



IHS
Making cities work

IHS is the international institute of urban management
of Erasmus University Rotterdam

Erasmus

MSc Programme in Urban Management and Development

Rotterdam, The Netherlands

September 2017

**The Influence of place attachment to the
mobility patterns of urban island communities
in the context of climate change**

The case of Pangan-an Island, Lapu-Lapu City, Cebu, Philippines

Name: Edeliza Velasco Macalandag

Supervisor: Dr. Maartje van Eerd, Ph.D.

Specialization: Urban Housing and Livelihoods

UMD 13

MASTER'S PROGRAMME IN URBAN MANAGEMENT AND DEVELOPMENT
(October 2016 – September 2017)

The Influence of Place Attachment to the Mobility Patterns of Urban Island Communities in the Context of Climate Change

The Case of Pangan-an Island, Lapu-Lapu City, Cebu, Philippines

Edeliza Velasco Macalandag, uap
Philippines

Supervisor: Dr. Maartje van Eerd, Ph.D.

UMD 13 Report Number: 1088
Rotterdam, September 2017

Summary

The need for better understanding of the mobility characteristics of climate-sensitive populations comes with the growing shift in the treatment of human movement not just as an inevitability driven by climate change vulnerability but as a climate adaptation strategy.

This study deviates from the go-to economic factors in both adaptation and mobility, instead examines an emotional mobility driver – place attachment, or the bond of people to a place of meaning, utility and familial connection (Altman & Low 1992; Hidalgo & Hernandez 2001). Often exhibited in a person's preference to be in or near a place of affinity and affection, the presence of place attachment is extracted and measured in this study by way of its three dimensions of symbolism (place identity), functionality (place dependence), and temporality (place rootedness) – and see if this has any influence in the mobility patterns of small urban island communities exposed to climate change.

Inspired from the adaptive mobility actions set by tiny atoll communities in the Pacific, the most climate-vulnerable communities in the world yet among the most proactive climate adaptors, this study looks into the similar climate-sensitive and development-marginalized low-lying densely populated small island urban and peri-urban island communities in the Danajon Bank in central Philippines, and examines the influence of place attachment to their mobility patterns.

Ultimately, this study – in seeking to determine the influence of place attachment to human mobility in the light of its recent prescription as an adaptive response to climate change – extracts for immobility tendencies in vulnerable communities which could lead to maladaptive mobility choices.

The research locale is Pangan-an Island (population: 2,070, as of 2015), an urban island barangay belonging to the highly urbanized city (HUC) of Lapu-Lapu (population: 408,112, as of 2015), Cebu province, in the Philippines.

Using the survey research design, the survey questionnaire was the primary quantitative data collection methodology, supported by qualitative semi-structured interviews with experts and key informants from the community. The research sought to independently determine the level of place attachment, mobility characteristics, climate change risk perception among the study sample and then test for the statistical influence of place attachment to the mobility patterns of Pangan-an residents. The confounding impact of climate change risk perception to the two key concepts is also examined.

The findings of the study reveal that the people of Pangan-an is brimming with moderately strong place attachment. Among the three place attachment dimensions, place rootedness is the strongest. Place identity was professed to be strong but was not matched with strong place care practices. Their utilitarian satisfaction to place, is found to be moderate, corresponding to the moderate level of social satisfaction. Their strong residential satisfaction despite the absence of most public utilities while an aberration is corroborated with other studies which found high satisfaction even in deprived neighborhoods.

As for their mobility characteristics, they lean towards immobility, as derived from their low movement cycles, lack of desire for resettlement, as well as their low capacity for movement. Further, the immobile among their population are more attached to the place. Their place

attachment – formed by strong familial roots to place, and their middling self-identification and sense of contentment towards their community – tested as a negative influence to their mobility.

However, the climate change risk perception among the Pangan-an Island residents resulted in negligible effect size on both the place attachment and mobility patterns of the Pangan-an community. But despite that, plus the weak effect size of place attachment to mobility, still, these emotional and psychological traits in individuals and communities should be considered alongside the other mainstream factors in community-based climate change adaption and mitigation (CCAM) policy and actions.

The Pangan-an Island residents may be deprived and underprivileged but they are well-adjusted and fairly satisfied, and have little capacity nor the desire to move – and this propensity for immobility, as revealed in this study, is also spurred by their deep affections for their close-knit island culture, people and place – these are all admirable qualities of a community setting their own course, a romantic notion of self-determination. But, in the light of increasing climate change impacts particular to low-lying small islands such as coastal erosion and inundation, deep anchorage, is cause for alarm.

There are non-economic intangible psychosocial and place-based aspects in a community's mobility choices and these factors must be weighed in and integrated into the national, local and community-based climate adaptive mobility policy, planning and action.

Keywords

place attachment, climate displacement, climate mobility, trapped populations, urban islands

Abbreviations

CANCC	Coalition of Atoll Nations on Climate Change
CC	Climate Change
CCAM	climate change adaptation and mitigation
DRRM	disaster risk reduction and management
ERB	environmentally-responsible behavior
HUC	highly-urbanized city
IHS	Institute for Housing and Urban Development
IOM	International Organization for Migration
IPCC	Intergovernmental Panel on Climate Change
LGU	Local Government Unit
NIMBY	not in my backyard
PCCC	Philippine Climate Change Commission
UN	United Nations
UNFCCC	United Nations Framework Convention on Climate Change
UNGA	United Nations General Assembly
UNHCR	United Nations High Commissioner for Refugees

Table of Contents

Summary.....	3
Keywords	4
Abbreviations	5
Table of Contents	6
List of Figures.....	8
List of Tables	9
Chapter 1: Introduction	10
1.1 Background.....	10
1.1.1 Human Mobility and Climate Change.....	10
1.1.2 Adaptive Capacity and Mobility in Small Island Communities	12
1.2 Problem Statement.....	12
1.2.1 The Research Locale: <i>Pangan-an Island, Lapu-Lapu City, Cebu, Philippines</i>	13
1.3 Research Objectives	16
1.4 Research question(s).....	16
1.5 Significance of the study	16
Chapter 2: Literature Review.....	17
2.1 Making Sense of Place Attachment.....	17
2.1.1 Place Attachment Theorized	17
2.1.2 Place Attachment Defined.....	18
2.1.3 Place Attachment Deconstructed	19
2.1.4 Place Attachment in Praxis	20
2.1.4.1 Place Attachment and Attitudes towards the Environment	20
2.1.4.2 Place Attachment in Place-Making Disciplines and the Urban Environment	22
2.2. Tracking human movement in the context of climate change	24
2.2.1 Mobility Ebbs and Flows	25
2.2.2 Contextualizing Perceptions to Climate Change Risk.....	26
2.4 Place Attachment, Mobility and Climate Change Nexus	26
2.4.1 Conceptual Framework.....	28
Chapter 3: Research Design and Methodology.....	30
3.1 Operationalization	30
3.1.1 Measuring Place Attachment	32
3.1.2 Measuring Mobility Patterns.....	33
3.1.3 Measuring Climate Change Risk Perceptions	33
3.2 The Research Strategy	34
3.3 Data Collection Methods.....	35
3.3.1 Survey Questionnaire.....	35
3.3.1.1 Questionnaire Design	35
3.3.1.2 Sampling.....	35
3.3.2 Semi-structured interview	36
3.3.2.1 Sampling.....	36
3.4 Data Analysis Methods.....	37
3.4.1 Reliability and Validity	37
3.4.2 Credibility	38
3.5 Limitations and delimitations	38
Chapter 4: Research Findings and Analysis	39
4.1 The Sample Population.....	39
4.1.1 Demographic Profile	39

4.2 Human Mobility Patterns.....	43
4.2.1 Mobility Experience.....	43
4.2.1.1 Off-Island Residency Experience.....	43
4.2.1.2 Off-Island Travel Experience.....	44
4.2.1.3 Mobility Experience Index.....	46
4.2.2 Mobility Agency.....	47
4.2.2.1 Mobility Disposition.....	47
4.2.2.2 Mobility Capacity.....	48
Economic Situation.....	48
Migrant Network.....	48
Mobility Capacity Index.....	50
4.2.2.3 Mobility Agency Index.....	50
4.2.3 Human Mobility Patterns.....	51
4.3 Place Attachment.....	53
4.3.1. Place Identity.....	53
4.3.1.1 Expressed Place Meaning.....	53
4.3.1.2 Applied Place Meaning.....	54
4.3.1.3 Place Identity Index.....	55
4.3.2 Place Dependence.....	56
4.3.2.1 Social Satisfaction.....	56
4.3.2.2 Residential Satisfaction.....	57
4.3.2.3 Place Dependence Index.....	58
4.3.3 Place Rootedness.....	59
4.3.4 Place Attachment Index.....	60
4.4 Climate Change Risk Perceptions.....	62
4.4.1 Net Climate Change Risk Perception.....	65
4.5 Place Attachment – Human Mobility – Climate Change Connectivity.....	66
4.5.1 The Climate Change Risk Perception Connection to Place Attachment & Human Mobility	66
4.5.1.1 Influence of Climate Change Risk Perception to Place Attachment.....	66
4.5.1.2 Influence of Climate Change Risk Perception to Mobility Patterns.....	67
4.5.2 Influence of Place Attachment to Mobility Patterns.....	67
Test for Association.....	68
Strength of Association.....	68
Chapter 5: Conclusion.....	70
Climate Change Risk Perception: Moderate.....	70
Mobility Pattern: Immobile.....	71
Place Attachment: Moderate.....	71
Ties that bind: Place attachment affects mobility.....	72
Reflections and recommendations.....	74
Bibliography.....	75
Annex 1: Research Instruments.....	83
Annex 1.1 Survey Questionnaire.....	83
Annex 1.2 Interview Guide: Key Informant.....	90
Annex 1.3 Interview Guide: Experts (Resource Persons).....	93
Annex 2: Photographic Documentation.....	96
Annex 3: IHS copyright form.....	100

List of Figures

Figure 1. Key Concepts in Human Mobility	11
Figure 2. Pangan-an Island Location Map	15
Figure 3. Conceptual Framework.....	29
Figure 4 Measuring Place Attachment.....	32
Figure 5. Measuring Mobility Patterns	33
Figure 6. Measuring Climate Change Risk Perceptions	33
Figure 7 Age-Sex Pyramid.	40
Figure 8 Level of Education	40
Figure 9 Primary Livelihood Source.....	41
Figure 10 Total Household Income Distribution.....	41
Figure 11 Housing Situation	42
Figure 12 Determining the Human Mobility Pattern in Pangan-an.....	43
Figure 13 Off-Island Residency Experience	43
Figure 14 Off-Island Residency Experience Index.....	44
Figure 15 Off-Island Travel Frequency (M1).....	44
Figure 16 Off-Island Travel Experience (M1) Index ¹	45
Figure 17 Off-Island Travel Frequency (M12).....	45
Figure 18 Off-Island Travel Frequency (M12) Index ²	45
Figure 19 Off-Island Travel Experience Index.....	46
Figure 20 Mobility Experience Index	46
Figure 21 Mobility (Resettlement) Disposition	47
Figure 22 Mobility (Resettlement) Disposition Index	47
Figure 23 Economic Situation	48
Figure 24 Family Network	48
Figure 25 Family Network Index.....	49
Figure 26 Extended Family Network	49
Figure 27 Extended Family Network Index.....	49
Figure 28 Migrant Network Index	49
Figure 29 Mobility Capacity Index.....	50
Figure 30 Mobility Agency Index	50
Figure 31 Human Mobility Index.....	51
Figure 32 Mr. Pogoy's travels of note.	52
Figure 33 Place Attachment Formula	53
Figure 34 Expressed Place Meaning.....	53
Figure 35 Expressed Place Meaning Index	54
Figure 36 Applied Place Meaning.....	54
Figure 37 Applied Place Meaning Index.....	55
Figure 38 Place Identity Index.....	55
Figure 39 Social Satisfaction	56
Figure 40 Social Satisfaction Index	56
Figure 41 Residential Satisfaction	57

Figure 42 Residential Satisfaction Index.....	57
Figure 43 Place Dependence Index.....	58
Figure 44 History of Residency.....	59
Figure 45 Ancestral Roots to Place.....	59
Figure 46 Place Rootedness Index.....	59
Figure 47 Roots of Pangan-an Sample Population.....	60
Figure 48 Place Attachment Index.....	61
Figure 49 Climate Change Experience.....	62
Figure 50 Climate Change Experience Index.....	63
Figure 51 Natural Hazards Response.....	63
Figure 52 Natural Hazards Response.....	64
Figure 53 Expressed Climate Change Risk Perception.....	64
Figure 54 Expressed Climate Change Risk Perception Index.....	65
Figure 55 (Net) Climate Change Risk Perception Index.....	65
Figure 56 Level of Place Attachment of Aggregated Mobile/Immobile Residents.....	67
Figure 57 Best-fit Model on the influence of place attachment to mobility.....	69

List of Tables

Table 1. Operationalization Table.....	31
Table 2. Research Design.....	34
Table 3. Data Collection.....	35
Table 4. Key Informant Sample.....	37
Table 5 Mobility Experience Summary Statistics.....	46
Table 6 Mobility Agency Summary Statistics.....	51
Table 7 Pangan-an Mobility Patterns Summary Statistics.....	51
Table 8 Place Identity Summary Statistics.....	55
Table 9 Quality of services and facilities in the community.....	58
Table 10 Place Dependence Summary Statistics.....	58
Table 11 Place Rootedness Summary Statistics.....	60
Table 12 Place Attachment Summary Statistics.....	61
Table 13 Climate Change Risk Perception Summary Statistics.....	65
Table 14 Summary statistics of the three main variables.....	66
Table 15 Summary of Test of Association Results: Climate Change Risk Perception and Place Attachment.....	66
Table 16 Summary of Test of Association Results: Climate Change Risk Perception and Mobility Patterns.....	67
Table 17 Summary Results of Chi-Square Test for Independence.....	68
Table 18 Summary of Results in the Test for Strength of Association.....	68

Chapter 1: Introduction

1.1 Background

While all countries in the world are experiencing the effects of climate change¹, low-lying small islands and the communities they support – with their small size, peripherality, resource limitations, and limited development potentials – are particularly vulnerable to the increasing and intensifying effects of climate change such as the rising sea levels, and ever-escalating cyclones, monsoon rains, storm surges and coastal inundations, which not only threaten with decimations and disruptions of lives and livelihoods but endanger the very existence of their entire territories (UNGA 1994; IPCC 2015).

As climate change front liners, it is imperative for small island communities to increase their adaptive capacities and take the lead in climate adaptation. Adaptation is any of the array of adjustments in ecological and socio-economic policies and practices to allay, accommodate or tap opportunities from actual or expected climate change impacts (IPCC 2007; UNFCCC 2017 as cited in Biagini 2014). Adaptive capacity is the totality of “strengths, attributes and resources available to an individual, community, society, or organization” to adapt to climate change (IPCC 2012: 556). One coping action that is more and more explored and inscribed into the adaptation lexicon is human mobility.

1.1.1 Human Mobility and Climate Change

Mankind has been freely moving throughout history for various reasons, but contemporary humans, apart from leisurely and adventure travel, move to seek opportunities to improve living standards, and health and education outcomes, and/or to live in safer communities. Human mobility, the umbrella term for the movement of populations, in groups or as individuals, from one place to another, is a key ingredient to human freedom and development (UNDP 2009).

As changes in the climate heighten, global threats to natural and human systems increase. Among the many adverse effects are large-scale population displacement and movement as families and communities seek more secure living conditions and livelihoods elsewhere, or are driven out by the inevitability of settlements becoming uninhabitable and/or being literally washed away into non-existence (IPCC 2015). Climate displacement, or the involuntary movement of people due to climate change, is projected to increase each year, especially as populations lacking in resources to migrate experience higher exposure to extreme weather events (UNCHR et al. 2015).

On the other hand, migration in the context of climate change – defined as the voluntary movement of people away from climate change and disaster risks – while previously seen primarily as a failure to adapt, is being more and more considered and acknowledged as a

¹ As defined in the United Nations Framework Convention on Climate Change (UNFCCC 1992), the term ‘climate change’ is differentiated here as the anthropogenic changes in the state of the climate, in contrast to ‘climate variability’ which is attributed to the ‘natural processes within the climate system’ (IPCC 2012, p: 557). Acknowledging the human hand in the alteration of our climate system is important (Maibach et al 2014) because climate change mitigation seeks to minimize or reverse the very human interventions that increase emissions of climate-altering greenhouse gases (IPCC 2012). Mitigation is crucial in climate risk management (IPCC 2015). Further, integration of climate mitigation, adaptation and sustainable development is called for in global climate action (IPCC 2015).

‘nuanced’ but practical and effective adaptation measure (IPCC 2015; UNHCR et al. 2015; Tacoli 2009:513).

In fact, the inclusion of human mobility into the greater UNFCCC adaptation framework is fairly recent. It debuted in the 2011 Cancun Adaptation Framework (UNFCCC 2011) as one of the ‘reinforced adaption actions’ prescribed in the agreement which urged parties to draw up “measures to enhance understanding, coordination and cooperation with regard to climate change induced displacement, migration and planned relocation where appropriate, at national, regional and international levels” (UNFCCC 2011: 5).

Human Mobility		
Displacement	Migration	Planned Relocation
The involuntary movement of people from their homes	Voluntary movements of individuals or families	Organized relocation, often initiated and managed by the State with the community’s consent or request

*Figure 1. Key Concepts in Human Mobility
(UNHCR et al. 2015)*

Since then, the discourse on climate mobility in all its different forms, types and levels has been expanded and expounded. Among the first efforts to define it further was the “Peninsula Principles on Climate Displacement Within States” which set protection and assistance provisions for in-country climate-displaced persons, in accordance with the UN Guiding Principles on Internal Displacement. This Peninsula guideline was drafted and approved by representatives from Australia, New Zealand, Bangladesh, the Netherlands, Switzerland, the United Kingdom, Germany, Egypt, Tunisia and the United States in August 2013 (Displacement Solutions 2013).

Shortly after, in 2015, the Nansen Initiative², a “state-led, bottom-up consultative process” to build capacities and consensus on key protection principles for disaster and climate change displaced persons across borders, followed suit with the release of the “The Nansen Initiative Agenda for the Protection of Cross-border Displaced Persons in the Contexts of Disasters and Climate Change”.

In the same year, the Recommendation from the Advisory Group on Climate Change and Human Mobility³ for the 2015 United Nations Framework Convention on Climate Change (UNFCCC) Conference of Parties (COP) 20 in Lima, Peru called for human mobility solutions that can ‘preemptively’ be carried out – before displacement or other risky movements happen (UNHCR et al. 2015).

For their part, the United Nations High Commissioner for Refugees (UNHCR), together with Georgetown University’s Brookings Institute for the Study of International Migration led an

² The Nansen Initiative was borne from the pledge by the Governments of Switzerland and Norway, supported by several States, to cooperate with interested States and other relevant stakeholders, and was launched in October 2012. The Steering Group is chaired by Switzerland and Norway and includes the following countries: Australia, Bangladesh, Costa Rica, Germany, Kenya, Mexico and the Philippines. (The Nansen Initiative 2013)

³ The UNHCR, IOM, UNU-EHS, UNDP, ILO, NRC/IDMC, Sciences Po-CERI and Refugees International comprises the Advisory Group on Climate Change and Human Mobility.

initiative that produced the “Guidance on Protecting People from Disasters and Environmental Change through Planned Relocation” (UNHCR 2015).

1.1.2 Adaptive Capacity and Mobility in Small Island Communities

Meanwhile, small islands communities in the Pacific – guided by their traditions of mobility as seafaring cultures, and their history of population consolidation and resettlement during colonial times – have already been proactively initiating migration and resettlement policies and programs in response to felt and foreseen climate change risks (Pascoe 2015; Edwards 2013).

In the case of Kiribati, the government – through the nationwide skilled-labour relocation strategy dubbed 'migration with dignity' policy – encourages and actively enables individual-and/or household-level migration to other countries such as Australia and New Zealand as an integrated poverty alleviation and climate adaptation measure (McNamara 2015). Additionally, the state has announced plans of a possibility to relocate the entire nation to Fiji, with which the Fijian government and other members of the Coalition of Atoll Nations on Climate Change (CANCC) have endorsed and responded to positively (Ellsmoor and Rosen 2016).

Papua New Guinea’s Carteret Islands community, on the other hand, chose a whole-community anticipatory resettlement approach. The community created their own NGO, Tulele Peisa, to lead an “ecologically and culturally sustainable” staged relocation and resettlement program for the Tulun/Carteret Atoll community with an emphasis on “community self-reliance and self-determination” (Tulele Peisa; Edwards 2013).

These anticipatory voluntary mobility and motility of individuals and communities are contextualized adaptation strategies initiated head of international guidelines.

Meanwhile, there is a need to understand the current and on-going mobility patterns in other vulnerable small island communities and see how these are reinforced or are reinforcing their adaptive capacity and sustainable development.

Particularly, there is a need to look out for tendencies towards immobility in vulnerable communities which could lead to what climate migration literature refer to as ‘trapped populations’, those who are unable to move out of a direct danger or crisis situation due to physical, financial, security, logistical, health and/or other reasons and thus need to be relocated (Black et al 2011; Martin et al 2014)

1.2 Problem Statement

The Philippines is among the most climate change -susceptible countries⁴, cyclically and continuously battered by natural disasters as typhoons, monsoon precipitation, storm surges, earthquakes and volcanic eruptions. Further, factors such as rapid urbanization, high poverty

⁴ The Philippines was ranked 13th most climate-vulnerable country of 186 countries in the 2016 Climate Change Vulnerability Index (CCVI) of international risk analysis firm Verisk Maplecroft; the 4th most climate-change-affected in 2014 and 4th for Long-Term Climate Risk (1995-2014) in the Germanwatch Global Climate Risk Index 2016; and the 3rd country, next only to Tonga (2nd) and Vanuatu (1st), with the highest disaster risk in the United Nations University World Risk Index 2015 (for the year 2013 data, the Philippines was ranked number 1, attributable to the wrath of super typhoon Haiyan).

incidence, poor planning, environmental degradation, and high population density in hazard-prone areas, exacerbate this vulnerability (NDRRMC 2014).

While the national climate change assessment is not detailed and specific down to the smaller islands groups in the country, the latest global climate change study (Rietbroek 2016) reports that the rising of sea levels near the Philippines is five times higher than the global average, which will have serious consequences to the country's 7,641 islands and their coastlines that are home to about 60%⁵ (World Bank 2005) of the Philippine's population of 100,981,437 (Philippine Statistics Authority 2015).⁶

Of those, residents from the hundreds of small island *barangays* (villages) scattered across the archipelago stand to be the most exposed to climate change. Because of their isolation, in both physical location and access to social, economic and political infrastructures, small island communities in the Philippines are some of the poorest in the country (CCS et al. 2011).

Christian Aid's Building Disaster-Resilient Small Island Communities Project or BDRSIP (Sep 2008 – Dec 2009) and Advancing Safer Communities and Environments against Disasters or ASCEND (2011) "Project Experiences in Capacitating Communities" enumerates the following vulnerabilities faced by Philippine small island barangays, *inter alia*: resource limitations, usually resulting in food insecurity and chronic poverty; lack of self-sufficiency and high dependence on the mainland; lack of access and links to market institutions and technology; political/social marginalization due to the existing governance structure; lack of alternative sustainable livelihoods to complement farming and fishing; direct exposure to climate-related hazards, especially typhoons and storm surges; lack of risk assessment, early warning, and search and rescue capacity; and isolation, especially when disasters strike (CCS et al. 2011).

Additionally, living in these island barangays are not the most ideal of living conditions, with no fresh water and energy supply, and lack of waste management systems in the household and community level.

However, despite the aforementioned harsh conditions, populations in these small island communities are increasing, the subsequent population densification aggravating their already precarious living conditions.

1.2.1 The Research Locale: *Pangan-an Island, Lapu-Lapu City, Cebu, Philippines*

Lapu-Lapu⁷ City, with a population of 408,112 (as of 2015), is a first class highly-urbanized city (HUC)⁸, in the province of Cebu in the Philippines, which is listed by the National Climate Change Commission in its 2017 Climate Change Adaptation and Mitigation (CCAM)

⁵ 64 (of the 79) provinces and 822 (of the 1,502) municipalities in the Philippines are coastal (World Bank 2005).

⁶ In 2013, those very coastal residents were among the most affected by tropical storm Yolanda (Haiyan), one of the strongest and deadliest tropical cyclones in the northwestern Pacific history (Mei et. al. 2015) which left on its wake a record of 6,300 deaths, 1,062 missing, 28,688 injured, 4.4 million displaced and damage to infrastructural, productivity, social and cross-sectoral properties estimated at PhP571.1 billion, not to mention the long-term stress and trauma to the 3,424,593 families or 16,078,181 persons from the 591 (+57) affected municipalities and cities (NDRRMC 2013).

⁷ The city is named after Datu Lapu-Lapu, the local chieftain of then Mactan, who defeated the Portuguese explorer Ferdinand Magellan in 1521.

⁸ In the Philippines, an HUC is a city with: (1) a minimum population of 200,000 inhabitants; and (2) an annual income of at least 50 million pesos based on 1991 constant prices, as certified by the city treasurer.

Situationer as one of the top 10 provinces most susceptible to combined climate hazards and poverty.

The city occupies most of Mactan Island and is linked to the greater Cebu Metropolitan Area of mainland Cebu by the Mactan-Mandaue Bridge and Marcelo Fernan Bridge. Mactan-Cebu International Airport, the second busiest airport in the Philippines, is located in the city (Lapu-Lapu City LGU). Covering a total land area of 58.10 square kilometers, the city has a total of thirty (30) urban barangays, eight (8) of which are located in Olango Island, while a further three (3) are islet barangays (Lapu-Lapu City LGU 2017).

The proposed community for this study is one of these islet barangays, Pangan-an, with a population of 2,070 (3.06% per annum growth rate, as of 2015). Pangan-an Island, part of the Olango Island Group, lies south of the main Olango Island. During low tide, the flat coral-bedrock that separates the two islands dries up allowing access by foot or land transportation (Dico 2008).

Like most island communities in the Philippines, the traditional sources of living of Pangan-an residents are fishing and its related activities. But these, the local government reports, have since expanded to personnel services, small and micro enterprises and tourism-related opportunities. While there is nothing specifically unique with the chosen study area in the context of the study, in fact it shares similar characteristics with the island barangays in the larger reef zone between the provinces of Cebu and Bohol, the following are some of the reasons for the selection of Pangan-an Island as the research area:

1. It is an urban island barangay – in a satellite islet next to the protected Olango Island Wildlife Sanctuary belonging to the Olango Island Group belonging to the highly urbanized city of Lapu-Lapu, which is part of the country's second biggest metropolis – that faces multiple levels of climate vulnerability and disaster risks. Additionally, it also lies in the Danajon Bank, touted for its rich marine biodiversity and unique double barrier reef formation, often peered on by development organizations not just for their marine resources but for their overpopulated impoverished and underserved small island communities.
2. It has been a site of previous research and not-for-profit development interventions, therefore procedures and protocols on such are present.
3. It is accessible both virtually (in the preliminary research) and physically during the field research.



Figure 2. Pangan-an Island Location Map showing detail of a residential density along its sandy coast (Source: Google Maps 2017)

1.3 Research Objectives

This research seeks to examine the role of place attachment as an influencing factor in the settlement, retention and mobility of residents in urban island barangays and how these mobility patterns are affected by perceived and actual risks from climate change and disasters. The objectives are to:

- determine the implications of place attachment to the mobility or non-mobility of residents in disaster-prone and climate-change vulnerable urban islands;
- determine if human mobility is actively and consciously employed as climate change adaptation strategy in urban islands; and as such, consequently:
- enrich empirical basis for future policy and community action options towards mobility as climate change adaptation strategy

1.4 Research question(s)

The main question asked for in this research is:

- What is the influence of place attachment (PA) to the mobility of small island communities in the context of climate change (CC)?

To support the above main research question, the following sub-questions are posed:

- What is the level of climate change vulnerability of Pangan-an Island and what are the community's perceptions to these climate change risks?
- What are the mobility patterns and mobility decision-making considerations of Pangan-an Island residents?
- What is the level of place attachment – as derived from the three PA dimensions of place identity, place dependency and place rootedness – of Pangan-an Island residents to their island *barangay* (locale)?

1.5 Significance of the study

By looking into the interaction and interplay between place attachment and mobility patterns and climate change risk perceptions in small island communities, it is hoped that the results will inform adaptation and livability policy and measures in small barangays with the focus on the applicability of migration and planned relocation as practical and effective adaptation measures for climate-vulnerable islet barangays – and vis-à-vis inform, prepare and empower these communities in dealing with such displacement interventions.

Chapter 2: Literature Review

The investigation into how attachment to place influences the mobility or non-mobility of urban island populations in the context of climate change is anchored in the understanding and appreciation of the concept of place attachment which is dissected and synthesized in this section.

As such, an exhaustive discussion of place attachment and its major discourse and advancements will first be tackled before its relationship with mobility and climate change theories will be ascribed to.

Place attachment, the theory and the construct, is related to and sometimes interchanged with other concepts such as sense of place, *genius loci*, topophilia, rootedness, place dependence, place identity, place affinity, place memory, urban identity, sense of community, community attachment (Manzo & Devine-Wright), but in this study, place attachment is purposely singled out and used in its delineated form not just for its lexically self-explanatory phrasing but because of its recognition and prevalence in mobility and environment studies.

2.1 Making Sense of Place Attachment

The term ‘place attachment’ is broadly defined as the “bonding of people to places” (Altman & Low 1992:2). Social psychologist Irwin Altman and environmental psychologist Setha Low were the first to unpack the emerging concept and laid the ground for its concretization and application in the social sciences and environmental design disciplines (Manzo & Devine-Write 2013).

Not a new concept per se, place attachment is grounded in the field of cultural and humanist geography and traced back to when forerunner Yi Fu Tuan (1975) distinguished place from site or location, and deepened it as space given meaning and value with human experience. Tuan, in fact, had previously used a similar Altman and Low definition, but which he appropriated to the term topophilia as “the affective bond between people and place” (Tuan 1974; 1990:4).

2.1.1 Place Attachment Theorized

Following decades of development in the theory and application of place attachment, along came a profusion in terminological and definitional mutations, not uncommon in theories conceived from interdisciplinary persuasions (Manzo & Devine-Write 2013). Worth noting are some concepts used interchangeably with place attachment but are wanting of differentiation.

Sense of place is the particular set of reactions that a particular environment stirs in a person (Steele 1981). Jorgensen and Stedman (2001) further expounded these responses as part of a “complex psychosocial structure that organizes self-referent beliefs, emotions, and behavioral commitments” (Jorgensen & Stedman 2001:237) concurring to an earlier assertion by Shamai (1991) that sense of place subsumes the concepts of place identity, place attachment, and place dependence. These three must, then, be distinguished from each other.

Place identity, linked with rootedness and sense of belonging, relates to how a person self-identifies or conceives one's self from his or her perceptions of his or her inhabited physical world (Tuan 1980; Relph 1976; Buttimer 1980; Proshansky et al. 1983; Stedman 2002). Place dependence, on the other hand, is the goal-oriented behavioral manifestation of sense of place (Pretty et al. 2003), suggesting that it represents the practicality of being drawn to a place (Stokols and Shumaker 1981 in White et al. 2008). However, the emotive quality of place attachment must be stressed (Knez 2005; Jorgensen & Stedman 2006) to set it apart from the former two, which Jorgensen and Stedman (2006) describe as more cognitive and conative, respectively.

Backlund and Williams (2004), and Williams and Roggenbuck (1989), on the other hand, situate place identity and place dependence as dimensions of place attachment, concurring with Williams and Roggenbuck (1989) who have previously advanced that attachment to places, particularly to recreation settings, stems from at least two factors: (1) functionality and (2) emotionality or symbolism. Place identity is the 'symbolic' place attachment, evinced by the value(s) ascribed to the place; whereas place dependence, not necessarily directly correlated to the former, is the 'functional' place attachment exhibited in the physical attributes of the place (Williams and Roggenbuck, 1989).

As a multifaceted process, place attachment indeed covers and is covered in a wide range of concepts and tends to be interpreted differently in different circumstances (Kaltenborn 1997). In "Place Attachment: Advances in Theory, Methods and Applications" edited by Lynne C. Manzo and Patrick Devine-Wright (2013) – a collection of the most recent advancements, including persisting questions and new research areas in the field chronicled through the works of its top scholars – this diversity in perspectives, definitions and terminology is acknowledged as 'restrictive' but is also seen as a healthy, mature debate welcomed in this post-modernist era.

As Williams (2013 in Manzo & Devine-Wright 2013) resigns: the best way to study place relations is that of a 'critical pluralist', where "no one research program by itself can successfully engage the various facets of place" (Williams 2013:97).

2.1.2 Place Attachment Defined

While the nomenclature debate persists, it is important to note that there is a unanimity in the use of the term place attachment, and its general notion as an expression of people-place bonding has been and is being applied in such fields as the social sciences, environmental disciplines and spatial studies, including social housing and community design (Manzo & Devine-Wright 2013).

Most definitional renditions by scholars in different fields do not stray from the generic place attachment meaning that is the bond of people to places (Altman & Low 1992), and as expected, the succeeding reinterpretations build on that very bare bones definition.

Thus, 'bond' has been further qualified as generally 'emotional', 'positive' and 'experienced' (Brown and Perkins 1992 in Altman & Low 1992; Manzo 2003; Shumaker and Taylor 1983 in Hidalgo & Hernandez 2001), a nod to Tuan's (1975) essentialization of place as human-experienced space of value and meaning. In addition to putting a time element in this 'bonding'

process, Brown and Perkins (1992 in Altman & Low 1992) suggested that ‘people’ can refer to individuals or groups and ‘place’ is comprised of both social and physical environment.

Lacking in most permutations though, is the external expression of such linkage which Hidalgo and Hernandez (2001), by borrowing from psychological sciences which define ‘attachment’ as the need and/or inclination to stay close or near to the object of attachment (Ainsworth & Bell, 1970; Bowlby, 1969, 1973, 1980), added the crucial element to place attachment: the action or manifestation which is generally the preference of one to remain and stay close at, or desire and/or yearn for, that place of attachment (Hidalgo & Hernandez 2001).

2.1.3 Place Attachment Deconstructed

With its increasing application and operationalization in the various sciences, scholars had to organize, qualify and quantify place attachment to fit to the disciplines they are serving.

Synthesized from the various place attachment permutations, Scannell and Gifford (2009) composed a framework depicting the three principal place attachment dimensions which they have thusly identified as: person, process, and place. In their framework, also called person-process-place (PPP) model, the first dimension refers to the actor attached and can be an individual or a community. The second dimension, process, deals with the affective, cognitive and behavioral aspect, while the third, the place itself, which is further dissected into social or physical place, points to the very object of the attachment and its characteristics (Scannell and Gifford 2009).

Giuliani et al. (2003) described three non-mutually exclusive types of lifecycle attachment-forming processes: (1) satisfaction with the quality and functionality of place; (2) meaning and value ascribed to a place; (3) long residence and familiarity. This analysis is essentially a derivative of the identity and dependence classifications of place attachment by Williams and Roggenbuck (1989), however, by adding the time element, it emphasizes on the role of stability vis-à-vis mobility risks and whether attachment history affects new bond-formation (Giuliani et al. 2003).

In their landmark book, Setha Low (1992 in Altman & Low 1992) proposed six distinct yet overlapping elements of what she referred to as cultural place attachment: (1) genealogical, about place origin and family lineage or history; (2) loss and destruction, through voluntary or involuntary movements, disasters or urban development; (3) economic, which includes ownership, inheritance and politics; (4) cosmological, about religiosity and spirituality; (5) cultural events, either religious or secular; and (6) narrative, about storytelling and naming of places. These symbolic people-place linkages contained in language and culture were drawn from cultural studies in the designed and built environment disciplines (Low 1992 in Altman & Low 1992).

Concurring with Low’s conclusion that place attachment is dynamic and interactional, formed from differing processes and changes across place and space, Cross (2015) picked up on the former’s typologies, and herself proposed seven common interactional processes that sum up a person’s attachment to a place: (1) sensory; (2) narrative; (3) historical; (4) spiritual; (5) material dependence – while the first five are very similar in terminology and definition with Low’s classifications, two more contemporary transactions are added – (6) ideological, the bond to place due to moral, ethical, or legal commitments; and (7) commodifying, where place

is considered a commodity for consumption, and characterized by being able to choose a place based on desirable attributes. Cross's conceptualization highlights the influence of time and the socio-cultural environment with specific processes of place attachment (Cross 2015).

For her part, Lewicka (2011b) conducted a study in Poland to identify types of place relations and whether they corresponded to known community attachment typologies identified by Hummon (1992 in Altman & Low 1992), but which she transposed into five types of place relations: (1) traditional attachment, the innate unaffected emotional tie with a place connected to intergenerational rootedness; (2) active attachment, the self-conscious emotional bond marked by an interest in the goings-on of the place and active involvement in community activities; (3) place relativity, the tentative provisional go-along attitude to the place where one lives; (4) place alienation, almost a dislike to the place; and (5) placelessness, feeling no specific need to identify emotionally with the place. The first two are types of place attachment, whereas the last three are types of nonattachment or place detachment (Lewicka 2011b).

2.1.4 Place Attachment in Praxis

The growth in scientific and academic interest in place attachment studies in the past decades is partly attributed to the increase in attention towards the effects of migration and globalization which weaken people-place ties and of environmental degradation, including climate change, which threaten the very existence of places (Relph 1976; Sanders, Bowie & Bowie 2003; Sennett 2000 in Scannell & Gifford 2009).

2.1.4.1 Place Attachment and Attitudes towards the Environment

Evolving from its humanistic geography roots, the application of place attachment is consequently rife in the environmental behavior studies, notably in their integration with environmental management, protection and conservation disciplines.

In particular, strong emotional connections to a place have been ascribed to pro-environment viewpoints. Vorkinn and Riese (2001), in their study, concluded that place attachment, especially, in the local level, predicts the response towards development proposals that would considerably alter the immediate environment, as in a proposed hydropower project, as was the case cited in their study. People with stronger attachment to the particular area that is to be most affected by the proposed development intervention – suggesting a localized contextual nuance to attachment – expressed more negative attitudes towards the perceived development-induced environmental change (Vorkinn and Riese 2001).

Brown and Perkins (1992 in Altman & Low 1992) refer to this place change impact as 'disruption' which is a threat to the familiarity, stability and security afforded in people-place bonds. Disruptions to place attachment can activate dormant psychological bonds to places which are then manifested in such stressful psychological reactions as anxiety, loss and trauma (Brown & Perkins 1992; Fullilove 1996; Fried 2000). Looking into disruptions caused by housebreaking, voluntary relocations and environmental disasters, Brown and Perkins (1992) examined three phases in the disruption process – (1) the pre-disruption period, which may be a preparatory stage in anticipated changes, say, in voluntary relocation plans; (2) the period of disruption itself; and the coping period of (3) post-disruption, which can involve new bonds

creation – thus further unfurling the temporal aspect in the attachment formation and disruption cycle.

These disruptions need not be actual and/or physical; threats of or anticipated future changes to a place can be as disruptive (Devine-Wright 2009). An environmental social scientist, Patrick Devine-Wright (2009) cuts deeper into the tendencies of communities to be protective of places and resist disruptions to them – even towards generally agreeable interventions such as the introduction of green energy technologies – and elucidates on the NIMBY (not in my backyard) attitude.

Though often used by proponents of development projects to disparage community opposition (Dear 1992), alongside presumption of irrational self-interest (Burmingham et al. 2007) and of information deficiency (Owens 2001), NIMBYism is reframed by Devine-Wright as a place-protective response rooted in place attachment and place identity processes. From there, he proposed a framework in probing an individual's or community's response over time to place change, with the following stages of analysis: (1) awareness, (2) interpretation, (3) assessment of change as either threat or enhancement, (4) coping mechanisms, and, which could lead to (5) actions of resistance or support, or even inaction (Devine-Wright 2009).

Devine-Wright (2012) applied this framework in analyzing the role of place attachment, among others, in NIMBY opposition to power lines in South West England. Focusing on two attachment types which correspond to Lewicka's (2011b) traditional and active attachment, respectively, the study recorded stronger objections from individuals with learned attachment than those with inherited attachment.

Additionally, place-protective attitudes motivated by attachment to place has a higher chance to develop into a functional attachment, one that is acted upon, where they are propped up with appropriate socio-ecological knowledge and experience. Hintz (2015) found this to be true in the case of women farmers in Wisconsin and Minnesota, whereby place attachment and place meaning were found to have significantly influenced their active care for place – demonstrated not only in their persistence in 'farming' but also in their views on interconnectedness, reciprocity and shared productivity, and rights for the next generation (Hintz 2015).

While causal sequence between these factors was not discussed in Hintz' study, Vaske and Kobrin (2001) took the two dimensions of place attachment – place dependence and place identity – and looked into their influence in shaping environmentally-responsible behavior (ERB) among students in Colorado. Their hypothesis that place dependence increases place identity, that which, in turn, leads to environmentally-responsible behavior (ERB) was not only substantiated, but also showed that the ERB developed was directed not only towards the place of attachment (in the study, a natural resource area, different from their home-place) but led overall to everyday environment-friendly attitudes and actions in their homes, schools, etc. (Vaske & Kobrin 2001).

However, by treating place meanings as distinct from and not a component of place attachment, Brehm et al. (2013) found the former (place dependence) to be the strong predictor for environmental concern, not the latter (place identity). To distinguish place meanings, Brehm et al. ascribed them as the cognitive aspect, separate from the emotional elements of the setting. This conceptualization essentially corresponds to 'place identity' as used by Stedman, one of Brehm's co-authors, in a separate study (Jorgensen & Stedman 2006) where place identity,

alongside place dependence and attachment, were used as predictors of sense of place. As previously cited, other theorizations (Vaske & Kobrin 2001; Backlund & Williams 2004) put dependence and identity as dimensions of place attachment. This illustrates how the lack of definitional standard can potentially muddle empirical studies of people-place relations.

Even so, there is sense and evidence in inferring that place attachment and its other permutations and/or parallels drive pro-environmental behavior (Relph 1976; Walker & Chapman 2003; Kaltenborn 1997; Vask & Kobrin 2001; Devine-Wright 2009; Hintz 2015) – and this relationship has significant implications not only in the management of environmental resources (Schroeder 1996; 2002; Brehm et al. 2013) but more so in development planning and management in general, in the face of increasing global urbanization and climate change (Schroeder 2007) where the extant and extent of ecosystems are challenged (Semken 2012).

2.1.4.2 Place Attachment in Place-Making Disciplines and the Urban Environment

While a number of place attachment research in the urban environment merely transplants the nature-scape staples of its humanistic geography roots into the city setting (i.e. Budruk et al. 2009; Ryan's 2005), more and more research on urban-specific place bond and related phenomena are being explored – further expanding and concretizing place attachment literature. This is especially relevant as cities are that “one environment created exclusively for human use”, and, as such, are exemplified in place studies as “centers of meaning” (Tuan 1975: 156-157 in Lewicka 2011a).

Bringing the range of attachment closer to the individual, to the home itself, Easthope (2004) highlighted the importance of the ‘home-place’ concept in housing studies. In taking the definition of home as a “socio-spatial entity” emerging from the union of the ‘physical’ house and the ‘social’ household (Saunders and Williams 1988:83 in Easthope 2004:134) located in space (and time), Easthope delegates this construct of home as the quintessential special place, a “place of greatest personal significance” (Proshansky et al. 1983:60) where meanings, identities, dependencies and attachments can be formed and/or disrupted.

At the neighborhood front, Brown, Perkins and Brown (2004) link the concept of “incivilities” – neighborhood residential discourtesies as litter, graffiti, unkempt houses and yards, essentially the opposite of physical manifestations of home-place attachment such as investments in home care, personalization, maintenance and improvement (Brown & Werner 1985; Werner et al. 1989 in Brown et al. 2004) – to crime. Incivilities theories posit that actual observed incivilities in homes and the neighborhood increase risks to crime (Wilson & Kelling 1982; Skogan 1990 in Brown et al. 2004). The study tested and proved that both household- and neighborhood block -level place attachment, in either buffering or encouraging incivilities, can lower or raise crime risk. As such, and particularly at the block level, they concluded that place attachment can be cultivated for its crime-detering characteristic (Brown, Perkins and Brown 2004). This supports the same researchers’ (2003) prior proposal that place attachment at the block scale can be an important tool in revitalizing neighborhoods in decline.

Manzo and Perkins (2006) further explored community -tier place attachment by cross-pollinating it with community planning within an ecological framework where multiple levels of attachment and environmental domains of analysis are employed. They examined the individual, social group, neighborhood and city level of attachment, but particularly, sought to

draw out the communal aspects of attachment that are nurtured in both the individual and shared social processes in the community. And by analyzing beyond the physical and social capitals, factoring in political and economic perspectives contingent to community development, they determined that shared place-based values – persistence, place-protection, place-nurturing attitudes – developed in community place attachments can stimulate participatory community planning and development (Manzo and Perkins 2006).

However, Lewicka (2005) is wary of the positive characterization of place attachment and notes that there are studies (Perkins & Long 2002; Bonaiuto et al. 2002 in Lewicka 2005) that do not fully support the direct hand of place attachment in civic action. She underscored this by pointing out unfavorable empirical findings about people-place bonds – which assign place attachment as a predisposition of the marginalized (Baumann 1998), a result of a lack of alternatives for advancement, and therefore, a hindrance to mobility and individual progress (Fried 2000). She recognizes that the positive aspects tip the scales for place attachment in community development but asserts that the shades of contradictions must not be overlooked. In her study with Polish communities, Lewicka found culture capital to be the better predictor for civic activity than place attachment. A negative relationship between place attachment and cultural capital was also documented (Lewicka 2005).

This may again be redounded to a difference in place attachment theorization. Where other scholars include a social communal dimension to place attachment, she specifically differentiated place attachment from neighborhood and even highlighted in her study that, other than culture capital, it was not “place attachment” but “neighborhood ties” that determined “civic involvement” (Lewicka 2005:392).

Nevertheless, place essentialization is more and more affirmed in urban studies, urban design and the designed environment disciplines. The emotional bond to urban places and the positive values it imbibes is perhaps best capitalized in placemaking.

Though Aravot has argued in 2002 that placemaking has not yet really been fully embraced in the urban design discipline, despite being the latter’s reason for being – after transcending from modernist urbanism’s sterility and detachment (Gosling & Maitland 1984; Broadbent 1990 in Aravot 2002) and going the social scientific and interdisciplinary route (Kreditor 1990) – placemaking is now a canon in creative urban strategies. Placemaking or the everyday practice of people making, transforming, maintaining, and owning the places where they live (Schneekloth & Shibley 1995) is today regarded and implemented as socially-responsible urban redevelopment, a rebranding of the concept of neighborhood revitalization and urban renewal (Fincher, Pardy & Shaw 2016). Additionally, placemaking in the pure sense tries to draw away from expert culture by using participatory approaches to the making of places and promoting the idea of design professionals and the communities as co-collaborators in the design of physical and social spaces (Schneekloth & Shibley 1995). There is a general understanding that places made are positive spaces beneficial to overall well-being of the makers and/or the dwellers. Also it can be noted that in the early placemaking conception, these were not specified as public spaces, however, they have since been cast as so – parks, plazas, benches, art, and what not – by the very field it wants to be unfettered from. It is imperative then to highlight other placemaking perspectives.

Placemaking need not be an elaborate urban design project, and could be as simple as appropriation. Sampson and Glifford (2010) shed light on the use of placemaking by young

refugees in Australia as a coping mechanism for recovery, resettlement and general well-being. Placemaking here in the study's context is depicted in the correspondents' appropriation of places (like the library, quiet corners, etc.) which they deemed meaningful, relaxing, socializing and safe, categories that correspond to humanitarian resettlement goals of restoring: safety, attachments and social connections to others, meaning in life, and dignity (Sampson & Gifford 2012).

“Placemaking is everybody's job”, Friedman (2010) asserts and he especially seeks for it in ordinary urban neighborhoods. Lombard (2014) examined this ordinary making of places in the *colonias populares* of Mexico. Just by using placemaking as an analytical lens in exploring informal sites, first, by treating these as “places” of lived experience, dynamic change and power, and reframing the spatial, social, cultural, political processes in its continuing evolution as “placemaking”, Lombard (2014) redirected the inquiry towards place values, attachments and meanings, essentially humanizing these otherwise ‘otherized’ and stigmatized communities.

Going back to the conception of home as the basic unit of place attachment, sometimes it is neglected, in both scholarly investigations and in urban practice, that informal settlements (in slums in Ghana, Osumanu et al. 2015; in Bangkok, Kamalipour 2016; in China, Li & Wu 2013) mass-produced urban housing (in Tehran, Kamalipour et al. 2012), in foreign settlements (in Cyprus, Bogaç 2009) and precarious urban environments are homes of people, too, where as much emotional bonds can flourish, transform or languish.

As Harvey (1993:5) put it, “...place in whatever guise... is a social construct. The only interesting question that can be asked is, by what social process is place constructed?”

2.2. Tracking human movement in the context of climate change

In migration literature, human mobility is used as the generic neutral term for movement of people. It is oftentimes used interchangeably with migration, which is described by the International Organization for Migration (IOM) as “any kind of movement of a person or a group of persons” in-country or across state borders, regardless of “length, composition and causes”, including “migration of refugees, displaced persons, economic migrants, and persons moving for other purposes, including family reunification” (IOM 2011:62-63).

However, within the climate change discourse, the Advisory Group on Climate Change and Human Mobility⁹ uses human mobility as the ‘umbrella’ term to encompass the three climate-change-related population movement types: (1) displacement, or the involuntary movement of people from their homes; (2) migration, or the voluntary movements of individuals or families; and (3) planned relocation, or the organized relocation, often initiated and managed by the State with the community's consent or request (UNHCR et al. 2015).

As this study also tackles human movement within the climate change frame, at the same time, straying from the definitional inconsistencies that likewise hound this subject, the use of the term ‘human mobility’ here is anchored from the above reference (UNHCR et al. 2015), and prodded by the conscious choice of keeping it generic as much as possible. In that way, people

⁹ The Advisory Group on Climate Change and Human Mobility, composed of the UNHCR, IOM, UNU-EHS, UNDP, ILO, NRC/IDMC, Sciences Po-CERI and Refugees International, centers on human mobility both as a climate change adaptation strategy and as a loss and damage dimension (UNHCR et al 2015).

mobility here can also encompass such less permanent and shorter-distance movements as seasonal migration and commuting weekly or monthly (Adams 2012).

2.2.1 Mobility Ebbs and Flows

A good number of contemporary studies in the movement of people revolve around mobility flows and motivations.

van Hear (1998) identifies five components of human movement, in terms of flow: (1) the move *outward* from a place of origin, as a consequence of which, a (2) the move *inward* to another place. Then, there could be a (3) *return* to previous place of residence, which also involves an *inward* movement; or (4) *onward* movement to yet another place, which repeats the first and second flows. Lastly, there is (5) *non-movement*, especially referring to those are left behind.

The fifth element is a concern especially in crisis situations where people are not able to run away from danger. Referred to as ‘trapped’ populations (Black & Collyer 2014:52), they are those who want to and/or need to move but do not have the capacity and resources to do so. They are usually the most marginalized in the locality; their immobility, a double handicap. But Black & Collyer (2014) points out that the concept of ‘trapped’ should refer to those who are *forced* to stay and must be distinguished from those who *choose* to stay.

This brings to the fore the two mobility dimensions of, (1) choice and (2) coercion, discussed by Richmod (1994 in van Hear et al. 2005). But which, however he argued, lead to a false dichotomy, for instance, when applied to separate the voluntary (referring to migrant workers) from the forced migrants (i.e. refugees and asylum seekers). Human mobility decisions, according to Richmod, run along a continuum – ranging from proactive to reactive, from carefully calculated decisions to last minute calls in crisis situations where fleeing, as a matter of survival, could be the only alternative. This underscores the importance of recognizing and understanding *agency*, or the capacity and willingness of people to move and/or settle elsewhere, as a key trigger for human mobility (van Hear et al. 2005).

This relates to another bisection of human mobility in terms of so-called “push” and “pull” factors. Bogue (1969; 1977) elaborated on the theorization that people are being “pushed” out of their place of origin or residence by a variety of negative factors making staying no longer satisfactory, while some are “pulled” out from or lured to leave a place by better prospects elsewhere. Ensuing research (Lewis 1982 in Stimson and McCrea 2004) have since expanded those push-pull factors as the spectrum of place- and people- based “socioeconomic, lifecycle, and locational” elements that push people away from a place, at one end, and on the other, pull people to a place. These factors are also referred to, respectively, as “stressors”, the aspects which cause people to leave a place, and “attractors”, those which draw people to settle and/or relocate to a place (Stimson and McCrea 2004).

While there is a full gamut of diverse, and overlapping mobility factors across the push-pull spectrum, and which are studied in varying dispositions and contexts (i.e. conflict situations, life cycle patterns, etc.), this study picks out and examines climate change and place attachment as possible “push” and “pull” motivators to human movement, respectively – and their response to these drivers of mobility and non-mobility.

But first, there is a need to take apart climate change and extricate its facet most relevant to this intersectional study.

2.2.2 Contextualizing Perceptions to Climate Change Risk

Climate change refers to the range of changes in the state of the climate which is ascribable to human interventions and manifested in such phenomenon as, among others, slow on-set sea level rise, global warming, and extreme weather events (UNFCCC 1992; IPCC 2015). Vulnerability to climate change effects vary from community to community and is measured in terms of their exposure, susceptibility and adaptive capacity (IPCC 2007).

While changes in the climate and their actual continuing effects and risks projections are scientific and technical assessments regarded with authority, the manner in how people regard and make use of these information is subjective and contextual – borne from experience, intuition and commonsensical rationality (Garvin 2001; Brody 2008) – and, in the end, is key to how they cope with climate change. Climate change risk perception is the extent to which climate change is seen as a risk requiring “urgent attention” (van der Linden 2014:112) which varies across cultures and socio-demographic groups in both the degree of collective public concern as well as general willingness to address the issue (Bord et al. 1998; Brody 2008; Brechin & Bhandari, 2011).

Unlike other risk agents, climate change as a complex global problem is regarded with exception in risk management, say from other periodic environmental disasters and how people have perceived these threats locally, since climate change is a “slow, cumulative and largely invisible process” that may or may not be directly experienced (van der Linden 2014:112).

The perceptions of the public on climate change are considered key predictors of their keenness to adapt and mitigate to climate change, and as such are important elements in climate change studies and policy-making decisions on the ground.

2.4 Place Attachment, Mobility and Climate Change Nexus

Place literature substantiates the conclusive but place-care-forming attribute of emotional, functional and symbolic bonds to place which, depending on the context, can be exhibited in pro-environment behaviors, community participation, collective action, placemaking, among others. Place disruptions are seen to especially set off otherwise latent place-vigilance in individuals and/or communities. But these disruptions are foremost threats not only to the existence and quality of the socio-spatial place but also to the identities, memories and meanings it embodies.

Modern urbanization and globalization capitalism are academically well-exhausted place-alterants, but the dangers posed by climate change and its impacts beyond biodiversity and geophysics cannot be underplayed nor ignored.

Emotional reactions, feelings of environmental responsibility, and related adaptation actions represent psychological responses to climate change threats. Doherty and Clayton (2011) picked out these psychological responses and examined them side by side other social, technological, and ecological climate change ramifications, thereafter identifying three

categories of psychological impacts: direct, indirect and psychosocial (p:266). Direct effects from climate change can include increase in number and severity of mental health issues in affected communities, serious dents in mental health services and interruptions to social, economic and environmental factors that contribute to overall mental well-being. This could include posttraumatic stress disorder, depression, and increase in substance abuse, suicides, physical violence and domestic abuse (Galea, Nandi & Vlahov 2005; Fritze et al. 2008; Anderson 2001; Qi, Tong & Hu 2009 in Doherty & Clayton 2011). These are impacts to affected populations following actual firsthand experience of climate change determinants such as natural disasters (Doherty & Clayton 2011).

Indirect impacts, on the other hand, are manifested second-hand, in people who have not necessarily experienced any major environmental disasters, but are, nonetheless, affected emotionally from taking in reports and images of environmental degradation or human suffering project by media and elsewhere (Stokols et al. 2009; Böhm 2003 in Doherty & Clayton 2011). Doherty & Clayton (2011) cited evidences from various studies recounting of environmental anxiety and other depressive emotions linked to the global climate crisis. Symptoms of these anxieties include panic attacks, loss of appetite, irritability, weakness, and sleeplessness that could become obsessive and disabling (Rabinowitz & Poljak 2003 in Doherty & Clayton 2011). Also referenced were Langford's (2002) and Maiteny's (2002) separate but similar studies on responses from climate-change-induced anxiety where they identified a spectrum of responses from active denial, apathy and disinterest to positive reactions as engagement, increased eco-responsibility and connection with eco-social processes (Doherty & Clayton 2011).

The third set of impacts identified by Doherty & Clayton (2011) are the psychosocial effects on social and community relationships resulting from direct environmental shocks but more likely from indirect effects seen in people's climate-related habituation and livelihoods disruptions and adaptations. Disturbances could include increase in violent aggression (from a correlational research between environmental heat and violence by Anderson in 2001) and intergroup conflicts over resource competition (Gilman, Randall, & Schwarz, 2007). Climate displacement and relocation, that could be both a disturbance outcome and a planned response, lead to breaking of home-place attachments which could lead to mental health issues (Fullilove 1996) such as "grief, anxiety, and a sense of loss, particularly among those with a strong place or national identity" (Doherty & Clayton 2011:271).

Doherty and Clayton (2011) neatly wound their study up with a proposed psychological framework outlining the range of climate change -induced psychological responses and their corresponding psychological defense and consequent functional implications, extricating the psychosocial dimensions of the global climate change problem, thereby, calling for and adding to the deeper more holistic cache of interventions. This is important as it is widely acknowledged that communities all over, especially the most disadvantaged populations, already feel the brunt of socio-economic and psychological climate change impacts (Fritze et al. 2008). Further, to solidify climate change mitigation and adaptation literature and policy, Doherty and Clayton (2011) proposed areas for further research that include the question on the effect of climate change and its determinants to sense of place and place attachment.

In a community-driven research looking into the relationship of climate change, sense of place, and health in the Inuit community of Rigolet in Nunatsiavut, Canada, Willox et al. (2012) found

that climate-related disruptions in local landscapes and activities such as hunting, foraging and traveling had negative place attachment impacts in the community, and which also affected the physiological and psychological well-being of the people. The research specifically tried to pinpoint place attachment as an important measure for health and how this general well-being is also impacted by climate change.

For her part, Adams (2015) likewise extended the climate change-place attachment link by adding the aspect of population persistence into the mix. With an eye out for population traps, she particularly focused on why residents in an environmentally-precarious migrant-sending highland locale in Peru stay on and if, among others, emotional bond to place has an influence to their decisions. Adams determined respondents who have not considered migration in the previous five year to be satisfied residents. Focus was then transferred to the dissatisfied populations, those who have considered migration, and the reasons for their non-migration. In addition to resource barriers and low *mobility potential* (or the ability for people to move, Morrison 1972), the reasons identified included positive attachment. This means that lack of resources is not the sole mobility barrier of these so-called populations rendered immobile or trapped during natural disasters, illuminating the non-economic, psychosocial walls related to emotional place bonds that keep people in. The research strengthens calls for the consideration of place attachment and other place-based factors into climate adaptation interventions such as planned resettlement (Adams 2015).

However, Adams has conceded that the research failed to directly link climate and weather impacts perceptions with place attachment and mobility, thus not exactly yielding a three-way correlation. She encourages future research to fully make the connection of the trio.

Taking off from that, with the understanding that various nuances exist in place-based constructs, human mobility patterns and migration decision-making, and climate change realities and perceptions, this research attempts to establish the nexus of place attachment, human mobility and climate change but with a principal focus on the first two variables.

2.4.1 Conceptual Framework

Climate change is real (Maibach et al. 2014), this research does not entertain other claims. However, perceptions to its effects and impacts differ per individual and/or community. Climate change has the potential to cause place detachment, and populations living in environmental hazard zones have been found to intentionally loosen ties to place, migrate and form new ones to other places (Agyeman et al. 2009) – considered an adaptation response (Milan & Ho, 2013). But as evidenced above (Adams 2015) and other studies (Fried 2000), place attachment discourages mobility; people with strong bonds to their home-place are less likely to move (Gustafson 2009b). This is especially true with communities with strong ties to place, especially those that are proximally, aesthetically, and economically tied to natural resources (Burley 2010) indicating the importance of particularity and context of place to climate adaptation (Lyth 2015).

Informed by place theorizations in climate mobility, this research seeks to determine the influence of place attachment to the mobility patterns of urban island communities in the context of climate change. The connection of people-place bonds, human mobility and climate change in a particular nature-dependent urban context.

Place attachment is taken apart into the two dimensions identified by Backlund and Williams (2004): symbolic place attachment or place identity and functional place attachment or place dependence. In addition, the temporal aspect of place attachment, indicated by long residence and familiarity (Giuliani et al. 2003) and herein referred to as place rootedness, is also included in the dissection. It must be noted that the term ‘rootedness’ is one of the many ‘sense of place’ correlates but which Tuan (1980) has earlier distinguished as a more instinctive kind of attachment to a place innate with long continuous residence there.

Human mobility patterns is, as well, split into mobility and immobility – seeking for answers on the migration and non-migration choices of people in especially precarious places.

Why do some choose to migrate from disaster zones? Why do people choose to stay? Why do people refuse to evacuate when called for in disaster preparedness and prevention (Bukvic & Owen 2017)? In light of environmental uncertainties in risky areas, does deep emplacement imprison one to his or her home-place? Does this make the usually beneficial notion of place attachment harmful? Why do people feel so strongly about their home-place in the first place?

The conceptual model below (Figure 3), frames this research’s modes of inquiry. As pictured, this study principally tests for the relationship of the two main variables, specifically the effect and or influence of place attachment to human mobility patterns.

Climate change risk perception is included here as a cofounding variable: to mobility, in the light of the changing paradigms on climate movement; and to place attachment, particularly in the context of small low-lying islands, where extreme climate change predictions (notably, sea-level rise) point not only to damage in lives and property but, possibly, the complete obliteration of the ‘place’, the very object of attachment.

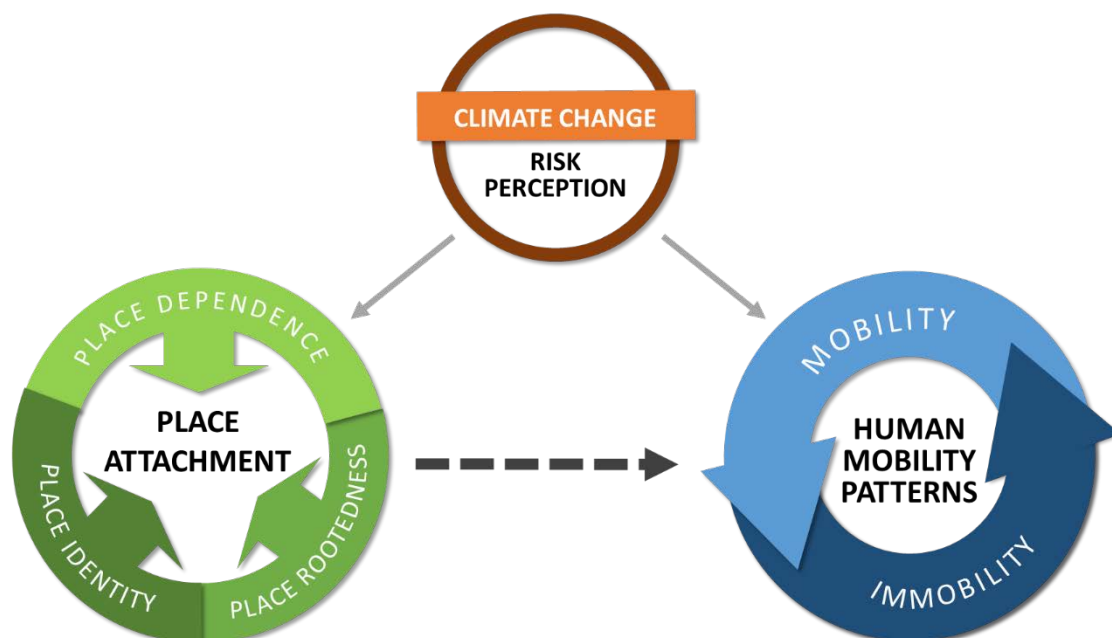


Figure 3. Conceptual Framework

The Influence of Place Attachment to Human Mobility in the Context of Climate Change

**The broken arrow depicts a causal effect which is the main objective in this research: determining the effect of place attachment to human mobility patterns.*

*** The greyed out arrow is used to depict a relational effect. Climate change risk perception is an exogenous variable.*

Chapter 3: Research Design and Methodology

As theorized, people-place bonds affects settlement preference (Altman & Low 1992; Hidalgo & Hernandez 2001). In answering the main research question – what is the influence of place attachment to the mobility of small island communities in the context of climate change – this research probed for the presence and level of people-place bonding in small island communities and looked into its influence in the movement or non-movement of the population in light of their actual climate change vulnerability and perceived climate change risks.

3.1 Operationalization

Progressing into the empirical research phase, following the conceptualization of the three key concepts probed for in this research, this section elaborates on their nominal definition derived from literature accorded to this study's specific context.

This process of operationalization translates the abstract concepts into concrete quantifiable elements and defines the corresponding instruments for their measurement and analysis (van Thiel 2014).

The operation table below (Table 1) summarizes the breakdown of the key concepts into measurable elements. It starts off with the nominal or working definition generated from the previous chapter which is the key guide in the generation of the variables, indicators and the type of measures and instruments for data collection and analysis.

Table 1. Operationalization Table

Key Concept	Operational Definition	Variables	Indicators	Values
Place Attachment (PA)	Place attachment (PA) is the emotional positive bond of people to places, generally manifested by one's preference or desire to remain and stay close to the place(s) of attachment (Altman & Low 1992; Hidalgo & Hernandez 2001), and that which is formed with the PA processes and/or dimensions: symbolic PA or place identity, functional PA or place dependence, and temporal PA or place rootedness (Williams and Roggenbuck 1989; Backlund and Williams 2004; Scannell and Gifford 2009; Giuliani et al. 2003).	Place Identity (Symbolic PA): the value(s) ascribed to the place; is related a person's self-identification with a place (Williams and Roggenbuck, 1989; Stedman 2002)	Presence & degree of value and meaning assigned by the individual to the place - Love for place* - Sense of home* - Civic involvement*	The higher the number and degree, the more PA
		Place Dependence (Functional PA): 'functional' place attachment exhibited in the physical attributes of the place (Williams and Roggenbuck, 1989) exhibited in the practicality of being drawn to a place (Stokols and Shumaker 1981 in White et al. 2008)	Level of satisfaction with <i>quality & utility</i> of the social attributes of place Level of satisfaction with the <i>quality & utility</i> of the physical attributes of place (residential satisfaction): - Place aesthetics ** - Place services and facilities**	The more satisfied, the more place dependence, the more place attachment
		Place Rootedness (Temporal PA): length of residency (Giuliani et al. 2003).	History of residency of the individual and his/her forebears in the research locale***	The more years of residency, the more rooted to place, the more place attachment
Human Mobility Patterns	Human mobility refers to the movement of individual or group(s) of humans from one place to another (Moula et al. 2015) and which in climate migration literature is comprised of three main types: displacement (involuntary), migration (voluntary) and planned resettlement. (UNHCR et al. 2015)	Mobility/ Immobility Agency: the disposition & capacity to move/stay (van Hear et al. 2005)	- Presence of mobility (voluntary/ involuntary) experience - Intent to move/stay (disposition) <i>Capacity to move</i> - presence of immediate family member who is a migrant worker elsewhere - presence of family or clan in mainland city/ province <i>Verifying intent to stay with presence of such actions as:</i> - investment in house improvement - investment in improving in-place livelihood source	
Climate Change Risk Perception	Climate change risk perception is the extent to which climate change is seen as a 'risk requiring urgent attention' (van der Linden 2014) and which varies across cultures in both the degree of collective public concern as well as general willingness to address the issue (Bord et al. 1998; Brechin & Bhandari, 2011)		- level of climate change vulnerability - acknowledgement of CC risk <i>Subjective perception factors****:</i> - level of knowledge on climate change - personal experience with extreme weather events - worry/ affect - socio-demographics <i>Perception Response:</i> - presence of actions to address climate change	

* Vaske & Kobrin 2001; Devine-Wright 2009; Lewicka 2011; Adams 2012; Hintz 2015

** Lewicka 2011; Adams 2012; Permentier et al. 2011; Adriaanse 2007

*** Giuliani et al. 2003

**** van der Linden 2014; Leiserowitz 2006; Safi et al. 2012; Brody et al. 2008

3.1.1 Measuring Place Attachment

As previously mentioned, the level of place attachment was sought using its three dimensions of place identity, place dependence and place rootedness (Backlund & Williams 2004; Giuliani et al. 2003).

Place identity or symbolic place attachment was measured two-ways, looking for the presence and level of: (1) subjective value and meaning ascribed to the place; and (2) the external manifestation of these feelings through active care for place (Hintz 2015), environmentally-responsible behavior (Vaske & Kobrin 2001), and place-protective practices (Devine-Wright 2009).

Place dependence or functional place attachment, described simply as the utility of place attraction (Stokols and Shumaker 1981 in White et al. 2008), on the other hand, was investigated within the socio-spatial features of the living environment. Adams (2012; 2015), in her study about migration decision-making through the lens of place utility, ecosystem services and the potential for mobility in highland communities in Peru, and with which this research largely builds on, measured place utility (place dependence) with residential satisfaction, and dug further by likewise measuring the level of dissatisfaction and its factors. This research adopted the former, but omitted the latter.

The satisfaction to the people or co-residents of the place was determined with the quality of ties within the community (Adams 2012). On the other hand, the level of satisfaction with the quality & utility of the physical attributes of place was principally measured using residential/neighborhood satisfaction indices adopted from Adams (2012), Lewicka (2011), Permentier et al. (2011), Adriaanse (2007).

Temporal place attachment or place rootedness, was established straightforward with the respondent's and his forebear's history of residency in the locality (Giuliani et al. 2003). Rootedness was not measured from the actual number of years of residency, as the survey population differed in ages. Rather, it was derived from three criterion of whether the respondent was (1) born elsewhere and migrated to Pangan-an as adult, (2) born elsewhere but raised in Pangan-an, or (3) born and raised in Pangan-an.

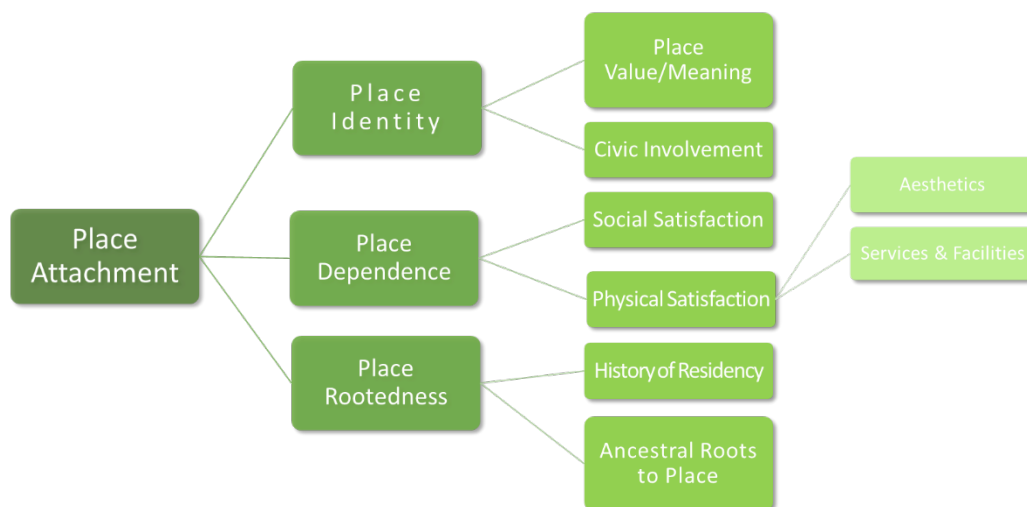


Figure 4 Measuring Place Attachment

3.1.2 Measuring Mobility Patterns

To establish the mobility characteristics of the community in terms of its response to push-pull factors against their agency or disposition and capacity to move, the mobility/immobility decision-making characteristics of the standing population were examined.

Self-reported mobility experience was, first, recorded at the individual and household level, followed by their disposition or willingness for movement. After which, the said decisions were verified, particularly for intentions that require mobility *potential* or the capability for moving.

This part of the research focused on the migration patterns dependent on an individual's agency (Adams 2012) outside of coercive climes such as situations of conflict and extreme disasters.

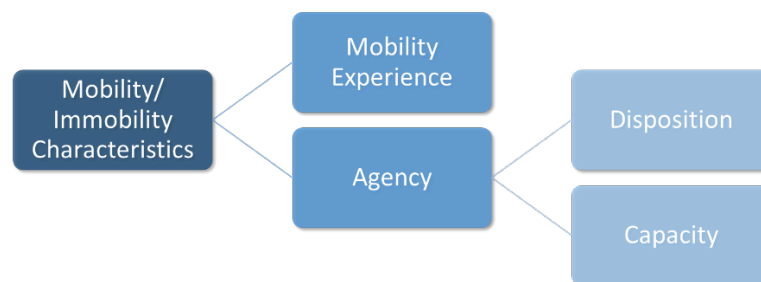


Figure 5. Measuring Mobility Patterns

3.1.3 Measuring Climate Change Risk Perceptions

In establishing the presence and level of climate change risk perceptions in the research locale, determinants were picked out from various models derived from literature (van der Linden 2014; Leiserowitz 2006; Safi et al. 2012; Brody et al. 2008). Action or response to the perception was also recorded.

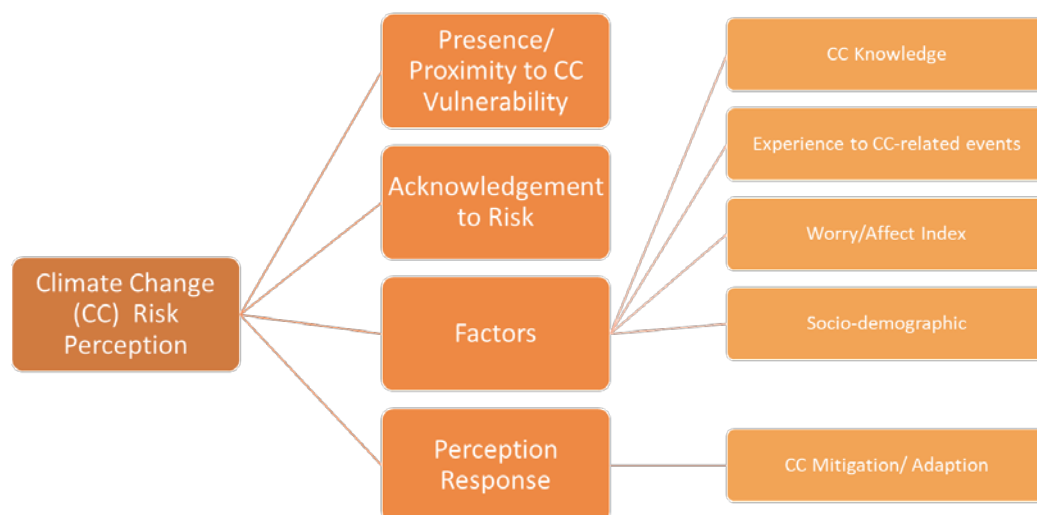


Figure 6. Measuring Climate Change Risk Perceptions

3.2 The Research Strategy

The survey research strategy – using deductive methods and techniques that generate quantitative or numeric data sets of trends, knowledge, attitudes, opinions or practices of a sample population with the goal of generalizing the findings to the greater population (Creswell 2009) – was employed as this study’s blueprint for the structuring, execution, and quality assurance in addressing the research question (Mouton 1996; Robson 1993).

In testing the theory that the level of place attachment affects the choices and actions of people to move and/or remain in their place of residence in the face of climate change, a cross-sectional or snapshot survey research was used.

The two aspects of survey strategy that was considered especially crucial to this research is highlighted below:

Generalizability. To satisfy the objective of this research in enriching climate mobility policy directions, particularly in the emergent adaptation strategy of whole-community planned relocation for small island communities, this research intends to extrapolate the case of the Pangan-an Island community to other climate-vulnerable small island, islet, or atoll communities.

Theory Deduction. The cause-probing nature of this research was aptly served by quantitative survey design which requires for standardized measurements and predetermined answer categories corresponding to the hypothesized concepts (van Thiel 2014; Neuman 1997), in what Babbie & Mouton (2001:646) described as methodical numeric manipulation of observations.

However, while the survey strategy, anchored in the positivist and post-positivist paradigm, gives adequate information and explanations at surface level, it may be insufficient in quantifying subjective dimensions of behavior (Marsh 1982). This is especially true where the focus is strictly directed on variables, excluding the subjective contextual elements, and thereby losing holism in the study (Moutinho & Hutcheson 2011).

While acknowledging the need for objectivity and quantifiability in this empirical enquiry, the researcher conducted this research with critical postmodernist eyes, mindful of the “historical, structural and a value-basis of social phenomena” (Babbie & Mouton 2008:36).

Table 2. Research Design

Research Strategy	Purpose of Study	Data Collection Methods	Analysis
Survey Research	Establish causality and correlation	Survey Questionnaire	Statistical Analysis
		Semi-structured Interview	Thematic Analysis & Coding
		Secondary Data Collection	Content Analysis

Using mixed methods of data collection and analysis, the main findings from the survey questionnaire with perspectives from key informants and experts, as well as the findings from secondary data, were compared and integrated.

3.3 Data Collection Methods

Research techniques, the variety of methods used for generating and collecting data (Oppenheim 1992; van Thiel 2014), used in this study are listed in the table below.

Table 3. Data Collection

Data Collection Method	Instrument	Sampling	Sample Size
Survey Questionnaire	Structured questionnaire; enumeration	Systematic random	n=90 Unit of analysis: HH Target respondents: HH heads
Semi-structured Interview	Semi-structured interview guide	Purposive; Snowball	n=3
Experts (government officials; persons in with authority on the study's subject)			n=6
Key informant (sectoral leaders in the locality)			
Secondary Data Collection	Checklist	N/A	

3.3.1 Survey Questionnaire

Standardized questionnaires was employed to systematically collect data about sample population's preferences and behaviors. To ensure more high response rate, more accurate and clean data harvesting, face-to-face interview was administered. The personal conduct of interview captured verbal and bodily cues (Glasow 2005) to lessen subject error and bias.

3.3.1.1 Questionnaire Design

Except for putting the socio-demographic group of questions up front, the flow of questions in the questionnaire approximately mirrored the operationalization outline in the previous section. Although the questionnaire was administered by an interviewer or enumerator, it was still translated into the local language, Cebuano – to ensure optimal communicability of the survey interview.

The questionnaire was pre-tested or piloted to check for translation/language errors, variation in type of answer, redundancy, non-response, flow and timing, among others. This was done during the training/briefing of the enumerators. The interview ran for no more than 20 minutes.

3.3.1.2 Sampling

The whole population of the research locale of Pangan-an Island, recorded by the Philippine Statistics Office as 2,070 (as of 2015), comprised the research population or the total number of units from which data was collected (Parahoo 1997) in this research. But as this research appointed the household¹⁰ (HH) as the unit of analysis, the number of households (n=429) constituted the sample population (N).

¹⁰ The National Statistical Coordination Board (NSCB), the Philippine's national statistics policy-making and coordination body, defines the "household" as social unit that can be composed of either an individual living alone or a group of individuals who sleep in the same dwelling and share the same food preparation and consumption arrangements (NSCB Resolution No. 11, Series of 2003 Annex-BR-11-2003-1).

Sample Size. With 429 households, the sample size at $n=90$ with a confidence level¹¹ of 95% and confidence interval (margin of error) of ± 9.19 . The margin of error could be higher, however, time and resources constraints limited the sample size to such, but not without ensuring that the sample size, including the sub-group of male ($n=45$) and female ($n=45$) respondents, is sufficient ($n > 30$) in detecting a statistical effect (Hogg & Tanis 2009).

Respondent Selection. The target survey respondents were those considered the household head¹² (HH) or the principal earner of the family or the spouse of said HH head, deemed co-head of the family unit. As the investigation for mobility is targeted at the household and family level both are considered principal co-equal decision-makers.

Housing units was used as the sample frame, since it was known that families in the target island communities in the Philippines generally live in single-family dwellings (though extended families existed but was not prevalent).

Sampling. Barangays in the Philippines have ‘spot maps’ where landmarks and all housing units are plotted within the village’s geo-political unit. As such, the sampling was done by way of systematic area probability using the ‘barangay spot map’. As the research locale is an islet community in a small and contained geographical location, comprehensiveness of the sampling probability was easily assured, as was the efficiency rate to which members of the target population were located and thus, surveyed and interviewed.

The enumeration yielded $n=92$ completed questionnaires, where one (1) was invalidated (having not met the household head criteria) and the last remaining questionnaire (no. 92) was left out in the data entry. The response rate was not recorded, however. Spot-checking (one respondent for each enumerator was cursorily re-interviewed; this was determined by the sampling pattern and double-checked as per the respondent’s answer) was done by the researcher to ensure the quality of enumeration.

3.3.2 Semi-structured interview

In the semi-structured interview, the researcher conversed with experts and key informants following a prepared interview manual or topic list (van Thiel 2014) corresponding to the research concepts and operationalization variables. This qualitative mode of inquiry allowed for clarifications and deeper exploration of the major themes by the experts, as well as experiential narratives from the key informants.

3.3.2.1 Sampling

In this research, key informants were differentiated from the experts, and picked out from distinct respondent groups from the sample population. They were sampled purposively, but with room for snowball sampling.

¹¹ Calculated with the Creative Research Systems sample size calculator at <https://www.surveysystem.com/sscalc.htm>

¹² “Household head” is defined as the provider of the principal income in the household who may be an adult male or female responsible for caring for and organizing the household and is acknowledged as such by the household members (NSCB Resolution No. 11, Series of 2003 Annex-BR-11-2003-1).

The key informant interview, while guided by the topics list, aimed at extracting from the interviewees issues that freely came from them, opening up for concerns overlooked in the research proposal phase. They were asked using the same interview guide (see Annex 1.2).

The respondent groups for the key informants were chosen according to the demographic category below:

Table 4. Key Informant Sample

Sampling Frame	Target Respondent
Socio-Economic Status	Representative of Conditional Cash Transfer (CCT) beneficiaries
	Representative of the church/chapel organization, traditionally regarded as highly-connected and of the upper socio-economic demographic
Age	Representative of an active youth organization
	Representative of senior citizen's organization
Livelihood	Representative of an active local fisher folks organization
	Representative of women's organization

On the other hand, the identified experts/ community leaders to be interviewed were the: (a) Lapu-Lapu City Disaster Risk Reduction and Management (DRRM) Officer; (b) Punong Barangay (Village Chairman) of Pangan-an, the elected village chief; (c) representative from national government agency Philippine Climate Change Commission (PCCC). The interview instruments for these three will be designed separately and specific to each of their position/ role in the community (see Annex 1.3).

3.4 Data Analysis Methods

In the analysis of the survey questionnaires, descriptive and inferential statistical techniques (mainly, regression and cross tabulation analysis), was used with the help of a statistics software (SPSS).

Thematic analysis and coding were employed for the semi-structured interview. The results of all data collection and analyses were compared and integrated; from which compelling and convincing research findings were derived.

3.4.1 Reliability and Validity

Reliability and validity measures are integral to quantitative research particularly to survey research which aims for statistical estimation of specific attributes of a sample population and then being able to accurately assign this approximation to the entire target population (Golafshani 2003).

Reliability refers to the degree of consistency, stability and dependability in measuring of the same thing over time (Glasow 2005). Reliability analysis tests can be generated from statistics software. But to minimize inconsistencies, the questions were crafted carefully to avoid ambiguities, and prevent subject errors and biases.

As to the research validity or the degree to which the findings meet the study's purpose and the context of the research, fair sampling (see sampling section) was ensured to avoid selection bias that could lead to high regression in the results.

Particularly in this research where the effects of climate change are hypothesized as key factors in place attachment and human mobility, history effect – or the occurrence of a recent and/or proximate climate change or weather –related event, i.e. a storm – could hugely affect the results of the research. Had this occurred during the fieldwork, an option for an alternative research locale was planned, especially that the scheduled site visit was within the monsoon season.

Luckily, this was not resorted to as the actual weather during (including those of the days before, and the forecast, days after) the fieldwork was fair. Though, during the second day of fieldwork, a major earthquake struck the nearby island province of Leyte, which completely disrupted the power supply of the neighboring province of Bohol, however, due to the isolation of Pangnan-an, in both communications and power-grid, the said event had no effect to them.

3.4.2 Credibility

This research was conducted in accordance with normative research ethics. Appropriate information regarding the study's purpose, objectives and procedures was given to all respondents. Consent, voluntary participation and anonymity was ensured in the anonymous survey enumeration. For the semi-structured and expert interview resource persons, their express consent as named interviewees were sought. They were, as well, promptly briefed with limits of confidentiality with the assurance that sensitive disclosures will be protected.

3.5 Limitations and delimitations

As mentioned, the sample size was narrowed down due to economic and time factors. A larger sample size will have increased this study's statistical power.

This study seeks to determine the tendency of populations for immobility, as such, only focuses on those that persist in the island. Former Pangnan-an Island residents or those that have moved away from the island are not considered here, but could provide for a good subject in subsequent studies.

While measurement of the key concepts purposely includes both perceptions and actions to substantiate the emotional subjective feelings with actual behavior, these are still mined via self-reports from the survey respondents and, thus, even with careful crafting of the questions, are inevitably still subject to reporting bias. Secondary collection of data, to verify some of the indicators asked for in the primary data, was insufficient as the records from both local village and city authorities were incomplete and even largely unavailable.

Further, the limited range of this study in terms of literature review and command of the subject, allows only for inferential statistical analysis of the key concepts and the principal sub-concepts.

Chapter 4: Research Findings and Analysis

In seeking to measure the influence of place attachment on the mobility traits and practices of residents in urban islets within actual and perceived climate change risks, this study unraveled from literature and contextual inference the key elements comprising the three main concepts in question: place attachment, human mobility and climate change risk perception.

The triumvirate of place identity, place dependence and place rootedness (Backlund & Williams 2004; Giuliani et al. 2003) which make up place attachment was subsequently unwound at indicator-level and is laid out in this chapter like so. Human mobility was quantified similarly, but clipped into its dichotomous mobility-immobility conditions.

This research brings to view human mobility patterns (dependent variable) in light of increasing population movements directly or indirectly caused by climate change and its impacts in light of the fairly recent recognition in the policy (UNFCCC 2011) and practice (i.e. Kiribati, Fiji, Papua New Guinea's Carteret Islands) of voluntary migration as a climate change adaptation measure. Particularly, in isolated urban communities like Pangan-an, besieged by circumstance and happenstance with multiple (social, economic, political, etc.) vulnerabilities, and especially where these stresses are apparent – this study alternatively ferrets out the intangible, subjective and sometimes latent factor of place attachment (independent variable), the emotional affinity of people to places (Altman & Low 1992) and determine its causal impact to the human mobility practices.

4.1 The Sample Population

As of 2015, there are 429 households from a population of 2,070 in Pangan-an as per the data from the Philippine Statistics Authority, 2015 Census of Population¹³.

The survey sample size is $n=90$, disaggregated equally by sex $n=45$ females; $n=45$ males. This size was determined with data collection constraints of time and resources in mind, but foremost, that the number comfortably lies above the minimum statistical sample size requirement.

The respondents targeted were household heads, 18 years old and above. The survey used a systematic area-probability sampling (Marcelli 2014) where the three (3) local enumerators were spread out across the nine (9) *sitios* or wards of the island. With the help of barangay map, each was assigned a landmark point of reference (either the *sitio* meeting shed or the chapel), starting out at the first house to the right. The succeeding respondents were then picked out every other house, circling back (clockwise) to the starting point.

4.1.1 Demographic Profile

The following descriptive statistics give an overview of socio-economic characteristics of the survey population.

¹³It must be noted that the Barangay Local Government Unit (BLGU) of Pangan-an Island reports for 2016 a population figure ($n=2,956$; households= 489) significantly higher than the latest (2015) Philippine Statistics Authority (PSA) figures. For consistency, especially in using past population figures, growth rates and projections, the PSA figures are used.

Although, sex is not a key variable considered in this research, the equal distribution of 50% (n=45) male and 50% (n=45) female respondents (the household head(s) or his/her spouse) was fulfilled to allow for such statistical treatment when needed. The age was determined (as per the questionnaire design) by age group categorized by decade, except for the youth and the senior citizens (those of aged 18-30, and above 60, respectively, as defined by Philippine law).

There is a fairly even age-sex distribution (Figure 7) in most age brackets, except for the 31-40 (16% male n=7; 31% female n=14) and 41-50 (31% male n=14; 24% female n=11) groups which almost inversely correlate in size. The higher quantity (compared to other age brackets) among the male and female population are those aged 41-50 and 31-40, respectively.

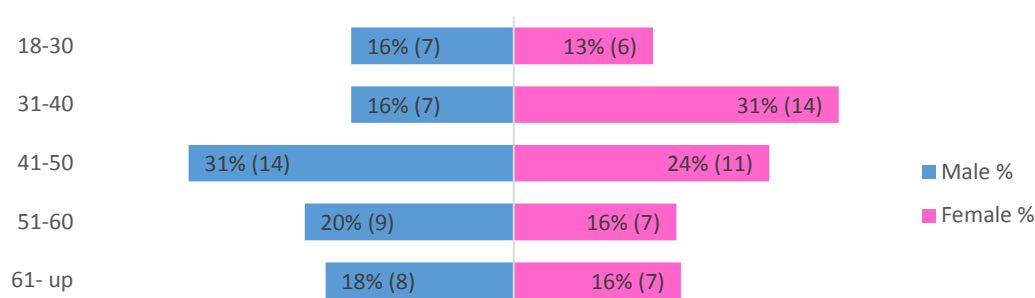


Figure 7 Age-Sex Pyramid.

**There's a moderate evidence of independence between age and sex (Chi-square= 3.097, df= 5, p= 0.685).*

The level of education (Figure 8) is very low, where 62% (n=56) self-reported of completing some or finished elementary education and only 6% (n=5) reached college level.

The National (2010 Census) educational attainment of 'college level' is at 20% (PSA 2013). To give context, Philippine basic literacy rate, defined as the Filipino population of 10 and above, who "can read, write and understand simple messages in any language or dialect" is 95.6%.

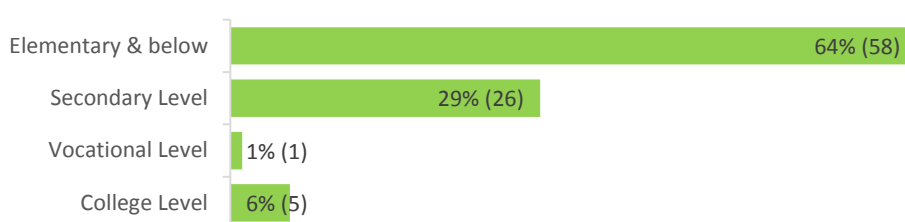


Figure 8 Level of Education

**The only secondary school in the island, Sta. Rosa National High School - Pangan-an HS Extension was established only in 1996, while the elementary school as founded a good while back in 1974.*

As an island community, despite its classification as an urban barangay belonging to a highly urbanized city, majority of its residents still primarily rely on fishing and related activities as their main means of livelihood.

As Figure 9 shows, 50% (n=45) reported fishing as their primary income source, with small home-based business (sundry shops) as the second largest primary income source. Of those

with livelihood means, 62% (n=48 of 78) do not have a secondary livelihood. 13% (n=12) reported as, at the moment, unemployed or not engaged in any form of livelihood. This is higher than the unemployment rate in the Philippines which is reported at 6.6% as of January 2017.

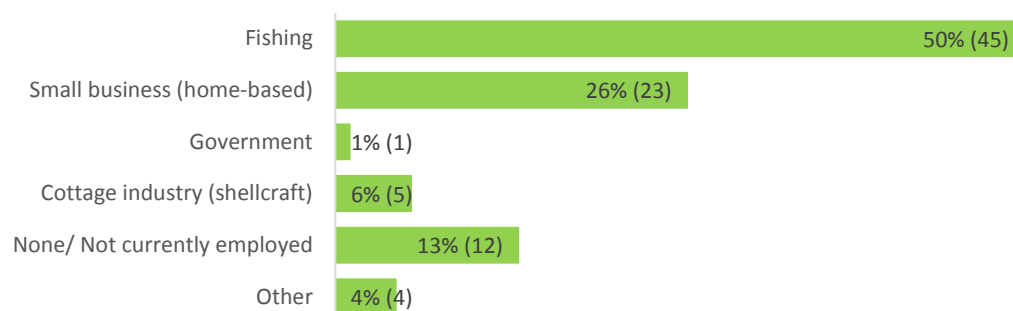


Figure 9 Primary Livelihood Source

Home-based small businesses, also listed in the Barangay profile as such, are primarily home-based shops or *sari-sari* (mix-mix) stores which sell a range of items that range from food items to solar lamps to construction supplies. However, during the semi-structured interviews, other small home-based businesses were revealed to include such small enterprises as buying-and-selling of clothing items and small-time lending. Shellcraft (including sourcing of shells and actual making of the shell products, i.e. necklace, home décor, etc.) was specified by respondents and verified by the authorities as the only cottage industry in the island.

More than half (52%, n=47) of the survey population reported their total household income (Figure 10) in the past year as less than ₱20,000¹⁴ (roughly €320). This is significantly lower than the 2015 national per annum rate¹⁵ at ₱267,000 (about €4,380) and regional rate of ₱230,000 (€3,900). This may be attributable to the non-cash income of the community's primary livelihood source. In the Philippines, fishing communities have some of the highest poverty incidence.

The average household size is 6; the number of minors average at 3 per household. Roughly, one (1) minor (aged below 18 years) is dependent to every adult (18 years and above).¹⁶

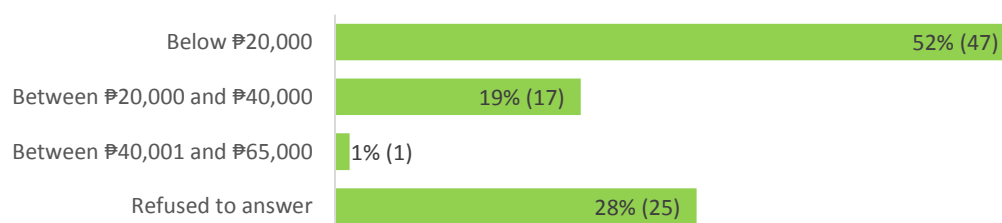


Figure 10 Total Household Income Distribution

¹⁴ This corresponds to annual per capita poverty threshold in the province of Cebu is at P21,740. Although quantifying their income is difficult in non-wage earning communities, 2015 Philippines poverty statistics indicate fisherfolks to be among the poorest sectors in the country with 34% poverty incidence within the sector (poverty incidence nationwide is at 21.6%).

¹⁵ Philippine Statistics Authority (PSA) 2016. 2015 Family Income and Expenditure Survey.

¹⁶ Lapu-Lapu City's dependency ratio is at 56 in the working age group as per the 2010 Census.

Majority of the housing in the island are of the constitution that matches its very light materials. But these also allows them to easily and freely build which accounts for the high housing ownership among the respondents (see Figure 11).

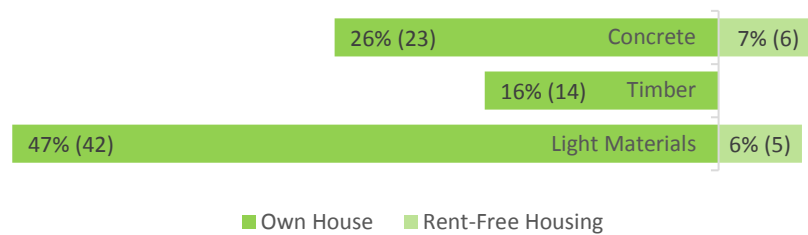


Figure 11 Housing Situation

4.2 Human Mobility Patterns

In determining the mobility characteristics of the Pangan-an Island community, this study distilled from the respondents their (1) actual mobility experience, (2) agency for mobility, which, in turn, is derived from their (a) willingness and (b) capacity to move.



Figure 12 Determining the Human Mobility Pattern in Pangan-an

4.2.1 Mobility Experience

The mobility experience is constructed from: (1) experience of residing outside Pangan-an, and their (2) travel frequency to and from the island. The latter is taken from the self-reported travels off the island in the past month and the past year (from the research period).

4.2.1.1 Off-Island Residency Experience

Off-island residency experience is obtained from a multiple response question asking for the respondent's experience in several possible situations of living outside the island. The results (Figure 13) show that only 17% (n=15) have not experienced residing outside of Pangan-an.

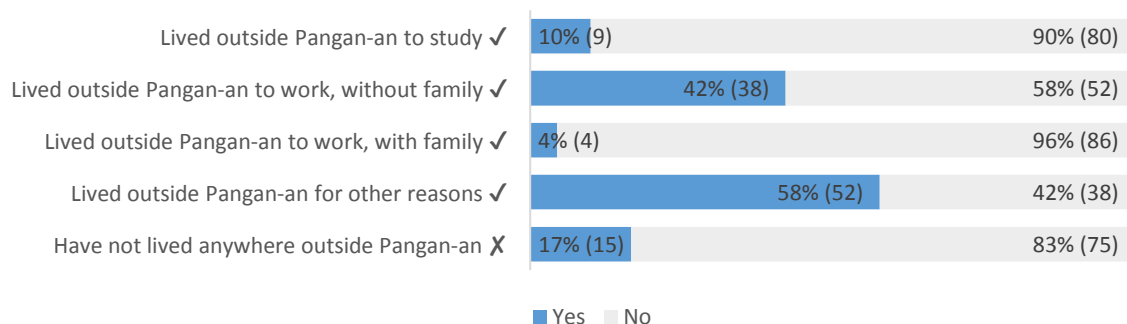


Figure 13 Off-Island Residency Experience

*Taken from a multiple-response question

Throughout this study's whole statistical analysis, these sets of repeated and overlapping measures taken from either Likert-scale, dichotomous or multiple-response series (such as above, Figure 13) are synthesized into composites, referred to in this study as the 'index'. These are computed using either sum, media, mean scores following appropriate statistical treatment (Field 2005).

The questions in Figure 13 scoops for the presence and/or absence of off-island residency experience; the affirmative, lifting four (4) kinds or levels of such. These are summated in the Off-Island Residency Experience Index (Figure 14), wherein the negative answers were kept as is, while the median scores of the 'yes' responses were ranked into moderate to high intervals.

Figure 14 shows that majority (79%, n=71) of the respondents have had a ‘moderate’ off-island residency experience, which is also reflected in the median score for the whole sample population. Having lived elsewhere at one point in one’s lifetime for various reasons adds to their overall mobility experience.



Figure 14 Off-Island Residency Experience Index

*Mean= 0.88, Median= 1.0, SD= 0.445, Variance= 0.228, Skewness= 0.666

**Measured from the multiple response dichotomous questions (n=90) in Figure 13 where 0= None (No experience at all); 1= Moderate (less experience; ticked 1-2 ‘lived outside Pangan-an’ items); 2= High (more experience; ticked 3-4 ‘lived outside Pangan-an’ items); item X= reverse-coded

4.2.1.2 Off-Island Travel Experience

In determining how often Pangan-an residents travel outside of the island, the respondents were directly asked of the frequency of travels they have made to a list of places that have a pull effect in terms of commerce, education, leisure and job opportunities within two (2) periods: first, in the past month (M1) and then, to further validate, in the past twelve months (M12).

Figure 15 shows that there were nearly zero travels made outside of the province (Visayas, Mindanao, Metro Manila & Luzon, and abroad) in the past month. The most traveled to place is the nearby Olango Island, with 33% of the survey sample reporting of traveling there more than five (5) times in the past month. Olango Island is the mother island of Pangan-an, accessible by foot and light vehicles during low tide, and contains the essential services and facilities unavailable in Pangan-an (i.e. cemetery).

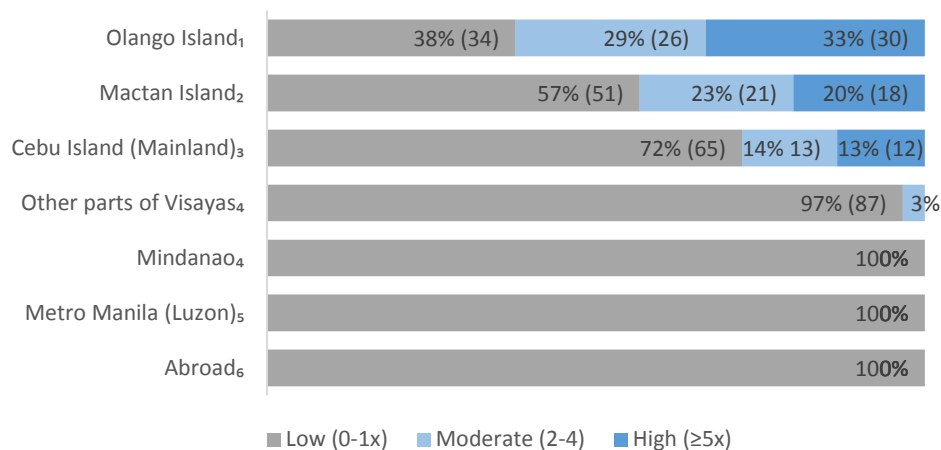


Figure 15 Off-Island Travel Frequency (M1)

The Travel Experience (M1) Index is calculated from the weighted composite scores of the reported travels in the previous month. ‘Low’ travel experience is prevalent among the survey population, as Figure 16 indicates and the median confirms.



Figure 16 Off-Island Travel Experience (M1) Index¹

* Mean= 1.09, Median= 1.0, SD= 0.466, Variance= 0.217, Skewness= 0.830

**Computed from the median of the weighted scores of the items in Figure 15 (the corresponding weights, assigned according to proximity and ease of access, are indicated in the subscript) where 1= Low, 2=Moderate, 3=High

As anticipated, the tally of travel experience in the past 12 months is higher than the account of the past month, as can be seen in Figure 17. But importantly, it reveals that the respondents are not entirely immobile and at least one (1) respondent traveled to a farther place, Mindanao.

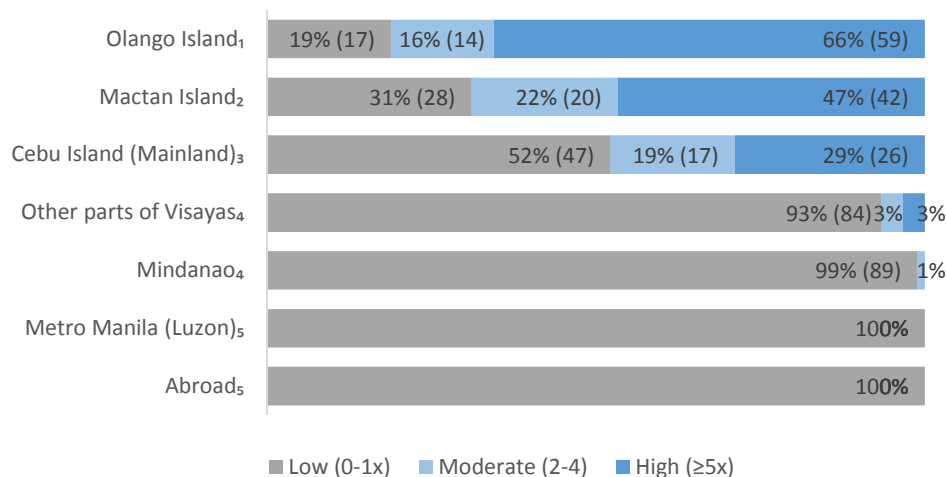


Figure 17 Off-Island Travel Frequency (M12)

*Reliability analysis (performed only for items 1-3) Cronbach's Alpha= 0.601

The Off-Island Travel Frequency (M12) Index (Figure 18) also shows a marked increase (+10%) in ‘moderate’ travel experience level among the respondents. The ‘high’ mark still registered nil, however.



Figure 18 Off-Island Travel Frequency (M12) Index²

*Mean= 1.41, Median= 1.0, SD= 0.495, Variance= 0.245, Skewness= 0.367

**Computed from the median of the weighted scores of the items in Figure 17 (the corresponding weights, assigned according to proximity and ease of access, are indicated in the subscript) where 1= Low, 2=Moderate, 3=High

The Off-Island Travel Experience Index (Figure 19) mirrors that of the Off-Island Travel Frequency (M12) Index with 59% (n=53) of the respondents registering ‘low’ and 41% (n=37) ‘moderate’ travel frequency. This can be attributed to the twofold (conservative, but was so given to account for memory recall) weight given to M12.

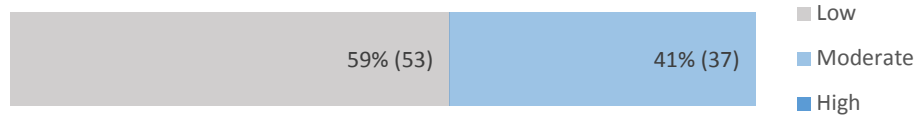


Figure 19 Off-Island Travel Experience Index

*Mean= 1.41, Median= 1.0, SD= 0.495, Variance= 0.245, Skewness= 0.367

**Computed from the median of the weighted scores of Travel Experience (M1)¹ Index & Travel Experience (M12) Index² where 1= Low, 2=Moderate, 3=High

The Off-Island Travel Experience Index median score indicates ‘low’ frequency of travel among the respondents.

4.2.1.3 Mobility Experience Index

Figure 20 summarizes the level of mobility experience of the survey population, extracted from the composite experience in residing outside of the island and the frequency of travels. It shows that Pangan-an residents are more immobile than mobile with 66% (n=59) recording low mobility experience.

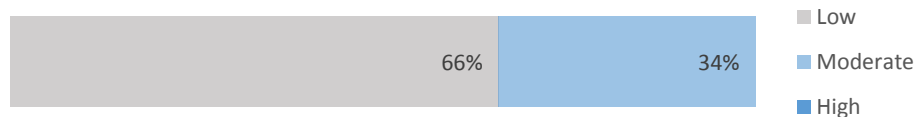


Figure 20 Mobility Experience Index

*Mean= 1.344, Median= 1.0, SD= 0.478, Variance= 0.228, Skewness= 0.666

*Taken from median of off-Island Residency and Off-Island Travel Experience

Mobility experience of the Pangan-an community is ‘low’. Table 5 summarizes.

Table 5 Mobility Experience Summary Statistics

	Mean	Median	SD	Variance	Skewness	Kurtosis	Result
Mobility Experience	1.344	1.0	0.478	0.228	0.666	-1.593	Low
Off-Island Residency Experience	0.88	1.0	0.445	0.198	-0.567	1.559	Low
Travel Experience Index	1.41	1.0	0.495	0.245	0.367	-1.908	Low
Travel Experience (M1)	1.31	1.0	0.466	0.217	0.830	-1.342	Low
Travel Experience (M12)	1.41	1.0	0.495	0.245	0.367	-1.908	Low

4.2.2 Mobility Agency

To establish mobility agency, there is a need to, first, categorically ask for the individual's disposition or inclination towards movement or non-movement. Secondly, the attainability of this leaning is ascertained by looking for his/her level of capacity to follow-through or act on these disposition, if and when he or she chooses to.

4.2.2.1 Mobility Disposition

Disposition measured herein pertains to an individual's various intentions for mobility. This section of the survey collected agreements or disagreements to statements expressing plans to a higher (as opposed to the movements described in the previous section) kind of human movement – family resettlement. Again, follow-up items of affirmation and negation were added to establish a higher degree of certainty.

Figure 21 (Mobility/ Resettlement Disposition) shows that almost all disagreed to having plans in resettling elsewhere. The negating item – “I have no plans at all in resettling my family elsewhere” – registered 38% (n=39) of agreements and 54% (n=49) strong agreements.

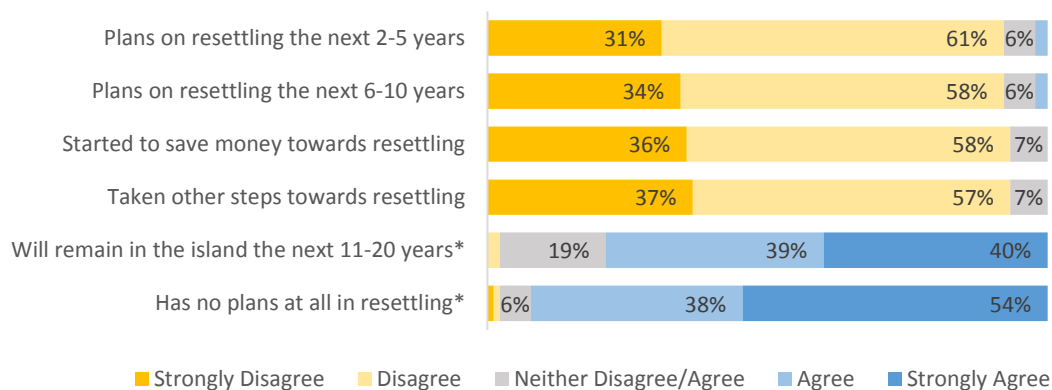


Figure 21 Mobility (Resettlement) Disposition

*Internal consistency is high at Cronbach's Alpha of 0.929 (The last 2 items were reverse-coded in the extraction of the alpha)

The Mobility (Resettlement) Disposition Index (Figure 22) shows the composite score on resettlement intention which is almost unanimously low. The respondents do not have plans to resettle elsewhere in the near and foreseeable future, as such have low mobility disposition.



Figure 22 Mobility (Resettlement) Disposition Index

*Mean= 1.022, Median= 1.0, SD= 0.148, Variance= 0.222, Skewness= 6.593

**Computed from the median of Figure 21 Likert scale Items (1-2; reverse-coded 5-6) and recoded to 1=Low (SD-D-NDA); 2= Moderate (Agree); 3= High (Strongly Agree)

***As intent is a pro-active notion, all non-agreement is herein considered low disposition in the recoding

4.2.2.2 Mobility Capacity

Capacity for free movement is measured here by the family's economic situation and presence of migrant network.

Economic Situation

The economic condition considers the weighted average of the reported total household income, educational attainment (less, some, moderate) and housing condition (rent-free, renter, owner). Figure 23 reflects the Economic Situation composite derived from income distribution, and, to a degree, their housing and education factors.

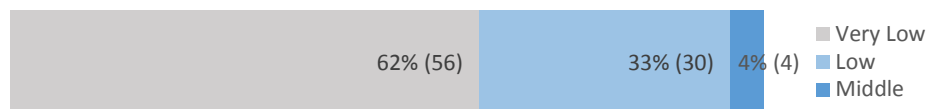


Figure 23 Economic Situation

*Mean = 1.42, Median= 1.0, SD= 0.142, Variance= 0.337, Skewness= 1.017

Migrant Network

Familial ties in cities can, when activated, facilitate migration and develop into a migrant network. In this study, presence of direct family members and close relatives in areas that are possible attractors for resettlement was asked from the respondents. These places, ranked in their proximity to Pangan-an and their strength as migration attractors, are: Olango Island, the mother island of Pangan-an; Mactan Island, the mother island of Olango; Mainland Cebu, the mother island of Mactan; Metro Manila and other major Philippine cities; and overseas, the highest migration aspiration for Filipinos.

Figure 24 (Family Network) shows the presence of immediate family members in said areas, while Figure 26 (Extended Family Network) is a list for close relatives. Only 10% (n=9) of the survey population reported to having immediate family members residing or working abroad, while close relatives were accounted for the same by about four times (42%, n=38) higher.

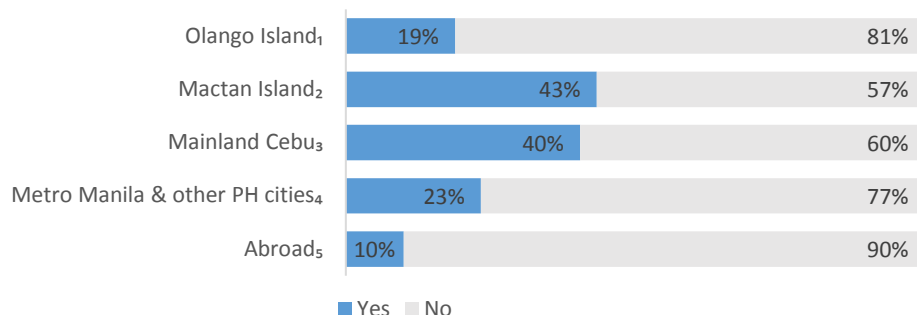


Figure 24 Family Network

*Reliability test performed with items on Figure 27. Internal consistency is moderate at Cronbach's Alpha = 0.707

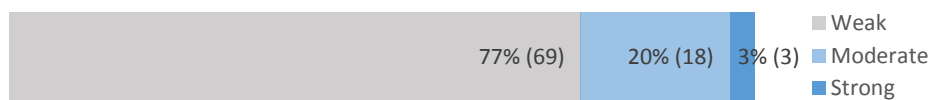


Figure 25 Family Network Index

*Mean = 1.267, Median= 1.0, SD= 0.513, Variance= 0.267, Skewness= 1.802
 **Computed from the median of the weighted scores of the items in Figure 24 (the corresponding weights, assigned according to proximity and ease of access, are indicated in the subscript) where 1=Weak, 2=Moderate, 3=Strong

As can be seen in the composites in Figures 26 and 27, close relatives or the extended families in magnet locales can form the larger part of the migrant network of the Pangan-an Island community.

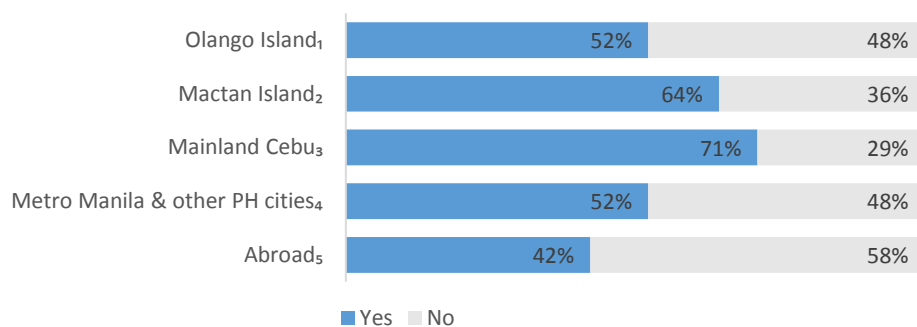


Figure 26 Extended Family Network

*Reliability test performed with items in Figure 24. Internal consistency is moderate at Cronbach's Alpha = 0.707

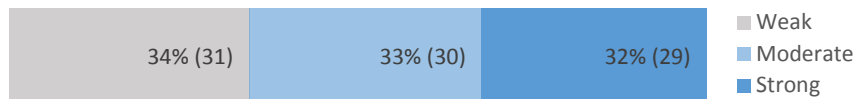


Figure 27 Extended Family Network Index

*Mean= 1.978, Median= 2.0, SD= 0.513, Variance= 0.267, Skewness= 1.802
 **Computed from the median of the weighted scores of the items in Figure 24 (the corresponding weights, assigned according to proximity and ease of access, are indicated in the subscript) where 1=Weak, 2=Moderate, 3=Strong

The Migrant Network Index (Figure 28) captures the overall strength of the community's mobility connections, which is not particularly robust with more than half (59%; n=53) reported to weak links, and only 3% (n=3) have strong ties.

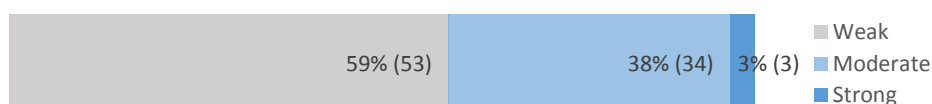


Figure 28 Migrant Network Index

*Mean= 1.444, Median= 1.0, SD= 0.563, Variance= 0.317, Skewness= 0.802
 **Computed from the median of the Family and Extended Family Networks where 1=Weak, 2=Moderate, 3=Strong

The median score of the Migrant Network Index shows that the respondents have a ‘weak’ migrant network.

Mobility Capacity Index

The economic situation and the level of migrant network make up the overall mobility capacity of the individual and his/her family. In the absence of a high economic situation category among the respondents, the Mobility Capacity Index (Figure 29) follows the former’s rating.

Figure 29 shows that 43% (n=39) of the survey population exhibit ‘very low’ mobility capacity. The upper percentile, however, stretches the Mobility Capacity median score to a ‘low’ mobility capacity index.



Figure 29 Mobility Capacity Index

**Mean= 1.61, Median= 2.0, SD= 0.575, Variance= 0.33, Skewness= 0.277*

***Computed from median of economic status and migrant network indices where 1=Very Low, 2=Low, 3=Moderate*

4.2.2.3 Mobility Agency Index

Figure 30, the overall mobility agency score, reflects the previously reported low level of mobility disposition in nearly all of the survey respondents as well as the fairly low capacity for movement.



Figure 30 Mobility Agency Index

**Mean= 1.256, Median= 1.0, SD= 0.439, Variance= 0.192, Skewness= 1.140*

***Computed from median of mobility disposition and capacity composite z-scores where 1= Low, 2=Moderate, 3=High*

With 98% (n=88 of 90) expressing no wish for migration in the foreseeable future, mobility agency of Pangan-an community members is ‘low’. The median score of the Mobility Agency Index (Figure 30) concurs.

Table 6 Mobility Agency Summary Statistics

	Mean	Median	SD	Variance	Skewness	Kurtosis	Result
Mobility Agency	1.256	1.0	0.439	0.192	1.140	-0.717	Low
Mobility Disposition	1.022	1.0	0.148	0.022	6.593	42.408	Low
Mobility Capacity	1.611	2.0	0.575	0.330	0.277	-0.745	Low
Economic Situation	1.422	1.0	0.580	0.337	1.017	0.070	Weak
Total Household Income	1.20	1.0	.402	.162	1.526	.334	Poor
Education Level	1.41	1.0	.598	.357	1.160	.361	Low
Housing Ownership	2.76	3.0	.659	.434	-2.346	3.583	High*
Migrant Network	1.444	1.0	0.563	0.317	0.802	-0.370	Weak
Family Network	1.267	1.0	0.515	0.265	1.802	2.475	Weak
Extended Family Network	1.978	2.0	0.821	0.674	0.042	-1.515	Moderate

*High ownership; but quality all-around is low.

4.2.3 Human Mobility Patterns

The mobility patterns of the Pangan-an Island community is revealed in the synthesis of the composites of the mobility experience and agency indicators as shown in Figure 31. This was calculated using the generated standardized z-scores.

The median score of the Human Mobility Index (Figure31) is indicative of a ‘largely immobile’ population with ‘low agency’ for mobility.

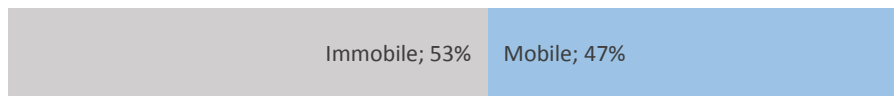


Figure 31 Human Mobility Index

*Mean= 1.467, Median= 1.0, SD= 0.502, Variance= 0.252, Skewness= 0.136

**Computed from median scores of mobility experience and agency composites where 1=Immobile, 2=Mobile

Quantitative results reveal that the residents of Pangan-an Island are generally immobile, scoring low across all dimensions of mobility characteristics used in this study: travel patterns, intent to move and/or resettle, and capacity for movement (see Table 7).

Table 7 Pangan-an Mobility Patterns Summary Statistics

	Mean	Median	SD	Variance	Skewness	Kurtosis	Result
Mobility Patterns	1.467	1.0	0.502	0.252	0.136	-2.027	Immobile
Mobility Experience	1.344	1.0	0.478	0.228	0.666	-1.593	Low
Mobility Agency	1.256	1.0	0.439	0.192	1.140	-0.717	Low
Mobility Disposition	1.022	1.0	0.148	0.022	6.593	42.408	Low
Mobility Capacity	1.611	2.0	0.575	0.330	0.277	-0.745	Low

*There is an evidence of an association between mobility experience and mobility agency ($p=0.038$). This study however does not deeply explore the relationships between sub-variables due to time limitations.

This leaning towards immobility is principally influenced by the overall lack of disposition or inclination to reside elsewhere.

Florencio Pogoy, 62 years old and the Vice President of the Pangan-an Island Senior Citizens' Association, after saying that he has never wanted or thought of moving and residing elsewhere other than Pangan-an, punctuated, “Kung asa ang imong pusod, anha gyud ka...” (one stays where one’s umbilical cord lies).

He added that he has never really left the island for too long, except during his 30s where he once worked in the seaweed farming industry for a year in Tawi-Tawi (one of the most southern-most small islands in the Philippines). Mr. Pogoy also shared that longer, farther fishing trips were more common then, but not anymore these days. These trips took them to as far away as Palawan (towards the West Philippine Sea or South China Sea border; see Figure 32) for about two weeks, the longest.

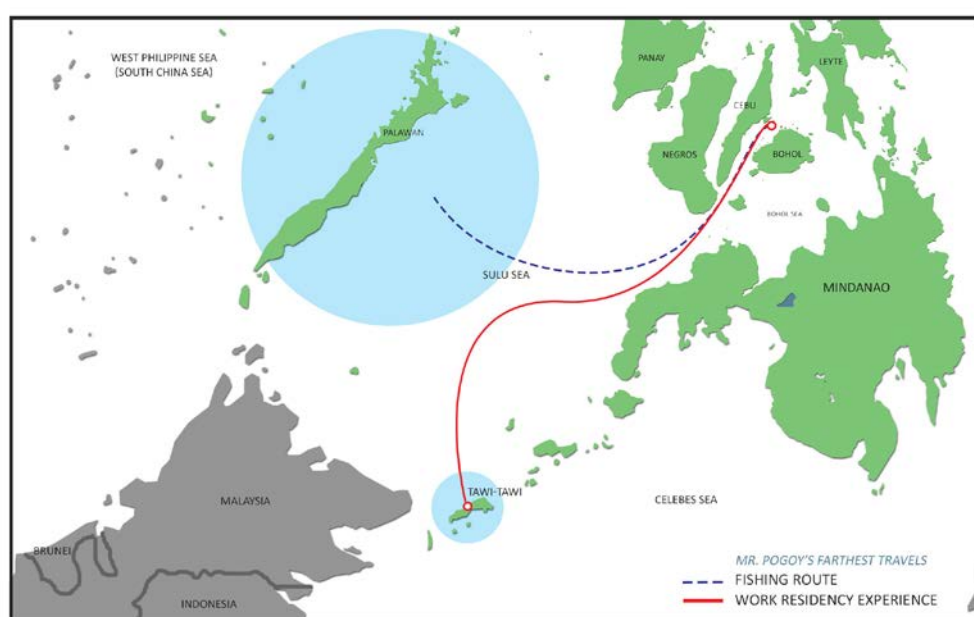


Figure 32 Mr. Pogoy's travels of note.

Marejane Estoy, 26, a youth leader from Looc Tunga in Pangan-an, also relates how her mother prevailed in making the whole family move to her home island Pangan-an. Their family used to live in her father's rural village in neighbouring Bohol province, where Marejane was also born. But Marejane says her mother got tired of rural living and eating ‘sweet potatoes with everything’, so they moved to in Pangan-an 18 years ago.

Marejane herself studied college at the Cebu Mainland city of Mandaue but she says she can never really get used to the hustle and bustle of the city. While the youth of the island, she says, are attracted to the city – “para magpa-syudad (to become an urbanite), magpa-puti (to become fair-skinned), magpa-japorms (to be cool) – most come back for their family, especially, during feast days, and eventually settle in the island as many marry fellow local islanders.

“Dili ka makaingon nga *dili na ko makabalik diri*”. (You can't say ‘I can't come back here’.) Marejane adds in jest, recounting a local legend oft-repeated by elders that appearing before the statue of their patron saint San Roque (St. Roch) guarantees one's return to the island.

Meanwhile, while the general movement or travel experience of Pangan-an residents is low, from the interviews, it is revealed that there is a strong active interaction (for instance, during the fieldwork, a ‘suicide’ from the previous week at the neighbouring island and a death by lightning strike in yet another island, were one of the hot topics in Pangan-an) with other small islands in the Danajon Bank, the marine-resource-rich double barrier reef region where Pangan-an and its mother Olango Island Group sit. This movement pattern sees them limited in circling around these nearby islands.

4.3 Place Attachment

Three dimensions of place identity, place dependence and place rootedness (Backlund & Williams 2004; Giuliani et al. 2003) are indexed below from the indicator level to the respective sub-variable composite scores and further amassed into the larger concept of place attachment.



Figure 33 Place Attachment Formula

4.3.1. Place Identity

The presence and level of place identity (symbolic place attachment) is assessed with two indicators: (1) expressed place meaning, the subjective value assigned by the individual to a place, and (2) applied place meaning, environmentally-responsible actions and behaviors which embody the former, thus, a way of verifying it (Hintz 2015; Vaske & Kobrin 2001).

4.3.1.1 Expressed Place Meaning

Expressed place meaning is pulled up from iterations of love for home-place and other positive feelings for place. As shown in Figure 34, almost all (98-100%) of the respondents expressed positive feelings for Pangan-an. In fact, 100% (n=90) strongly considered Pang-anan Island as their home. Only ‘pride of place’ yielded a negative response of 1% (n=1).

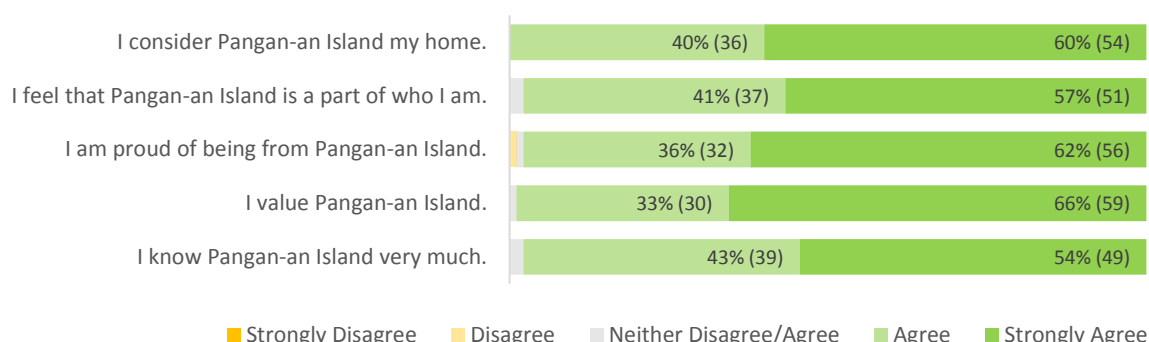


Figure 34 Expressed Place Meaning

*Internal consistency is high at Cronbach's Alpha of 0.952.

**The scales are unidimensional and have a fairly high variability within the items with Kaiser-Meyer-Olkin Measure (KMO)= 0.876 (Bartlett's Test of Sphericity= 472.916, df= 10, p-value= <0.001). Sampling is adequate.

These expressed place meaning items were summarized to form the Expressed Place Meaning (Figure 35) Index where, corresponding to the quality of responses, the scale was recoded into ‘weak’, ‘moderate’ and ‘strong’. The recoding was performed to gain consistency, simplicity and interpretability, and which shall be used in the succeeding summations.

As such, the index (Figure 35) reveals that 60% (n=54) of the survey population self-reported to ‘strong’ expressed place meaning.



Figure 35 Expressed Place Meaning Index

*Mean= 2.59, Median= 3.0, SD= 0.52, Variance= 0.267, Skewness= -0.62

**Computed from the median scores of the five components in Figure 34, where, upon recoding, 1= Weak (SD-D-NDA); 2= Moderate (Agree); 3= Strong (Strongly Agree)

The median score of the Expressed Place Meaning Index reveals ‘strong’ professed love for home-place among the respondents.

4.3.1.2 Applied Place Meaning

Applied place meaning is drawn out from the presence and frequency of engagement in communal activities for place care and community development in the past year.¹⁷

Figure 36 shows that the ‘barangay assembly’, the regular meetings called by the village council, has the highest participation rate of 94% (n=85). Tree/ mangrove planting is the civic activity least engaged in, with 56% (n=50) or more than half of the respondents unable to participate in the past year.

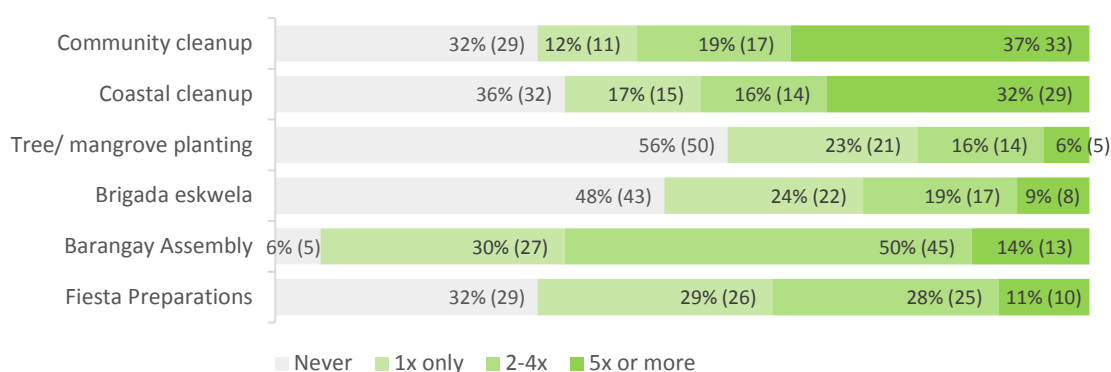


Figure 36 Applied Place Meaning

*Internal consistency is at acceptable level with a Cronbach's Alpha of 0.646.

**There is also an acceptable (<0.50) sampling adequacy with KMO= 0.504 (Bartlett's Test of Sphericity= 131.925, df= 15, p-value= <0.001).

¹⁷ The actual presence of these activities in the village were verified with village leaders as well as the enumerators during pretesting.

The Applied Place Meaning Index (Figure 37) summarizes the items in Figure 36 and has similarly been recoded into ‘weak’, ‘moderate’ and ‘strong’.

The composite in Figure 37 indicates that half (50%, n=45 of 90) of the respondents have ‘weak’ applied place meaning and only 11% (n=10) have ‘strong’ applied place meaning.



Figure 37 Applied Place Meaning Index

*Mean= 1.61, Median= 1.5, SD= 0.68, Variance= 0.465, Skewness= 0.67

**Computed from the median of the six components in Figure 29 where, after recoding, 1= Weak (Never-1x); 2= Moderate (2-4x); 3= Strong (5x-more)

4.3.1.3 Place Identity Index

Finally, the level of Place Identity is extracted from the Expressed Place Meaning and Applied Place Meaning composites. Figure 38 shows that all of the respondents possess place identity, with a majority (67%) exhibiting ‘strong’ place identity.

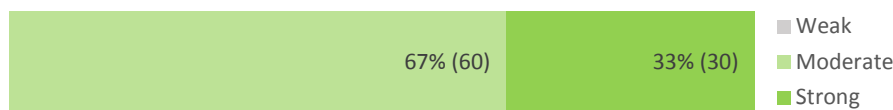


Figure 38 Place Identity Index

* Mean= 2.33, Median= 2.0, SD= 0.47, Variance= 0.225, Skewness= 0.72

**Computed from the median of EPM Index and APM composites where 1=Weak, 2= Moderate, 3= Strong

However, the median indicates that place identity is ‘moderate’. The table below summates.

Table 8 Place Identity Summary Statistics

	Mean	Median	SD	Variance	Skewness	Kurtosis	Result*
Place Identity	2.33	2.0	0.47	0.225	0.72	-1.52	Moderate
Expressed Place Meaning	2.59	3.0	0.52	0.267	-0.62	-1.06	Strong
Applied Place Meaning	1.61	1.5	0.68	0.465	0.67	-0.64	Moderate

*Where 1=Weak; 2=Moderate; 3=Strong

4.3.2 Place Dependence

Place Dependence is the functional place attachment derived from the tangible attributes of the place (Williams and Roggenbuck, 1989), related to the usefulness of (being attracted to a) place (Stokols and Shumaker 1981 in White et al. 2008), and herein measured with social and residential satisfaction.

4.3.2.1 Social Satisfaction

Social satisfaction is derived from the neighborly impressions of the community members towards each other.

In the case of the Pangan-an, majority of the survey sample reported to general agreeability with each other across all social satisfaction items as highlighted in Figure 39. Though, there is a good deal of neutral answers (24-31%) in terms of neighborly protection, cooperation and communication, overall there is a very small number of socially dissatisfied people in Pangan-an.

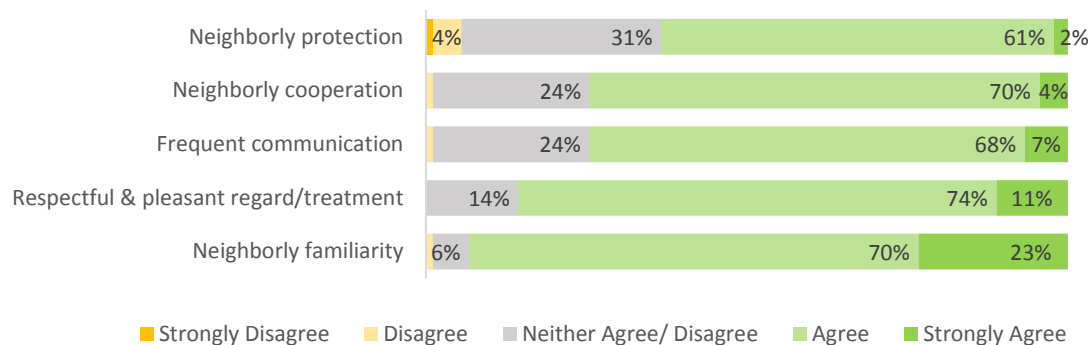


Figure 39 Social Satisfaction

*Internal consistency is at above acceptable level with a Cronbach's Alpha of 0.683.

**There is sampling adequacy with KMO=0.674 (Bartlett's Test of Sphericity= 80.577, df= 10, p-value <0.001).

The Social Satisfaction Index (Figure 40) better illustrates the positive social regard of the survey population with the greater Pangan-an community, although the composite scale reveals a fair majority (74%, n=67) of moderately positive social satisfaction.



Figure 40 Social Satisfaction Index

*Mean= 1.81, Median= 2.0, SD= 0.472, Variance= 0.222, Skewness= -0.568

*Computed from the median of the five components in Figure 39 and recoded into: 1= Low (DA-A-NDA); 2= Moderate (Agree); 3= High (Strongly Agree).

4.3.2.2 Residential Satisfaction

The residential/neighborhood satisfaction survey determines the utilitarian pull of the place. The questionnaire asked how satisfied or dissatisfied the respondents are of the basic and commonly available utilities and facilities in a generic healthy neighborhood.

Figure 41 shows that only the item: ‘Leisure/ Entertainment’ facilities was given a ‘very dissatisfied’ rating by the survey population (9%, n=8). Both ‘Safety and Security’ and ‘Education’ facilities received zero dissatisfaction rating. Ratings (56-68%) in the services for potable water, electricity, safety and security, livelihood, education and healthcare leaned towards ‘high satisfaction’.

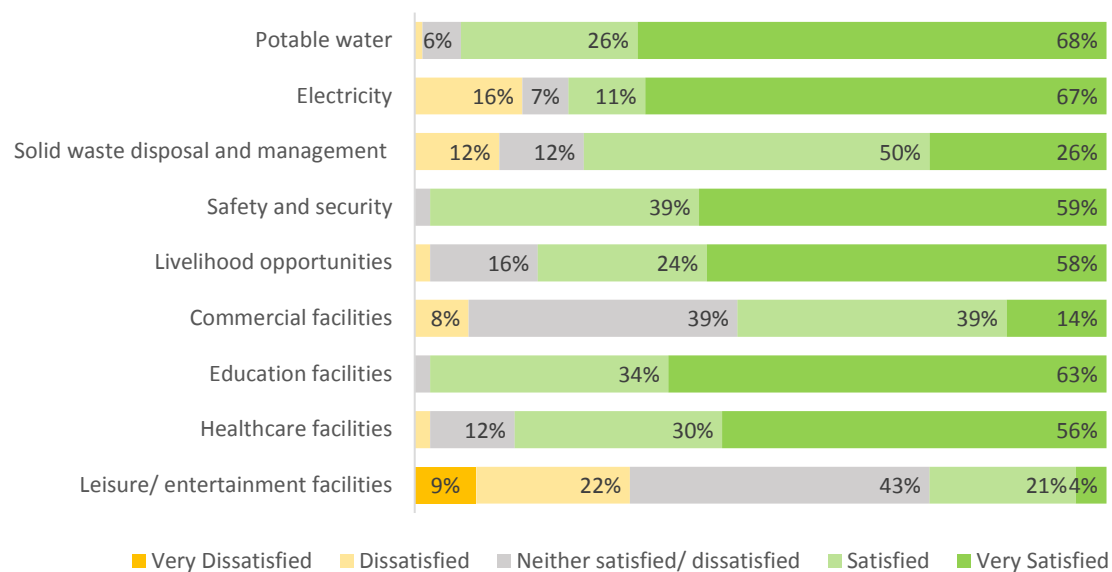


Figure 41 Residential Satisfaction

*Internal consistency is high at Cronbach's Alpha 0.857.

**There is sampling adequacy with KMO=0.887 (Bartlett's Test of Sphericity at $T=501.163$, $df=36$, $p\text{-value} < 0.001$).

Overall, the Residential Satisfaction Index (Figure 42) reveals that 54% of the survey population is highly satisfied with the basic services and facilities in their island community. The median reveals a ‘high’ residential satisfaction level among the Pangan-an island residents.



Figure 42 Residential Satisfaction Index

*Mean= 2.37, Median= 3.0, SD= 0.472, Variance= 0.771, Skewness= -0.743

**Computed from the median of the nine items in Figure 41 where, after recoding, 1= Low Satisfaction (VD-D-NSD); 2= Moderate (Satisfied); 3= High (Very Satisfied).

The high level of satisfaction to the services and facilities asked for in the survey contradicts to the actual presence and quality of those, as listed in Table 5. This information was derived from interviews with key informants and the local officials, and confirmed by the ethnographic observations by the researcher.

Table 9 Quality of services and facilities in the community

Facilities/ Services	Availability/ Condition
Potable water	Household-level rainwater harvesting only
Electricity	Off-the-grid local diesel power generator plant run by a local cooperative; power runs daily from 6pm – 10pm or 12mn only
Solid waste disposal and management	Very few houses with toilets and of the 4 community toilets, only 2 are functional and rarely used, instead people use the sandy beaches, mangrove area, or the woods; No centralized solid waste management system in place; collection and recycling of reusable plastics is available but intermittently
Safety and security	No police outpost; but with presence of active local barangay police (tanod) and the Peace Council (Lupon Tagapamayapa)
Livelihood opportunities	Primarily fishing and related activities (i.e. boat operations, seaweed farming, shell craft cottage industry), and some in other sectors as the barangay government, small enterprises, etc.
Commercial facilities	Small enterprises only (sari-sari store, the Philippine-style home-based convenience store)
Education facilities	One (1) Daycare center, one (1) Elementary School, one (1) High School (Grades 7-10 only; no Senior High School (Grades 11-12)
Healthcare facilities	One (1) barangay health center; no hospital
Leisure/ entertainment facilities	Community level: covered basketball court and the beaches; other leisure/ entertainment facilities are at the household level

4.3.2.3 Place Dependence Index

The Place Dependence Index (Figure 43), generated from the Social Satisfaction Index and Residential Satisfaction Index, reveals that almost all (99%) of the survey population is satisfied with the physical and social functionality of Pangan-an Island.



Figure 43 Place Dependence Index

*Mean= 2.34, Median= 2.0, SD= 0.501, Variance= 0.251, Skewness= 0.389

**Composite is derived from the mean of the social and residential satisfaction indices where 1= Low, 2= Moderate, 3= High

The median translates to a ‘moderate’ level of place dependence as shown in the table below.

Table 10 Place Dependence Summary Statistics

	Mean	Median	SD	Variance	Skewness	Kurtosis	Result*
Place Dependence	2.34	2.0	0.501	0.251	0.389	-1.197	Moderate
Social Satisfaction	1.81	2.0	0.472	0.222	-0.568	0.479	Moderate
Residential Satisfaction	2.37	3.0	0.771	0.594	-0.743	-0.921	Strong

*Where 1=Weak; 2=Moderate; 3=Strong

4.3.3 Place Rootedness

The level of Place Rootedness is measured with the length of habitation in one place and further appraised in this study with the extent of the family's generational roots in the island of Pangan-an.

Figure 44 shows that a much larger group from the survey sample have a 'high' history of residency in the island; that is, 77% (n=69) of the respondents are *lumad* (indigenous) in Pangan-an, born and raised in the island.



Figure 44 History of Residency

*Mean= 2.56, Median= 3.0, SD= 0.823, Variance= 0.677, Skewness= -1.359

**1= Low (born elsewhere and migrated to Pangan-an as adult); 2= Moderate (born elsewhere but raised in Pangan-an); 3= High (born and raised in Pangan-an)

Ancestral Roots to Place (Figure 45) accounts for the birthplace of the parents of the respondents. 54% (n=49) of the sample reported that both parents are native to Pangan-an. They have 'strong' ancestral roots to the locality.



Figure 45 Ancestral Roots to Place

*Mean= 2.32, Median= 3.0, SD= 0.819, Variance= 0.670, Skewness= -0.663

**1= Weak (Both parents are not from Pangan-an); 2= Moderate (At least one parent is from Pangan-an); 3= Strong (Both parents are from Pangan-an)

Tallying the composites of History of Residency and Ancestral Roots to Place, the Place Rootedness Index (Figure 46) shows that 54% (n=49) of the survey population have 'strong' temporal attachment to place. Less than a quarter (21%, n=19) have a 'weak' level of place rootedness.



Figure 46 Place Rootedness Index

*Mean= 2.33, Median= 3.0, SD= 0.807, Variance= 0.652, Skewness= -0.684

**Derived from the median of History of Residency (Fig. 44) and Ancestral Roots to Place (Fig. 45) where 1= Weak, 2= Moderate; 3= Strong

The table below shows that the median score of the Place Rootedness Index indicates 'strong' place rootedness among the survey population. Figure 47 is a visual representation of the roots of the Pangan-an residents.

Table 11 Place Rootedness Summary Statistics

	Mean	Median	SD	Variance	Skewness	Kurtosis	Result*
Place Rootedness	2.33	3.0	0.807	0.652	-0.684	-1.123	Strong
History of Residency	2.56	3.0	0.823	0.677	-1.359	-0.108	Strong
Ancestral Roots to Place	2.32	3.0	0.819	0.670	-0.663	-1.186	Strong

*Where 1=Weak; 2=Moderate; 3=Strong

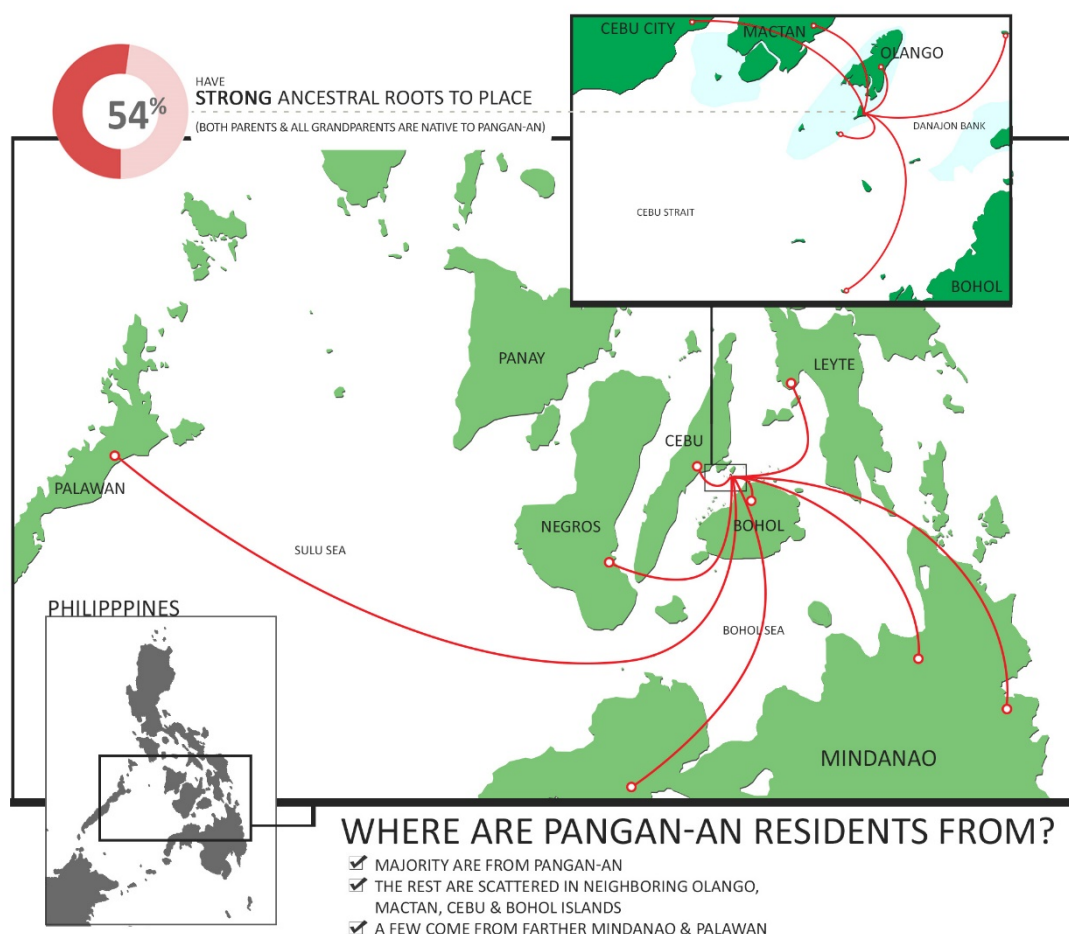


Figure 47 Roots of Pangnan-an Sample Population

4.3.4 Place Attachment Index

After consolidating place identity, place dependence and place rootedness, these three dimensions are then synthesized to determine the presence and level of place attachment among the Pangnan-an Island residents.

Figure 48 shows that place attachment is present in all of the surveyed population. A third of them (34%, n=31) exhibit 'strong' degree place attachment characteristics while the remaining majority (66%, n=59) have moderate place attachment. None exhibit weak place attachment.

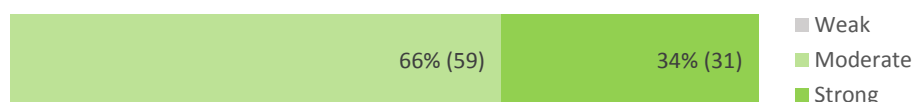


Figure 48 Place Attachment Index

*Mean= 2.34, Median= 2.0, SD= 0.807, Variance= 0.652, Skewness= -0.684

**Computed from the median of the three PA dimensions: Place Identity, Place Dependence, Place Rootedness where, recoded, 1= Weak, 2= Moderate; 3= Strong

The median score of the Place Attachment Index reveals that the respondents possess ‘moderate’ place attachment to their home-place of Pangan-an Island which encompasses the symbolic, utilitarian and temporal ambit of people-place bonds.

The breakdown in Table 12 shows no low scores in all the place attachment dimensions and their sub-variables.

In the variables where the intensity is overwhelmingly strong, as in the expresses love (place meaning) for the island, their presence or ‘being’ is almost inherent, like a reflex, as can be gleaned from the interviews with selected key residents. However, there was difficulty in expounding these feelings.

Table 12 Place Attachment Summary Statistics

	Mean	Median	SD	Variance	Skewness	Kurtosis	Result*
Place Attachment	2.34	2.0	0.478	0.228	0.666	0.666	Moderate
Place Identity	2.33	2.0	0.474	0.225	0.719	-1.517	Moderate
Expressed Place Meaning	2.59	3.0	0.52	0.267	-0.62	-1.06	Strong
Applied Place Meaning	1.61	1.5	0.68	0.465	0.67	-0.64	Moderate
Place Dependence	2.34	2.0	0.501	0.251	0.389	-1.197	Moderate
Social Satisfaction	1.81	2.0	0.472	0.222	-0.568	0.479	Moderate
Residential Satisfaction	2.37	3.0	0.771	0.594	-0.743	-0.921	Strong
Place Rootedness	2.33	3.0	0.807	0.652	-0.684	-1.123	Strong
History of Residency	2.56	3.0	0.823	0.677	-1.359	-0.108	Strong
Ancestral Roots to Place	2.32	3.0	0.819	0.670	-0.663	-1.186	Strong

*Where 1=Weak; 2=Moderate; 3=Strong

**There is no evidence of association ($p > 0.05$) among the three place attachment dimensions. This study however does not further explore the relationships between sub-variables due to time limitations.

Youth leader Marejane Estoy, whose family moved in the island when she was 8, says that the island of Pangan-an means a lot to her because it is where she was raised, and it is home to her and her family. She is proud of her home island and speaks of it with pride. “*Kay taga diri man ko*” (Because I’m from here), she explains matter-of-factly, adding the popular adage “*mahalin ang sariling atin!*” (love your own!) to emphasize her point.

Ginalie B. Inoc, 34, secretary of the local women’s organization ‘Kababainhan sa Pangan-an’ (Women of Pangan-an), echoes Marejane’s equating of home with family – that Pangan-an is home because it is where her children were born and are being raised. Ginalie is originally from a coastal town north of the province and moved in Pangan-an in 2004 when she married a local.

While the applied place meaning do not directly match the intensity of the feelings of affection for the island, the moderate level of place care is still noteworthy. The “clean and green” group in the neighborhoods, for instance as described by Ginalie who is also the secretary of the barangay government, now functions with little supervision or monitoring from the barangay. She describes a self-regulated work-shifts system for volunteer neighborhood and beach cleaners among the residents which help keep public places in Pangan-an clean and litter-free.

Catalina Pareja, 44, treasurer of the organization of conditional cash transfer (CCT) beneficiaries in the village, says her husband represents their family in their neighborhood ‘clean and green’ group. Catalina describes Pangan-an people as cooperative and helpful, concurring to Ginalie’s appraisal that the community is still tight and close-knit, as such “*makapangayo pa ka ug kamunggay sa silingan*” (you can still ask for moringa fronds from your neighbors).

This fair regard for the members of the community is reflected in the positive but moderate social satisfaction score.

Across all the place attachment indicators there is positive level of attachment which range from moderate to strong. The two sub-variables ‘applied place meaning’ (for place identity) and ‘social satisfaction’ (for place dependence) registered moderate scores which eventually influenced their resultant variable (see Table 12).

4.4 Climate Change Risk Perceptions

In determining how the population recognizes the dangers posed by climate change, first their experience to such is assessed.

Figure 49 shows that except for ‘storm surge’ and ‘sea level rise’, there is a near-perfect response to exposure from weather phenomenon related to climate change. Exposure to the strongest climate change indicator – sea level rise – is the only one in this set receiving a fairly split opinion with 61% (n=55) positive and 39% (n=35) negative responses.

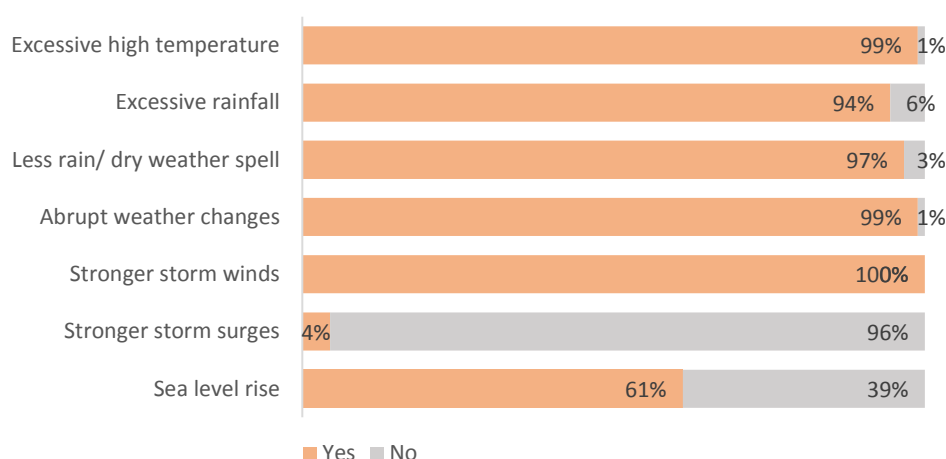


Figure 49 Climate Change Experience
*Derived from dichotomous yes/no question series

Lapu-Lapu City Disaster Risk Reduction and Management Officer, Andy B. Berame, whose office also handles climate change adaptation and management in the city, confirms that storm surge is not yet seen as a major hazard in Pangnan-an. In fact, the city considers the island mainly at risk only of ‘strong winds’ hazard, particularly “dumagsa” (north/ northeasterly) winds which intensify during “amihan” (northeast monsoon) season.

“Of course, typhoons are also a major hazard but only when the island is at its direct path, which is not very often”, says Elvis A. Pagcilan, 48, an entrepreneur and senior barangay councilor. He adds that sea level rise, to them, is not yet that visibly apparent, although from time to time they experience tidal surges where seawater breaches into settled low-lying sandy coasts of the island. He recalls that the highest and most recent coastal flooding was about a foot-high which just about reached the ground level of the community hall.

Bernardo S. Sumalinog, 56, a fisherman and also a barangay councilor heading the environment committee and the barangay Disaster Risk Reduction and Management (DRRM) council, likewise remembers these occasional extreme high tides but does not associate them with sea level rise nor to the bigger climate change phenomenon. This is not surprising, as the community as a whole is not exposed to climate change education.

Even so, overall, there is an overwhelming agreement to experiencing climate change and its related weather events, as shown below in Figure 50.



Figure 50 Climate Change Experience Index

*Mean= 1.99, Median= 2.0, SD= 0.105, Variance= 0.011, Skewness= -9.487

**Computed from the median of Climate Change Experience (Figure 41) items where 1= No, 2= Yes

Further, the measure of their appropriate anticipatory response to climate-related events and natural hazards indicates recognition to the risks they bring. Figure 51 shows a high percentage of response to the standard preparedness and contingency measures (items 1-3) for the commonly occurring hydro-meteorological hazards in the island.

The Natural Hazards Response composite (Figure 52), therefore, is taken only from these three items. The last two components, notably ‘off-island evacuation’ which registered zero ‘yes’ marks, are included here to highlight their weak presence in the Philippine disaster risk response context.

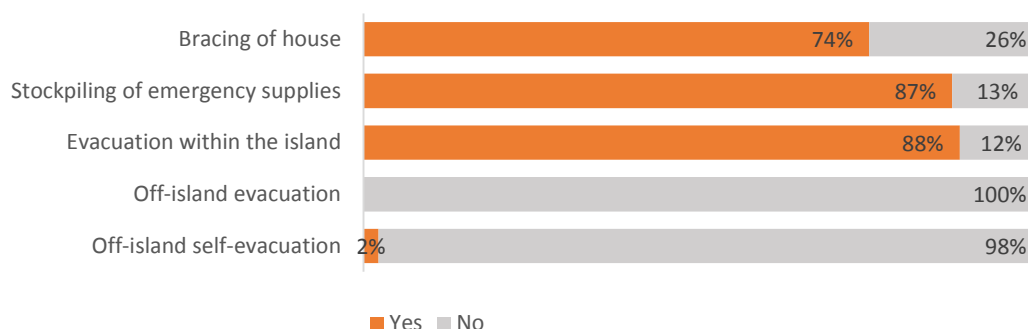


Figure 51 Natural Hazards Response

*Derived from dichotomous yes/no question series

Figure 52 highlights the larger part of the population positively taking actions in preparing for and responding to natural hazards. The median shows that there is ‘positive’ response to natural hazards.



Figure 52 Natural Hazards Response

*Mean= 1.87, Median= 2.0, SD= 0.342, Variance= 0.117, Skewness= -2.194

**Computed from the median of Natural Hazards Response (Figure 51) items 1-3 only where 1= No, 2= Yes

The barangay DRRM council head Bernardino S. Sumalinog confirms that a call for emergency evacuation off the island of Pangan-an has not happened yet. More customary, he says, are evacuation orders ahead of typhoons and extreme hydro-meteorological events for residents living in the coastal hazard zones. Their designated evacuation area is the local elementary school which lies a little farther inland. He adds that they are not fully equipped with early warning devices, so he usually does everything manually, as in, he visits each of the houses to announce the evacuation order. While most do evacuate, some still don't; instead, wait the last minute to do so.

Figure 53 is the breakdown of responses on knowledge and perceptions about the impacts of climate change to the individual and the community. The items are repeated and confirmatory notions of climate change awareness and understanding to arrive at the Climate Change Risk Perception Index (Figure 54) where it shows that 81% (n=57) of the respondents expressed an awareness to the risks of the climate change phenomenon.

That translates in the median score which infers that there exists a ‘moderate’ level of expressed climate change risk perception among the survey population.

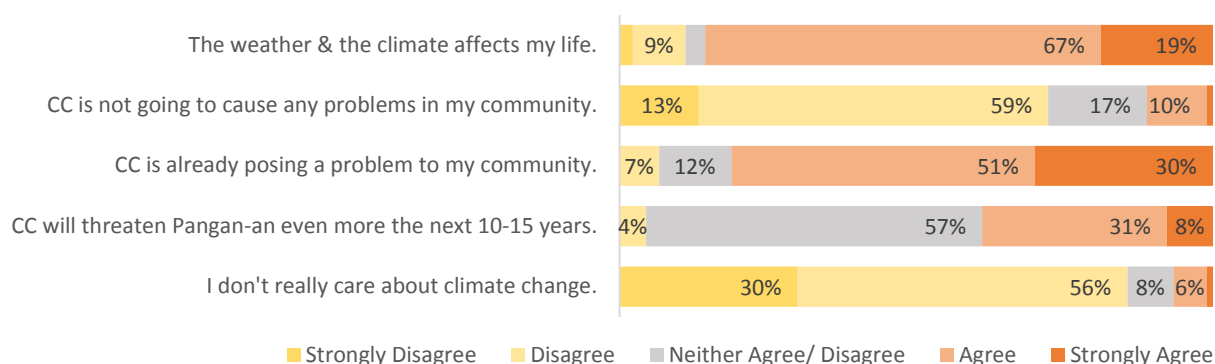


Figure 53 Expressed Climate Change Risk Perception

*Internal reliability is moderate at Cronbach's Alpha= 0.734 (Items 2 & 5 were reverse-coded in the reliability analysis)



Figure 54 Expressed Climate Change Risk Perception Index

*Mean= 1.99, Median= 2.0, SD= 0.609, Variance= 0.371, Skewness= 0.005

**Computed from the median of Figure 45 Likert scale Items (with items 2 & 5, reverse-coded), as recoded, where 1= Low (SD-D-NDA); 2= Moderate (Agree-); 3= (Strongly Agree)

4.4.1 Net Climate Change Risk Perception

The net Climate Change Risk Perception (Figure 55) measures the survey population's expressed climate change risk perceptions (Figure 50), that is the subjective understanding and acknowledgment of the current and probable risks and dangers of climate change and related events – validated with their experience (Figure 52) to said occurrences and their response (Figure 54) to those.

As shown in Figure 55 and the median score of the net Climate Change Risk Perception Index, 'moderate' risk perception is present among the survey population. This means that the respondents report to being aware of climate change but are not especially alarmed by the risks it poses. Table 13 summarizes.



Figure 55 (Net) Climate Change Risk Perception Index

*Mean= 2.04, Median= 2.0, SD= 0.54, Variance= 0.29, Skewness= 0.04

**Computed from the standardized scores (z-scores) of CC Experience, Natural Hazards Response and Expressed CC Risk Perception where 1= Low; 2= Moderate; 3= High

Table 13 Climate Change Risk Perception Summary Statistics

	Mean	Median	SD	Variance	Skewness	Kurtosis	Mean
Climate Change Risk Perception	2.04*	2.0	0.54	0.29	0.04	0.55	Moderate
Climate Change (CC) Experience	1.99**	2.0	0.105	0.011	-9.487	90.000	Affirmative
Natural Hazards Response	1.87**	2.0	0.342	0.117	-2.194	2.877	Affirmative
Expressed CC Risk Perception	1.99*	2.0	0.61	0.371	0.005	-0.219	Moderate

*Maximum= 3. **Maximum= 2.

***Testing for association among the above sub-variables, only climate change experience and natural hazards response were found to have statistically significant relationship ($p=0.010$) This study however does not further explore the relationships between sub-variables due to time limitations.

4.5 Place Attachment – Human Mobility – Climate Change Connectivity

After determining the level of mobility (immobile), place attachment (moderate) and climate change risk perception (moderate) as shown in Table 14, comes the test for determining the connectivity of these three key concepts within this study's context.

Table 14 Summary statistics of the three main variables

	Mean	Median	SD	Variance	Skewness	Kurtosis	Mean
Mobility Patterns*	1.467	1.0	0.502	0.252	0.136	-2.027	Immobile
Place Attachment**	2.34	2.0	0.478	0.228	0.666	0.666	Moderate
Climate Change Risk Perception**	2.04	2.0	0.54	0.29	0.04	0.55	Moderate

*Where 1=Mobile; 2=Immobile

**Where 1=Weak; 2=Moderate; 3=Strong

4.5.1 The Climate Change Risk Perception Connection to Place Attachment & Human Mobility

Climate change is the contextual frame of this study. Although the presence of climate change risks in the research locale has been established at the outset, and confirmed in the subsequent secondary data collection and interviews with relevant agencies, perception to the risks that go hand-in-hand with the phenomenon was added into the conceptual formula as a confounding variable to both the independent and dependent variables.

4.5.1.1 Influence of Climate Change Risk Perception to Place Attachment

The test for independence between climate change risk perception, place attachment and its three dimensions gave weak evidence to an association. The level of climate change risk perception and place attachment among Pangan-an residents has no statistical relation. The result of this study indicates that one does not affect or influence the other.

Table 15 Summary of Test of Association Results: Climate Change Risk Perception and Place Attachment

		Pearson Chi-Square	df	P-Value
	Place Attachment	3.744	2	0.154
CLIMATE CHANGE RISK PERCEPTION	Place Identity	1.468	2	0.480
	Place Dependence	8.230	4	0.084
	Place Rootedness	1.957	4	0.744

4.5.1.2 Influence of Climate Change Risk Perception to Mobility Patterns

Likewise, as Table 16 shows, there is no statistical evidence of a relationship between climate change risk perception and mobility patterns.

Table 16 Summary of Test of Association Results: Climate Change Risk Perception and Mobility Patterns

		Pearson Chi-Square	df	P-Value
CLIMATE CHANGE RISK PERCEPTION	Mobility Patterns	0.761	2	0.684
	Mobility Experience	0.298	2	0.861
	Mobility Agency	2.118	2	0.347
	Mobility Disposition	2.858	2	0.240
	Mobility Capacity	5.500	4	0.240
	Migrant Network	3.660	4	0.454
	Economic Situation	6.189	4	0.185

4.5.2 Influence of Place Attachment to Mobility Patterns

According to the results from the descriptive statistics, place attachment with ‘moderate’ strength exists among the sample population and their mobility patterns reveal of a tendency towards ‘immobility’. Further, Figure 56 shows that the level of place attachment of the immobile among the respondents is higher than those of the mobile population.



Figure 56 Level of Place Attachment of Aggregated Mobile/Immobile Residents

While this result coincides with the hypothesis, the next important step – the essence of this research – is to test whether the relationship between the two characteristics is beyond incidental. The interpretations are reference from Cohen’s (1988) statistical power analysis.

Test for Association

The chi-square test for independence as shown in Table 17 indicates that there is evidence of association between mobility patterns and place attachment ($p=0.047$).

Table 17 Summary Results of Chi-Square Test for Independence

		Pearson Chi-Square	df	P-Value
Mobility Patterns	Place Attachment	3.944	1	0.047*
	Place Identity	3.214	1	0.073
	Expressed Place Meaning Index	2.721	2	0.257
	Applied Place Meaning Index	0.281	2	0.869
	Place Dependence	2.770	2	0.250
	Social Satisfaction Index	0.668	2	0.716
	Residential Satisfaction Index	3.867	2	0.145
	Place Rootedness	5.653	2	0.059
	History of Residency	7.473	2	0.024*
	Ancestral Roots to Place	8.515	2	0.014*

* $p < 0.05$; null hypothesis is rejected

Seeing a statistically significant association between mobility patterns and place attachment, the noted immobility of Pangan-an residents can be accounted on their level of place attachment.

Strength of Association

After obtaining evidence of statistical relationship, the strength of association between mobility patterns and place attachment is further determined. Table 18 shows the summary of results in the Cramer's V measure of association.

With a degree of freedom (df) of 1 and phi (ϕ) of 0.209, there is a 'weak' strength of association between mobility patterns and place attachment. The test results between mobility and place rootedness and its sub-dimensions are slightly higher (with a $df=2$) and can be interpreted as having a medium effect size to mobility.

Table 18 Summary of Results in the Test for Strength of Association

		Measure of Association		
		df	Cramer's V (ϕ)	P-Value*
Mobility Patterns	Place Attachment	1	0.209	0.047
	Place Rootedness**	2	0.251	0.059
	History of Residency	2	0.288	0.024
	Ancestral Roots to Place	2	0.308	0.014

*This value is the same as the chi-square p-value.

To summarize, Figure 57 shows the hypothesized conceptual model – expanded with the derivatives of the two key concepts – after inferential statistical tests. While all of the variables

shown in this model were cross-tabulated against each other, except for the key concepts, only those with statistical significance are highlighted here.

Looking at the three (3) key concepts, the exogenous climate change risk perception has no association (non-significance is depicted in 'red' lines/arrows, while 'purple' indicates significance) to both place attachment and mobility.

In the principal causal relationship tested for in this research, it is shown that place attachment has a negative influence to mobility. As previously mentioned, the impact is weak but is still statistically significant. Among all place attachment dimensions, this explanatory power is mirrored only with place rootedness and its cognates.

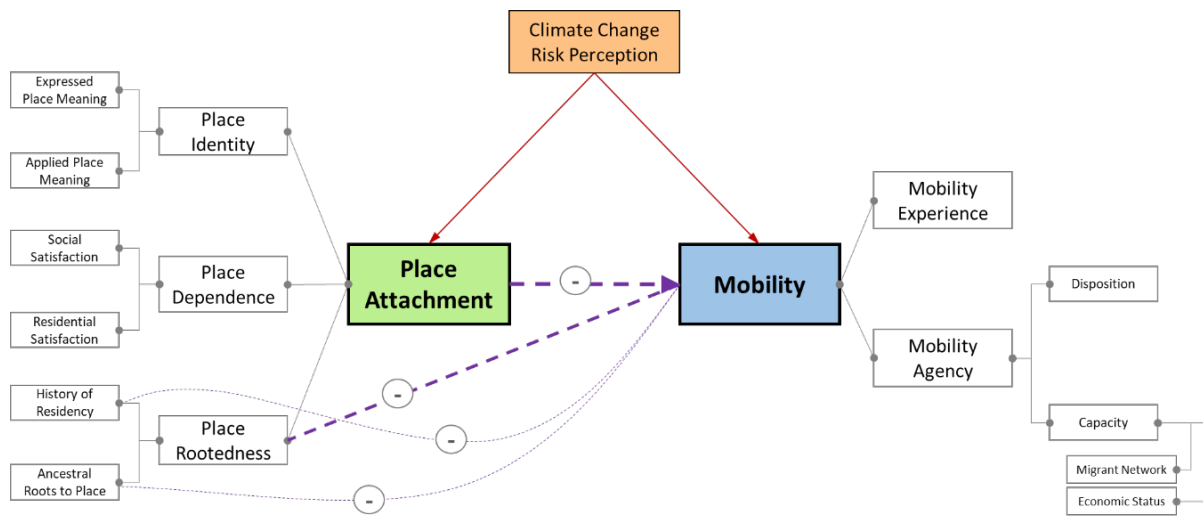


Figure 57 Best-fit Model on the influence of place attachment to mobility

* The color of the lines and/or arrows corresponds to purple= statistical significance; red= non-significance

**While place attachment and mobility could be endogenous variables, the effect of mobility to place attachment is not addressed in this study.

***Relationships between the sub-dimensions are omitted in this model.

Chapter 5: Conclusion

The need for better understanding of the mobility characteristics of climate-sensitive populations comes with the growing shift in the treatment of human movement not just as an inevitability driven by climate change vulnerability but as a strategy for adaptation and resilience.

This research departs from the oft-probed mobility factors of economic, social and logistical capacities where it is known and established that the target communities are isolated, underdeveloped, and underserved such as the climate-sensitive small island communities in the Philippines – and examines another driver in the movement and non-movement of people from or to a place, place attachment, or the emotional bond of people to a place of meaning, utility and familial connection (Altman & Low 1992; Hidalgo & Hernandez 2001).

Often exhibited in a person's preference to be in or near a place of affinity and affection, the presence of place attachment is extracted and measured in this study by way of its three dimensions of symbolism (place identity), functionality (place dependence), and temporality (place rootedness) – and see if this has any influence in the mobility patterns of small urban island communities exposed to climate change.

Drawn from the climate action exemplars of tiny atoll communities in the Pacific which are widely considered the most climate-vulnerable communities in the world yet among the most proactive climate adaptors, this study looks into the similar climate-sensitive and development-marginalized low-lying densely populated small island urban and peri-urban island communities in the marine biodiversity and conservation hub of Danajon Barrier Reef (also Danajon Bank) in central Philippines, and examines the influence of place attachment to their mobility patterns.

Ultimately, this study – by seeking to determine the influence of place attachment to human mobility in the light of its recent prescription as an adaptive response to climate change – angles for tendencies of immobility or non-movement in vulnerable communities and see if this warrants a prognosis of a consequent maladaptive climate change response.

Pangan-an Island (population: 2,070, as of 2015), identifies not only as an urban barangay belonging to the highly urbanized city (HUC) of Lapu-Lapu (population: 408,112, as of 2015), but also as one of the Danajon Bank community of small islands. Although the presence of climate change risks in the research locale has been established at the outset, assessing the community's perception to the climate change risks and vulnerabilities further shores up the frame of this study.

Climate Change Risk Perception: Moderate

The level of climate change risk perception in Pangan-an is found to be of 'moderate' strength. This was measured from their overall experience to the occurring indicators of climate change and their response to prior natural hazards, alongside their understanding of the general risks of the global climate change phenomenon.

However, it must be noted, that it is possible that this assessment may be higher than the actual level of climate change risk perception among residents of Pangan-an Island. From the

responses of the key community leaders and sectoral representatives on the topic of climate change during the semi-structured interviews, it can be inferred that they have limited knowledge on climate change, its complexity and the global scale of its causes and impacts.

Additionally, the local barangay government of Pangan-an does not have a community climate change adaptation and mitigation plan, a disaster risk reduction and management plan, a hazards map, nor any program or project on climate change education. They also have not recently been a recipient of any such environment, disaster or climate change –related projects from an external non-government organization or environmental group which adds to their lack of appropriate knowledge about climate change and its full range of effects to people and places.

Not to be disregarded, though, are their innate or instinctive awareness of the natural environment around them as their lifestyle, culture and livelihood as island folks are directly connected to it. However, again, as climate change is deemed an exception because of its global cumulative process, and slow-onset and sometimes imperceptible effects (van der Linden 2014), traditional knowledge may not be enough. But along with an expansive yet locally-relevant climate change education – folk intuition and local realities are essential in community-based climate change adaptation.

The Philippine Climate Change Commission recognizes this, as they push for climate change adaptation and mitigation (CCAM) planning at the local level that are more science-based and risk-informed, and at the same time, strengthening local climate actions.

Mobility Pattern: Immobile

Measured from its mobility experience, and movement disposition and capacity, the mobility characteristic of the Pangan-an Island community is found to lean towards non-movement or immobility.

On top of the low mobility experience and lack of desire or plan to live anywhere else other than their home island, their capacity for movement is also low.

While there is no statistical association between the lack of mobility capacity, which is derived from low socio-economic situation and average migrant network, thus discounting the low economic circumstance in the island as a migration stressor, the bustling metropolis across the island, which can be seen fire-lit at night in the horizon does not seem to be a huge “attractor” for the Pangan-an residents either.

This concurs with the findings of Adams (2015) that mobility is influenced by other factors beyond economics and resources.

Place Attachment: Moderate

The presence of place attachment in Pangan-an is copious but moderate in strength. Among the three place attachment dimensions, place rootedness is particularly strong. Their place attachment is more traditional or the emotional bond innate in generational rootedness (Lewicka 2011b).

However, place identity, while professed to be strong, is weighed down by place care practices that did not match the former. In their case, the high place identity did not fully translate to strong environment-responsible behavior.

Place dependence, or their utilitarian satisfaction to place, was found to be moderate, corresponding to the moderate level of social satisfaction, despite the strong showing of the other place-dependence determinant, residential satisfaction.

The high level of residential satisfaction – rated with the resident’s comfort and approval of the basic facilities and services in their community – was particularly not expected, considering the meager presence of these utilities in the island. There is no water supply system in place, for instance, and potable water is chiefly sourced per individual household from rainwater. Yet, majority still expressed a positive satisfaction to what drinking water source they have. In finding the same incongruent satisfaction to inadequate facilities in informal settlements in China, Li and Wu (2013) attributes the differences in tolerance and expectation levels among communities. Context matters and this is as true in Pangan-an. Their acclimatization to ‘simple’ living could also explain this sense of easy contentment as there is little to compare their way of living with considering their strong rootedness to the island and their limited mobility, mostly within neighboring islands with similar socio-economic conditions as theirs.

Ties that bind: Place attachment affects mobility

An important element of people’s bonds to places is the preference of the attached individual to remain, be near, and/or long for the place of attachment (Hidalgo & Hernandez 2001); place attachment is, thusly, deemed an anchoring factor towards immobility.

In the case of the people of Pangan-an, the immobile among their population are found to be more attached to place. Their place attachment – formed by strong familial roots to place, and their middling self-identification and sense of contentment towards their community – is determined to be a negative influence to their mobility. This corresponds to previous studies which posit that place attachment deters mobility disposition and decision-making (Fried 2000; Gustafson 2009b; Adams 2015)

Though the statistical significance borders to chance, and the weight of impact of place attachment to immobility is weak, a movement-detering place attachment will have implications in the overarching adaptive mobility response to climate change.

This is so, despite the (low to) moderate climate change risk perception among the Pangan-an Island residents having no statistically significant association to and, thus, has no influencing effect on both the place attachment and mobility patterns of the Pangan-an community.

Presently, climate displacement and migration is still viewed in Philippine climate change policy (PCCC 2012) as a resultant action after extreme climate events, however, anticipatory movement of people away from danger zones is now more and more stringently employed by authorities and the affected communities themselves. These preemptive actions, though, are more aligned with disaster risk reduction and management (DRRM) operations, as in, temporary evacuations during seasonal typhoons and the like where risk is more apparent and easily picked up and where attachment of people to place and property is still one of the major

causes for delays in moving out of harm's way and subsequent dangerous (for both rescuers and evacuees) last-minute evacuations.

Additionally, the prime climate change adaptation measure introduced by the Philippine government and development organizations to vulnerable communities are climate education campaigns coupled with some form of economic and livelihoods -based capacity building. But with the likely prescription of human mobility as a climate change adaptation measure into national and local climate policy, and the mainstreaming of the adaptive mobility experiences from the trailblazing Pacific islands, it will not take long for the Philippines and other climate-vulnerable archipelagic nations to integrate adaptive mobility measures, such as anticipatory resettlement that includes wholesale permanent evacuation of island communities, into their climate adaptation plans.

But like other forms of displacements – i.e. development-induced which can be very easily greenwashed – there will be serious reckoning between choices and capacities for movement and resettlement, between mobility and immobility. And maladaptive immobility heralds population traps, which is perilous in the unforgiving air in climate change crisis situations.

In the case of Pangan-an island where the residents are deprived and underprivileged but well-adjusted and fairly satisfied, have no desire to move but also have limited capacity if they do choose to move, and add to that, the propensity for immobility that is spurred by their deep affections for their close-knit island culture, people and place – these are all admirable qualities of a community setting their own course and very romantic notions of self-determination – but, in the light of increasing climate change impacts particular to low-lying small islands such as coastal erosion and inundation, this should cause for alarm.

There are non-economic intangible psychosocial and place-based aspects in a community's mobility choices and these factors must be integrated in national, local and community-based climate adaptive mobility policy, planning and action.

Reflections and recommendations

In two of the semi-structured interviews, the ‘love for place’ was expressed almost synonymously with ‘love for family’ – that is, they professed to value and care for the place because it is home to their family. ‘Place’ was explored in this study as socio-spatial notion, however, social aspect of ‘place’ can be further examined in subsequent studies, that is, exploring the concept of ‘place transference’ in the context of planned ‘whole community’ or ‘whole place’ resettlement.

Generalizability was sought for, in this study’s use of the survey design. But as can be gleaned from the previous reflection which was taken from the semi-structured interview, a more qualitative survey design with a large number of respondent samples can provide for more localized, robust findings – as such, should be explored in higher level studies on this subject matter.

Bibliography

- Adams, H., 2016. Why populations persist: mobility, place attachment and climate change. *Population and Environment: A Journal of Interdisciplinary Studies*, 37 (4), pp. 429-448.
- Adams, P. C., 2015. Place Attachment: Advances in Theory, Methods and Applications. *Geographical Review*, 105 (1), pp. 129-132.
- Adriaanse, C.C.M., 2007. Measuring residential satisfaction: a residential environmental satisfaction scale (RESS). *Journal of housing and the built environment*, 22(3), p.287.
- Agyeman, J., Devine-Wright, P. and Prange, J. 2009. Close to the edge, down by the river? Joining up managed retreat and place attachment in a climate changed world. *Environment and Planning A*, 41 (3), pp. 509-513.
- Allen, K. M., 2006. Community-based disaster preparedness and climate adaptation: local capacity-building in the Philippines. *Disasters*, 30 (1), pp. 81-101.
- Anderson, C. A., 2001. Heat and violence. *Current Directions in Psychological Science*, 10 (1), pp. 33-38.
- Backlund, E. A. and Williams, D. R., eds., 2003. A quantitative synthesis of place attachment research: Investigating past experience and place attachment, [Proceedings of the 2003 Northeastern Recreation Research Symposium]. pp. 320-325.
- Bankoff, G., 2001. Rendering the World Unsafe: 'Vulnerability' as Western Discourse. *Disasters*, 25 (1), pp. 19-35.
- Bauman, Z., 1998. On glocalization: Or globalization for some, localization for some others. *Thesis Eleven*, 54 (1), pp. 37-49.
- Biagini, B., Bierbaum, R., Stults, M., Dobardzic, S., et al., 2014. A typology of adaptation actions: A global look at climate adaptation actions financed through the Global Environment Facility. *Global Environmental Change*, 25 pp. 97-108.
- Black, R. and Collyer, M., 2014. Populations' trapped' at times of crisis. *Forced Migration Review*, (45), p.52.
- Bogue, D.J., 1977. A Migrant's-Eye View of the Costs and Benefits of Migration to a Metropolis. *Internal migration: A comparative perspective*, pp.167-182.
- Böhm, G., 2003. Emotional reactions to environmental risks: Consequentialist versus ethical evaluation. *Journal of Environmental Psychology*, 23 (2), pp. 199-212
- Bonaiuto, M., Carrus, G., Martorella, H. and Bonnes, M. 2002. Local identity processes and environmental attitudes in land use changes: The case of natural protected areas. *Journal of Economic Psychology*, 23 (5), pp. 631-653.
- Bord, R.J., Fisher, A. and Robert, E.O., 1998. Public perceptions of global warming: United States and international perspectives. *Climate research*, 11(1), pp.75-84.
- Bostrom, A., Morgan, M. G., Fischhoff, B. and Read, D. 1994. What do people know about global climate change? 1. Mental models. *Risk Analysis*, 14 (6), pp. 959-970.

- Brechin, S.R. and Bhandari, M., 2011. Perceptions of climate change worldwide. *Wiley Interdisciplinary Reviews: Climate Change*, 2(6), pp.871-885.
- Brehm, J. M., Eisenhauer, B. W. and Stedman, R. C. 2013. Environmental concern: Examining the role of place meaning and place attachment. *Society & Natural Resources*, 26 (5), pp. 522-538.
- Brody, S.D., Zahran, S., Vedlitz, A. and Grover, H., 2008. Examining the relationship between physical vulnerability and public perceptions of global climate change in the United States. *Environment and behavior*, 40(1), pp.72-95.
- Brown, B. B. and Perkins, D. D. 1992. Disruptions in place attachment. *Disruptions in place attachment*. 1992. Place attachment. Springer. pp. 279-304.
- Brown, B. B., Perkins, D. D. and Brown, G. 2004. Incivilities, place attachment and crime: Block and individual effects. *Journal of Environmental Psychology*, 24 (3), pp. 359-371.
- Brown, G., Brown, B. B. and Perkins, D. D. 2004. New housing as neighborhood revitalization place attachment and confidence among residents. *Environment and Behavior*, 36 (6), pp. 749-775.
- Budruk, M., Thomas, H. and Tyrrell, T. 2009. Urban green spaces: A study of place attachment and environmental attitudes in India. *Society and Natural Resources*, 22 (9), pp. 824-839.
- Bukvic, A. and Owen, G. 2017. Attitudes towards relocation following Hurricane Sandy: should we stay or should we go? *Disasters*, 41 (1), pp. 101-123.
- Coastal CORE Sorsogon (CCS), Marinduque Council for Environmental Concerns (MaCEC) and Social Action Center Northern Quezon (SAC-Northern Quezon), 2011. *Voyage to Disaster Resilience in Small Islands: A Guide for Local Leaders*. Quezon City: Christian Aid-Philippine Office.
- Cohen, J., 1988. *Statistical power analysis for the behavioral sciences*. Hillsdale. NJ: Lawrence Earlbaum Associates.
- Creswell, J.W., 2013. *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.
- Devine-Wright, P., 2009. Rethinking NIMBYism: The role of place attachment and place identity in explaining place-protective action. *Journal of Community & Applied Social Psychology*, 19 (6), pp. 426-441.
- Devine-Wright, P., 2013. Explaining “NIMBY” objections to a power line: The role of personal, place attachment and project-related factors. *Environment and Behavior*, 45 (6), pp. 761-781.
- Devine-Wright, P., Price, J. and Leviston, Z. 2015. My country or my planet? Exploring the influence of multiple place attachments and ideological beliefs upon climate change attitudes and opinions. *Global Environmental Change*, 30 pp. 68-79.
- Doherty, T. J. and Clayton, S. 2011. The psychological impacts of global climate change. *American Psychologist*, 66 (4), pp. 265.

- Easthope, H., 2004. A place called home. *Housing, Theory and Society*, 21 (3), pp. 128-138.
- Edwards, J. B., 2013. The Logistics of Climate-Induced Resettlement: Lessons from the Carteret Islands, Papua New Guinea. *Refugee Survey Quarterly*, 32 (3), pp. 52-78.
- Ellsmoor, J. and Rosen, Z., 2016. Kiribati's land purchase in Fiji: does it make sense? Devpolicy Blog from the Development Policy Centre [blog] 11 January 2016 <<http://devpolicy.org/kitibatis-land-purchase-in-fiji-does-it-make-sense-20160111/>>
- Field, A., 2005. *Discovering statistics using SPSS* (2nd Edition). London: Sage.
- Fincher, R., Pardy, M. and Shaw, K. 2016. Place-making or place-masking? The everyday political economy of "making place". *Planning Theory & Practice*, 17 (4), pp. 516-536.
- Fritze, J. G., Blashki, G. A., Burke, S. and Wiseman, J. 2008. Hope, despair and transformation: Climate change and the promotion of mental health and wellbeing. *International Journal of Mental Health Systems*, 2 (1), pp. 13.
- Fullilove, M. T., 1996. Psychiatric implications of displacement: Contributions from the psychology of place. *The American Journal of Psychiatry*, 153 (12), pp. 1516.
- Galea, S., Nandi, A. and Vlahov, D. 2005. The epidemiology of post-traumatic stress disorder after disasters. *Epidemiologic Reviews*, 27 pp. 78-91.
- Garvin, T., 2001. Analytical paradigms: the epistemological distances between scientists, policy makers, and the public. *Risk Analysis*, 21(3), pp.443-456.
- Gilman, N., Randall, D., Schwartz, P., Blakely, T., et al., 2007. Impacts of climate change: A system vulnerability approach to consider the potential impacts to 2050 of a mid-upper greenhouse gas emissions scenario. Retrieved April, 27 pp. 2009.
- Giuliani, M. V., Ferrara, F. and Barabotti, S. 2003. One attachment or more? People, Places and Sustainability, pp. 111-122.
- Glasow, P.A., 2005. *Fundamentals of survey research methodology*. Retrieved January, 18, p.2013.
- Golafshani, N., 2003. Understanding reliability and validity in qualitative research. *The qualitative report*, 8(4), pp.597-606.
- Gustafson, P., 2001. Roots and routes: Exploring the relationship between place attachment and mobility. *Environment and Behavior*, 33 (5), pp. 667-686.
- Hidalgo, M. C. and Hernandez, B., 2001. Place Attachment: Conceptual and Empirical Questions.
- Hintz, C., 2015. An Ecology of Love: Women Farmers, Sense of Place, the Georgic Ethic, and Ecocentricity. *Journal of Sustainability Education*.
- Hogg, R.V. and Tanis, E.A., 2009. *Probability and statistical inference*. Pearson Educational International.
- Hummon, D. M., 1992. Community attachment. Community attachment. 1992. Place attachment. Springer. pp. 253-278.

- Intergovernmental Panel on Climate Change (IPCC), 2015. *Climate Change 2014: Mitigation of Climate Change*. Cambridge University Press.
- Jorgensen, B. S. and Stedman, R. C. 2006. A comparative analysis of predictors of sense of place dimensions: Attachment to, dependence on, and identification with lakeshore properties. *Journal of Environmental Management*, 79 (3), pp. 316-327.
- Jorgensen, B.S. and Stedman, R.C., 2001. Sense of place as an attitude: Lakeshore owners' attitudes toward their properties. *Journal of environmental psychology*, 21(3), pp.233-248.
- Kälin, W., 2012. From the Nansen principles to the Nansen initiative. *Forced Migration Review*, (41), pp. 48.
- Kaltenborn, B. P., 1997. Nature of place attachment: A study among recreation homeowners in Southern Norway. *Leisure Sciences*, 19 (3), pp. 175-189.
- Kamalipour, H., 2016. *Urban Morphologies in Informal Settlements*. Contour, Agency/Agents of Urbanity.
- Kamalipour, H., Yeganeh, A. J. and Alalhesabi, M., 2012. Predictors of Place Attachment in Urban Residential Environments: A Residential Complex Case Study.
- Kelman, I. and West, J. J. 2009. Climate change and small island developing states: a critical review. *Ecological and Environmental Anthropology*, 5 (1), pp. 1-16.
- Knez, I., 2005. Attachment and identity as related to a place and its perceived climate. *Journal of Environmental Psychology*, 25 (2), pp. 207-218.
- Krosnick, J.A., Holbrook, A.L., Lowe, L. and Visser, P.S., 2006. The origins and consequences of democratic citizens' policy agendas: A study of popular concern about global warming. *Climatic change*, 77(1), pp.7-43.
- Langford, I. H., 2002. An existential approach to risk perception. *Risk Analysis*, 22 (1), pp. 101-120.
- Leiserowitz, A., 2006. Climate change risk perception and policy preferences: The role of affect, imagery, and values. *Climatic change*, 77(1), pp.45-72.
- Lewicka, M., 2005. Ways to make people active: The role of place attachment, cultural capital, and neighborhood ties. *Journal of Environmental Psychology*, 25 (4), pp. 381-395.
- Lewicka, M., 2011. On the varieties of people's relationships with places: Hummon's typology revisited. *Environment and Behavior*, 43 (5), pp. 676-709.
- Lewicka, M., 2011. Place attachment: How far have we come in the last 40 years? *Journal of Environmental Psychology*, 31 (3), pp. 207-230.
- Lewis, G.J., 1982. *Human migration: a geographical perspective*.
- Li, Z. and Wu, F., 2013. Residential satisfaction in China's informal settlements: A case study of Beijing, Shanghai, and Guangzhou. *Urban Geography*, 34(7), pp. 923-949.

- Lombard, M., 2014. Constructing ordinary places: Place-making in urban informal settlements in Mexico. *Progress in Planning*, 94 pp. 1-53.
- Low, S. and Altman, I. 1992. *Place Attachment-Human Behavior and Environment. Advances in Theory and Research* (Eilt 12). New York & London: Plenum Press.
- Low, S. M., 1992. Symbolic ties that bind. *Symbolic ties that bind*. 1992. Place attachment. Springer. pp. 165-185
- Lyth, A., Harwood, A., Hobday, A. J. and McDonald, J. 2016. Place influences in framing and understanding climate change adaptation challenges. *Local Environment*, 21 (6), pp. 730-751.
- Maibach, E., Myers, T. and Leiserowitz, A. 2014. Climate scientists need to set the record straight: There is a scientific consensus that human-caused climate change is happening. *Earth's Future*, 2 (5), pp. 295-298.
- Maiteny, P. T., 2002. *Mind in the Gap: summary of research exploring 'inner' influences on pro-sustainability learning and behavior*.
- Manzo, L. C. and Perkins, D. D. 2006. Finding common ground: The importance of place attachment to community participation and planning. *Journal of Planning Literature*, 20 (4), pp. 335-350.
- Manzo, L. C., 2005. For better or worse: Exploring multiple dimensions of place meaning. *Journal of Environmental Psychology*, 25 (1), pp. 67-86.
- Marsh, C., 1982. *The survey method: The contribution of surveys to sociological explanation*. George Allen.
- Marshall, R. D., Bryant, R. A., Amsel, L., Suh, E. J., et al., 2007. The psychology of ongoing threat: relative risk appraisal, the September 11 attacks, and terrorism-related fears. *American Psychologist*, 62 (4), pp. 304.
- McAdam, J. ed., 2010. *Climate Change and Displacement: Multidisciplinary Perspectives*. Oxford and Portland, Oregon: Hart Publishing.
- Menny, C., Osberghaus, D., Pohl, M., & Werner, U., 2011. General knowledge about climate change, factors influencing risk perception and willingness to insure. Mannheim: Germany: ZEW (Centre for European Economic Research). Discussion paper No. 11e060.
- Moula, M.M.E., Törrönen, M., Maula, J., Paatero, J. and Järvinen, M., 2015. Human Mobility in the Context of Sustainable Energy Services in Brazil. in *Sustainable Futures in a Changing Climate*, p.108.
- Moutinho, L. and Hutcheson, G.D. eds., 2011. *The SAGE dictionary of quantitative management research*. Sage.
- Mouton, J. and Babbie, E., 2001. *The practice of social research*. Cape Town: Wadsworth Publishing Company.
- Mouton, J., 1996. *Understanding social research*. Van Schaik Publishers.

- Oppenheim, A., 1992. Questionnaire Design, Interviewing and Attitude Measurement. Pinter, London.
- Pachauri, R. K., Meyer, L., Plattner, G. and Stocker, T., 2015. IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. IPCC.
- Perkins, D. D. and Long, D. A. 2002. Neighborhood sense of community and social capital. Neighborhood sense of community and social capital. 2002. Psychological sense of community. Springer. pp. 291-318.
- Permentier, M., Bolt, G. and Van Ham, M., 2011. Determinants of neighbourhood satisfaction and perception of neighbourhood reputation. *Urban Studies*, 48(5), pp.977-996.
- Philippine Climate Change Commission (PCCC), 2012. Philippines: National climate change action plan 2011-2028.
- Philippine Statistics Authority, 2015. 2015 Census of Population. Available at: <https://psa.gov.ph/content/highlights-philippine-population-2015-census-population>.
- Proshansky, H. M., Fabian, A. K. and Kaminoff, R., 1983. Place-identity: Physical world socialization of the self.
- Qi, X., Tong, S. and Hu, W. 2009. Preliminary spatiotemporal analysis of the association between socio-environmental factors and suicide. *Environmental Health*, 8 (1), pp. 46.
- Rabinowitz, P. M. and Poljak, A. 2003. Host–Environment Medicine. *Journal of General Internal Medicine*, 18 (3), pp. 222-227.
- Roberts, E., Andrei, S., Huq, S. and Flint, L. 2015-12-01. Resilience synergies in the post-2015 development agenda. *Nature Climate Change*, 5 (12), pp. 1024.
- Robson, C., 1993. Real world research. 2002. Massachusetts: Blackwell.
- Ryan, R. L., 2005. Exploring the effects of environmental experience on attachment to urban natural areas. *Environment and Behavior*, 37 (1), pp. 3-42.
- Saleh Safi, A., James Smith, W. and Liu, Z., 2012. Rural Nevada and climate change: vulnerability, beliefs, and risk perception. *Risk Analysis*, 32(6), pp.1041-1059.
- Sampson, R. and Gifford, S. M. 2010. Place-making, settlement and well-being: The therapeutic landscapes of recently arrived youth with refugee backgrounds. *Health & Place*, 16 (1), pp. 116-131.
- Scannell, L. and Gifford, R. 2010. Defining place attachment: A tripartite organizing framework. *Journal of Environmental Psychology*, 30 (1), pp. 1-10.
- Schneekloth, L. H. and Shibley, R. G., 1995. Placemaking: The art and practice of building communities. Wiley.
- Schroeder, H. W., 1996. Voices from Michigan's Black River: Obtaining Information on 'Special Places' for Natural Resource Planning. (NC-184),

- Schroeder, H. W., 2007. Place experience, gestalt, and the human–nature relationship. *Journal of Environmental Psychology*, 27 (4), pp. 293-309.
- Semken, S. and Brandt, E. 2010. Implications of sense of place and place-based education for ecological integrity and cultural sustainability in diverse places. 2010. *Cultural Studies and Environmentalism*. Springer. pp. 287-302.
- Shamai, S., 1991. Sense of place: an empirical measurement. *Geoforum*, 22 (3), pp. 347-358.
- Skogan, W., 1990. *Disorder and Decline: Crime and the Spiral of Decay in American Cities*. New York: Free Press.
- Stimson, R.J. and McCrea, R., 2004. A push–pull framework for modelling the relocation of retirees to a retirement village: the Australian experience. *Environment and Planning A*, 36(8), pp.1451-1470.
- Stojanov, R., Duží, B., Kelman, I., Němec, D., et al., 2016. Local perceptions of climate change impacts and migration patterns in Malé, Maldives. *The Geographical Journal*, pp. n/a-n/a.
- Stokols, D., Misra, S., Runnerstrom, M. G. and Hipp, J. A. 2009. Psychology in an age of ecological crisis: From personal angst to collective action. *American Psychologist*, 64 (3), pp. 181.
- Sundblad, E.L., Biel, A. and Gärling, T., 2007. Cognitive and affective risk judgements related to climate change. *Journal of Environmental Psychology*, 27(2), pp.97-106.
- Tacoli, C., 2009. Crisis or adaptation? Migration and climate change in a context of high mobility. *Environment and Urbanization*, 21 (2), pp. 513-525.
- Tuan, Y., 1972. *Topophilia: personal encounters with the landscape*.
- Tuan, Y., 1974. *Topophilia: a study of environmental perception, attitudes, and values*.].
- Tuan, Y., 1975. Place: an experiential perspective. *Geographical Review*, pp. 151-165.
- UNHCR, IOM, UNU-EHS, UNDP, et al., 2015. Human mobility in the context of climate change: Recommendations from the Advisory Group on Climate Change and Human Mobility COP 20 Lima, Peru. Advisory Group on Climate Change and Human Mobility.
- United Nations - Office of the High Representative for the Least Developed Countries, Landlocked Developing Countries and Small Island Developing States (UN-OHRLLS), 2011. *Small Island Developing States: Small Islands Big(ger) Stakes*. New York: United Nations.
- van der Linden, S., 2015. The social-psychological determinants of climate change risk perceptions: Towards a comprehensive model. *Journal of Environmental Psychology*, 41, pp.112-124.
- van Hear, N., Brubaker, R. and Bessa, T., 2009. Managing mobility for human development: The growing salience of mixed migration.
- Van Thiel, S., 2014. *Research methods in public administration and public management: an introduction*. Routledge.

- Vaske, J. J. and Kobrin, K. C. 2001. Place attachment and environmentally responsible behavior. *The Journal of Environmental Education*, 32 (4), pp. 16-21.
- Vorkinn, M. and Riese, H. 2001. Environmental concern in a local context: The significance of place attachment. *Environment and Behavior*, 33 (2), pp. 249-263.
- Warner, K., 2012. Human migration and displacement in the context of adaptation to climate change: the Cancun Adaptation Framework and potential for future action. *Environment and Planning C: Government and Policy*, 30 (6), pp. 1061-1077.
- Werner, C. M., Peterson-Lewis, S. and Brown, B. B. 1989. Inferences about homeowners' sociability: Impact of Christmas decorations and other cues. *Journal of Environmental Psychology*, 9 (4), pp. 279-296.
- Westland, J.C., 2010. Lower bounds on sample size in structural equation modeling. *Electronic Commerce Research and Applications*, 9(6), pp.476-487.
- White, D. D., Virden, R. J. and Van Riper, C. J. 2008. Effects of place identity, place dependence, and experience-use history on perceptions of recreation impacts in a natural setting. *Environmental Management*, 42 (4), pp. 647-657.
- Williams, D. R. and Vaske, J. J. 2003. The measurement of place attachment: Validity and generalizability of a psychometric approach. *Forest Science*, 49 (6), pp. 830-840.
- Williams, D. R., 2014. Beyond the commodity metaphor revisited: Some methodological reflections on place attachment research. *Place Attachment: Advances in Theory, Methods, and Research*, pp. 89-99.
- Willox, A. C., Harper, S. L., Ford, J. D., Landman, K., et al., 2012. "From this place and of this place:" Climate change, sense of place, and health in Nunatsiavut, Canada. *Social Science & Medicine*, 75 (3), pp. 538-547.
- Wilson, J. Q. and Kelling, G. L. 1982. The police and neighborhood safety: Broken windows. *Atlantic Monthly*, 127 (2).
- World Bank, 2005. *Philippines Coastal & Marine Resources: An Introduction*. Philippines Environment Monitor 2005: Coastal and Marine Resource Management.

Annex 1: Research Instruments

Annex 1.1 Survey Questionnaire

THESIS NO. 1088

SURVEY QUESTIONNAIRE

PLACE ATTACHMENT & MOBILITY IN THE CONTEXT OF CLIMATE CHANGE

Note for interviewer/enumerators:

Please introduce yourself and the objective of the survey properly and openly to your respondent before you start questioning. Establish a good relationship with your respondent. This survey is carried out to gain a better understanding of place attachment or emotional bond to place, mobility patterns and climate change risk perceptions of the residents of Barangay Pangan-an Island.

- When answering the questions, one need not disclose his/her name.
- All answers to the questions in the questionnaire should be true and sincere.
- All information provided by the respondent will be treated with strict confidentiality.

The respondent should be:

- Aged 18 years old & above
- The head (principal earner) of the household (husband/ wife)
- Capable of being interviewed & can communicate w/o assistance

(If target household head respondent is not at home/ unavailable, set an appointment for another visit/ interview.

INTRODUCTION

Hello, my name is _____ and I am part of a team conducting a survey of people in this area about their bond with the island of Pangan-an, their mobility patterns, and their perception towards climate change risks. We would very much appreciate your participation in this survey by answering a few questions on the mentioned topics. Whatever information you provide will be kept strictly confidential and your name and answers will not be shown to or shared with any other person except for those people who are working on the survey. Your answers will make up the bulk of the research data needed in the Master thesis research entitled “The Influence of Place Attachment to the Mobility Patterns of Urban Island Communities in the Context of Climate Change”.

Participation in this survey is voluntary and you can choose not to answer any individual question or all of the questions. However, your views are important to us and I hope you will participate. May I begin the interview now?

Respondent agrees to be interviewed ☐ Yes
(If no, keep tally on separate sheet of paper)

(Internal: Filled in prior to the interview without asking the respondent)

Area of enumeration (purok/ zone)					Control Number	
Date & time of interview:					Enumerator	
Gender of respondent:		Male		Female	Reviewed by	
House Type		One-storey		Two-storey	Encoded by	
Main Housing Material		Concrete		Timber		Three-storey
						Light Materials



"To begin, I would like to ask you some questions about yourself and your family history."

Section 1 | SOCIO-DEMOGRAPHICS

(1) How old are you?

<input type="checkbox"/>	18 to 30	<input type="checkbox"/>	41 to 50	<input type="checkbox"/>	61 to 70
<input type="checkbox"/>	31 to 40	<input type="checkbox"/>	51 to 60	<input type="checkbox"/>	71 or older

(2) What is your civil status?

<input type="checkbox"/>	Single	<input type="checkbox"/>	Widowed	<input type="checkbox"/>	Separated/ Annulled
<input type="checkbox"/>	Married	<input type="checkbox"/>	Live-in Partner	<input type="checkbox"/>	Other _____

(3) If you belong to a religion, please tell me which religion. [Choose ✓ only one.]

<input type="checkbox"/>	Roman Catholic	<input type="checkbox"/>	Ang Dating Daan
<input type="checkbox"/>	Iglesia Filipina Independente (IFI)	<input type="checkbox"/>	Muslim
<input type="checkbox"/>	Iglesia Ni Kristo	<input type="checkbox"/>	Born Again Christians
<input type="checkbox"/>	Church of Latter Day Saints (Mormons)	<input type="checkbox"/>	Local/ traditional
<input type="checkbox"/>	Baptist	<input type="checkbox"/>	None
<input type="checkbox"/>	Seventh Day Adventist	<input type="checkbox"/>	Other _____

(4) What is your highest level of educational attainment? [Choose ✓ only one.]

<input type="checkbox"/>	No school completed	<input type="checkbox"/>	Vocational Level
<input type="checkbox"/>	Elementary level	<input type="checkbox"/>	College Level
<input type="checkbox"/>	Secondary level	<input type="checkbox"/>	Refused to answer

(5) Are you the principal earner of the household?

<input type="checkbox"/>	Yes	<input type="checkbox"/>	No
--------------------------	-----	--------------------------	----

(6) In which locality do you work?

<input type="text"/>	<input type="text"/>	<input type="text"/>
Barangay	City/Town	Province

(7) What is your primary occupation or sector of work? [Choose ✓ only one.]

<input type="checkbox"/>	Fishing	<input type="checkbox"/>	Food preparation or restaurant
<input type="checkbox"/>	Housework	<input type="checkbox"/>	Tour operations
<input type="checkbox"/>	Small business (sari-sari store, buy & sell, etc.)	<input type="checkbox"/>	Professional (lawyer, doctor, teacher, etc.)
<input type="checkbox"/>	Private company	<input type="checkbox"/>	Artisanal/ cottage industry (crafts, etc.)
<input type="checkbox"/>	Factory or manufacturing	<input type="checkbox"/>	None/ Not currently employed
<input type="checkbox"/>	Government	<input type="checkbox"/>	Other _____

(8) What is your primary occupation or sector of work? [Choose ✓ only one.]

<input type="checkbox"/>	Fishing	<input type="checkbox"/>	Food preparation or restaurant
<input type="checkbox"/>	Housework	<input type="checkbox"/>	Tour operations
<input type="checkbox"/>	Small business (sari-sari store, buy & sell, etc.)	<input type="checkbox"/>	Professional (lawyer, doctor, teacher, etc.)
<input type="checkbox"/>	Private company	<input type="checkbox"/>	Artisanal/ cottage industry (crafts, etc.)
<input type="checkbox"/>	Factory or manufacturing	<input type="checkbox"/>	None/ Not currently employed
<input type="checkbox"/>	Government	<input type="checkbox"/>	Other _____



- (9) In the past calendar year, from January to December, what's your best estimate of the total income earned by all family members that currently live in the same home with you? Again, this information will not be shared with anyone.

<input type="checkbox"/>	Below P20,000	<input type="checkbox"/>	Between P20,000 and P40,000
<input type="checkbox"/>	Between P40,001 and P65,000	<input type="checkbox"/>	Between P65,001 and P80,000
<input type="checkbox"/>	Greater than P80,000	<input type="checkbox"/>	Refused to answer

- (10) Which of the following best describes your current housing situation? [Choose ✓ only one.]

<input type="checkbox"/>	I live in a house I rent.
<input type="checkbox"/>	I live in a house I own.
<input type="checkbox"/>	I live rent-free in my parents' or my spouse's parents' house.

- (11) Please answer how each of these statements regarding housing improvements apply to you.

		Yes	No
A.	I have done a painting/repainting job of my house in the last 2 years.	<input type="checkbox"/>	<input type="checkbox"/>
B.	I have made minor improvements/ repairs to my house in the last 2 years.	<input type="checkbox"/>	<input type="checkbox"/>
C.	I have bought 1 or more large electronic/electrical appliance(s) (like TV, refrigerator, washing machine) in the last 2 years.	<input type="checkbox"/>	<input type="checkbox"/>
D.	I have made major improvements (concretized/ added rooms/ floor) to my house in the last 10 years.	<input type="checkbox"/>	<input type="checkbox"/>

- (12) To what extent do these plans for future housing improvements apply to you?

		Strongly Disagree	Disagree	Neither Agree/ Disagree	Agree	Strongly Agree
A.	I plan to paint or repaint my house in the next 2 years.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
B.	I plan to make minor improvements/ repairs to my house in the next 2 years.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
C.	I plan to buy 1 or more large electronic appliance(s) (like TV, refrigerator, washing machine) in the next 2 years.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
D.	I plan to make major improvements (concretize/ add rooms/ floor) to my house in the next 3-10 years.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

- (13) How many people (including yourself) are members of your household?

Adults (19 years old & up) Minors (18 years old & below)

- (14) How long (in months/years) have you lived in Pangan-an Island? _____ months _____ years

- (15) Which of the following best describes how you came to live here? [Please choose ✓ only one.]

<input type="checkbox"/>	I was born and raised in Pangan-an Island.
<input type="checkbox"/>	I was not born in Pangan-an Island, but I grew up here.
<input type="checkbox"/>	I settled in Pangan-an Island as an adult.
<input type="checkbox"/>	I settled here because my spouse is from Pangan-an Island.
<input type="checkbox"/>	Other _____

- (16) From where are your parents? [Please indicate barangay, city/town, and province.]

	Barangay	City/Town	Province
(a) Mother	<input type="text"/>	<input type="text"/>	<input type="text"/>
(b) Father	<input type="text"/>	<input type="text"/>	<input type="text"/>



(17) From where are your grandparents? [Please indicate barangay, city/town, and province.]

	Barangay	City/Town	Province
(a) Maternal Grandmother			
(b) Maternal Grandfather			
(c) Paternal Grandmother			
(d) Paternal Grandfather			

"Now, I would like to ask you some questions about your feelings on Pangan-an Island as your home barangay."

Section 2 | PLACE ATTACHMENT

(18) I am going to read you a list of 5 statements about how you identify with your island, and how you place meaning and value to it. How would you agree or disagree with the following statements?

		Strongly Disagree	Disagree	Neither Agree/Disagree	Agree	Strongly Agree
A.	I consider Pangan-an Island my home.					
B.	I feel that Pangan-an Island is a part of who I am.					
C.	I am proud of being from Pangan-an Island.					
D.	I value Pangan-an Island.					
E.	I know Pangan-an Island very much.					

(19) Have you personally participated in any of the following activities in the past 12 months?

		Never	1x only	2-4x	5x or more
A.	Community cleanup				
B.	Coastal cleanup				
C.	Tree/ mangrove planting				
D.	Brigada eskwela				
E.	Barangay Assembly				
F.	Preparations for community fiesta activities				

(20) Are you an active member in any of the following community organizations in Pangan-an Island?

		Yes	No
A.	Religious organization		
B.	School-based organization (PTA, etc.)		
C.	Fisher folks organization		
D.	Women's organization		
E.	Cooperative (formal/ informal)		
F.	Other (please specify) _____		

(21) The following are statements on the social attributes of your community. How would you agree to each of these?

		Strongly Disagree	Disagree	Neither Agree/Disagree	Agree	Strongly Agree
A.	Pangan-an Island residents know each other quite well.					
B.	Neighbors treat each other pleasantly & respectfully.					
C.	Pangan-an Island residents frequently talk and communicate with each other.					
D.	Pangan-an Island residents help each other as much as they can.					
E.	Pangan-an Island residents will not hesitate to protect each other.					



(22) How satisfied or dissatisfied are you with the following facilities in Pangan-an Island?

		Very Dissatisfied	Dissatisfied	Neither satisfied/dissatisfied	Satisfied	Very Satisfied
A.	Potable water					
B.	Electricity					
C.	Solid waste disposal and management					
D.	Safety and security					
E.	Livelihood opportunities					
F.	Commercial facilities					
G.	Education facilities					
H.	Healthcare facilities					
I.	Leisure/ entertainment facilities					

(23) Please rate the extent to which you agree/disagree with the following statements about the settlement and development prospects of this island in the next 20 years?

		Strongly Disagree	Disagree	Neither Agree/Disagree	Agree	Strongly Agree
A.	There will be more and more people living in this island.					
B.	There will be enough opportunities for my children to settle & build a family here.					
C.	I see a deserted Pangan-an island where more and more residents will be moving away from here.					

"In this section, I will ask you questions about your patterns in moving around/ settling here and the factors affecting decisions to do so."

SECTION 3 | MOBILITY

(24) Which of the following apply to you and your family's mobility experience? [Choose all that apply.]

<input type="checkbox"/>	I have previously lived outside of Pangan-an Island to study.
<input type="checkbox"/>	I have previously lived outside of Pangan-an Island for work, but my family remained here.
<input type="checkbox"/>	I have previously lived outside of Pangan-an Island for work, where I brought my family along with me.

(25) In the past month, how often did you travel to the following places?

		Never	1x only	2-4x	5x or more
A.	Olango Island				
B.	Mactan Island				
C.	Cebu Island (Mainland)				
D.	Other parts of Visayas				
E.	Mindanao				
F.	Metro Manila (Luzon)				
G.	Abroad				



(26) In the past 12 months, how often did you travel to the following places?

		Never	1x only	2-4x	More than 5x
A.	Olango Island				
B.	Mactan Island				
C.	Cebu Island (Mainland)				
D.	Other parts of Visayas				
E.	Mindanao				
F.	Metro Manila (Luzon)				
G.	Abroad				

(27) How would you agree to the following statements about your plans or intentions on changing your place of residency in the foreseeable future?

		Strongly Disagree	Disagree	Neither Agree/Disagree	Agree	Strongly Agree
A.	I plan for me & my family to move away from Pangnan-an Island permanently and settle elsewhere in the next 2-5 years.					
B.	I plan for me & my family to move away from Pangnan-an Island permanently and settle elsewhere in the next 6-10 years.					
C.	I have started to save money towards moving & settling my family elsewhere.					
D.	I have taken other steps towards moving & settling my family elsewhere.					
E.	I see myself & my family still living in Pangnan-an Island in the next 11-20 years.					
F.	I do not have plans to at all move and settle my family elsewhere.					

(28) If you plan to move elsewhere, what is the likelihood that this will happen? Say, if I return here after 10 years, will you still be here?

1	2	3	4	5
Not likely at all	No likely	Neutral	Likely	Very Likely

(29) The following are statements on whether you have family members living elsewhere than Pangnan-an Island. Please answer, accordingly, if each of these applies to you or not.

		Yes	No	I don't know/Not sure
A.	I have immediate family members (sibling/ parents/ children) living/working in Olango Island.			
B.	I have close relatives (cousins/ uncles/ etc) living/working in Olango Is.			
C.	I have immediate family members (sibling/ parents/ children) living/working in Mactan Island.			
D.	I have close relatives (cousins/ uncles/ etc) living/working in Mactan Is.			
E.	I have immediate family members (sibling/ parents/ children) living/working in mainland Cebu.			
F.	I have close relatives (cousins/ uncles/ etc) living/working in mainland Cebu.			
G.	I have immediate family members (sibling/ parents/ children) living/working in Metro Manila or other cities (outside Cebu) within the Philippines.			
H.	I have close relatives (cousins/ uncles/ etc) living/working in Metro Manila or other cities (outside Cebu) within the Philippines.			
I.	I have immediate family members (sibling/ parents/ children) living/working abroad.			
J.	I have close relatives (cousins/ uncles/ etc) living/working abroad.			



"In this last section, I will ask about climate change and what you know and perceive of it."

SECTION 4 | CLIMATE CHANGE RISK PERCEPTIONS

(30) Have you experienced any of these in the past 10 years and what were their impacts? (Impacts are open-ended to let the respondents freely answer their felt or experienced effects from the climate change indicators).

		Y	N	What were the impacts to your life and livelihood?
A.	Excessive high temperature			
B.	Excessive (intensity and duration) rainfall			
C.	Less rain/ dry weather spell			
D.	Abrupt changes in the weather or seasons			
E.	Stronger storm winds			
F.	Stronger storm surges			
G.	Sea level rise			

(31) In the last 10 years, which of the following response to climate and weather -related calamities have been carried out by you and/or members of your family in Pangan-an?

		Yes	No	I don't know/ Not sure
A.	Strengthening or bracing of our houses			
B.	Stocking of food, water and other emergency non-food items			
C.	Evacuated at an evacuation center in Pangan-an			
D.	Evacuated at an evacuation center outside of Pangan-an			
E.	Stayed for a while at a friends'/relative's place outside of Pangan-an to avoid calamity			

(32) What is your opinion on the following statements about the changing climate & weather patterns and their effects to the island and the community?

		Strongly Disagree	Disagree	Neither Agree/ Disagree	Agree	Strongly Agree
A.	The weather & the climate affects my life.					
B.	Climate change is not going to cause any problems in my community.					
C.	Climate change is already a problem in my community.					
D.	Living in a small island community already puts us in fragile living situations as it is.					
E.	Climate change, in addition to small island living, is likely to threaten Pangan-an even more in the coming 10-15 years.					
F.	Climate change mitigation activities will help buffer some of the effects of climate change in the future.					
G.	I know enough about climate change & its effects to the weather, the environment & the people.					
H.	I have nothing to do with climate change.					

"Thank you for your help in responding to this anonymous questionnaire survey."



Annex 1.2 Interview Guide: Key Informant

INTERVIEW GUIDE^{keyinformant}

PLACE ATTACHMENT & MOBILITY IN THE CONTEXT OF CLIMATE CHANGE

THESIS NO. 1088

Research Sub-Questions (RSQ)	Questions
Place Attachment	<p>Place Rootedness (Temporal PA)</p> <p><i>Background:</i></p> <ul style="list-style-type: none"> • residency_length1: How long have you lived in the island? • residency_length2: How long has your family/clan lived in the island? • family_origin1: From where are your parents? • family_origin2: From where are your grandparents? <p><i>Probing:</i></p> <ul style="list-style-type: none"> • family_settlement_history: How did you/ your family come to settle in Pangan-an?
	<p>Place Identity (Symbolic PA)</p> <ul style="list-style-type: none"> • place_meaning: What does the island mean to you? • place_home: Do you consider Pangan-an Island as home? How so? • place_pride: Are you proud of being from Pangan-an? Why?
	<p>Place Dependence (Functional PA)</p> <p><i>Residential Satisfaction</i> (Look out for responses on place_aesthetics, place_facilities, place_accessibility)</p> <ul style="list-style-type: none"> • What are the characteristics of the island that you are happy about? • What do you like about the island? • What do you like about living and life in in the island?



The Influence of Place Attachment to the Mobility Patterns of Urban Island Communities in the Context of Climate Change
The Case of Pangan-an Island, Lapu-Lapu City, Cebu, Philippines

1

	<p><i>Social Satisfaction</i> (Look out for responses on family_connection, community_connection)</p> <ul style="list-style-type: none"> • What do you like about the people/community of Pangan-an Island?
	<ul style="list-style-type: none"> • civic_involvement: What do you do to keep and maintain the quality of the aspects that you love about Pangan-an? • place_care: What do you do to improve the negative aspects of Pangan-an?
<p>Human Mobility Characteristics</p>	<ul style="list-style-type: none"> • mob_disposition: Have you ever thought of moving out from the island? • mob_driver: What would make you want to move out of Pangan-an Island? <p><i>Mobility Capacity</i> [mob_capacity] (Look out for migrant networks or family connections in migration magnet centers)</p> <ul style="list-style-type: none"> • How will you be able to move out if you ever decide to do so? • What would stop/hinder you from moving out of the island? <p><i>Mobility Experience</i> [mob_experience]</p> <ul style="list-style-type: none"> • Have you ever lived someplace else?



Climate Change Risk Perception

- ccknowledge: What do you know about climate change? [Probe about effects of climate change such as, but without enumerating them, excessive high temperature, excessive (intensity and duration) rainfall, less rain/ dry weather spell, abrupt changes in the weather or seasons, stronger winds, stronger storm surges, sea level rise]
- ccexperience: Have you experienced any unusual weather or climate related events in the island in the past 2-3 years? What were the impacts of those to you and your family's lives and livelihoods?
- ccevacuation: Have you been ever asked to evacuate the island ahead of or due to a natural disaster?
- ccrisk_acknowledgment: Do you think that climate change and its effects will pose a problem to your family and the island?
- ccworry: Do you worry about climate change and natural disasters, particularly that you live in an isolated, small island barangay?

Risk Perception Response (Look out for in place cc_mitigation and cc_adaptation measures)

- What does the community do to mitigate and to prepare from these?
- How do you see the Pangan-an island community cope up with climate change?



Annex 1.3 Interview Guide: Experts (Resource Persons)

INTERVIEW GUIDE^{expert}

PLACE ATTACHMENT & MOBILITY IN THE CONTEXT OF CLIMATE CHANGE

Research Sub-Questions (RSQ)		Questions	Brgy. Pangan-an Island Punongbarangay (Village Chairman)
Place Attachment	Place Rootedness (Temporal PA)	Settlement History	<ul style="list-style-type: none"> What's the history of the settlement of Pangan-an Island? From being just a fishing rest stop, how did it become populated as such?
	Place Identity (Symbolic PA)	Pride of Place	<ul style="list-style-type: none">
	Place Dependence (Functional PA)	Socio-Economic Profile	<ul style="list-style-type: none"> How are the living conditions in the barangay?
		Civic Involvement	<ul style="list-style-type: none"> What is the level of community spirit here?
Human Mobility Characteristics		Mobility Dispositions & Capacity	<ul style="list-style-type: none"> What are the mobility trends here? Do you see more people moving out or remaining here in the years to come?
Climate Change Risk Perception		CC Vulnerability Level	<ul style="list-style-type: none"> Do you see Pangan-an in terms of climate change vulnerability? Is there an effort by the Barangay to ascertain the effects of climate change such as sea level rise, soil inundation, saltwater intrusion?
		Perception Factors	<ul style="list-style-type: none"> What are programs of the barangay in terms of climate change education?
		Perception Response	<ul style="list-style-type: none"> What are the climate change adaptation and mitigation programs and projects of the barangay?



INTERVIEW GUIDE^{expert}

PLACE ATTACHMENT & MOBILITY IN THE CONTEXT OF CLIMATE CHANGE

Climate Change Risk Perception (RSQ3)		Lapu-Lapu City Disaster Risk Reduction and Management (DRRM) Officer
CC Vulnerability Level	<ul style="list-style-type: none"> Are islet barangays in the city considered climate change hotspots? 	
	<ul style="list-style-type: none"> What is the climate change vulnerability classification of Pangan-an Island? 	
Perception Factors	<ul style="list-style-type: none"> In your Disaster Risk Reduction Plans, is evacuating islet residents (individual or the whole community) to the mainland included as a contingency? Has this been implemented before? 	
Perception Response	<ul style="list-style-type: none"> Is there a long term adaptation program especially in addressing reduction in landmass because of sea level rise and soil erosion/inundation? 	



INTERVIEW GUIDE^{expert}

PLACE ATTACHMENT & MOBILITY IN THE CONTEXT OF CLIMATE CHANGE

Climate Change Risk Perception (RSQ3)		Representative from the Philippine Climate Change Commission/ Office of the President CCAM Cluster
CC Vulnerability Level	<ul style="list-style-type: none"> Are islet barangays included in the Commission's list of climate change hotspots? 	
	<ul style="list-style-type: none"> What is the climate change vulnerability classification of Pangan-an Island? 	
Perception Factors	<ul style="list-style-type: none"> In the Philippine Climate Change Action Plan or other climate policies, is evacuating islet residents (individual or the whole community) to the mainland included as a contingency? Has this been implemented before? 	
Perception Response	<ul style="list-style-type: none"> Is there a long term adaptation plan for vulnerable islands and coastal areas due to of sea level rise and soil erosion/ inundation? 	



Annex 2: Photographic Documentation



Photo 1 Aboard the outrigger boat carrying passengers and supplies from Mactan Island to Pangnan-an.



Photo 2 Arriving at Pangnan-an Island. The boat ride took nearly 2 hours because the boat engine was low in fuel. The ride could otherwise be as fast as 30 minutes.



Photo 3 A local enumerator (in green shirt) is pictured here interviewing a respondent.



Photo 4 Shellcraft table outside a cluster of homes.



Photo 5 Interviewing Mr. Pogoy, the Senior Citizen's Association representative.



Photo 6 This still intact but non-functional solar farm was donated by the Belgian government in 1998.



Photo 7 The typical dwelling in the island, made of light materials.



Photo 8 A particular tidal surge, almost breached the floor of the Pangan-an Barangay Hall, which features a rainwater collector (leftmost).



Photo 9 This elderly lady is seen rearranging a boat.



Photo 10 Island folks are seen huddling around a fisherman re-painting his boat.



Photo 11 Fishing boats parked in the beach.

Annex 3: IHS copyright form

I grant IHS, or its successors, all copyrights to the work listed above, so that IHS may publish the work in *The IHS thesis series*, on the IHS web site, in an electronic publication or in any other medium.

IHS is granted the right to approve reprinting.

The author(s) retain the rights to create derivative works and to distribute the work cited above within the institution that employs the author.

Please note that IHS copyrighted material from *The IHS thesis series* may be reproduced, up to ten copies for educational (excluding course packs purchased by students), non-commercial purposes, providing full acknowledgements and a copyright notice appear on all reproductions.

Thank you for your contribution to IHS.

Date : 30 October 2017

Your Name(s) : Edeliza V. Macalandag

Your Signature(s) : 

Please direct this form and all questions regarding this form or IHS copyright policy to:

The Chairman, IHS Research Committee Burg. Oudlaan 50, T-Building 14 th floor, 3062 PA Rotterdam, The Netherlands	j.edelenbos@ihs.nl Tel. +31 10 4089851
--	--