
17	We feel that there is wind driven to the inside	-	-	-	1	-	-

Table 19: Combined responses of respondents on perceived comfort (part 2)

		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>PERCEIVED COMFORT: TEMPERATURE/VENTILATION (continuation)</b>							
17	We feel that there is wind driven to the inside	-	-	-	1	-	-
18	The wind going inside the house do not have dusts in it	-	-	-	1	-	1
19	We do not need to do anything (tarpaulins as ceilings) to block the heat from radiating to the inside of the house	-	-	-	1	-	1
20	Cold breeze ventilates the interior of the house	-	-	2	-	1	1
21	You do not feel the heat being radiated by the materials (G.I. Roof) to the inside	-	-	-	2	-	1
22	Temperature inside is more comfortable than the outside	-	-	1	-	-	-
23	Even in hot season, the air is not stuffy inside the house	-	-	-	-	-	1
24	Our old place is hotter compared to here	-	-	-	-	-	1
25	Aside from during typhoons, we do not feel any breeze.	-	-	-	-	1	-
26	The quality of the material used do not influence our behavior on opening the windows	-	-	-	-	-	1
<b>Question 42. PERCEIVED COMFORT: NOISE</b>							
1	Dependent on the users especially kids	2	-	-	-	3	-
2	Sound from outside is very noisy	3	-	1	-	3	1
3	Sometimes I just bear the noise from our neighbors to prevent conflict	1	-	-	-	-	-
4	Dependent on cars passing by	1	-	-	-	-	-
5	The wall veneer I installed in the interior of the house helps prevent noise infiltration	1	-	-	-	-	-
6	It is not very noisy. It is bearable	1	1	1	-	2	-
7	Sometimes it feels like the sound from talking amplifies inside the house	1	-	-	-	4	-
8	We got used to the noise	1	-	-	-	1	-
9	The material prevents sound from outside from infiltrating to the inside	-	-	-	1	-	-
10	Occasional noise from celebrations is fine	-	-	1	-	-	-
11	Less noise from neighbors because of the location	1	-	1	-	2	-
12	This is not as noisy as my previous place	-	-	-	-	1	1
13	Dependent on the time of the day	1	-	1	-	1	-
14	Sound from outside is amplified inside	-	-	-	-	3	-
15	Sometimes we have to reprimand our neighbors	2	-	-	-	1	-
16	We had to cut down the fruit tree so the children will not congregate around it	-	-	-	-	1	-
17	The community agreed for curfew on loud sounds in the evening	-	-	-	-	1	-
18	You cannot hear the noise from the outside	-	-	-	-	-	1
<b>Question 46. PERCEIVED COMFORT: ILLUMINATION</b>							
1	Placing shades to remediate glare is not necessary	-	1	-	-	-	-
2	Illumination is enough	3	-	-	-	-	-
3	The artificial light we used is not very bright	-	1	1	-	3	-
4	We usually only need to use the artificial light in the evening or when working	1	-	-	-	-	-
5	Surroundings do not limit the natural light from reaching the interior of the house	-	2	-	-	-	-
6	The space is very bright	1	-	-	-	-	-
7	It is not very bright in the living area	-	1	1	-	-	-
8	Illumination in the sleeping area is enough	1	-	-	1	-	-
9	It is not necessary to open the windows/curtains to brighten the space inside	-	-	-	2	-	1
10	The material used (amakan) helps illuminate the interior	-	-	1	-	-	-
11	Natural illumination is enough	-	-	-	-	1	-
12	Not very bright artificial light is fine since we are usually out in the evening to fish	-	-	-	-	1	-
13	Furniture do not block the illumination from the lighting fixture	-	-	-	-	-	1
14	Illumination is from a flashlight only	-	-	-	-	1	-
15	The interior does not feel gloomy	-	-	-	-	-	2
16	We do not turn the lights in the sleeping area for privacy concerns	1	-	-	-	-	-

Table 20: Combined responses of respondents on overall comfort

		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>Question 48. PERCEIVED COMFORT: OVERALL</b>							
1	The materials used do not show any signs of decay	-	1	-	-	-	-
2	Comfortability from familiarity with the neighbors and the neighborhood	1	-	-	-	-	-
3	Orientation of the building and the door do not cause glare	-	1	-	-	-	-
4	The size is bigger than the previous house	3	-	-	-	-	-
5	The carpenters did their job well and did not leave until it is done	-	1	-	-	-	-
6	The carpenters finished the work and used all the materials	-	1	-	-	-	-
7	The situation now is better than in the previous house	-	1	-	-	-	-
8	It is more comfortable now than in the previous house	-	1	-	-	-	-
9	We are contented and happy	1	-	-	-	-	-
10	Comfortability from ownership of the lot	-	-	-	1	1	-
11	The air in the current place is fresher	-	-	-	-	1	6
12	We are surrounded by more trees here than in the previous place which makes the air feel fresher	-	-	-	-	1	1
13	Comfortability from not being evacuated during typhoons	-	-	-	-	1	-
14	The air does not get dusty	-	-	-	-	-	2
15	It is easier to get fresh produce (fish) here than in previous house	-	-	-	-	-	1
16	There are less things that need to be paid here than in the previous place	-	-	-	-	-	1
17	Things are cheaper here than in the previous place	-	-	-	-	-	1
18	It is less hot here than in the previous place	-	-	-	-	2	-
19	Comfortability from safety during typhoons	-	-	-	-	1	-
20	Comfortability from proper facilities (road not muddy)	-	-	-	-	-	1
21	Comfortability from being given a free place to stay	1	-	-	-	-	-

Table 21: Combined responses of respondents on overall health

		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>Question 50. PERCEIVED HEALTH: OVERALL</b>							
1	Same as before	3	-	1	-	1	-
2	We have more privacy here than sharing the place with a relative before	2	-	-	-	-	-
3	Health from better illumination (artificial illumination)	1	-	-	-	-	-
4	Health from cleaner environment	1	-	-	-	-	-
5	Health from bigger space	1	-	-	-	-	-
6	Children are less sickly now than before	1	-	-	-	-	-
7	Health from having a place of their own	1	-	-	-	-	-
8	better functioning place than previous house	1	-	-	-	-	-
9	Current place has more space between neighbors than previously	-	-	-	1	-	-
10	Health from airy environment	-	-	-	2	-	-
11	This place has less dust in the air than in previous place	-	-	-	1	-	-
12	The materials used in the current place is better than in the previous place	-	-	-	1	-	-
13	I do not feel sicker now than in the old house	-	-	-	1	-	-
14	Health from safer location especially during typhoons	-	-	1	-	3	-
15	Health from possibility to plant vegetables in the garden	-	-	1	-	-	-
16	Health from constant food support by the government	-	-	1	-	-	-
17	Health from presence of family members	-	-	-	-	1	1
18	Accessibility to better food choices	-	-	-	-	1	2
19	Accessibility to potable water supply	-	-	-	-	1	-
20	More fresher food choices here than in the previous place	-	-	-	-	-	2

Table 22: Combined responses of respondents on personal control

		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>Question 56. PERSONAL CONTROL</b>							
1	Ceiling fan - children got accustomed to it	3	-	2	-	1	-
2	Ceiling fan is not necessary	4	1	1	1	2	2
3	Electricity to power a television is necessary	1	-	-	-	-	-
4	Electricity to power the bulb is necessary	2	-	-	-	-	-
5	Artificial light for use by the children	1	-	-	-	1	-
6	Ceiling fan - used to deter mosquitoes	1	-	1	-	1	-
7	Ceiling fan - to cool the space for the children	1	-	2	-	-	-
8	The fan is effective in cooling the space	-	-	-	1	3	-
9	Fans do not make me feel bloated	-	-	-	-	-	1
10	Artificial light for work (crab meat)	-	-	-	-	1	-
11	Artificial illumination makes me at ease	-	-	-	-	1	-
12	Noise from neighbors is controlled by reprimanding them	1	-	-	-	-	-

Table 23: Combined responses of respondents on utility costs

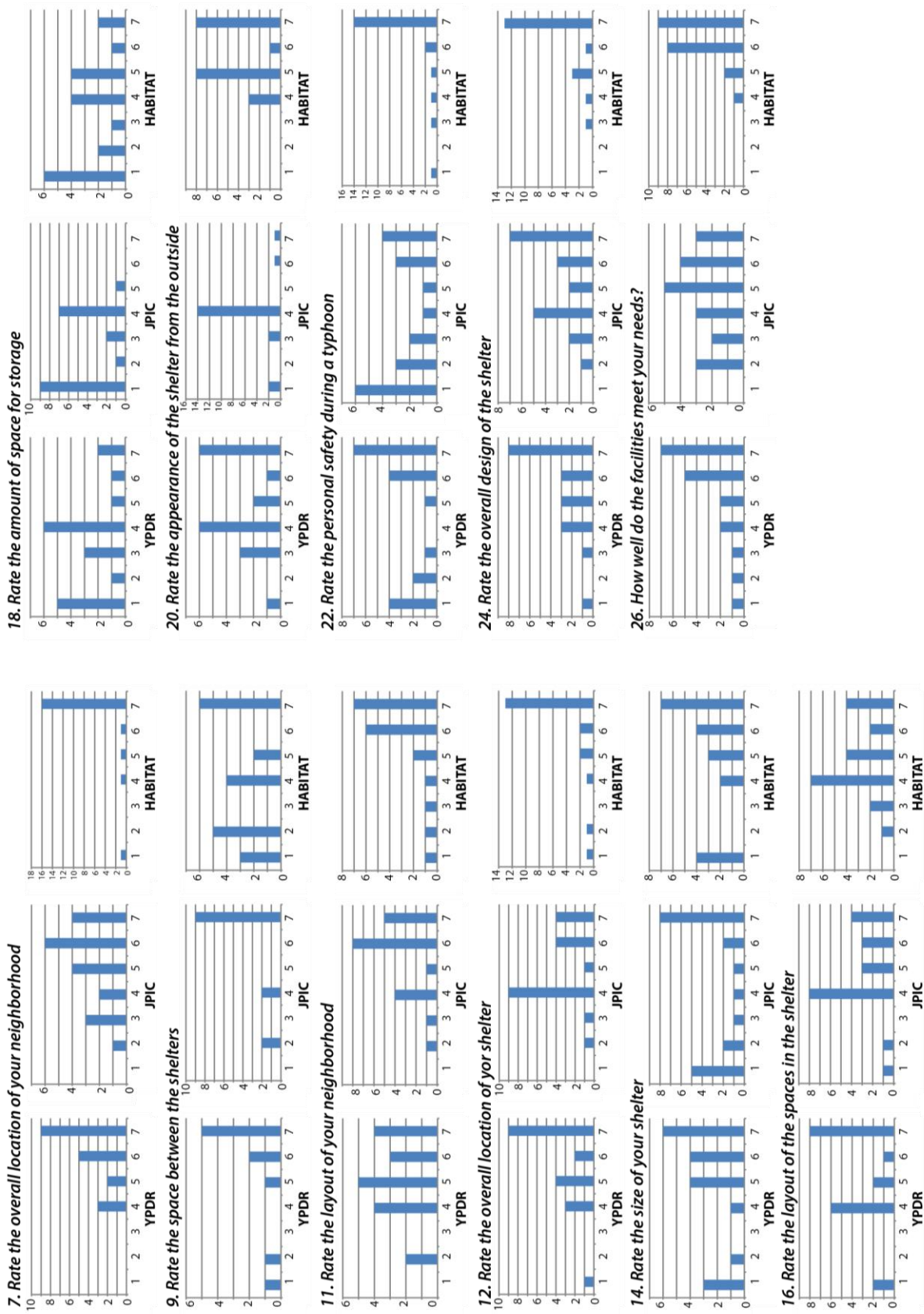
		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>Question 69. UTILITY COSTS: HEATING/ COOLING</b>							
1	We only use the ceiling fans when its really hot	2	-	3	-	-	-
2	We just open the doors so the air can circulate	-	-	-	-	1	-
3	The ceiling fan is solar powered	-	-	-	-	1	-
4	I turn off the fan when the children are already asleep	-	-	-	-	1	-
<b>Question 70. UTILITY COSTS: LIGHTING</b>							
1	We only have one light in the living area	1	-	-	-	-	-
2	We only turn on the light when necessary (dinner, evening)	2	-	-	-	2	-
3	We usually turn on the light outside of the house	1	-	1	-	-	-
4	We turn off the lights for privacy purposes	2	-	1	-	-	-
5	We only turn on the light in the living area	1	-	-	-	-	-
6	We feel that our expenses are lower with electricity that buying gasoline for the lamps	-	-	1	-	-	-
7	We leave the light on overnight	-	-	-	-	1	-
8	Even if more expensive, we prefer the electric lights for safety purposes	-	-	-	-	1	-
9	We use the solar powered lights during power outages	-	-	-	-	1	-
<b>Question 71. UTILITY COSTS: APPLIANCES</b>							
1	We limit the times we are using the television	1	-	-	-	-	-
2	We do not have much appliances	-	-	1	-	-	-
3	We rarely use the rice cooker now	-	-	1	-	-	-
<b>Question 72. UTILITY COSTS: WATER</b>							
1	We buy tap water for cooking	3	-	3	-	-	-
2	We buy bottled water for drinking	7	-	14	-	8	-
3	We use the water from the well for bathing, laundry, washing dishes	3	-	4	-	1	-
4	We do not store water	4	2	1	1	-	7
5	We feel that our expenses are higher now than before	1	-	-	-	-	-
6	We use the well for our needs	6	-	9	-	-	-
7	The water faucet needs to be repaired	1	-	-	-	-	-
8	We get the water for drinking from the well	1	-	-	-	-	-
9	We get the water for cooking from the well	1	-	1	-	-	-
10	We use tap water for our needs (except drinking)	-	-	2	-	7	-
11	We use bottled water for cooking	-	-	2	-	-	-
12	There is usually no water outage here	-	-	-	-	-	10
13	We drink bottled water since others are saying that the water from the tap is not safe	-	-	-	-	1	-
14	We use the tap for all our needs	-	-	-	-	4	-



Table 24: Lifestyle changes

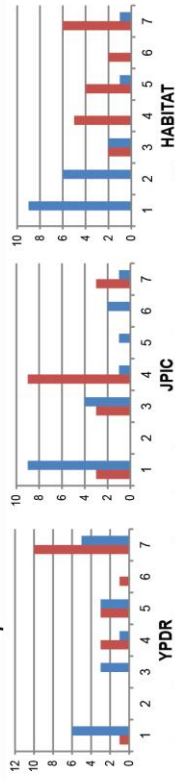
		YPDR		JPIC		HH	
		+	-	+	-	+	-
<b>Question 58. LIFESTYLE CHANGES: WORK</b>							
1	It is easier to move around now with the artificial light	1	-	-	-	-	-
2	The breadwinner of the family (mother, father) has a better source of income now	2	1	-	-	1	-
3	We are now raising poultry animals.	-	-	1	-	-	-
4	We now have a sari-sari store	-	-	1	1	1	-
5	I just rely on others (children, grandchildren) for support	-	-	1	-	1	-
6	I started planting vegetables in the yard	-	-	1	-	-	-
7	Still the same as before	-	-	-	-	2	-
8	Living expense here is better than in the previous place	-	-	-	-	-	1
9	You can just go around and scavenge for firewood here	-	-	-	-	-	1
10	I can take better care of my kids now	-	-	-	-	1	-
<b>Question 59. LIFESTYLE CHANGES: LEISURE</b>							
1	We were able to procure things for the house/kids	2	-	-	-	1	-
2	I do not have any hobbies	1	-	-	-	-	-
3	We now have appliances (television, speakers, ricecooker)	1	-	4	-	2	-
4	We now have equipment (cellphones)	-	-	1	-	-	-
5	I can see more people here than in the previous place	-	-	-	1	-	-
6	There are more community activities ("fiesta") here	-	-	-	-	-	4
7	I like that it is more quiet here than in the previous place	-	-	-	-	-	1
8	We don't have to rely on gasoline powered generators now	-	-	-	-	1	-
9	I like the limit imposed by the community on gatherings	-	-	-	-	1	-
10	There are always community meetings here than before	-	-	-	-	1	-
<b>Question 60. LIFESTYLE CHANGES: DIET</b>							
1	We now have an "abuhan"	-	-	1	-	-	-
2	We can now eat rice compared to only milled corn before	-	-	1	-	-	-
3	We now manage to have meat or hotdogs as viand compared to only soy sauce or oil before	-	-	1	-	-	-
4	I started to eat healthier (vegetables) here	-	-	1	-	-	-
5	It is easier to get fresh produce by going to the seashore and glean for shellfishes than before	-	-	-	-	-	2
6	There is enough space for you to plant for vegetables	-	-	-	-	-	1
7	We eat more fresh foods here than in the previous place	-	-	-	-	-	1
8	We now have the capacity to buy purified water for drinking	-	-	-	-	3	-
9	We do not usually eat processed foods	-	-	-	-	2	-
10	We now prefer purified water than tap water	-	-	-	-	2	1
<b>Question 61. LIFESTYLE CHANGES: TRAVEL</b>							
1	Distance to school is closer now than before	-	1	-	-	1	1
2	Distance to get potable water (well) is closer now	-	-	1	-	3	-
3	There is no need to cross the sea	-	-	-	-	13	-
4	We now have waterline installed in our house	-	-	-	-	14	-
5	Going to school is safer now	-	-	-	-	2	-
6	The travel cost here is cheaper than before	-	-	-	-	-	1
7	Going to church/school/work is faster now than before	-	-	-	-	3	-
8	The fishing grounds is closer here than before	-	-	-	-	1	-
9	We now have electricity installed in our house	-	-	-	-	8	-
10	We cook using firewood	1	-	-	-	-	-
<b>Question 62. LIFESTYLE CHANGES: OTHERS</b>							
1	Nothing changed	1	-	-	1	-	-
2	We have more privacy now since living separately.	1	-	-	-	1	-
3	We can sleep more comfortable here	1	-	-	-	-	-
4	Our children have grown already	1	-	-	-	-	-
5	We have our own CR so no need to go to the neighbor's	-	1	-	-	1	-
6	We have our own water/electricity so need to connect to the neighbor's supply	-	1	-	-	-	-
7	We now have a modest house	1	-	-	-	-	-
8	My children/grandchildren now do not get sick often	1	-	-	1	-	-
9	The space do not feel cramped	-	-	1	1	-	-
10	I would prefer this over the previous house	-	-	-	1	-	-
11	We can now focus on other needs such as food	-	-	1	-	-	-
12	I feel more motivated here than before	-	-	1	-	-	-
13	It is different after my husband/partner died	-	-	1	-	-	-

## E. Histogram of Ratings

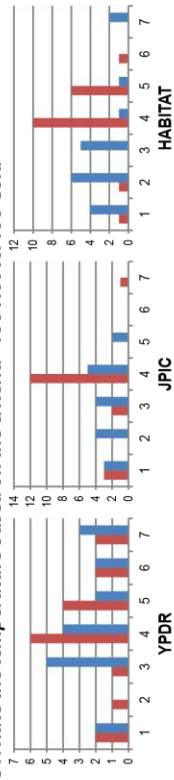


Legend for Q.30-37: ■ General Situation ■ Monsoon Period

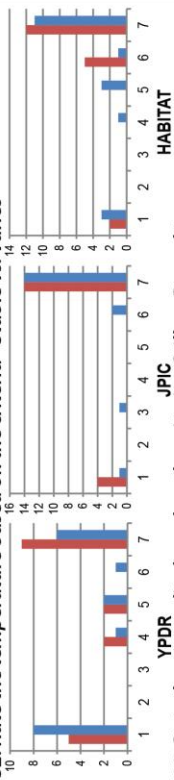
**30. Rate the temperature based on the criteria - Uncomfortable vs. Comfortable**



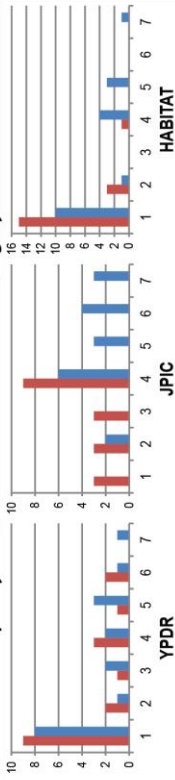
**31. Rate the temperature based on the criteria - Too Hot vs. Too Cold**



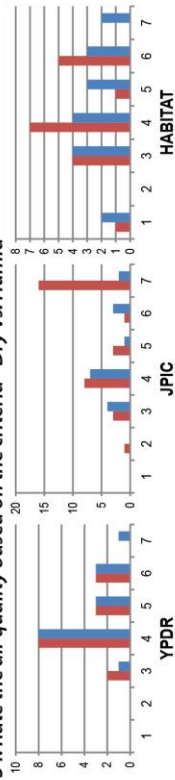
**32. Rate the temperature based on the criteria - Stable vs. Varies**



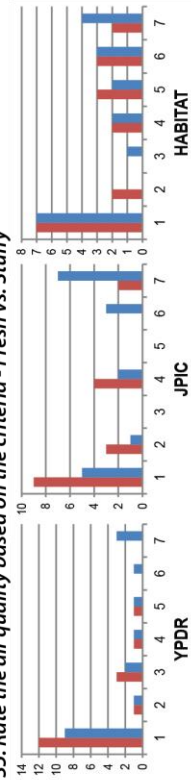
**33. Rate the air quality based on the criteria - Still vs. Draughty**



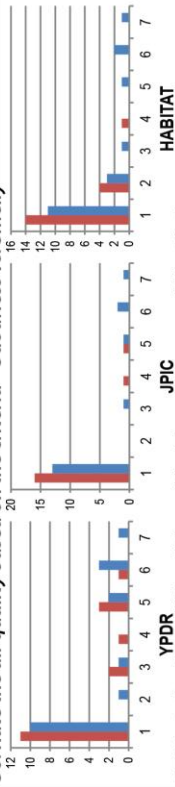
**34. Rate the air quality based on the criteria - Dry vs. Humid**



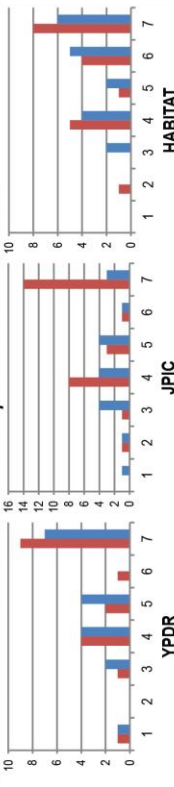
**35. Rate the air quality based on the criteria - Fresh vs. Stuffy**



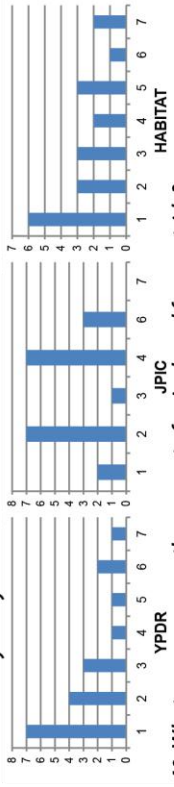
**36. Rate the air quality based on the criteria - Odourless vs. Smelly**



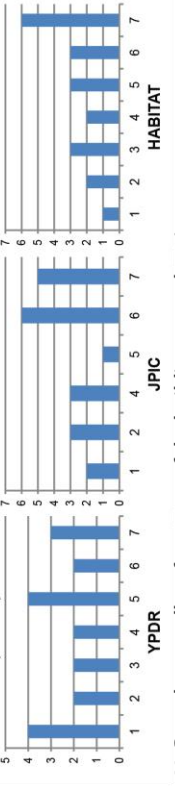
**37. Rate the Overall Condition of the Temperature and Ventilation**



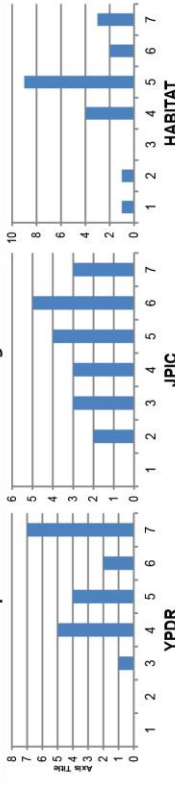
**39. What can you say on the amount of noise heard in between rooms?**



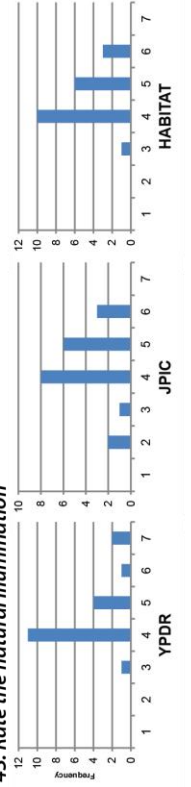
**40. What can you say on the amount of noise heard from outside?**

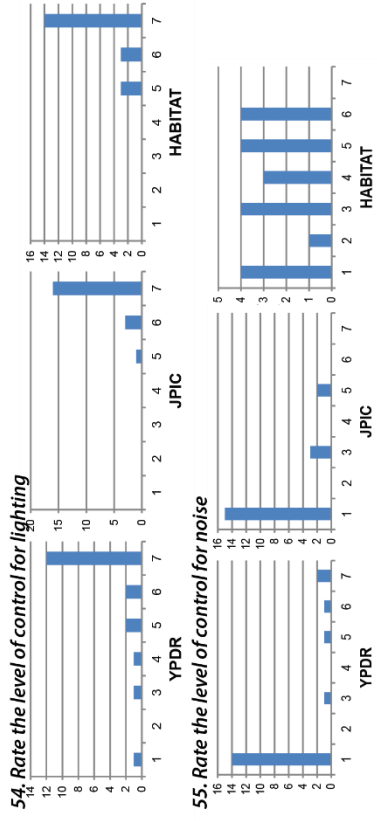
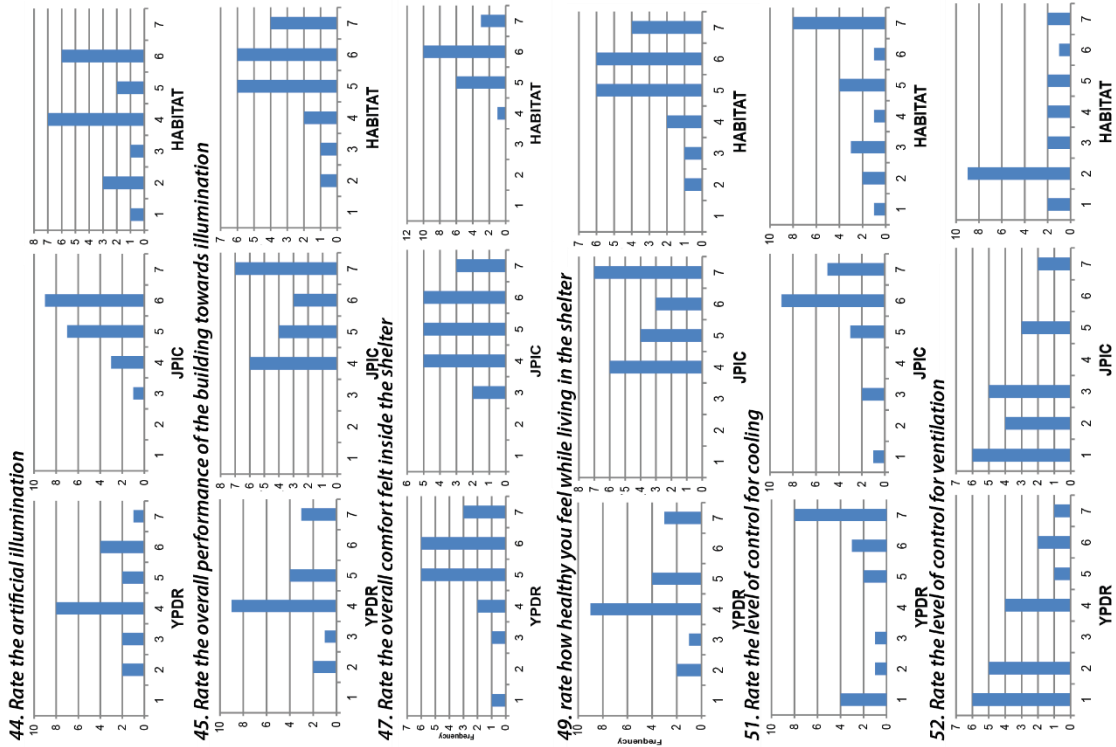


**41. Rate the overall performance of the building towards noise**



**43. Rate the natural illumination**





## F. User-initiated Renovations

CURRENT		Y	J	H	CURRENT		Y	J	H	CURRENT		Y	J	H
1	concrete hollow block			2	3	Sleeping mat			1	3	Vol 1 door - none		1	
1	lipak'	3	3	12	3	curtain	13	15	18	3	Vol 1 door - amakan	11	3	
1	corrugated G.I. sheet	2	1	8	3	amakan'		1	2	3	Vol 1 door - plywood	6	16	20
1	net			3	3	tarpaulin	8	4		3	Vol 1 door - lipak			
1	plants	5	7	9	3	plywood	5	6	13	3	Vol 2 door - none	1	8	19
1	plywood			2	3	sleeping mat	0	0	1	3	Vol 2 door - amakan	12	2	
1	clearing of grass	4	6		3	protection - tarp inside	7	6		3	Vol 2 door - plywood	9	8	1
1	miscellaneous items	1	1		3	protection - tarp outside	4	4		3	Vol 2 door - lipak			
1	firewood		1		3	Vol 1 & 2 divider (one side)	11	1	3	3	Porch door - none		1	
1	interlink	1			3	vol 1 & 2 divider (both sides)	1			3	Porch door - amakan		1	
2	tying structural elements	1		1	3	vol 1 (interior)	1	1	6	3	Porch door - lipak	1	2	
2	nailing	10	14	10	3	vol 2 (interior)	0	1	7	3	Porch door - plywood		1	
3	Ext connection - G.I. Sheet	9	10	14	3	extension	2		2	3	amakan'	29	2	
3	Ext connection - Tarpaulin	3	5	4	3	front vol 1 (exterior)	4	8		3	jalousie - glass	5	16	40
3	Ext connection - Nipa	1	7		3	front vol 2 (exterior)	5	5		3	jalousie - wood		1	
3	Removed	1			3	side vol 2 (exterior)	1			3	sliding - glass	2		
3	Changed to 'lipak'	1	1		3	Main door painted	6	7		3	sliding - wood		1	
3	Changed to 'amakan'	1	2		3	Door to vol 2 painted	1	2		3	fiber cement board	1		
3	Changed to ficem	1			3	None	9	5	3	3	opening only	2	8	
3	Changed to plywood	1	6		3	Plywood		3	2	3	plywood	1	4	
3	Changed to CGI sheet		1		3	Corrugated G.I.	2	8	6	3	ROOF IN EXT	None		4
3	CHB is plastered	4	10		3	amakan'	1	3	1	3	Corrugated G.I.	9	13	12
3	Curtain	13	23	20	3	Tarpaulin		1		3	Tarpaulin	3	4	4
3	amakan'	1	2	2	3	lipak'	4	5	3	3	Nipa	1	6	
3	Plywood	2	2	13	3	Nipa		2						
3	Furniture	2	4	12	3	CHB	2	2	4					
3	CHB	1			3	Net			1					
3	wall studs only	1												

(Y) YDR shelter; (J) JPIC shelter; (H) Habitat for Humanity permanent house;  
 (1) Site; (2) Structure; (3) Skin; (4) Services; (5) Space plan; (6) Stuff

CURRENT		Y	J	H	CURRENT		Y	J	H	CURRENT		Y	J	H				
3	FLOOR	Extension - concrete	6	6	11	5	cooking stove	inside	5	6	11	6	ORNAMENTATIONS	curtain	10	7	17	
3		Extension - wood	2			5		front				6		medals	7	11	11	
3		Vol 1 - Concrete	15	20	20	5		side	2			6		religious images	8	5	8	
3		Vol 2 - Concrete		20	20	5		rear			7	6		family photos	9	11	17	
3		Vol 2 - Plywood	2	2		5		public	7	4	4	6		learning aids		1	6	
3	CEILING	Vol 1 - plywood			1	5	ALTAR	semi-private			1	6		school projects	5	3	3	
3		Vol 1 - amakan	1			5		private	5	2	3	6		Floormat in vol 1	5	9	13	
3		Vol 1 - mat	1			5		outside of vol 1	10	8	15	6		Floormat in vol 2	4	6	13	
3		Vol 2 - plywood	1			5	SLIPPER	outside of vol 2	3			6		posters	5	5	9	
3		Vol 2 - tarpaulin		1		5		outside of porch	0	3	2	6		plywood (thermal)	0	1	4	
3		Extension - tarpaulin		1		5		CURTAINS	Vol 1 - privacy	6	12	5	6	SLEEPING	mats on floor	12	6	18
4		WIRING	fastened	10	17	2			5	Bet. Vol 1 & 2 - privacy			4		6	foam on floor	4	2
4	embedded in walls		1			5	Vol 2 - privacy		12	9	16	6	bamboo bed + mat		3	8	7	
4	hanging		17	13	18	5	Extension - privacy		2	6		6	bamboo bed + foam		1	6	4	
4	PLUMBING	embedded in walls				5	Vol 1 - shade/glare		2	3	5	6	mattress on floor		4	1	1	
4		exposed			10	5	Bet. Vol 1 & 2 - shade/glare		1	10	9	6	none	8	9	10		
5	VOL 1	public	13	10	20	5	Extension - shade/glare			3	2	6	CLOTHES STORAGE	makeshift wood cabinet (free standing)	2	2	1	
5		semi	4	8	4	5	Vol 1 - divider		2	1	2	6		makeshift wood cabinet (fixed)	2	2	7	
5		private	1	2		5	Bet. Vol 1 & 2 - divider				4	6		shelves	3	7	3	
5	VOL 2	public	1	1	1	5	Vol 2 - divider		2	5	6	6		cardboard box	8	11	13	
5		semi	1		1	5	Extension - divider	1	1		6	sack			1	3		
5		private	19	18	18	5	Bet 1 & 3 - divider	2			6	plastic cabinet		13	10	13		
5	EXTENSION	public	3	11	4	5	Vol 1 - dust protection	1	0	0	6	CURTAINS		cover of storage	1	6	8	
5		semi	3	3	2	6	ceiling fan in vol 1	13	7	9	6			door		6	13	
5		private	3	4	13	6	ceiling fan in vol 2	24	6	15	6			Vol 1 - ornamentation	10	9	15	
5	"abuhan"	front	4	7		6	FANS	stand fan	10	6	9			6	Bet. Vol 1 & 2 - ornamentation	0		3
5		side	5	5		6		ceiling fan in extension		3			6	Vol 2 - ornamentation	10	14	18	
5		rear	1	1	6	6		LED Light in vol 1	11	13	14		6	Extension - ornamentation	1	5		
5		inside				6	LED Light in vol 2	15	10	2								
5	WC - given		3		20	6	LIGHTING	LED in extension spaces	6	8	5							
5		WC - selfmade		4		6		tv	16	19	18							

(Y) YDR shelter; (J) JPIC shelter; (H) Habitat for Humanity permanent house;

(1) Site; (2) Structure; (3) Skin; (4) Services; (5) Space plan; (6) Stuff

FUTURE RENOVATIONS			Y	J	H
1		Apprehensive of making big changes since the family do not own the lot.	1		
1		Cannot be moved since the access road is too small	1		
1		fencing at rear			1
1		The fence at the kitchen is already broken			1
2		The wood parts have been 'eaten' by termites already	3	5	
2		increase size of structure		2	
2		The wooden parts are already rotten		1	
2		planning to have vol 2 same level with vol 1	5	-	
2		We fell into the crack several times since the 'lipak' floors are decaying.	3		
2		strengthen so the house will not shake when there is a strong wind.	1		
2		straighten the walls	1		
2		Improve the kitchen at the rear			5
2		The floor of the CR is not properly leveled.			1
2		septic tank for dishwashing			1
3	ROOF	Rusty why it is leaking	1	2	2
3		roofing at extension	2	1	9
3		corrugated G.I.			1
3	WALL	marine plywood	2	6	
3		CHB	2	4	
3		fiber cement board	1	1	
3		wall veneer at interior	1	3	
3		improve wall of vol 3	1		
3	FLOOR	plywood in Vol 2	1		
3		Concretize Vol. 1	1		
3		Concretize extension			1
3		floor tiles			2
3	WINDO W	Repair windows			2
3		jalousie		2	
3	DOORS	replace door hinge			1
3		doors break easily			2
3	OTHERS	Paint the interior			4
3		Place ceiling			1
5		extension		5	1
5		division in the rooms			2
6		clothes storage			1
6		padlock of door			2
6		The door knob and the jalousie breaks easily.			1

(Y) YDR shelter; (J) JPIC shelter; (H) Habitat for Humanity permanent house;  
 (1) Site; (2) Structure; (3) Skin; (4) Services; (5) Space plan; (6) Stuff

## G. GPS Locations of Survey Sample

Young Pioneer Disaster Response		Justice, Peace & Integrity of Creation		Habitat for Humanity + MARCH for Christ	
1	11.17532, 123.79379	1	11.18554, 123.78203	1	11.14824, 123.72229
2	11.17553, 123.79414	2	11.18554, 123.78179	2	11.14829, 123.72222
3	11.17286, 123.79685	3	11.18747, 123.77101	3	11.14818, 123.72191
4	11.17271, 123.79755	4	11.17948, 123.78366	4	11.1488, 123.7221
5	11.17263, 123.79759	5	11.17934, 123.78285	5	11.14905, 123.72198
6	11.15036, 123.72484	6	11.17907, 123.78342	6	11.14956, 123.72176
7	11.14857, 123.72328	7	11.17913, 123.78391	7	11.1493, 123.72121
8	11.14935, 123.72971	8	11.17803, 123.78584	8	11.14912, 123.72194
9	11.1492, 123.72972	9	11.17513, 123.78893	9	11.14972, 123.72176
10	11.17854, 123.78483	10	11.17514, 123.78907	10	11.14774, 123.72198
11	11.17319, 123.79726	11	11.17506, 123.78917	11	11.14876, 123.72165
12	11.18509, 123.77381	12	11.17523, 123.78893	12	11.14881, 123.72164
13	11.18483, 123.77326	13	11.17519, 123.78888	13	11.14928, 123.7219
14	11.18963, 123.77232	14	11.17521, 123.78883	14	11.14784, 123.7224
15	11.18963, 123.77257	15	11.18818, 123.77975	15	11.1484, 123.72078
16	11.17475, 123.79382	16	11.18586, 123.78159	16	11.14868, 123.72075
17	11.1545, 123.80089	17	11.18628, 123.77964	17	11.14955, 123.72103
18	11.15494, 123.80114	18	11.18575, 123.78134	18	11.14969, 123.72139
19	11.16823, 123.76743	19	11.186, 123.78107	19	11.14777, 123.72176
		20	11.18877, 123.77017	20	11.14875, 123.72177

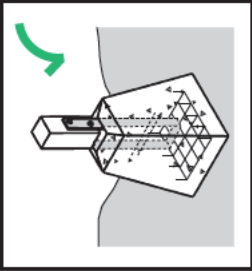


## H. Build back Safer – Design Infographics

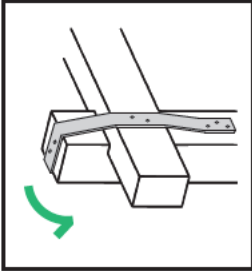
V1.1

### 8 BUILD BACK SAFER KEY MESSAGES

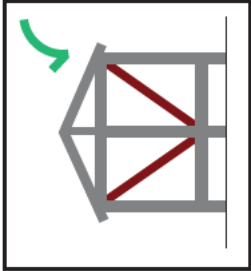
**1 BUILD ON STRONG FOUNDATIONS**



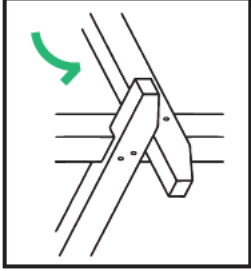
**2 TIE-DOWN FROM BOTTOM UP**



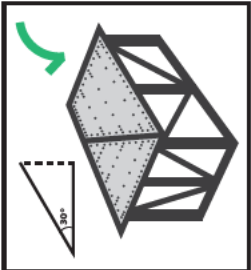
**3 BRACE AGAINST THE STORM**



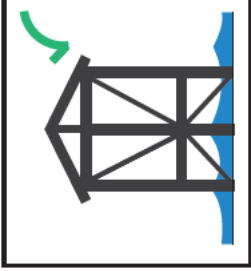
**4 USE STRONG JOINTS**



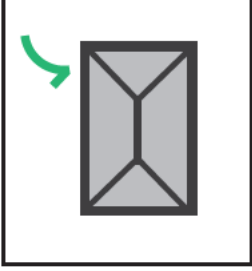
**5 A GOOD HOUSE NEEDS A GOOD ROOF**



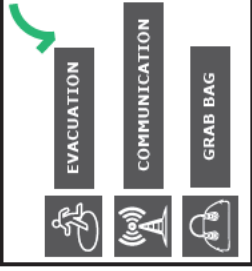
**6 SITE YOUR HOUSE SAFELY**



**7 A SIMPLE SHAPE WILL KEEP YOU SAFE**

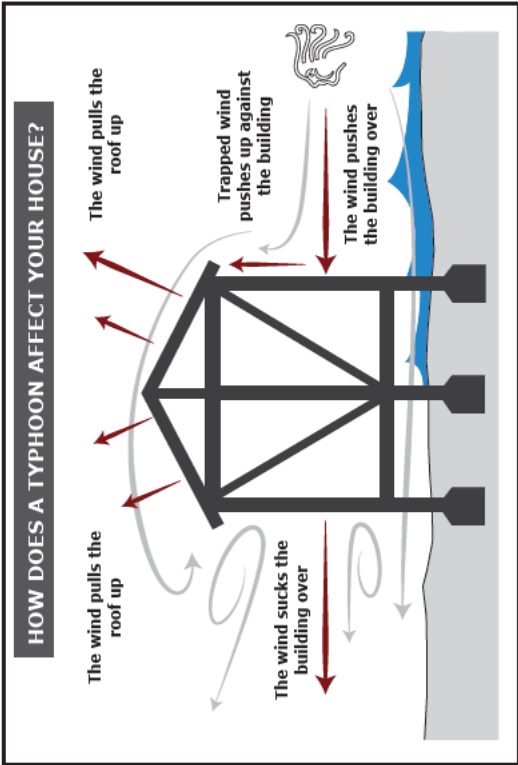



**8 BE PREPARED**



**Yolanda showed us that the way we build houses needs to be stronger. These are 8 key messages on how to repair your house and build back safer.**

**HOW DOES A TYPHOON AFFECT YOUR HOUSE?**





**Shelter Cluster Philippines**  
ShelterCluster.org  
Coordinating Humanitarian Shelter

(ShelterCluster.org, 2017)

Die approbierte gedruckte Originalversion dieser Diplomarbeit ist an der TU Wien Bibliothek verfügbar.  
The approved original version of this thesis is available in print at TU Wien Bibliothek.

*Now this is not the end.  
It is not even the beginning of the end.  
But it is, perhaps, the end of the beginning.*

*Winston Churchill*