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Exploring the place of emotions in climate (non-)migration research
A data-collection approach

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Exploring the place of emotions in climate (non-)migration research

A data-collection approach

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Abstract

A growing concern and challenge for climate migration researchers is to avoid the oversimplification of the complex channels through which climate change relates -or not- to migration. One source of complexity lies in the subjectivity of people in their perception of their environment affecting the decision to move. However, current approaches only partially tackle the question of subjectivity of (potential) migrants, leaving out emotions. In fact, current research in the field of climate (non-)migration is built on methodologies that place emotions in the blind spot. In particular, data collection to research the migration-climate change nexus are either environmental quantitative spatio-temporal data, or people's rational description of some well-defined climate-related impacts on their lives and living conditions. The interactions between people's emotional experiences and climate change is not surprisingly at best overlooked if not fully ignored.

As a response, this thesis explores the place of emotions in climate (non-)migration research by questioning classical data-collection approaches and proposing an alternative. A guessing game was developed and played in 61 households in the Philippines three years after it was hit by Super-Typhoon Haiyan, an event mimicking the conditions predicted under future climate change. By following its simple rules, the respondents were led to formulate and share both emotion levels and explanations for emotion-environment associations' data. Moreover, the game was motivating and changed the status of participation, as the researchers played with the respondents in an inversed power setting. Its particular interactional structure also improved the quality of the data produced by reducing expectation as well as cultural and translation barriers encountered in the field.

The analysis of the data uncovered dominantly positive emotional experiences of and in places, intertwining tangible and intangible facets of the person-environment relationship. Best described as 'place-based emotional experiences', the data revealed the various roles played by the tangible features of the environment and the Typhoon in shaping the emotional experiences of and in places. As they provide an in-depth and nuanced understanding of people's relations to their living places, 'place-based emotional experiences' may contribute to explain why people decide (or not) to leave. While it provides a proper place to emotions in climate (non-)migration research, this way of explaining the decision (not) to migrate however challenges its current research framework, by reversing the traditional focus on actual and perceived physical changes over local's relations to places.

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Chapter 1: Introduction

This thesis aims to explore the place of emotions in climate (non-)migration research. I argue that collecting data in the form of place-based emotional experiences would allow to question and enrich the methods and knowledge of climate (non-)migration research. Place-based emotional experiences indeed reveal how people experience the climate in their environment and the ways they both might change. They also provide an in-depth understanding of people's relations to their living places that are fundamental in migration (non-)decision making. It is based on a tailor-made explorative data collection and data treatment adapted to the specific challenge of researching emotions in relation to places in a climate-related post-disaster context.

1.1. Researching the links between climate change and (non-)migration

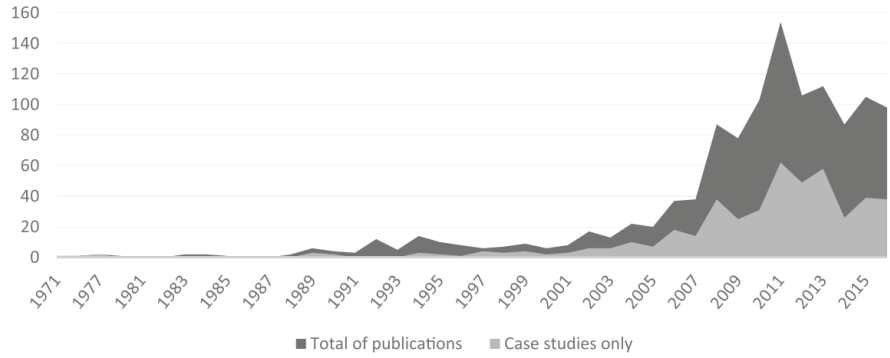
1.1.1. Why researching the links between climate change and (non-)migration?

Doing research on the links between climate change and migration has often been motivated by the threat posed by actual and expected environmental change on human well-being (McLeman *et al.*, 2006; Roquet, 2008; Mortreux and Barnett, 2009; Bohra-Mishra *et al.*, 2017). A growing concern and challenge for climate migration researchers is to avoid the oversimplification of the complex channels through which climate change relates to migration (Borderon *et al.*, 2019). Indeed, climate migration scholars are calling attention to the over-simplification of the links between climate change and migration that is pregnant in (Western) imaginaries through the 'alarmist'

discourses of ‘climate refugees’ (Piguet, 2012; Bettini, 2013; Nash, 2018; Boas *et al.*, 2019). While speaking of ‘climate refugees’ is a powerful advocacy tool for raising climate change awareness (Gemenne, 2011), those simplifications may have armful policy implications (Bettini, 2013; Betts and Pilath, 2017; Boas *et al.*, 2019); one of the consequence being that the climate change and migration nexus has been extensively debated as a problem needing fixing in the media, UN agencies, non-governmental organizations, and states governments (Nash, 2018). To understand how those ideas have developed, it is informative to know how migration-environment appeared as a research field.

1.1.2. A short history of environmental migration research

Since the 2000s, there is a significant increase in the number of publications focusing on migration and climate change (►Figure 1) (Laczko and Piguet, 2014; Piguet, Kaenzig and Guélat, 2018; Borderon *et al.*, 2019). In fact, studies about the natural environment as a driver of migration have reappeared in the second half of the 1980s after a disappearance over the course of the twentieth century (Piguet, 2012). Among others, the demise of environmental determinism explain this disappearance. Indeed, some early migration studies aiming to explain people’s movements advanced simplistic evolutionist arguments: people move for a better land, eventually invading those most habitable places of the world and fighting for them (Huntington, 1907; Semple, 1911). Their monocausal explanations were criticized for justifying colonial oppression by legitimizing racism and a natural hierarchy of development (Piguet, 2012). Another cause of the decreasing focus on environmental factors in migration research is the rise of an economic paradigm in migration theory. The idea that economic factor drive migration dates back to Ravenstein, the most prominent figure in migration studies at its beginning stages (Piguet, 2012): “It does not admit of doubt that the call for labour in our centres of industry and commerce is the prime cause of those currents of migration […] If, therefore, we speak perhaps somewhat presumptuously of ‘laws of migration’, we can only refer to the mode in which the deficiency of hands in one part of the country is supplied from other parts where population is redundant”(Ravenstein, 1885, p198). That being said, he exposes the so-called ‘laws of migration’: migration is dominated by short distance movements; females are more migratory than males, etc.



►*Figure 1: Number of publications and case studies on migration and climate change (1970-2016)* (Piguet, Kaenzig and Guélat, 2018)

The reappearance of the migration-environment nexus happened in the environmental sciences, disconnected from mainstream migration studies (Piguet, 2012). It is partly explained by a rise of environmental concern and growing anxieties regarding climate change. It is in that context that Myers (1993, 1997) and Myers and Kent (1995) publicized their first (and largely criticized) forecasts of expected numbers of environmental refugees that remain widely cited in policy and activist circles (Betts and Pilath, 2017). Critiques denounced the monocausality assumed in such research that very rarely exist in practice (Piguet, 2012). Instead, the field evolved toward a search to disentangle the complicated relationships existing between environmental drivers and migration (Black, W. N. Adger, *et al.*, 2011). Over the last 20 years, quantitative and qualitative researchers have sought to deepen our knowledge of the complex interactions between climate change and migration, questioning the role and weight of climate and environmental factors in migration patterns and decision making (Black, W. N. Adger, *et al.*, 2011; Piguet, 2012; Borderon *et al.*, 2019).

1.1.3. Climate (non-)migration: definitions

According to the official definition of environmental migrants -including climate migrants, "***Environmental migrants*** are persons or group of persons who, for compelling reasons of sudden or progressive changes in the environment that adversely affect their lives or living conditions, are obliged to leave their habitual homes, or choose to do so, either temporarily or permanently, and who move either within their country or abroad" (IOM, 2008 p 23). The environmental change to be related to migration is thus something either sudden or progressive that adversely affects people's lives and living condition. The rapid or sudden onset-events include all kind of natural hazards: earthquakes, tsunamis, floods, volcanoes, storms, hurricanes, and droughts (IOM, 2009). The term 'rapid' or 'sudden' is due to the

relative rapidity of change in people's environment in consequence of the hazard. The slow-onset events regroup the conditions in the natural environment that participate in or constraint human wellbeing, excluding the rapid-onset events. Those conditions are climatic conditions and ecosystem services (Black, W. N. Adger, *et al.*, 2011). A change in those conditions (e.g. change in land productivity, habitability and food/energy/water security) can influence migration patterns.

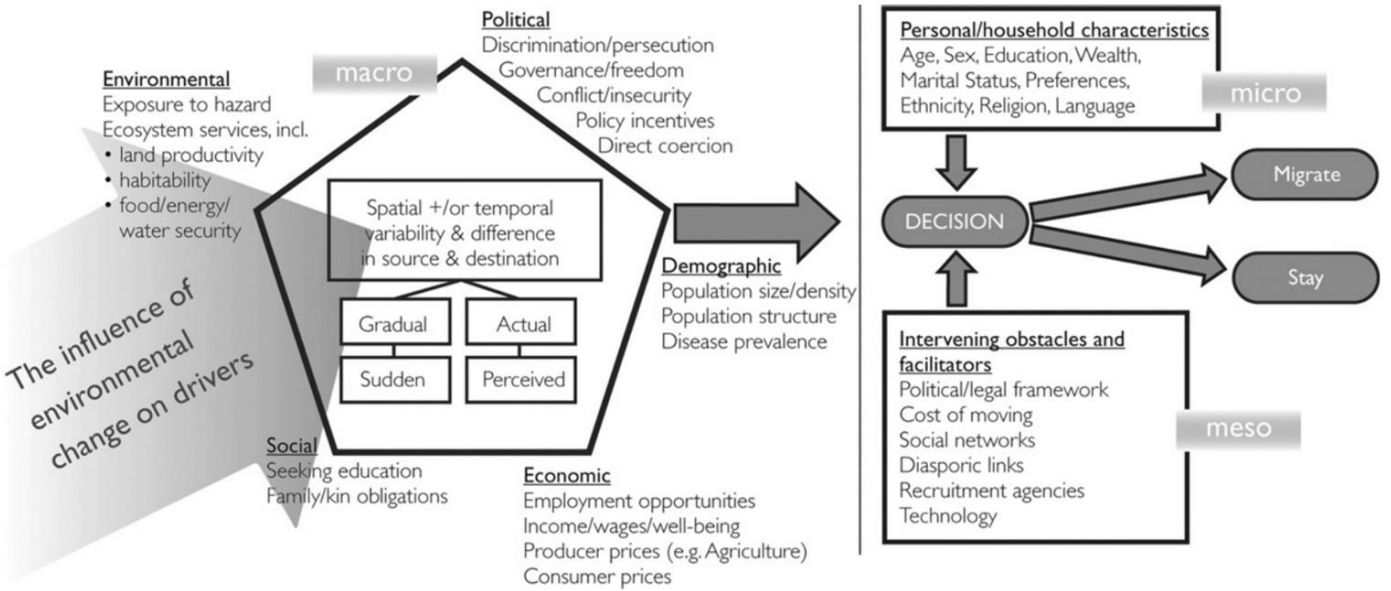
A confusion emanates from the fact that the word environment itself "necessarily means such different things to different people, that in aggregate it encompasses quite literally everything there is" (Harvey, 1996 in Piguet, 2012, p. 149). For clarity purposes, this thesis is focused on ***climate migration***. It refers to a subset of environmental migration specifically related to climate change: it includes floods and storms for example, but not volcanic eruptions. Climate change is indeed defined as a long-term change in the average weather patterns that have come to define Earth's local, regional and global climates. These changes have a broad range of observed effects that are synonymous with the term (Shaftel *et al.*, 2021). In this thesis, those effects are understood to appear in and change people's local ***environments*** that we define following George (1970) in Veyret (2007, p. 133, translated by the author) as "all the elements which, in the complexity of their relationships, constitute the framework, the context, and the living conditions for humans". Following this definition, the environment refers to the physical context of people's lives (including roads, buildings, etc.) in interdependence with societies. Consequently, our definition for the environment does not match that of environmental migrants that restricts the environment to its 'natural' aspects.

In short, climate change effects –such as the occurrence of a typhoon of very high intensity- are here understood to be part of the environment and to induce short-term and long-lasting changes in this environment. All those effects may contribute to the individual's and household's decision (not) to migrate. On the other hand, for environmental migration scholars, 'natural' environmental changes impact the 'natural' environment and other aspects of people's lives and it may lead to migration (see the reference framework of Black *et al.*, 2011, ►Figure 2). While this research is focused on climate migration, we may refer to the term environmental migration – as including climate migration- when it is most appropriate to render some specific authors' explanations.

The term '***migration***' is seemingly less confusing. According to the International Organization of Migration (IOM), it refers to "The movement of persons away from their place of usual residence, either across an international border or within a State" (IOM, 2021). However, the reality of people's mobility in response to a changing climate is complex: there are short term and long term movements, temporary or permanent, sometimes circular movements; people move across short and long distances; they may need to move to safety but not being able to do so, while

others do not want to move even when facing significant risk, etc. (Boas *et al.*, 2019). *Climate mobility* would therefore be a more appropriate term than *climate migration* to capture the diverse ways in which people do or do not become mobile. Nevertheless, this thesis maintain the use of the term '*migration'*. Indeed, we primarily focus on climate migration as a research field rather than as a research object. Maintaining the traditional term is therefore more convenient.

Finally, ***'(non-)migration'*** refers to the idea that migration and non-migration can be seen as two sides of the same coin (Zickraf, 2018). As it will appear in the next sections, researchers investigating the climate-related reasons to migrate inevitably provide clues to explain non-migration following climate-related disruptions, such as the absence of financial resources. Reciprocally, some research specifically examined the absence of migration, providing a better understanding of the entire '(im)mobility spectrum', including voluntary stay and inability to move (Black, N. Adger, *et al.*, 2011; Adams, 2015; Zickraf, 2018). While they address issues of agency and mobility potential, those studies also draw attention to the suitability and desirability of places for living. For example, the concept of 'trapped population' refers to the idea that some people may not have the ability to move for their own protection when facing environmental adverse conditions (Black and Collyer, 2014). As another example, Adams (2012) examined people satisfaction with their place of living and showed the important role of place attachment in lowering the mobility potential. In turn, this thesis focuses on people's relations to their living places as a key-element in explaining both migration and non-migration as two facets of a single phenomenon. Somehow, we aim to explain where people end up living and why; and this question necessitates reflecting on both migration and non-migration.



►*Figure 2: A reference conceptual framework for the 'drivers of migration'* (Black, W. N. Adger, *et al.*, 2011)

1.1.4. Research methods in environmental and climate (non-)migration research

They are several methods used to analyze the role and weight of environmental factors in migration (Piguet, 2010). Many quantitative researchers set migration as the dependent variable of a multi-variables statistical model (Henry, Schoumaker and Beauchemin, 2004; Paul, 2005; Massey, Axinn and Ghimire, 2007; Carvajal and Pereira, 2009; Gray, 2009; Feng, Krueger and Oppenheimer, 2010; Ocello *et al.*, 2014; Robalino, Jimenez and Chacon, 2015; Koubi *et al.*, 2016). They use ecological inference to build the independent proxy variables for environmental stress, benefits and/or risk. Others also collect data on perceived environmental pressure and economic contexts through individual sample surveys. Most quantitative researchers choose either to use macro- or micro- modelling, but multilevel approaches such as the reference empirical study of Henry, Schoumaker and Beauchemin (2004) combine ecological and individual data. Those methods are efficient in detecting the influence of actual and perceived environmental contexts on migration flows or individual decision making, while controlling for the other potential causes of migration. Those causes enter the following categories: economic, social, demographic, political, individual, facilitators and obstacles (as synthetized by Black et al. in 2011, ►Figure 2).

Other modelling techniques are also used, such as agent-based modellings (Piguet, 2010). They simulate the behavioral responses of individuals and households to environmental changes (Piguet, 2010; Mena *et al.*, 2011; Thober, Schwarz and Hermans, 2018). Moreover, they are able to take the interactions between actors into account.

Next to those quantitative modelling, another strategy is to qualitatively focus on a small amount of migrants and/or potential migrants and to understand the complex interplay of the various causes of migration. It is based on people's narratives, field observations, and historical documents (Meze-hausken, 2000; Carr, 2005; Each-For Project, 2008; Perch-Nielsen, Bättig and Imboden, 2008; Mortreux and Barnett, 2009; Carte *et al.*, 2010; Afifi, 2011; Fielding, 2011; Morrissey, 2013; Adams, 2015). This second approach is contextual, but leads to a deep understanding of the causes of migration in particular settings. For example, Morrissey (2013) developed a complex understanding of the combination of effects leading or not to migration including access to a well, food aid, location of schools in urban areas and reliance on rain fed agriculture.

►Table 1 presents a synthesis of the different dimensions of the environment encountered in key environmental migration research articles and the approach (either conceptual or methodological) to the link between environmental change and migration adopted by their author(s). The articles presented were compiled by the author in 2017 following the saturation principle: the aim of the table was to encircle the classical approaches to the environment in environmental migration research. The research papers reviewed used either qualitative or quantitative methods. Both slow- and rapid-onset events had been studied, sometimes altogether within the same study.

The table reveals the way(s) by which the author(s) relate the environment to migration. They are underpinned by the notions of risk and stress and the impact of environmental change is mostly analysed on the negative side. Those relations are however far from being homogeneously conceptualized and researched. Consequently, the results emanating from environmental migration studies are difficult to compile to provide a consistent message (Borderon *et al.*, 2019).

1.1.5. Complex links between climate change and (non-)migration.

Researchers have shown during the last decades that the decision to move is driven by a multiplicity of factors among which the environment plays a significative role (Black, W. N. Adger, *et al.*, 2011). However, the causal relationships between environmental change and migration remain contested (Betts and Pilath, 2017). Rather than listing up coherent and contradictory climate (non-)migration research findings exhaustively, the present section aims to provide a sense of the empirical complexity of climate (non-)migration. Based on Black, W. N. Adger, *et al.* (2011), the most widespread conceptualization of climate and environmental (non-)migration (►Figure 2), we discuss the interplay of environmental migration with economic, social and political factors as three examples of this complexity. In the last paragraph of this section, we shortly present other research perspectives.

In many cases, migration is first driven by economic incentives. When asked to state the reasons for migration, research participants mostly refer to economic reasons (Obokata, Veronis and McLeman, 2014). Researchers have to trace back these economic motivations to environmental changes. Afifi, (2011) speaks of 'Environment induced economic migration'. Economic reasons may actually be difficult to disentangle from environmental reasons, as exemplified by the following statement: ''my son's migration…isn't directly tied to [Hurricane] Mitch, but rather because he can't earn anything here. Yes. We lost everything with Mitch, and yes, the economy was destroyed here, but in the end, he left to find a job'' (Wrathall, 2012, p.591).

►*Table 1: Classical approaches to the environment in environmental migration research: method used (either qualitative, quantitative or others), dimensions of the environment considered (entering either the rapid- or slow-onset events category or both) and approach. The articles presented were compiled following the saturation principle by the author in 2017.*

Authors	Year	Title	Method	Rapid-onset	Slow-onset	Approach
Adams	2015	Why populations persist: mobility, place attachment and climate change	Quali	Aspects of weather (abrupt changes in weather, abrupt seasonal changes and drought)	Water resource and availability, aspects of weather (temperature extremes, excessive precipitation)	Perception
Afifi	2011	Economic or Environmental Migration? The Push Factors in Niger	Quali	Drought	Soil degradation, shrinking of lake Chad, the Niger River Problem, deforestation and sand intrusion	Environment induced economic migration
Carr	2005	Placing the environment in migration: environment, economy and power in Ghana's Central Region	Quali		Declining rainfall and increasing soil degradation	Environment integrated within economic and political contexts
Carte et al.	2010	Experiencing agricultural failure: Internal migration, tourism and local perceptions of regional change in the Yucatan	Quali		Agricultural failure compared to successes in the tourism industry	Perception of the failure of agriculture as livelihood

Carvajal and Pereira	2009	Climate shocks and human mobility: evidence from Nicaragua	Quanti	Hurricane (precipitation measures)		Vulnerability and Adaptive capacity
EACH-FOR project	2009	Environmental Change and Environmental migration Scenarios	Quali	Earthquakes, landslides and mudflows, cyclones, floods	Water shortage, unreliable rainfall, desertification, soil pollution, waste disposal, soil degradation and erosion, poor soil fertility, sea level rise, lake drying out, deforestation	Case-studies in locations facing environmental stressors or change
Feng et al.	2010	Linkages among climate change, crop yields and Mexico–US cross-border migration	Quanti		Instrumental variable for crop yield change due to climate change	Impact of variation of climate on crop yield
Gray	2009	Environment, Land, and Rural Out-migration in the Southern Ecuadorian Andes	Quanti		mean annual precipitation	Life histories survey
Henry et al.	2004	The Impact of Rainfall on the First Out-Migration: A Multi-level Event-History Analysis in Burkina Faso	Quanti		Rainfall	Multi-level event-history analysis

Koubi et al.	2016	The role of environmental perceptions in migration decision-making: evidence from both migrants and non- migrants in five developing countries	Quanti	If individuals mentioned that they experienced any heavy rain, storm, flood, hail/snow, hurricane, cyclone, typhoon, and/or land- slide/mudslide, coded this event as sudden and short-term environmental event	If individuals mentioned that they experienced any salinity, drought, or desertification coded as slow-onset and gradual long-term environmental event	Multi-level logistic regression models, large survey, perception
Massey et al.	2011	Environmental Change and Out-Migration: Evidence from Nepal Douglas	Quanti		Declining land cover, rising time to gather organic input, population density and perceived declines in agricultural productivity	Short vs long distance moves, perceived and actual environmental factors
Mena et al.	2011	Land use change on household farms in the Ecuadorian Amazon: Design and implementation of an agent-based model	Quanti		Land use change based on household decision making (different strategies possibilities)	Agent-based model: interaction between demography, land use, assets and remittance migration

Meze-Hausken	2000	Migration caused by climate change: how vulnerable are people in dryland areas? A case-study in Northern Ethiopia	Quali	Persistant drought (famine, agricultural yield, water supply, soil formation and pest infestation), rainfall variability	Life histories interviews, climate perception
Morrissey	2013	Understanding the relationship between environmental change and migration: The development of an effects framework based on the case of northern Ethiopia	Quali	Rainfall stress	Development of an effect framework
Mortreux and Barnett	2009	Climate change, migration and adaptation in Funafuti, Tuvalu	Quali	Increase in mean and extreme air temperature, rising sea levels, change in precipitation patterns, increase in intensity of extreme events	Analyse of reasons given to stay or to leave

Ocello et al.	2014	Environmental aspects of internal migration in Tanzania	Quanti	Drought or floods, crop diseases and severe water shortages (Survey question: presence/Absence of environmental choc experience)		Multivariate logistic regression models
Paul	2005	Evidence against disaster-induced migration: the 2004 tornado in north-central Bangladesh	Quanti	Tornado		Disaster relief, descriptive statistics
Perch-Nielsen	2008	Exploring the link between climate change and migration	Quali	Floods	Sea level rise	Conceptual model of the mechanisms linking climate change and migration
Robalino et al.	2015	The Effect of Hydro-Meteorological Emergencies on Internal Migration	Quanti	damages due to storms, electric storms, flash floods, floods, rainfall, strong winds, and weather-related landslides		Emergencies and damages, gravity model

Further, the link between economic factors and climate migration is not limited to the dependence of (potential) migrants on environment-sensitive economic activities. The cost of migration is also used to interpret the observed links between economic factors, environmental change and (non-)migration (Henry, Schoumaker and Beauchemin, 2004). In short, income and credit impact the vulnerability in staying negatively (potentially implying less migration) and the capability to migrate positively (potentially implying more migration) after a weather shock (Kaczan and Orgill-Meyer, 2020).

Contradictory results are also found in relation to social networks. On one hand, they facilitate migration (Borderon *et al.*, 2019). They also influence destination decision. For example, Carr (2005) observed that a large majority of migrants who left an area subject to declining rainfall and soil degradation could claim access to land in periurban settlements thanks to personal connection. On the other hand, social networks are also used for assistance to cope with a weather shock, thereby lowering people's vulnerability in staying (Kaczan and Orgill-Meyer, 2020).

Political factors also complexly intersect with environmental migration issues. Sporton, Thomas and Morrison, (1999) for example show how migration patterns in times of environmental stress were affected by national agricultural policies that themselves were shaped by international treaties. In another vein, Carr (2005) demonstrated how environmental change is understood through local power/knowledge and is therefore rarely the sole element on which the decision to migrate is built. The perspectives of political ecology to understand environmental migration has however been understudied (Greiner and Sakdapolrak, 2016). Further, historical-political context may explain observed environmental migration patterns such as colonially imposed cash cropping or sedentarization of previously mobile groups for which migration was a historical adaptation strategy to environmental stress (Hunter, Luna and Norton, 2015).

Altogether, the combination of effects that lead or not to climate migration appear to be highly context dependent (Obokata, Veronis and McLeman, 2014; Borderon *et al.*, 2019).

While many authors continue extending empirical knowledge on those effects and their combinations, others have turned to other methodological and conceptual angles of approach (Hunter, Luna and Norton, 2015; Borderon *et al.*, 2019). As an example, a body of literature focused on migration as an adaptation among other possibilities is rapidly extending (McLeman *et al.*, 2006; Tacoli, 2009; Gemenne and Blocher, 2017; Lietaer, Brüning and Faye, 2020; Van Praag, 2021a, 2021b). As another example, the translocality perspective has been introduced as a new theoretical approach to climate (non-)migration (Greiner and Sakdapolrak, 2013; Porst and Sakdapolrak, 2018): it 'systematically addresses socio-spatial dimensions

and the simultaneity of mobility and situatedness of migrants and non-migrants across space' (Porst and Sakdapolrak, 2018, p.35). The acknowledgement of the emotional aspects falls within this list of alternatives (Borderon *et al.*, 2019). The only existing research aiming to explore that dimension of climate (non-) migration is Parsons' study (2018) entitled "Structuring the emotional landscape of climate change migration: Towards climate mobilities in geography". His single paper on the matter is a drop in the ocean of the search for the emotional dimensions of climate (non-)migration.

1.2. Emotions and climate (non-)migration research

Current research in the field of climate (non-)migration is built on methodologies and conceptual frameworks that place emotions in the blind spot. As appearing in the above literature review, climate (non-)migration is indeed only observed as a rational process. Consequently, few scholars have stated that emotions could play a role in climate (non-)migration research: Naik (in IOM, 2009, p282-283) suggests that a possible reason for people not to move after a natural hazard is that fear and terror diminish and people feel psychologically able to stay; and explanations for involuntary migrant's dissatisfaction with their new place could be found in their own emotional state (Hugo, 2009 in IOM 2009, p285). In a migration research conducted in Funafuti, a majority of respondents gave reasons of 'lifestyle' including low-stress working environment and enjoyment of the natural environment for not to move out (Mortreux and Barnett, 2009).

As a way to start exploring the place of emotions in climate (non-)migration research, this thesis has sought anchors in existing discussions about climate (non-)migration research gaps. Two of them appear to open up to the study of emotions within climate (non-)migration research. First, environmental and climate migration research evolved as a research field separately from mainstream migration research (Piguet, 2012 and Hunter, Luna and Norton, 2015). Findings from migration studies have therefore little been mobilised in environmental and climate migration research. In section 1.2.1, we describe the place of emotions in relevant strands of migration studies. Second, the study of climate (non-)migration lacks emphasis on the way people experience changes to the environment and on the cultural dimensions of climate change (Piguet, 2012; Adger *et al.*, 2013; Parsons, 2018). Section 1.2.2 presents the cultural studies crossing emotions and climate change. To be exhaustive, the last section (section 1.2.3) rapidly discusses the cultural mobility literature approach followed by Parsons (2018), the only author who explicitly attempted to cross emotions and climate change migration, and not integrated within this research.

1.2.1. Emotions in migration studies

Migration[1] is studied across many disciplines, resulting in a large panel of research questions (Brettell and Eld, 2015). ►Table 2 presents the main migration research question(s) in various disciplines. It also lists the levels/units of analysis, the dominant theories and some research hypothesis. The table provides an overview of the very large panel of interrogations surrounding the phenomenon of migration. For example, political scientists question the difficulties for states to control migration while

[1] Note that 'migration' refers to *international* migration in Brettell and Eld (2015).

sociologist attempt to explain incorporation and inclusion. While many disciplinary approaches are relevant in the specific context of climate change, this thesis draws on the questions posed by economists, as they are mainly focused on the individual level and they are similar to the questions traditionally asked by climate (non-)migration researchers.

The frontier between mainstream migration and mobility research and climate (non-)migration is actually not completely hermetic. Some climate (non-)migration research focused on migration decision-making have already drawn on migration research theories emanating from the economical sciences (Adams, 2012).

In particular, the concept of Place Utility directly integrates environmental characteristics. According to Wolpert (1955, p.161), "migration is viewed as a form of individual or group adaptation to perceived changes in environment, a recognition of marginality with respect to a stationary position, and a flow reflecting an appraisal by a potential migrant of his present site as opposed to a number of other potential sites. […] The individual may adjust to the changing conditions at his site and postpone, perhaps permanently, the decision to migrate". The concept of Place Utility thus draws on the idea of extended economic rationality: the potential migrant weights up the costs and benefits of migrating versus remaining in location (Adams, 2012). In Kniveton *et al.* (2009), place utility is described as a way of considering the environment as a 'locational characteristic' providing physical amenities or disamenities. In Adams (2012), place utility data collection is based on an open-ended question on characteristics of life in the village from which respondents gained benefit. For example, Adams analysis highlights farming as a lifestyle as a component of place utility.

►*Table 2 : Migration theories across disciplines* (Brettell and Eld, 2015)

Discipline	Research Question(s)	Levels/Units of Analysis	Dominant Theories	Sample Hypothesis
Anthropology	How does migration effect cultural change and affect cultural identity?	Micro/individuals, households, groups	Relational or structuralist and transnational	Social networks help maintain cultural difference.
Demography	To what extent do immigrant and native populations become more similar over time?	Individuals, immigrant groups, ethnoracial groups, national foreign-born populations	Theories of migration (cost/benefit and structural; theories in integration (assimilation and pluralist-based); theories of migration effects (economic, social structural, and cultural)	Immigrants will not become successfully integrated when they experience significant membership exclusion.
Economics	What explains the propensity to migrate and its effects?	Micro/individuals	Rationalist: cost-benefit and utility maximizing behavior	Incorporation varies with the level of human capital of immigrants.
Geography	What explains the socio-spatial patterns of migration?	Macro, meso and micro/individuals, households and groups	Relational, structural, and transnational	Incorporation depends on ethnic networks and residential patterns.
History	How has a phenomenon (e.g. causes, structures, processes, consequences of migration) or a relationship (e.g. gender and migration) changed or persisted over time?	Varies temporally (from short-to medium and long-term) as well as spatially	Periodization	Usually not applicable.
Law	How does the law influence migration?	Macro and micro/the political and legal system	Institutionalist and rationalist (borrows from all the social sciences)	Rights create incentive structures for migration and incorporation.
Political science	Why do states have difficulty controlling migration?	More macro/political and international systems	Institutionalist and rationalist	States are often captured by pro-immigrant interests.
Sociology	What explains incorporation and exclusion?	Macro/ethnic groups and social class	Structuralist or institutionalist	Incorporation varies with social and human capital.

1.2.2. Emotions to reveal how people make sense of climate changes

Highlighting another gap in climate (non-)migration research, Piguet (2012, p.157) explains that we "should see the environment not as external to societies but as the product both of objectively measurable physical changes and of the subjective ways in which societies make sense of these changes". For example, Meze-Hausken (2004) study focusing on 'drought' reveals the complexity of the interrelations between meteorological conditions and the human system: there is no such thing as 'drought' separated from the farming conditions and people's needs. Along with other climate (non-)researchers, she observed the differences existing between the 'actual' and the 'perceived' environment, highlighting the subjectivity of people in their evaluation of their environment affecting the decision to move (Meze-Hausken 2004; de Longueville et al. 2016; Koubi et al. 2016; Massey et al. 2010). But Piguet's (2012) statement actually goes beyond this separation between 'actual' and 'perceived' environments: there is no such thing as an environment external to societies. There are 'objectively measurable physical changes' inextricable of 'the subjective ways in which societies make sense of these changes'. Citing the work of Hulme (2008), Adger *et al.* (2009) and Wisner (2010), this argument is in line with the perspective offered by cultural geography[2].

Researchers within cultural studies crossing emotions and climate change mainly interrogate people's experience and understanding of climate change, their adaptive capacity and resilience, and their motivation (or not) for mitigation actions (Gorman-Murray, 2010; Brugger *et al.*, 2013; Ryan, 2016; Hermann, 2017; Verlie, 2019; Haltinner, Ladino and Sarathchandra, 2021). There is indeed a need to report local meanings of climate change and to research the potential of emotion to incite (or not) adaptation (Gorman-Murray, 2010; Ryan, 2016). For example, Verlie (2019) introduces the concept of climatic-affective atmospheres. She describes them as "being distinct from the entirety of both 'the climate' and 'the affective' in that they attend specifically to how the meteorological, climatic, ecological, emotional and affective are entangled and how they affect each other" (Verlie, 2019, p.3). Affective atmospheres are phenomena connecting people, things and places, somehow erasing the boundaries between those well-defined entities: "atmosphere is never exclusively a psychological phenomenon, as state-of-mind, nor solely an objective thing 'out there', as an environment or milieu; atmospheres are always located in-between experiences and environments" (Bille, Bjerregaard and Sørensen, 2015, p.32). They work at a tacit level, between subject and object/subject, definite and indefinite

[2] Cultural geography is a sub-field of Anglophone Geography that is unclearly defined by either or both culture as the content of study and a 'culturalization' of many branches of geography (Zelinsky, 1983).

(Anderson, 2009; Bille, Bjerregaard and Sørensen, 2015). Among others, Verlie (2019) elaborates on Bissell (2010) study of people's experiences of public transport in relation with the concept of affective atmospheres. A frustrated atmosphere emerges when the train stops unexpectedly: the train slows down, generating negative affects, as it contradicts the desired or expected speed of passengers. Affects are also communicated between passengers, transmitted between bodies. Verlie (2019) argues that meteorological atmospheres may also play a role, as the frustration may increase on a 40° day, when bodies are sweating and public transport schedule is particularly vulnerable to those extreme temperatures. Further, the climatic-affective atmosphere of public transport may encourage people to choose to use their personal car, creating 'affective-climatic feedback loops' (Verlie, 2019, p.33).

As another example, Brugger *et al.* (2013) compared local emotions about glacier retreat in three different contexts: the Peruvian Andes, the Italian Alps, and the North Cascades in Washington State in the United States. They discuss various reasons that may explain the fact that glacier retreat alone does not make local residents anxious in these regions. They discuss the following factors one by one in comparison to the different levels of anxiety that were observed across regions: the frequency of interaction between the residents and the glacier, the relation between the glaciers and their sources of livelihoods, the fact that glaciers became or not part of local identity throughout the communities' history, the specific weather conditions during the year the residents were interviewed, the interviewee's other sources of worry and their trust in local authorities to take actions regarding that problematic. They conclude that those results inform individual and collective responses to climate change, regardless of the quantity and quality of (rational) information provided by scientific research.

Hermann (2017) goes further as she studies how worries in Kiribati, a Pacific Atoll State, not only refer to people, but also to the land itself. She suggests that "if worries point to reciprocities between social beings, they can also alert us to the degree to which not just human but also non-human entities—which are the subject of such worries—contain (from a culturally specific perspective) social dimensions" (Hermann, 2017, p.53). She finds out that people simultaneously express worries for the land and a determination to save it from the threat of climate change and sea-level rise.

In the same vein, in the Indian Himalayas, river devotees express love and loss when they decry the changes in the flow of the Ganga (Drew, 2013). Those changes are due to hydroelectric dams and climate shifts. But this research also echoes other studies pursuing a different objective than the above-mentioned research: their aim is to show that human well-being (and in particular 'emotional health') is threatened by climatic and environmental changes that are altering landscapes and

ecosystems (Cunsolo Willox *et al.*, 2013; Drew, 2013; Tschakert, Tutu and Alcaro, 2013).

For example, Tschakert, Tutu and Alcaro (2013) study psychological and emotional distress of people within the coupled context of environmental and climatic changes and internal migration in Ghana. They build their analysis on Albrecht *et al.* (2007) concept of solastalgia, 'the distress that is produced by environmental change impacting on people while they are directly connected to their home environment' (as opposed to nostalgia –'the melancholia or homesickness experienced by individuals when separated from a loved home') (Albrecht *et al.* (2007, S95). It aims to create another category of psychoterratic illness (defined as earth-related mental illness where people's mental wellbeing (psyche) is threatened by the severing of 'healthy' links between themselves and their home/territory (Albrecht *et al.* (2007, S95)) next to the well-documented post-traumatic stress disorder related to acute stressor such as wars and natural disasters. In the case of solastalgia, the stressors are chronic, such as drought. Tschakert, Tutu and Alcaro (2013) find out that withered crops, drying up of wells, loss of beauty, and deteriorating social networks (due to out-migration of those who can afford it) create a landscape and place alteration, and their inhabitants seem homesick of their home 'being eroded' (Tschakert, Tutu and Alcaro, 2013, p.23).

Interrogating emotions-environment interactions in climate change contexts thus reveals many facets of people's experience of climate change in their environment. Reciprocally, it also informs climate-related behaviours within the environment. As Graybill (2013, p. 39) explains: "If we understand that part of the human experience is lived through emotions, but within natural environments, then emotions about our ecological settings matter, because they are 'an intractable and intangible aspect of all of our everyday lives' and inform how we feel, think and act in our environments."

1.2.3. Emotions and the cultural mobility literature

Parsons (2018), the only author who explicitly attempted to cross emotions and climate change migration, reviews climate migration studies in parallel with the mobilities and translocality literatures. In line with the above discussion, he notes that the human experience of the climate has often been elided in migration-environment research and argues that the recent developments across the mobilities and translocality literatures 'have laid the groundwork for the structural and emotional dimensions of climate change responses to be engaged with under a coherent theoretical rubric' (Parsons, 2018, p 670). Based on the testimony of a single Cambodian beggar, Parsons (2018) shows that climate change emotions are contextual, but mediated by the intersubjective norms engendered by objective social structures of power and wealth.

In the cultural mobilities literature, studies crossing motion and emotion are indeed connected to a global system of relations and injustice (Werner, 2015). As an example, Vigh (2015) studies emotions such as anguish and despair related to the deportation back home of young migrants from Guinea-Bissau. Considering the environment within this motion and emotion research field, Tolia-Kelly (2007, 2008) uses painting to capture the sensory responses of translocal communities living in Lancashire and Cumbria to the English Lake District. The national park landscape embodies an English sensibility, 'normally exclusionary of British multi-ethnic, translocal and mobile landscape values and sensibilities' (Tolia-Kelly, 2007, p.2). She shows that the experience of the Lake District for mobile folk is 'tainted as a delimiting and sometimes fearful experience' (Tolia-Kelly, 2008, p.135).

The research work undertaken by Parsons (2018) attempts to 'circumvent the conceptual disjuncture between climate modelling and the lived experience of migration in response to the climate' (Parsons, 2018, p.3). His work indeed seeks 'to move away from an onus on 'proving' a relationship between migration and the climate, towards a focus on how the climate is experienced, guides action and creates meaning in doing so' (Parsons, 2018, p.15). His theoretical analysis challenges the current epistemology and research questions of climate migration research that struggle to integrate the lived experience of potential and actual migrants.

In turn, my stance in this research is to explore 'diplomatically' a way to accommodate emotions within existing climate (non-)migration research's questions and methodologies.

1.3. Research area

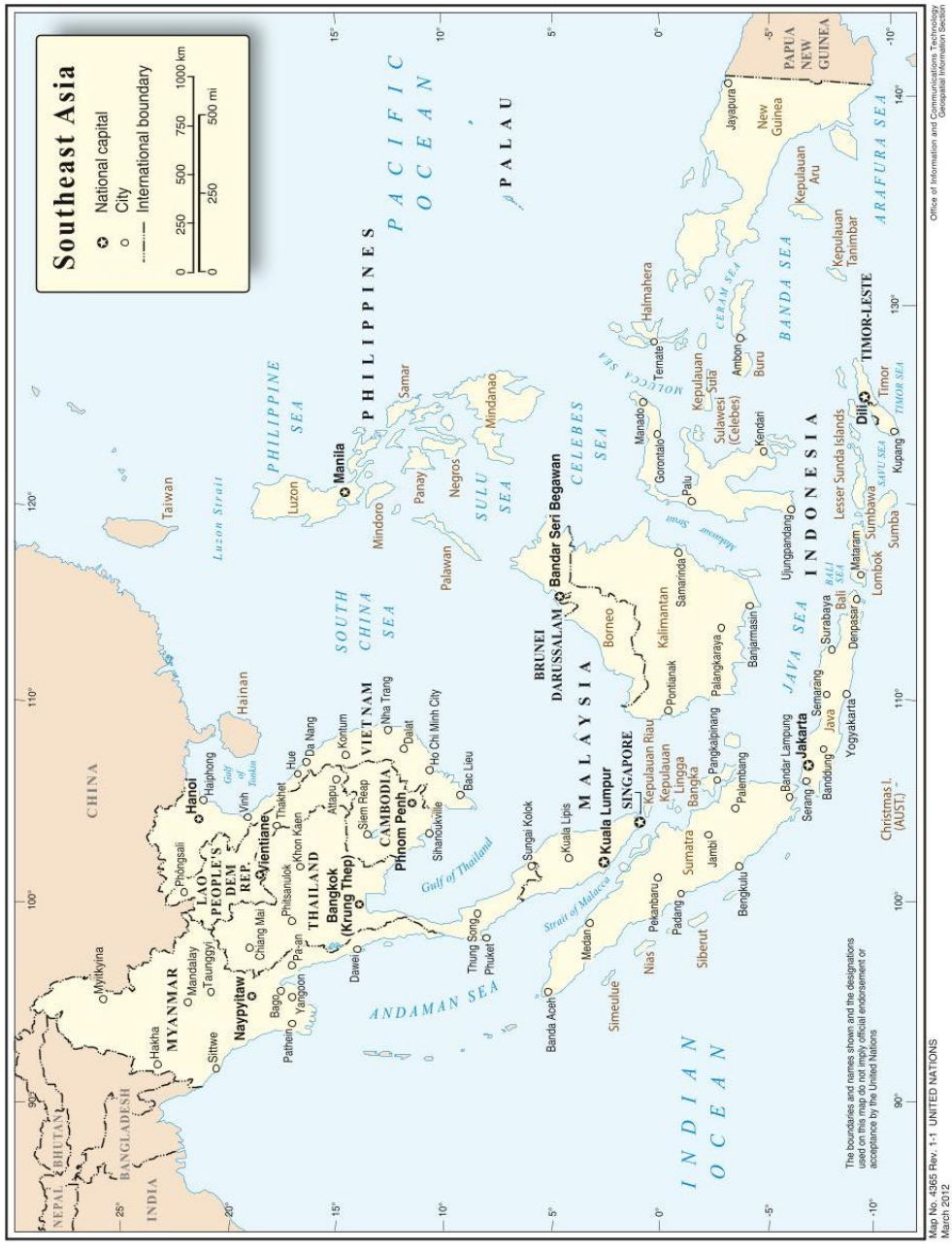
1.3.1. A field for climate change research

The selection process for the research field practically happened as followed. First, the Philippines were selected among the countries were our research team had strong research ties with, and where one find contemporary events mimicking the conditions predicted under future climate change. Morrissey (2009, p.19) would indeed define this thesis research as being a contemporary analogous study as it focuses on contemporary events that "effectively mimic the conditions predicted under future climate change". As a counter-example, another way of doing climate (non-)migration research would have been to focus on past climate change events and their migration effects. However, such studies tend to generate alarmist common sense models that are in contradiction with recent findings about the complex human mobility response to environmental change.

Second, we decided to focus on an extreme situation, to make sure that emotional aspects would obviously appear in relation with the event under study. Climate (non-)migration research explores the following specific types of climate change impact: extreme weather events (drought, flooding and disasters, tropical storms and tornadoes), sea-level rise and land degradation (Morrissey, 2009). Falling into this category of events, Typhoon Haiyan had provoked the biggest disaster during the recent years; it was also well documented. We thus turned our field investigation to the province of Eastern Samar, Philippines, where Typhoon Haiyan impact had been the greatest.

1.3.2. Eastern Samar, Philippines

The Republic of the Philippines (commonly named the Philippines) is situated in Southeast Asia (►Figure 3). Its surface area is 300,000 km² and its population as of May 1, 2020 counted 109,035,343 people (Philippine Statistics Authority, 2021; The World Bank Group, 2021). Its climate is tropical and maritime: relatively high temperature (mean annual temperature of 26.60 C, between 25.50C in January and 28.30C in May), high humidity (between 71% in March and 85% in September) and abundant rainfall (from 965 to 4,064 mm annually) (Government of the Philippines, 2021). A great portion of the rainfall, humidity and cloudiness are due to the influence of typhoons.



►*Figure 3: Southeast Asia* (United Nations Office of Information and Communications Technology - Geospatial Information Section, 2012)

The Philippines is indeed located on the Pacific 'Ring of Fire' and in the Pacific typhoon belt (UNDP Philippines, 2012). According to average annual loss (AAL)[3], an indicator of the magnitude of risk, the Philippines is one of the most at risk countries for 'natural' disasters (UNISDR, 2015), and tropical cyclones represent the highest share of this risk (Storm surges and cyclone winds account for 6613 million US$ out of the 7893 million US$ of Global multi-hazard AAL in the Philippines).

The country is administratively organized into 17 regions, 81 provinces and 1489 municipalities (Philippines Statistics Authority, 2021). A municipality is further divided into *barangays.* A barangay is actually both the lowest administrative unit of the country and the name of the community living within its limits. People strongly identify themselves to their barangay.

The fieldwork was conducted in Eastern Samar, one of the 81 provinces of the Philippines. It covers the eastern part of the island of Samar, along the Pacific Ocean (►Figure 3, ►Figure 4). It is a mountainous and hilly province covered with dense tropical vegetation in its interior part (Province of Eastern Samar, 2019a). The coastal part is covered with 'alienable and disposable land' (agricultural land, mangrove forest, beaches, etc.). 95% of the agricultural land is planted with commercial crops such as coconut, banana, vegetables and root crops.

Demographically, the population is young, due to a high birthrate (Province of Eastern Samar, 2019a). According to the official website of the province last updated in 2019, the median age is 21 years old, and the average household size is 4.8 persons. A rough forty percent of the population of the province of Eastern Samar belongs to the 0-14 years old group.

Among the five years old and over, 44.2% completed elementary school, 30.6% completed high school and 7.9% hold an academic degree (Province of Eastern Samar, 2019a). The poverty incidence is 37.4%. Agriculture and fishing, two low-income generating activities, dominate the province economy: those sectors occupy around three-fourths of the estimated employed persons. Both agriculture and fishing have a low productivity due to degradation of resources and lack of means.

The local language is Waray (Province of Eastern Samar, 2019a). But the official language of the Philippines is Filipino (Philippine Statistics Authority, 2021). Most educated people also speak English, which is spoken widely in the country

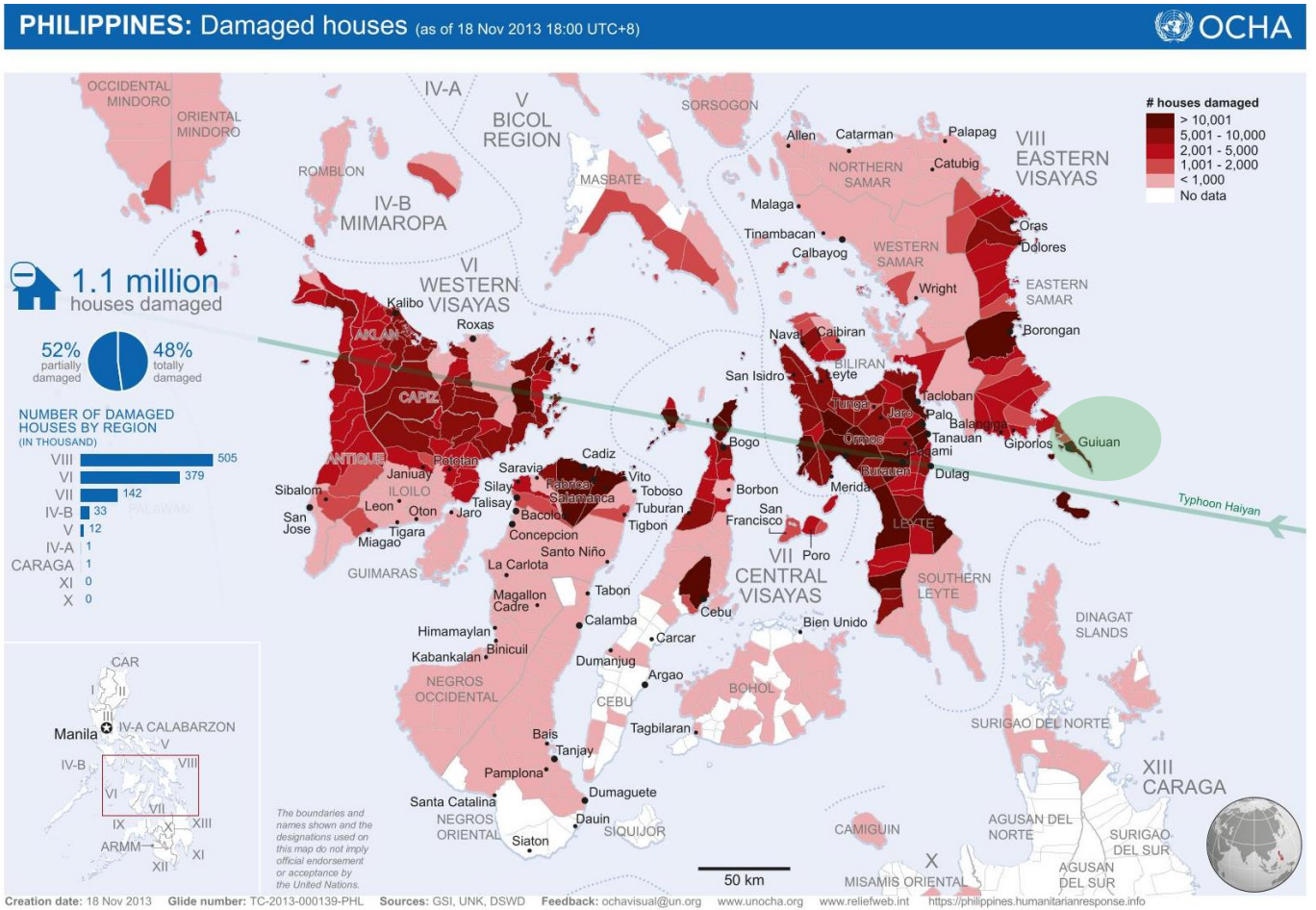
[3] The average annual loss (AAL) is a metric that provides guidance on the likely « order of magnitude » of risks. It is the expected average loss per year considering all the events that could occur over a long time frame (earthquakes, floods, cyclone winds, storm surges and tsunamis). It is a compact metric with a low sensitivity to uncertainty.

(Hincks, 2016). The Philippines were indeed an American colony from 1898 until World War II. The American cultural influence is still perceptible, from local basketball courts to the countrywide movie-loving culture.

Before 1898, the Philippines have been under the rule of the Spanish colonizers for almost 400 years when starting to count from the mid-1500s, when the area was claimed by Ruy Lopez de Villalobos for the future King Philip II (Curricula, 2015). The official discovery happened in Eastern Samar where Ferdinand Magellan first landed in 1521 (Province of Eastern Samar, 2019a). “The Catholic Church, through various religious orders with their own agendas, clearly shared power with Spain, and the two jointly administered the colonization of the islands”(Curricula, 2015, p.15). In Eastern Samar, 96.76 percent of the household population is Catholic (Province of Eastern Samar, 2019a). The religion co-exists with traditions and beliefs that can be traced to pre-colonial times. For example, fisherfolk ask permission from the water spirits for good catch and safety at sea, and farmers perform rituals invoking nature and ancestor spirits for good harvest.

1.3.3. Typhoon Haiyan

The study was conducted in the municipality of Guiuan (Philippines) where Typhoon Haiyan made its first landfall on 7 November 2013, at 4:40 AM (NDRRMC, 2013) (►Figure 4). Haiyan was the 24th storm to affect the Philippines in 2013, but it was one of the most powerful typhoons on record that ever made landfall into the Philippines (NASA Earth Observatory, 2013). Guiuan is located on the Eastern edge of the country, at the typhoon paths latitude. People are used to experience typhoons, but Haiyan strength was superior to everything they experienced before. The resulting disaster due to extremely strong wind and a storm surge in many coastal areas caused the death of 6300 individuals mostly due to drowning and trauma, and 28 688 were injured (NDRRMC, 2013). More than one million houses were damaged, a rough fifty percent of them being totally destroyed (►Figure 5). A vast majority of the damages were registered in Region VIII, where the municipality of Guiuan is located.



▶ *Figure 4: Philippines: Damaged houses (as of 18 Nov 2013 18:00 UTC+8)(OCHA, 2013)*

►*Figure 5 : EC - Audiovisual Service. A victim of the Haiyan typhoon walking in front of a destroyed church in Tacloban, Tacloban, 2013 by N. Asfouri. Copyright European Commission, 2014*

As argued throughout this thesis, rational facts alone do not provide a global picture of the Typhoon and its impacts. As a complement, I provide the following extract of *Typhoon Haiyan, the untold story:* "An emotional and powerful book" according to Reiko Yamaguchi (Mullés, 2014, back cover). 'Inspired by true events', its author, Albert Mullés wrote the book after himself experiencing Typhoon Haiyan in Tacloban.

- H-Day Plus One

"*The sun shone brightly, promising a good clime and a warm sunny day. As I went out into the street, the environs that greeted me were nothing like I have ever seen before. I was petrified as I surveyed the funereal seaside village, for it was a grotesque and an unheavenly picture of houses on a vast canvass of broken wasteland. The big stubborn trees that were there before my time, unbreakable as they seemed at the fortitude by which they mightily stood, had easily been plucked like bush weeds on a withering scorched garden. The raw loam and soil had been sprung from the earth like a freshly plowed field that gave way to the stomping of a thousand hooves of untamed beasts, defaced and artless.*

For the first time, the enormity of the tragedy began to sink in me. The entire landscape was almost an exact duplicate of that infamous Hiroshima picture of a lone belfry standing amidst the backdrop of the deserted ruins of the city during the Second World War, where the ghosts of its past had never ceased to haunt the undoing of the future. Then, I saw the huge mansion right across our compound, a prodigious edifice that looked impregnable to any disaster. Yet, here she was, a frivolous and unimportant skeletal structure that stood without meaning except as a testament unto itself, when Nature had ensnared it into its punitive lashes, transforming the formidable fortress into a simple wretched wreck.

Then, there was the lone government office building that used to be a house of empty promises, pulverized into a heap of rubble with only the anatomic bruised colonnades to remain of its infrastructure, like a cut tongue and limb that could no longer issue blank writ or gibberish pronouncement. As I snaked my way through the fallen archway in the gate of the village and out into the main avenue, I immediately noticed the dead body that lay outstretched on the pavement astride a local budget hotel. You can almost see his wide gaping jaw and half-shut eyes as you imagine the insufferable human struggle he valiantly fought to keep his life until fate had squandered that chance away. Lying next to him was a little boy, no more than five years of age, and wearing blue cartoon imprinted shorts. He was almost the same age as my daughter, with tiny soft hands that clinched to a piece of thorny wood. His composure was stencilled in the peaceful innocence and naiveté of a child, as his boyish childhood exuded the blossoming face of his youth. God bless this child and hear thine innocent cries!

Just a few meters ahead was a corpse of a woman, anonymous and nameless on that hallowed ground, where her face was covered in nocturnal black mud while ostensibly tucked on her shirt was a rosary with beautiful crimson beads that had been ripped from its twine, dispersing in a patch of dirty pool a few inches away. I then went by a lifeless old man where there hung a wry smile on his face, his dilated eyes looking up to the heavens and seemingly at peace. But I was wrong, for everything was horrifyingly real as it gently drowned me in a riverbed of tears. The horror of it all was still too difficult for me to comprehend as I wallowed in a trance like movement, staggering through the road as I walked".

'Typhoon Haiyan, the untold story'. Inspired by true events (Mullés, 2014)

1.3.4. Guiuan

The main fieldwork was conducted in Guiuan during the summer of 2016 -three years after Typhoon Haiyan devastated the place in 2013. By that time, most households were back 'home': with help from governmental and non-governmental agencies, their houses had been rebuilt, the streets were cleaned and many service-providing buildings were reconstructed. However, the impact of the Typhoon was still perceptible as ruins, devastated vegetation, first aid tents, etc. remained part of the landscape.

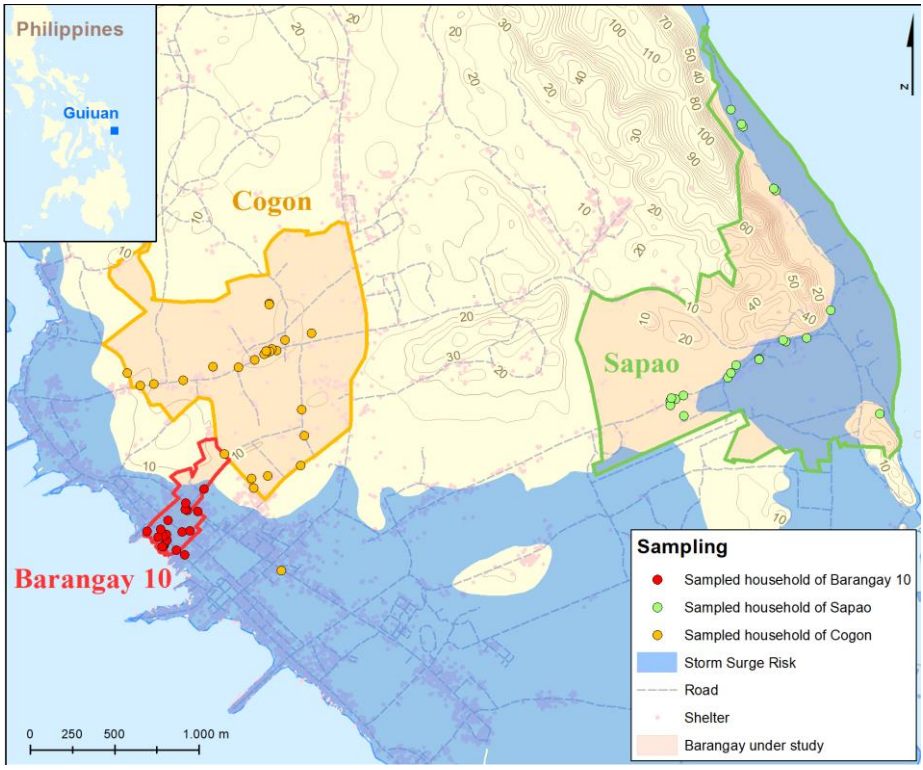
Guiuan was selected amongst the areas hit by Typhoon Haiyan because a survey including all households was conducted in this municipality during the last semester of 2015 by UN-Habitat. The UN-Habitat dataset contains among others classical socio-economic data and detailed information about the sources of income in the household. The UN-Habitat dataset has been used to sample the households visited during the fieldwork and in particular to establish the socio-economic profiles of the respondents.

Guiuan has a total land area of 175.49 km² for 52,991 persons (2015 census) (Province of Eastern Samar, 2019b). Agriculture covers 38.2% of the total land area and it is considered by the fisheries authorities as the best fishing belt in the region. The municipality is also rich in mineral resources.

Guiuan counts 60 barangays. Fourteen of them compose the urban centre. They are officially named 'Poblacion Ward' and numbered from 1 to 12 (there are a 4-A and a 9-A which explains the total number of 14). Locally, people call them Barangay 1, Barangay 2, etc. which is the appellation that we use in this study.

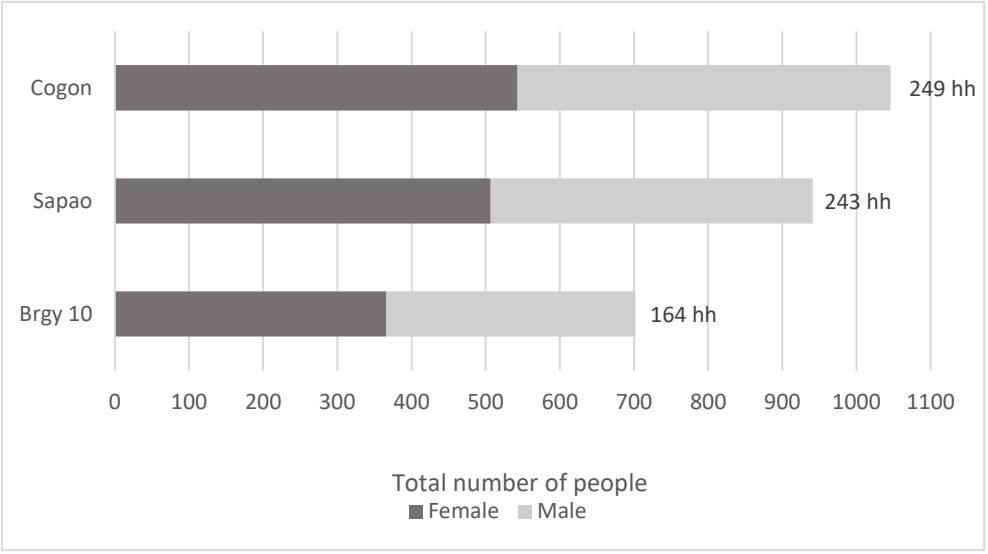
Among the areas with good data quality in the UN-Habitat survey, three barangays were selected to represent three different contexts (►Figure 6):

- 'Safest' place: places were relocation sites have been established. Those places are the ones located further from the sea. Cogon has been selected amongst them.
- Urban context: Guiuan being a rural municipality, they are very few urban barangays according to national criteria (Philippines Statistics Authority, 2016). The selected barangay is Barangay 10.
- Rural context: they were several coastal rural barangays with reliable data. The barangay selected was Sapao. According to municipality officials, it is the barangay with the highest amount of casualties due to Typhoon Haiyan.



►*Figure 6 : Sampled households in Guiuan (Philippines) and inundation risk in case of stormsurge (NOAH,2015). The points represent the household's shelters localisation except for one household of Cogon that was interviewed in a local eating-place (gpx data collected with a smartphone during the fieldwork, August 2016 by the authors).*

Finally, according to the UN-Habitat survey, the total population size of Cogon is 1046 people in 249 households, that of Sapao is 940 people in 243 households and that of Barangay 10 is 702 people in 164 households (►Figure 7).

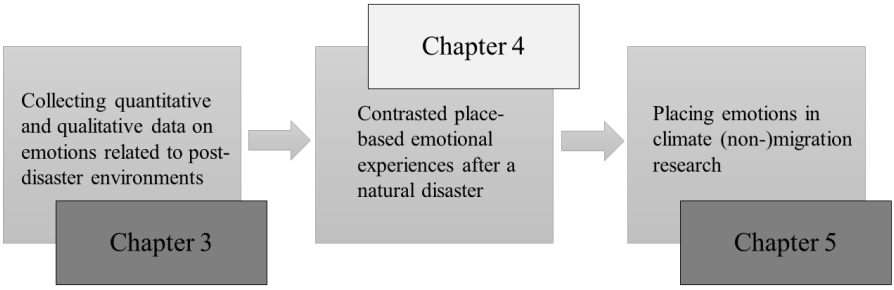


►*Figure 7: Population size of Cogon, Sapao and Barangay 10 (by the authors, based on a UN-Habitat survey conducted from September to December 2015)*

1.4. Research objectives and thesis outline

This thesis aims to explore the place of emotions in climate (non-)migration research. The emotional dimensions of climate experience and migration (non-)decision making have indeed until recently been totally avoided. The absence of emotions in climate (non-)migration research can however not be addressed completely within a thesis scope. I opted for –and restricted this thesis to- a data-collection approach. In fact, climate (non-)migration combines two groups of data: *climate change's impact* data and *migration* data. This thesis focuses on the former. Drawing on economic migration research, it considers the emotions experienced in places to explain the decision (not) to migrate; and combines it with cultural studies crossing emotions and climate change, using emotions to reveal how people experience climate and environmental changes.

The general objective of this thesis has been pursued following a three steps scheme: chapters 3 and 5 are rather practical, as the former presents methodological advances and the second reflects on the climate (non-)migration research framework (and in particular the interrelation between research questions and methodologies); chapter 4 is empirical (►Figure 8). The objectives pursued at each step are described in the next section. To close up this chapter, the last section provides this thesis outline, using a schema to illustrate how each part contributes to the whole.



►*Figure 8: A global research objective pursued in three steps. Practical propositions are found in chapters 3 and 5; chapter 4 is empirical.*

1.4.1. Three sub-objectives

This chapter presents the three sub-objectives pursued in this thesis as being both searches for practical solutions and theoretical advances (►Figure 8).

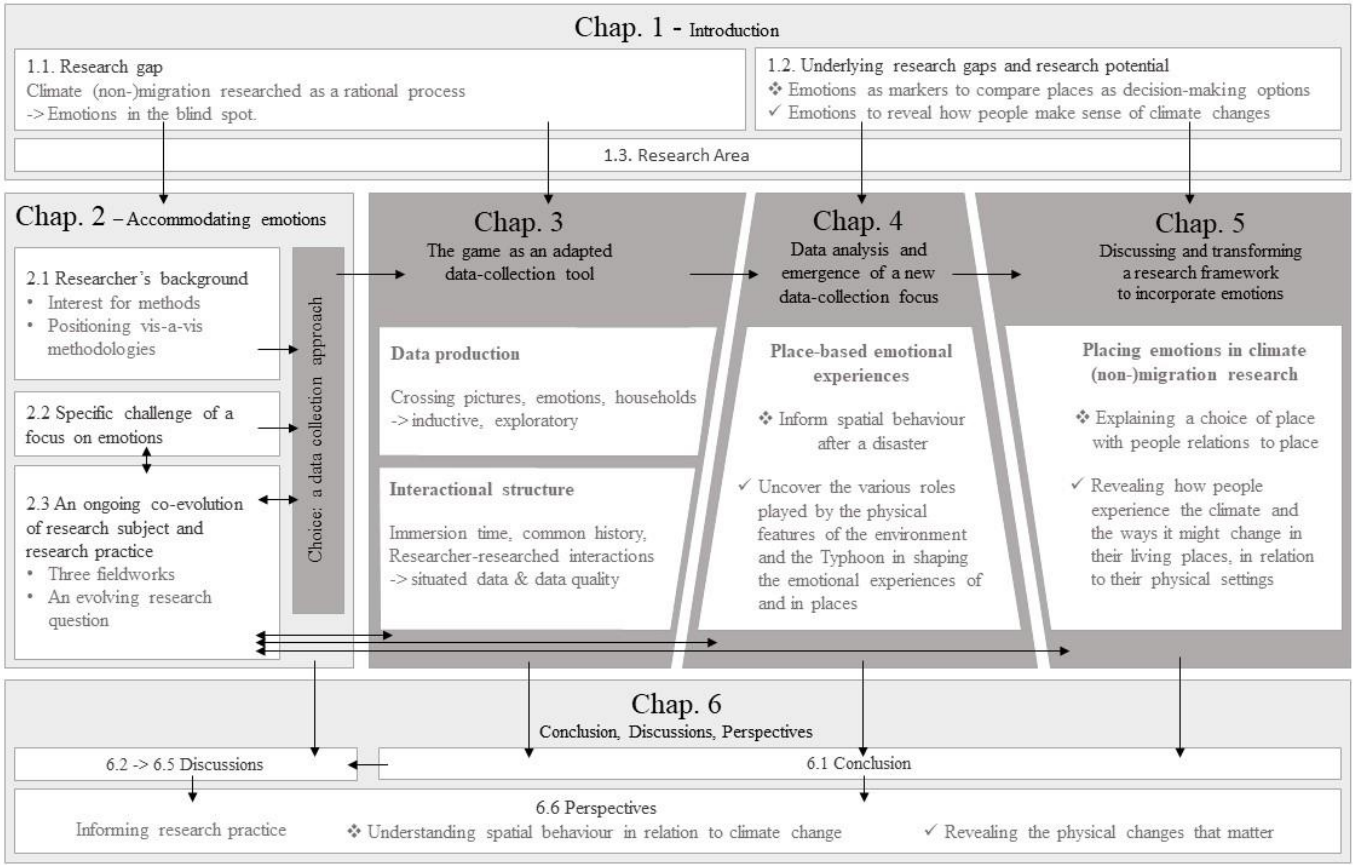
The objective of the first step (presented in chapter 3) was to collect data in a way that was both adapted to the research context and the challenges posed by collecting data on emotions in relation to the environment. We therefore developed, experimented and analysed a data-collection technique in the form of a game. This new data collection technique aimed to elicit how people described their post-disaster environment in their living places through emotions. It thus focused on emotions as signals imprinted in the environment and revealing its aspects relevant for understanding the decision (not) to migrate. We also chose to collect both quantitative and qualitative data to combine the possibilities of generalization provided by the former with a deeper understanding built on the latter.

The second step (presented in chapter 4) consisted of analysing the database resulting from the game. The objective of the data treatment was to interrogate several every-day living places and the diversity in their interaction with post-disaster emotional experiences. While the first and third step of this research reflected on research practice, the second step was empirical. The interpretation of the results has therefore been built on the existing literature about emotions and disaster recovery (as described above, the chosen climate change context was a post-disaster situation related to a super-typhoon). Throughout the analyses, place-based emotional experiences appeared to be an appropriate qualification for the data collected. They were analysed according to the three following objectives: [1] describing the place-based emotional experiences in general to contextualize Typhoon-related place-based emotional experiences; [2] characterizing the Typhoon-related place-based emotional experiences; [3] investigating the various environments most related to the Typhoon.

As to finally meet the research objective defined in this thesis, we reflected on the potential contribution of collecting data in the form of 'place-based emotional experiences' to climate (non-)migration research. In chapter 5, the strategy developed in this thesis to place emotions within climate (non-)migration research is resumed and further developed in light of the data collected and analysed at steps one and two.

1.4.2. Thesis outline

The three central chapters introduced above are framed by two introductory and one concluding chapters. The aim of this section is to highlight the main ideas and results of each of the six chapters in relation to the others in order to provide a sketch of the entire research workflow (►Figure 9).



►*Figure 9: Research workflow and thesis outline*

In this first chapter, we introduced the main research gap: historically, researchers have investigated environmental migration as a rational process, leaving out emotions (Chap 1 - Introduction, ►Figure 9). Exploring the emotional aspects of climate (non-)migration appear to be an important contribution to the ever-growing number of studies providing a nuanced picture of the phenomenon. However, it challenges current methodologies that place emotions in the blind spot (1.1.Research gap, ►Figure 9). The identification of this research gap led to the development of a data collection approach and the creation of a game to collect emotional data. Further, the absence of emotions in climate (non-)migration research is related to two well-known research gaps in the field (1.2. Underlying research gaps, ►Figure 9). First, the contributions from mainstream migration research have little been used to inform climate (non-)migration research. In fact, emotions have already been studied in relation to migration. In particular, they are used as markers to compare places as decision-making options in economic migration research. Second, the experience of climate and environmental changes are underemphasized. As a possible response, we found in cultural research that emotions reveal how people experience and make sense of climate changes. Those research potentials were used as anchors in analysing data and relating them to climate (non-)migration research (chapter 4 and 5). Finally, the third section of this introductory chapter presented the research area (1.3.Research Area, ►Figure 9). It was hit by Typhoon Haiyan, an event mimicking the conditions predicted under future climate change.

The second chapter exposes my motivations to opt for a data collection approach (Chap. 2 - Accommodating emotions, ►Figure 9). Most specifically, I explain why I decided to question how emotions could be integrated within the climate (non-)migration research framework. First, I expose my research background, and in particular my belief and interest in the central role of methodology (2.1.Researcher's background, ►Figure 9). Second, I provide an interdisciplinary description of emotions, showing that various and very different approaches co-exist (2.2.Specific challenge of a focus on emotions, ►Figure 9). Thereby, I demonstrate that collecting data about emotions constitutes a practical and conceptual challenge, especially in the case of emotions related to the environment. The third section describes my research practice and the research subject as being in co-evolution (2.3.An ongoing co-evolution of research subject and research practice, ►Figure 9). I posit my thesis research as a journey, punctuated by three different fieldworks. I then explain how my research practice evolved, resulting in an original contribution: proposing a data collection concept framing the way the reality may be captured, and an alternative research framework coherent with the so-collected data to incorporate emotions within climate (non-)migration research. This transformation is due to various challenges faced during the thesis journey (represented by double arrows on ►Figure 9): [1] the complexity of emotions, that belong to the realm of impressions and are elusive in nature and somehow implicit; [2] the stimulating approach of this research with data-collection as an entry point; [3] the intuitive development of an

adapted data-collection tool in response to the difficulties posed by the research context; [4] the resulting unexpected data form and content; and [5] the progressive realization that climate (non-)migration classical research methodologies and questions were ill adapted to the study of emotions, while their underpinnings were not in contradiction to the acknowledgement of emotions.

The objectives pursued in chapter 3, 4 and 5 were presented in section 1.4.1. To further highlight the research workflow, ►Figure 9 pinpoints the main contributions provided by each research step. Chapter 3 describes the chosen data-collection device, a game that we played in the field. It provided data in the form of crossings between pictures, emotions and households following an inductive and exploratory process. It also framed the interactions during the data collection activity: the resulting data must be assumed as being situated; and its quality was satisfactory due to the immersion time, the focus on the two interviewee's common history and the so-conditioned researcher-researched interactions.

Chapter 4 describes the data collected quantitatively and qualitatively. The results are situated within the literature about the emotion-environment-(post)disaster's nexus. More importantly, the way emotions relate to the environment is detailed, thereby introducing the concept of place-based emotional experiences. The results highlight how the Typhoon affected people emotional experiences of and in places in a variety of ways. As the data concerns a large range of places and their physical settings, they provide a nuanced picture of a post-disaster emotional landscape, which could inform the spatial behaviour after a disaster. Further, the various roles played by the tangible features of the environment in shaping the emotional experiences of and in places appear in their whole complexity. The physical changes provoked by the Typhoon that are mainly researched as neutral and 'cold' entities thereby acquire meaning and connect with an emotional reality.

In chapter 5, emotions are given a place within climate (non-)migration research. Collected in the form of 'place-based emotional experiences', they inform people relations to their living places. These relations are concretely realized in people choosing to experience some places more than other places, and thereby may contribute to explain why people choose to live in certain places rather than others. Besides, the aim of the climate (non-)migration framework is to explain the decision (not) to migrate by the impact physical changes have on the lives and living conditions where people live. As derived from the previous chapter contributions, this impact appears when observing place-based emotional experiences. The main contribution of chapter 5 is then to provide a comparison of the assumptions and research strategy used in classical approaches with the above discussed assumptions and research strategy, showing the research framework transformations needed to accommodate emotions within climate (non-)migration research.

Finally, the strategies adopted and the contributions provided in this thesis are summarized and further discussed in a concluding chapter (Chap 6 – Conclusion, Discussions, Perspectives, ►Figure 9). First, the main contributions and limitations of the three central chapters (Chapters 3, 4 and 5) are first restated (6.1.Conclusion, ►Figure 9). Second, I discuss the interactions between the research approach, the researcher's positioning and the main outputs of this research in four sections (6.2 -> 6.5.Discussions, ►Figure 9): one section by research step; and a fourth section to briefly address and open a reflexion about the place of the researcher's own emotions in doing research about emotions (section 6.5). The very last section of this thesis is dedicated to the research perspectives and applications offered by this thesis (6.6.Perspectives, ►Figure 9): informing research practice in climate (non-)migration research, better understanding spatial behaviour in relation to climate change, and revealing the physical changes that matter.

Chapter 2:
A data collection approach to accommodate emotions within climate (non-)migration research

2.1. The researcher's background as a starting point

In this section, I discuss my attitude towards research in general at the beginning of this thesis journey, which led to the development of a data-collection approach. In particular, I discuss my interest for methods and my positioning vis-à-vis methodologies.

2.1.1. Research approach: a personal interest for methods and research practice

I started a PhD because research is to me a free space and an opportunity for self-discovery. My choice was not about a particular topic. In fact, I am not particularly interested in climate (non-)migration. I simply followed my thesis advisor's research interests and expertise, a very practical consideration indeed. Nonetheless, I strived for enriching and nuancing climate (non-)migration research with passion during the

past seven years. I found motivation to do this research by looking at other aspects. I focused my attention on the why and how of climate (non-)migration *research* rather than on the why and how climate (non-)migration *occur onto the field*. To explain how I came up with a data-collection approach, I find it useful to provide some information about my background as a researcher.

My early scientific training was quantitative. I learnt to appreciate the power of statistical tools to synthetize and reveal information hidden in numbered database and to establish relations between observations, and of other rather quantitatively based techniques such as Geographic Information Systems and remote sensing. However, despite my pure quantitative training, I have never shared the conception of knowledge of quantitative purists (purists stands for researchers who either reject quantitative/qualitative methodologies and their underlying conception of reality and are proponent of the 'incompatibility thesis' (Onwuegbuzie and Leech, 2005)). According to 'the incompatibility thesis', quantitative methods are indeed tied to the positivist epistemological paradigm, "the view that scientific knowledge is the paragon of rationality; […] that it must be based on pure observation that is flee of the interests, values, purposes, and psychological schemata of individuals" (Howe, 1988, p.13). In short, while I did not reject quantitative tools, I did not adopt positivists exogenic perspective that views "knowledge as representative of the real world" (Westhues *et al.*, 2015, p.135).

Moving away from the exogenic perspective and following the endogenic perspective, I believe that "humans harbor inherent tendencies […] to think, categorize, or process information, and it is these tendencies (rather than features of the world in itself) that are of paramount importance in fashioning knowledge" (Gergen, 1985, p.269). I view knowledge as a construct, a rather artificial human product incapable of fully mirror a fixed reality, which complexity is out of the reach of human understanding power. Science therefore can only provide 'models' that tend to describe and explain reality in all its complexity without never entirely achieving it.

Retrospectively, I would say that *fallibilistic realism*[4] was the paradigm that best suited my understanding of knowledge and search for it at the beginning of this thesis journey. I review here two of its principles as exposed in Anastas (1999). First, this perspective is based on the idea that "there is an invariant reality that exists apart

[4] Fallibilistic realism is an epistemological position that "seeks to incorporate the critiques of logical positivism without abandoning the concept of a knowable reality entirely" (Anastas, 1999, p. 17). It can embrace a range of models of inquiry. Following fallibilistic realism, a key criterion for knowledge to be scientific lies in the plausibility in the connections drawn between what we know and the way things are. Further, "the immediate and historical context in which scientific investigation takes place is considered to be an integral part of the process that must be understood in evaluating its products" (Anastas, 1999, p.17)

from any particular observer of it" (Anastas, 1999, p. 18). To illustrate realism, philosophers suggest to imagine a tree falling in a forest. For realists, it makes a noise whether or not there is someone nearby to hear it. Second, "we can approach knowing this reality even though there will always be some error (i.e., theory-induced bias) in our observations and in the interpretations and conclusions based on them" (Anastas, 1999, p.19). In other words, there will always be imperfections in the observational process due to the observer, the research process itself, and the general context of the research activity: our theories and methods are not infaillible.

I therefore believed (and I continue to believe) that the responsibility of researchers is not only to question knowledge in light of new observations and theories, but also to continually question –always faillible- knowledge building strategies. I am always puzzeled by ways researcher's need to hold to something; to closely build on other researchers' work for developing their work with acknowledging their limitations. As a response, I wanted my thesis to explore alternative ways of building knowledge and be an 'out of confort zone' personal experiment, within acceptable scientific limits.

I thus reviewed climate (non-)migration research with this particular critical eye and personal motivation for exploring alternative research methods and questioning research practice. The research gap that this thesis tend to adress is therefore not fully circumscribed by stating that emotions are absent from climate (non-)migration research. My thesis specifically questions the fact that data-collection about the impact of climate change on people (that one find in any climate (non-)migration research methodology) has so far always been limited to rational factors and explanations. As reviewed above, it has excluded emotional aspects, due to the limiting –if not inhibiting?- historicity of climate (non-)migration research and its dominant methodologies and conceptual frameworks. In other words, emotions here are not fully investigated as a research object, they are explored as a lacking piece in an existing research framework.

2.1.2. About the game and the mixed method research framework

In this section, I introduce arguments for experimenting data collection with a game and for integrating qualitative and quantitative research tools within a mixed method research framework.

My research stance was to experiment research methods according to the constraints and possibilities of the context (in this case the field context or the dataset forces and weaknesses), and to follow my intuition to collect appropriate data. My research practice acknowledged the unavoidable fallibility of research anyways.

Nevertheless, I believe that it is better to do research as well as possible than to not do it at all; and there are great advantages of doing it in a rather 'disinhibited' way.

Therefore, I decided to explore the potential of a game to collect data in the field. For a variety of reasons exposed in chapter 3, it appeared to be an appropriate alternative data-collection tool. Also, I opted for a mixed methods research framework. Indeed, both approaches have strength and weaknesses, and researchers should combine their strength within a single study. In fact, mixed methodologists advocate "the use of whatever methodological tools are required to answer the research questions under study" (Tashakkori and Teddlie, 2009, p.14). Further, both quantitative and qualitative methods can be exploratory (e.g. descriptive statistics, exploratory factor analysis, cluster analysis and traditional thematic analysis) or confirmatory (e.g. inferential statistics and confirmatory thematic analysis) (Onwuegbuzie and Leech, 2005; based on Onwuegbuzie and Teddlie, 2003). This subdivision of research replaces the traditional quantitative/qualitative divide, and provides a framework that combines quantitative and qualitative data-collection and data analytical procedures. Based on those descriptions, I would qualify this thesis research as being exploratory.

Finally, as to round up the personal context in which this thesis' questioning and exploratory practice emerged, and before moving to the next chapter that exposes the specific challenge posed by a focus on emotions, I had liked to cite Lederer, (1934, p.221) in his social research article named 'Freedom and Science':

> "Even if it were possible to do away with all bias, would we not thereby exclude from our work all its most important problems? Would we not restrict ourselves to the mere observation of facts, to the mere accumulation of material without significant meaning? And while thus collecting facts can we, or should we, avoid that sudden lightning flash of intuition which fuses all the *disjecta membra* into one whole, and which is inevitably connected in some way or other with our personality?" (Lederer, 1934, p.221)

2.2. Emotions and the challenge they pose to data collection

Focusing on emotions is not a prerogative of psychological scientists. However, the most comprehensive description of emotions as a research object is to be found in psychology.

Emotions are defined by the context in which they emerge and the physical and psychological responses they provoke (Rimé, 2005). Further, researchers have identified categories of emotions. Among others, Ekman (1992) identifies the following basic emotions: anger, fear, sadness, enjoyment, disgust and surprised. There also seem to be two stable dimensions beyond those categories: valence (positive – negative) and arousal (strong – weak) (Rimé, 2005). Finally, research has shown that emotions are a universal phenomenon: people all around the world associate similar situations to joy, sadness, fear and angriness.

Emotions appear when there is a rupture of continuity in the interaction between an individual and his/her environment (Rimé, 2005). Those interactions vary continuously. On the side of individuals, there is a constant dynamic of needs, desires and aspirations. On the side of the environment, the source of variations are objects incursions, events and situations of both social and physical nature. A rupture of interaction appears when there is a lack of resources at one pole to react to a specific variation on the other pole. Indeed, individuals routinely use their knowledge, principles, beliefs, etc. to react appropriately to the variations in the environment. Emotions appear as coping means when individuals are unprepared to a particular change in the environment: temporarily, emotions guide action. Individuals also pursue goals and have projects that may vary over time. If the environment lacks resources to meet the new objectives or constitute an obstacle, emotions arise. In fact, those two sources of variations are dynamically intertwined.

Emotions manifest themselves through a change of expression (facial, vocal, etc.), an impulse for taking a specific action (running, breaking down, stopping to move, etc.), a coloration of the subjective experience (‘emotional experience’), and major cognitive modifications (Rimé, 2005). Those manifestations correspond to the strict definition of emotions as distinct from mood, temper, emotional troubles, preferences and affects. Emotions are understood to be the most extreme, acute and less diffuse of those manifestations. However, the distinction between those ‘affective states’ is not always clear (Clément and Sangar, 2008).

One source of confusion is the duration of emotions. Emotions as described above are very short manifestations: emotional expressions indeed last between half of a second and 4 seconds (Rimé, 2005). However, an emotional event does not only result in an emotion, but also in an emotional episode (Frijda *et al.*, 1991). They can last for a couple of days, if not longer. An emotional episode lasts until the individual’s

dealing with the emotional event is over, either due to a resolution of the problematic or an abandonment of any efforts to resolve it (Rimé, 2005). Further, paradoxically, the greatest contribution of emotions to adaptation is very probably not in the dealing with emergency where it is most visible. Most important for individuals is to avoid those emergencies by anticipating and preventing them. Therefore, emotions also imprint certain ideas, behaviours and elements of the environment. Those affective signals serve to guide individuals in their future actions. Through individual's implicit memory, those invisible guides act in all moments of our existence. For example, the walker in a city spontaneously takes enjoyable routes and avoids gliding pavements and insecure parts of the city, etc. (Rimé, 2005; Griffond-Boitier *et al.*, 2016).

> "Through emotional experiences, the universe transforms into a 'mapped' world, made of positive and negative coloured routes. Those colorations are continuously actualized according to the specific objectives we pursue at that moment; and the routes we follow unconsciously overlap with those invisible paths." (Rimé, 2005, p. 83, translation by the author)

This leads us to emotional geography, where researchers embrace a very different perspective on emotions. Emotional geographers indeed suggest that emotional geographies shouldn't be defined in such ways that "they might become mere objects of quantification, comparison and manipulation" (Smith et al. 2009, p.6), which is exactly what is done in the above mentioned description. Instead, "the phenomenal experiences of emotions are the starting point for most [emotional geography] researchers" (Smith et al. 2009, p.7). Indeed, a rational –emotion free- approach to emotions is contradictory to the very acknowledging of the existence and relevance of emotions.

Researching emotions is thus challenging as the very idea of rationally defining emotions raises coherence questions. Another difficulty lies in the time frame of emotional experiences: emotions "are attributes of a moment of experience, but the outcomes that people value extend over time" (Kahneman and Tversky, 2000, p.2). Further, both real-time measures or observations and individual's retrospective evaluations or explanations relate to episodes of experience, which temporal definition is unclear. Finally, the relation between places, environment, and emotions is not clear. It varies across disciplines, from fuzzy atmospheres to a very specific psychological reaction to a particular context.

2.3. An ongoing co-evolution of research subject and research practice

This section exposes the parallel existing between the framing of this thesis' contribution and the researcher's experience of doing research. They echo each other along this research journey and beyond, creating a dynamic that turned out to be fruitful in terms of questionings, practical and conceptual innovations, and research outputs and interpretations.

2.3.1. A research journey punctuated by three fieldworks

This research project started in September 2014. Among other research activities, it has been punctuated by three fieldworks that were conducted during summers 2015, 2016 and 2018 (due to teaching obligations during the rest of the year). I view fieldworks as privileged moments of connection between the researcher and his/her subject of investigation. They produce the constitutive raw material of a research, both in terms of data and research experiences. The term 'raw' is added on purpose, to stress the need for further processing the many signals captured by the researcher, sometimes in the form of disruptions that provoke in-depth changes in the researcher's comprehension of the subject, and apprehension of research in general. Hereunder I expose in a systematic way the research assumptions accompanying each of the fieldworks, and their outputs in terms of data and research practice's learnings.

Fieldwork 1 (2015), July 21st to August 27th – The first fieldwork was exploratory: I had never been in the Philippines before, the research area was not yet determined, and I had a very vague idea of the questions I wanted to tackle in my thesis. I knew that I wanted to dig deeper into the influence the environment has on people's decision to migrate. As I explicated in an early definition of my research project, I wanted to explore the role played by the environment in decision making through "emotions, memory bias, perception bias, etc." As I explained at that time, "by modelling migration more comprehensively, including new socio-psychological data, [I hope] to enlighten the complexity of migration choices due to environmental change" (the author, June 2015). Further, methodology development was already determined as being the core challenge of the research project, as I originally stated that I would be trying "to integrate more qualitative elements in quantitative statistical models through innovative surveying techniques" (the author, June 2015).

The objective of this first fieldwork was to get in touch with the Philippines, to choose an appropriate research area, to meet key-actors in the field and to better encircle the research subject. By meeting with a whole range of actors, I confronted my environmental migration research concerns with the practical needs pointed by

local actors. It allowed me to get a sense of local's understanding of environmental impacts and migration. After selecting Guiuan as the research area, I also tried my hand at interviewing, which I had never done before. It was a challenging experience. As explained in chapter 3 and further discussed in section 6.2, the choice to develop a data-collection game resulted from those first trials. Further, exchanging with people in the field equipped me with concrete, first-hand representations of local realities. It was useful to prepare my next fieldwork, which aim was to gather this thesis' core data.

Fieldwork 2 (2016), June 5th to August 26th – The preliminary objective formally stated for this thesis was the following: "integrating individuals' experience of their environment in migration models" (the author, April 2016). In order to meet that objective, I organized a fieldwork to collect data about "individuals' experience of their environment". In particular, I decided to develop a data-collection game and to focus on people emotional experiences of their environment:

> "The objective of the game is to link the 'environment variables' with indicators that represent the repulsive or attractive character of the elements of the environment. It would be measured by the emotions people relate to those elements of the environment" (the author, June 2016)

By 'environment variables', I meant objective physical elements of the environment. For example, instead of measuring the impact of 'flooding' with water levels and water damages, I would try to get information about the emotional experiences of the sea and the rivers, as an indicator of their repulsive or attractive character in relation to the experience of flooding. The expected data was thus hypothetical and roughly defined. To validate the data, a questionnaire would also be submitted to the respondents after the game session.

During a month, we (a field assistant, a Belgian intern and myself) conducted around three game sessions per day. In parallel to the data, I gathered self-observations about the unfolding of the game sessions, and about how my observations challenged my representations. The data rapidly appeared not to provide the expected information, as people related the emotions to the environment in ways I had not expected. As I would later realize, the confrontation happened at two levels. Firstly, I learnt more about the ways of life of the respondents, and about the complex ways in which the Typhoon seemed to have affected their lives. Secondly, the emotional data could not be simply used as 'indicators of the repulsive or attractive character of the elements of the environment'. They were much richer than that: they revealed unexpected aspects of people emotional experiences in their environment after a typhoon. As further developed below, the idea of 'measuring the impact of the environment' with emotion levels was actually flawed. Moreover, the immersive experiences of the game sessions also challenged my conception of data collection

itself. I slowly became aware of the complexity in the researcher-researched interactions, and the importance of the data collection context in shaping the data collected content.

Fieldwork 3 (2018), June 19th to July 2nd – Two years after the game fieldwork, I decided to organize a last data collection activity that would take into account the lessons learnt during the previous fieldworks. By then, I had a much more elaborated conception of my research subject:

> "Quantification necessitates some conceptual shortcuts. [ ] With no constraint of quantification, we will focus on the 'what it is like' and not on 'how much there is' of [the] emotions/experiences/socio-psychological aspects of the decision to stay after the Typhoon. In short, we would like to dig into what Ingold (1993, p152) would call the "lived, everyday involvement [of people] in the world" and how it relates to the reasons to stay after Typhoon Haiyan. A place hit by a typhoon is a good research area because it highlights the dynamic aspects of the environment, here obvious in the almost total destruction of the environment just after the Typhoon, and it slightly return to normal during the years that followed." (The author, June 2018)

In practice, I aimed to collect qualitative data about the respondent's every-day lives and practices in relation to the environment, and about why their barangay would be the right place for them to live. As I planned to visit the same households as those we played the game with, I also expected to discover some dynamic aspects of people's relation to their living place in the aftermath of a typhoon. Further, I briefed my field assistant to conduct the interviews alone, to avoid the complex 'disturbance' caused by my presence (that I discuss in Chapter 3).

The resulting data were much poorer than the game data, mainly because I was not there to orient the discussion in the expected direction. On one hand, that indicated that the game was a good alternative to facilitate data collection. On the other hand, I was deprived of in-depth meaning and direct migration-related data that I found by then necessary to round up the question originally posed. Consequently, the research necessarily took a turn, axing the last contribution piece (Chapter 5) on theory rather than on empirical data.

2.3.2. An evolving research subject

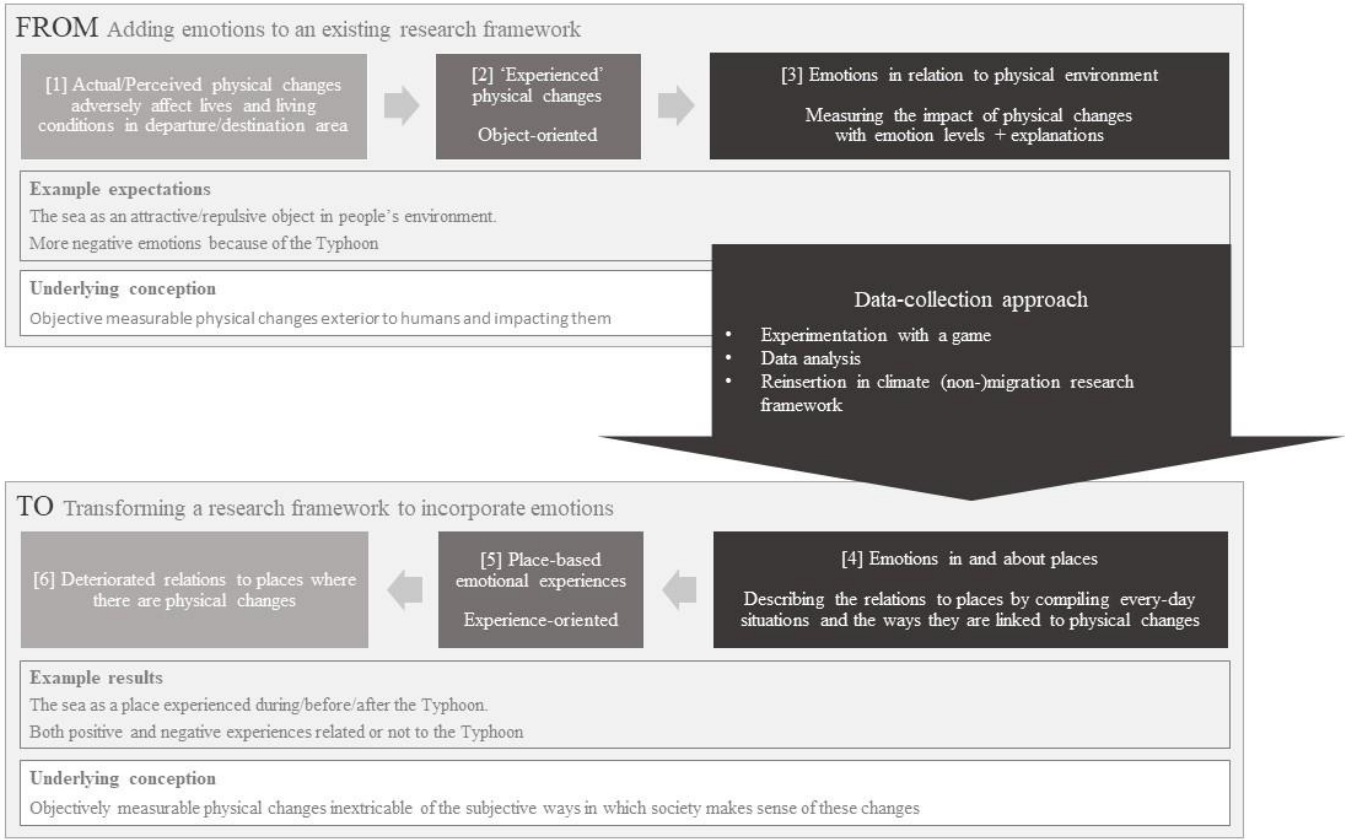
As described in the previous section, the research question has been progressively refined. I hereunder further explain how my conception of the research subject evolved in confrontation with empirical observations and practical experiences.

Moreover, the aim of this section is also to describe my positioning vis-à-vis knowledge building along this thesis journey.

In general, this thesis contribution evolved from adding emotions to an existing research framework (as presented in the previous section) to transforming a research framework to accommodate emotions (►Figure 10). In Chapter 5, I indeed provide an alternative climate (non-)migration research framework where emotions are given a central place.

As explained above, my original knowledge-building strategy was to collect emotions data as indicators of the experienced attractivity/repulsivity of the (material and objective) environment. I expected elements such as the sea to be related to negative emotions because of the Typhoon (the sea is related to the storm surge and flooding that accompanied the Typhoon and were very destructive).

My approach to research was initially deductive. First, I conducted a theoretical review of the climate (non-)migration literature focused on a core element of its research framework: the assumption that actual/perceived physical changes adversely affect the lives and living conditions in departure/destination areas ([1], ►Figure 10). As an alternative to actual/perceived physical changes, I decided to collect 'experienced' physical changes data [2]. Corresponding to what was classically done in the field, the data collection was directed toward 'objects' such as 'the sea', which experience would be affected by the Typhoon. In other words, perception and 'experience' were seen as subjectivity filters in people's apprehension of external objective environmental facts. (Non-)migration decision making was expected to be based on what people apprehend of their environment, and that is why it appeared important to gather such subjective data. In particular, I decided to collect emotion-environment associations' data quantitatively and qualitatively [3]. Underlying this development of a research strategy, I conceived humans as having a subjective 'evaluation' of the way they were impacted by objective measurable physical changes exterior to themselves.



►*Figure 10 : The data-collection approach leads to a revision of the research's contribution. Above: from [1] to [3]: development process of the research's strategy. Below: reinsertion of the results into a transformed research framework: [4] in practice, emotional experiences in and about places inform the relations to place; [5] place-based emotional experiences appear to be an adapted data-collection concept; [6] the research framework is transformed to incorporate emotions.*

The data collected with the game during the second fieldwork and analysed in chapter 4 challenged this initial conception of reality: I collected emotions in and about places [4]. For example, being happy when swimming *in the sea*. Instead of 'measuring' the impact of physical changes with emotions, the data allowed to describe people's emotional experiences in places, related or not to physical changes (associated with the Typhoon). Inductively, a shift occurred from a focus on actual/perceived environmental 'impacts' to a focus on possibly deteriorated 'relations to places', concretely realized in people everyday life experiences. In short, while the original data-collection focus was oriented toward objects impacting people [2], the data collected was oriented toward experiences [5]; and 'place-based emotional experiences' was introduced as a concept framing data collection. The decision (not) to migrate would then be explained as a choice of place and informed by people possibly deteriorated relations to places [6].

The experimentation with the game, the data analysis and the reinsertion of the unexpected results in the climate (non-)migration research framework have gradually changed my conception of reality, and of the ways knowledge could be built about this reality (vertical down arrow, ►Figure 10). The necessary data shift from object-oriented to experience-oriented data collection is central in this evolution. Emotions are indeed encircled very differently: in the former, they are understood as affecting people's evaluation of the material reality; in the latter, they *are* the reality on which data is collected. Further, emotional experiences are impossible to disentangle from other facets of the reality -immaterial and material. Moving from an outsider to an insider perspective, I now rather conceive objectively measurable physical changes as inextricable of the subjective ways in which society makes sense of these changes (as discussed in section 1.2.2).

In parallel, I also became increasingly aware of the impossibility to get to know this reality outside of our own representations, of the circumstances in which we gather information about it; and of the research framework closely related to a specific research question and the associated research field (in this case, climate (non-)migration). The contributions of chapter 3 and 5 draw on those observations.

Finally, the reality of emotions is fluid and elusive, and I believe that its contours are necessarily produced by the researchers mind and his/her research tools. My consequent search to enhance our capacity to grasp emotional experiences led to reflexions about definition, framing, and sampling that became central to this thesis (see section 4.2, section 5.2, and section 6.2.2). Besides, I searched to avoid objectifying emotions or to relegate them to the status of 'filter'. As suggested in the title of this thesis, my ultimate aim is to provide emotions a proper place in climate (non-)migration research.

Chapter 3:
Collecting quantitative and qualitative data on emotions related to post-disaster environments

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Adapted from: ***Henriet E, Burnay N, Dalimier J, Hurley J and Henry S (2021)*** *'Challenges and Opportunities of Field-based Data Collection with a Game. Analysis of the Development and use of a Game to Collect Data on People's Emotional Experience in their Environment', BMS Bulletin of Sociological Methodology/ Bulletin de Methodologie Sociologique, 149(1), pp. 7–29.*

3.1. Introduction

While games are popular in education because of their motivational and simulation potential (see for example Costanza et al. 2014; Duval et al. 2017; Garris et al. 2002; Hertzog et al. 2014; The Thiagi Group 2019), their specific structure is also exploited for data collection.

Most game-based methods are used in research to collect data from large online populations (Gundry and Deterding, 2019). In field-based research, serious games are developed to simulate real life systems (Costanza *et al.*, 2014). For

example, TerriStories is a game used as a participatory research tool (CIRAD, 2018). It simulates the management of a territory and its natural resources. Its particularity is to integrate the expertise, knowledge, experience, views and values of different stakeholders on the same level. By playing the game, solutions for a particular territory emerge and the players learn together. Another example is the proposition of Costanza et al. (2014) to use a game to evaluate the value of ecosystem services. The game would simulate or model a system integrating human behaviour and ecosystem responses. The objective of the game would be for the players to create their ideal world. Players would both learn ecosystem functioning through the game and make decisions. The players' trade-offs decision are considered by the authors as a valuable source of data for the evaluation of ecosystem services.

The game may thus be used as an alternative data collection tool, one of its particularity being the way the respondent is led to formulate and share information. In those examples, instead of asking the respondents to formulate an integrative set of political solutions for a territory or to evaluate ecosystem services values, they are guided through the game to do so. Researchers using games in the field actually introduced a new way of surveying which draws attention on the interactional structure of the data collection moment and enables the collection of complex data.

3.1.1. What type of activities are considered as being games?

A game is a goal-oriented activity that proceeds according to rules that limit players (Costikyan, 2002). It is through the rules and the goal that the game structures the actions and decisions of the players during a game session. A small change in the structure of the game breeds a big change in the players' behaviour. Secondly, the game is an artificial activity. In other words, game structures create their own meaning (e.g. Monopoly (Magie, 1935) bills cannot be used outside of the game structure). Moreover, players must 'enter' this activity voluntary. Indeed, "the basic transaction we make with games is to agree to behave as if achieving victory is important, to let the objective guide our behaviour in the game. There's little point, after all, in playing a game without making that basic commitment" (Costikyan, 2002). In general, games involve competition among players, but some games are cooperative. In those cases, the tension comes from the struggle of the players to achieve a certain situation together while adversity emanates from the game itself. Simulation games as presented in the introduction of this paper are mostly cooperative: players interact to achieve a common goal. Both competitive and cooperative games involve decision-making: players will make decisions through the game in order to achieve victory, and rational players seek to exploit the structure of the game to achieve their goals. Finally, games are generally associated with fun. Costikyan (2002) highlights the importance of the pleasure people have when playing that results in the compelling aspect of a game.

In this paper, we present a data-collection game named Tigo-Tigo[5]. The research takes place in Guiuan (The Philippines), an area hit by a super-typhoon in 2013. This game has been developed for collecting data on the impact of the typhoon, through the lens of people's emotions in their environment. It has been designed as an alternative to an interview or a questionnaire.

3.1.2. The potential of the game to collect data in the field vs interviews and questionnaires

The main purpose of the game designer is to create an experience (Schell, 2008) – understood as something that happens to you and affects how you feel (Cambridge University Press, 2021). Games are the means to that end. On the contrary, interviewers and enumerators create experiences, but their purpose is to record information that will be used to describe and understand reality. As a consequence, the experiences are the means to data collection. That difference constitutes both the main opportunity and the main challenge in collecting data with a game.

The challenge consists of producing valid data with the game. Indeed, games may be very artificial and disconnected from reality. On the other hand, the opportunity resides in the fact that games offer a lot of possibilities to innovate in the way respondents are led to share information, in a variety of data-collection games configurations. In turn, games provide new possibilities in terms of study object, complexity, and format of the data produced. Further, games include characteristics of both interviews and questionnaires. On one hand, it is an icebreaking activity and a mean to launch a conversation about its content and other subjects. On the other hand, it has similarities with questionnaires as it includes decision making, rules and systematism. Games are thus adapted to collect mixed – both qualitative and quantitative data.

Researchers have a long tradition of reflexivity on the experience of the data collection process and the way it conditions the data collected (e.g. power imbalances between the researcher and the researched) (Cloke *et al.*, 2004; Cefaï, 2010). Questionnaires for example may be thought to present bias-free answers, mostly in the case of straightforward factual data. However, face-to-face surveys are at risk of social desirability responses, biases due to the interviewer characteristics, etc. Knowing that the interactions between the researcher and the researched may influence both the content and the quality of the data, the game is worth being explored

[5] Tigo means « Guess » in Waray, the local language of the respondents. The repetition is a common characteristic of game names in that language.

as an alternative to questionnaires or interviews as it is immersive and it brings the stakeholders to let go of the research context.

Further, while questionnaires and interviews use direct means to bring out the data, information is produced in an indirect fashion in the case of games. Researchers willing to use a game as an alternative to an interview or a questionnaire must question the 'gates' between the game and the empirical world over which data needs to be collected. For example, Pictionary (Angel, 1985) could be used to elicit the main features people associate to certain jobs. The game mechanics would be used as following: 'jobs' are to be guessed, and players are constrained through the rules in a way that lead them to draw the main features of jobs. Some specific game mechanics appear particularly adapted as they encourage true story-telling (as in 'truth or dare'), or are based on the players' common history (as for most guessing games), or do reward the quality of the answers (as in games including a quiz like Trivial Pursuit (Abbott and Haney, 1982) and Pictionary (Angel, 1985).

Producing a 'let it go' effect and using indirect ways to elicit the answers may higher the validity of the produced data. In addition, when designing a questionnaire, surveyors must pay attention to its length, dullness and complexity. Ultimately, the challenge is to maintain the motivation and attention of the respondent and collect well thought through answers. As games are compelling in principle, they offer new potentials in terms of length of the data collected.

Finally, construction – piloting and improvement of the activity and the questions – is a main challenge in the development of a data gathering tool. Using a game to collect data is even more challenging as it requires a high level of understanding of game structures and mechanics. To improve a game, the behaviour of the players must be analysed carefully together with the quality of the produced data. It is a constraint: some elements/steps unrelated to the research objective will be added to improve the game experience. It may be seen as a strength: the quality of the game experience serves as an indicator for both the interactional structure of the activity and the quality of the data produced.

This paper presents the challenges and opportunities in the design and use of a game to collect data. For that purpose, we first contextualize and discuss the motivations to create Tigo-Tigo. Secondly, we expose both the development phase and the operationalizing phase of our data collection with the game. Finally, we discuss the achievements of our game based on the various aspects addressed throughout the paper.

3.2. Motivations to create a data-collection game

Our research aims to investigate a new way of quantifying an environmental phenomenon within the wider context of people's emotional experiences in a post-disaster area. Concretely, the study seeks to describe the link between a super typhoon and people's emotions in their environment three years after the area was hit by the Super Typhoon.

3.2.1. Translating the emotional experience in the environment into quantitative data

There is no consensus about how and under which format data on emotions should be collected. Collecting quantitative data on emotions in itself might be a source of criticism. Emotional geographers suggest that emotional geographies shouldn't be defined in such ways that "they might become mere objects of quantification, comparison and manipulation" (Smith et al. 2009, p6). Instead, "the phenomenal experiences of emotions are the starting point for most researchers" (Smith et al. 2009: 7). On the other hand, many psychologists and other researchers focusing on emotions showed the relevance of measuring them either via questionnaires or via biological measurements apparatus and observations (Nold *et al.*, 2004; Rimé, 2005). Respondents may for example be asked to identify the level of the emotions they experienced in various contexts (Kahneman and Tversky, 2000; Clément and Sangar, 2018).

Emotions happen at a certain moment in a certain place. Kahneman (2000) highlights the differences between a memory-based approach based on the subject's retrospective evaluations of past episodes and situations, and the moment-based approach that is based on real-time measures. He rightly points that the moment-based approach is more valid than the memory-based approach. However, the timeframe and logistical constraints of this research allowed only the retrospective evaluations of situations. To add in complexity, the link between emotions and the environment is not as straightforward as the link between a certain lived situation and emotions. Finally, quantitative data are known to lack in explanatory penetration (Cloke et al. 2004: 128). To fully encircle the subject, qualitative data needed to be collected together with the quantitative material.

3.2.2. The main difficulties of the surveying context

The research field is located in the Philippines, in an area that was hit by Typhoon Haiyan in 2013, one of the biggest typhoons to make landfall in recent history (NASA

Earth Observatory, 2013). After they lost almost everything, people received an enormous amount of international attention: NGO's and governmental organizations flew in to help locals to deal with the emergency. Given this context, local people have been used to expect material and immaterial help of any kind from foreigners who visit them. *Expectation* from the respondents was rapidly identified as a potential source of distortion in the data collection. Also, research is widespread in the area and people may be tired of being interviewed, used to it and rapidly bored during the survey. Some respondents may have developed their own responsive strategies. Cloke et al. (2004) speak of '*survey fatigue'*. Finally, many respondents seemed to be intimidated by the presence of a 'white', 'foreigner', and English speaker. More generally, the relationships between the researcher and the researched was hindered by *power imbalance and cultural barriers.*

A first fieldwork experience took place in the study area, one year before the game fieldwork, including a couple of interviews. People were asked about the elements of the environment and of their life that were meaningful to them, suggesting particular buildings, the sea, NGO's, their relationship, the house, etc. and they pointed some elements telling why it is important. For example:

"trees are important to us because it makes the temperature cool, nature is important to us."

(Translation based on the record of the interview)

A local teacher was hired as translator during the interviews. The translating wasn't always accurate. Regarding the trees:

"She said that nature is important because here if it is night, ano ka pa it tawag hiton? Taghom?"

(Translation during the interview)

It has been later translated by someone else as:

"She said that nature is important because if it's night, how do you call that? Cool?"

(Translation based on the record of the interview)

The face-to-face translator lacked vocabulary ("Taghom?") and added some own interpretations ("if it's night") to the respondents' answers, which rendered the interviews very difficult to conduct.

3.2.3. Expectations in using a game to collect data

Given the specificities of the aimed data and of the research context, we came up with the idea of the data gathering as an activity which the respondents could appreciate in itself. Collecting data with a tool as the game would foster the immersion of the participants and improve the retrospective evaluations of emotional experiences.

That activity would guide the respondent to the answers indirectly instead of asking them straightforwardly, lowering the obstacle related to the translation and to the abstract nature of the study object. The data quality would also be optimized by improving the connections between the participants. Indeed, the particular interactional structure of the game was expected to lower cultural barriers as well as the biases due to expectation, survey fatigue and power imbalance. The game was also expected to create dialogue and explanations and it was therefore adapted to the collection of mixed (quantitative and qualitative) data.

A game was thus developed to collect reliable quantitative and qualitative data on the respondent's emotional experiences in the environment in the aftermath of a super typhoon.

3.3. Developing Tigo-Tigo: a game to collect data on people's emotions related to their environment

Before describing the development phase of Tigo-Tigo, its principles must be outlined.

3.3.1. Delineating Tigo-Tigo

As explained above, the challenge for the researcher is to arrange game elements in a way that meets the basic criteria of reliable data gathering methods, without losing sight on the characteristics necessary for the game to be a game. To fulfil this objective, the following constraints were fixed as guidelines in the development of the game:

[1] The data-collection game is really a game. In order to call it a 'game', we had to create a real game, not to hide a data gathering process in something that looks like a game. In that purpose, game mechanics that make it being fun and compelling had to be integrated into the game. It also had to include basic characteristics such as: it is a goal-oriented activity, a contest that involves decision-making and in which the players make the basic commitment as if achieving victory is important. By doing so, the game fosters immersion of the participants and creates the setting to collect high quality data.

[2] The game is a system that leads the respondents to share data. Thorough the game, people should share information on a very spontaneous, authentic way. The game had to be motivating and make both the interviewer and the interviewee to rapidly feel comfortable in exchanging about feelings and complex information. In a sense, the game should accompany the emergence of the data to be shared by the respondents.

[3] The game is easy to understand. It doesn't require long explanations. The purpose is to create a game that is very accessible to the respondents. Moreover, people should be able to pick and exploit the structure of the game very fast. Complex games tend to gain in interest after they have been played several times while we planned to play our game only once in each household.

[4] The game is developed within an intercultural team and allows direct interaction between the researchers and the researched. Because one of the objective was to lower the cultural and translation barriers during the data collection activity.

3.3.2. Tigo-Tigo's material and rules

The objective of Tigo-Tigo is to associate pictures of household's environment with emotions (►Figure 11). The pictures of the environment were taken in the three districts under study and in the municipality center. They were aimed to represent elements of the environment classified under three categories: the built elements of the environment, the cultivated non-built elements of the environment and the naturally given non-built elements of the environment.

Tigo-Tigo is a game divided in 3 steps. During the first step, the researchers explain the rules of steps 2 and 3 and then they ask the household couple to choose for 11 pictures among 73 pictures (►Figure 11, left): 2 in each category and 5 more across all categories. During the second step, the household head associates one picture with emotions (represented by emoticons, ►Figure 11, right) and social network (represented by stylized drawings). The emotions are the followings: happy, sad, excited, calm, dominated, dominant, disgusted, afraid, angry and surprised. The social network tokens represent the followings: me alone, in couple/with someone else, with the close family, with the extended family, with friends, with NGO's, with the priest, with authorities. The amount of emoticons and social network tokens to be associated with one picture is limited by the Velcro-space available at the back of the card.

The third step of the game consists of the household partner and the researchers trying to guess the picture by looking at the emotions and social network the household head associated with it. The third step is timed: the partner and the researchers have to hurry up to choose the card they think is the right one. Steps 2 and 3 are repeated 10 times. The game stops when only one card remains and it is not possible to guess anymore (►Figure 11).

The household couple plays against the researchers. It gains 5 points every time only the household partner was able to guess the right card and it gets 3 points every time both the household partner and the researchers were able to guess the right card. The researchers only get points when they were able to guess right alone, but in that case they gain 7 points. The winner duo is the one with the highest amount of points at the end.

►*Figure 11: Example of data collected through the game in one household (14th of August 2016)*

3.3.3. How Tigo-Tigo was developed

While the game designer's task is to be innovative in the conception of new game elements, researchers can merely recombine those elements in order to meet their research criteria. The mechanic of 'guessing' has been selected to create Tigo-Tigo. It combines ideas of games such as Compatibility (Browne, 2010), Concept (Rivollet and Beaujannot, 2013), and Dixit (Roubira, 2008) in a certain setting to set up the guessing dynamic of the game. First, players are limited in terms of 'clues' to make the others guess. Moreover, the clues are quite abstract and visual: emotions and social networks symbols. Secondly, the objective of the guessing system is not to guess based on a universal description but rather to make use of what players have in common. The 'guessing' thus encourages the respondents to associate emotions with pictures in a way that has to be understood not only by themselves but also by their partner. Moreover, guessing games are expected to launch interrogation, discussion, and exchange because it includes a certain level of suspense.

Another 'gate' to the empirical world is the use of pictures of the players' environment, emotions and social network. It was expected to lead the players to make associations concerning their own lived environment rather than imaginary situations or stories. We used landscape analysis techniques to select pictures to be used in the game, as well as interviews of inhabitants in the research field. Photo elicitation is a well-known method to produce data (Glaw et al. 2017; Oldrup and Carstensen, 2012) as well as photo sorting such as the Q-method with pictures instead of quotes (Hawthorne et al. 2008; Milcu et al. 2014). The former is fully open in terms of photo interpretation. Researchers directly investigate what people see in the pictures. The latter is closed: researchers need a high understanding of their field of inquiry to cautiously choose what the pictures display. We had no preconception regarding the interpretation of the pictures and about how emotions relate to the environment (e.g. souvenirs, anecdotal and general feelings, etc.). But the respondents were not fully free in their answers given the game rules and the use of clues (emoticons and social network).

The way of distributing points encourages a certain way of associating pictures with symbols: you want certain people to be able to guess but not all of them. It encourages the respondents to avoid too general emotion-picture associations that the researchers will be able to guess and instead make a more personal association.

The first version of the game included more game phases: both the household and the researchers in turns made the others guess. As the game was too long and the phase when the researchers made the others guess useless in terms of data collection, it has been removed from the final version of the game. To further shorter the game session and make the game even funnier, the guessing was associated with a time

limit. This is a game mechanic that is used in many games as in Pictionary (Angel, 1985), for example.

Finally, the point system was made of tokens that formed a snake as in Worm Up (Randolph, 1995). Each point gained by a team allows the team to take one token at the back of the snake and add it to the top of the snake. In this way, the snake goes forward. At the end of the game, the team which snake comes first wins the game. Both the time pressure and the contest with the snake point counting system are not necessary for the data collection but they are a source of fun that is motivating for the players.

Those game mechanics do not have to be explicitly described when the rules are explained to the players. If people want to win, they will discover what is best for them to do: making a personal association of emotions and social network with the pictures. This forces the player to focus on the picture and all the possible feeling experiences that come to mind while looking at the picture, and to share them in the best abstract and simple way… and that is exactly the data that we wanted to collect with the game.

3.4. The data collected and the experience of the game sessions

The game has been played 63 times over 2 months during summer 2016. The respondents were sampled in three districts differently hit by the Typhoon. Many are fishermen or farmers but not a majority (22%). Young respondents (<35 years old) constitute a quarter of the people with whom the game was played and fifty percent belong to the 35-55 age group. Half of the respondents' highest educational attainment is elementary school or less.

The data produced during the operationalizing phase of the game is rich and complex. A general picture of their characteristics and potential is dressed below. The next section presents the experiences of the game sessions from both the researchers and the researched perspective.

3.4.1. The data collected

The number of emoticons per picture dataset is built on three dimensions: the pictures, the respondents and the emotions. For each intersection of a certain picture, one of the 10 emotions and a household, we collected the number of emoticons which represents the strengths of the emotions; the social network associated with it; and the explanation – if there was one – the respondent gave for this association. Hence, the game provides relevant information such as the most/least chosen pictures, the most/least chosen emotion, the pictures mostly related to one emotion, etc.

Given the game setting, respondents associated a variety of both positive and negative emotions to each picture. For example, ►Figure 11 shows that someone associated happy (1), calm (3), afraid (1) and disgust (1) to a picture of the plaza/basketball court (picture 22). The explanations given by the respondent are: they go to this place with friends and family and that's why he is happy; he just feels calm; disgust because the election campaign (speeches) happened in that place; he felt afraid during that period because so many could be manipulated by the politicians. For picture 19 – the bridge near the local beach: happy (3) because they go there; he is calm (3) when he is there; excited (1) to breathe fresh air; he is the one who decide (1 dominant) when they go there.

The most chosen pictures refer to the church related to the Sunday Mass; the sea where many go swimming during leisure time and where fishermen work; the coconut trees either broken or not that most related to the Typhoon and farming activities; a picture of a random house to link with their own house; the school; and the market. The pictures mostly related to sadness refer to the Typhoon (broken coconut trees; the damaged historical church; and a demolished house).

The pictures least chosen either illustrated no clear object to refer to, or were too specific and people were not concerned (a children recreation area that seemed not to be used; a specific industry). A particular case is a picture of the building were coq fighting – which is an illegal activity – takes place. It has only been chosen once and the person said he did not recognize the place. However, people may have avoided the picture because of the illegal character of the activity displayed.

Happy is the most chosen emotion, followed by calm, sad, and afraid. Our variable of interest, the Typhoon, was evoked at least once on most pictures. Many expressed negative emotions (e.g. specific souvenirs of the event, the transport terminal that remains non-functional, the meteorological tower that could give bad news, etc.), but also positive emotions (e.g. some buildings were rebuilt and the new version is better than the former one, the plants are growing again, they were happy and calm after the storm, etc.).

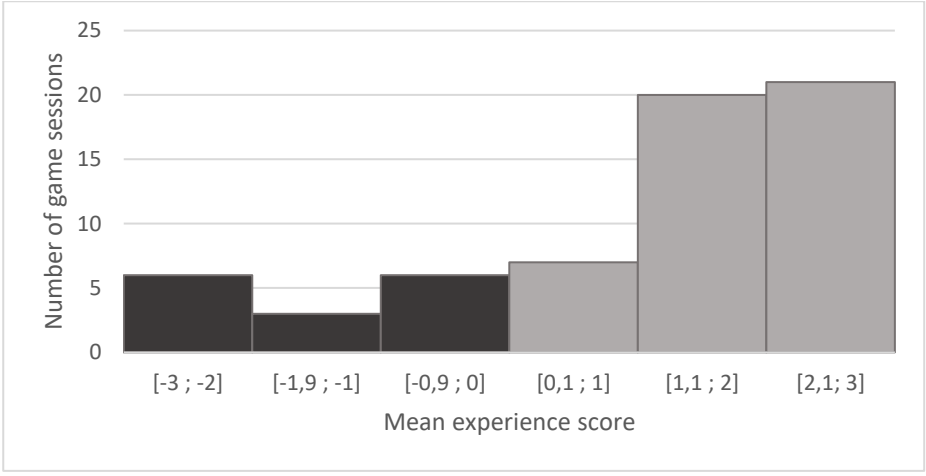
We computed the emotions strengths and emotions occurrences differences between when people evoke the Typhoon and when they do not. In general, the numbers show that negative emotions are relatively higher and more often chosen than positive ones. Also, the different areas present specific emotion signatures coherent with the way they have been impacted by the Typhoon and with the interdependence people have with their environment. In addition, the fact that both positive and negative emotions were associated together add nuance and complexity in the quantification of environmental facts. Most interestingly, the variety of effects encourages a non-binary (negative vs positive) approach in the study of the impact of a typhoon on human behaviour. Finally, the explanations inform about the variety of environment-people-typhoon emotional links: related to souvenirs, to the functions of particular elements of the environment, to aesthetics, to the material and the immaterial. Social network categories included NGOs, the priest, and the authorities. We could investigate how the people-environment-typhoon triangle relates to those various stakeholders.

In short, we successfully explored a new way to measure the impact of a typhoon. However, the data gathered may lack in focus as we quantify a large variety of emotional experiences together (souvenirs, judgment, particular and routine activities, etc.). Moreover, in some limited cases, people related emotions to the environment, but not their environment (e.g. I am happy that people living there own a house where to live); and some emotions linked to their environment were not their emotions (e.g. my son likes to walk there). However, the guessing system leads people to select certain parts of their environment and avoid others, and to select certain experiences with it in particular. As such, the game mechanics – with the specific point system in particular – allow collecting emotional, important and shared experiences in the environment.

3.4.2. The experience(s) of the game sessions

Creating a (positive) experience is one of the main motivations to structure the data collection through a game because it is expected to improve the quality of the data collected. The experience of the game sessions is described both based on the researchers' evaluation (at the end of the fieldwork, August 2016) and the respondents' comments about the game (two years after we played the game with them, summer 2018).

At the end of the fieldwork, after the last game had been played, each of the researchers who attended the game gave a score ranging from -3 (the game was very unsuccessful) to 3 (the game was very successful) to each of the game sessions. A mean score was computed for each. Two thirds of the 63 game sessions left a positive to very positive feeling to the researchers: 41 game sessions reached a score above 1 (►Figure 12). A minority of games were negatively perceived: 15 games were given a negative score. The most negative game session did actually end up just after the rules had been explained to the respondents: the household head felt uneasy with the activity and did not want to play. Other negative experiences included: playing with a very slow respondent while we were very tired; a game with someone who was obviously randomly placing the emoticons on the pictures because he did not understand the purpose of the game; a session during which the wife got angry on her husband; a game with a household head who was half asleep; and a session during which the lady expected a serious research activity and played the game as if she was actually interviewed, making us feel uncomfortable in playing. Some game sessions were really enjoyable: there was competition and suspense, complicity within the teams and even between the teams, surprise, and lots of fun. A session with an educated old man was particularly enjoyable because he was able to speak English which allowed a deeper exchange.



►*Figure 12: Evaluation of the experience of the game sessions by the researchers on a -3 to 3 scale (in the field, after the last game session, late August 2016)*

When some respondents were asked two years later if they would be willing to play the game again if they were asked to, their answers were generally positive. Someone found it relaxing. They liked the team spirit created by the game and they wouldn't change anything to it.

"INTERVIEWER: Okay. The game you played before sir, are you willing to play it again if you're to be asked?

B: Yes, it's fine with me.

INTERVIEWER: Why?

B: Because it was fun.

INTERVIEWER: You enjoyed playing the game?

B: Yes! My daughter enjoyed it too since we were helping each other (laughing).

INTERVIEWER: Both of you enjoyed it then. Do you want to suggest something like upgrade the game?

B: No, it's fine as it is. I liked it because it's fun."

Other respondents were less enthusiastic. A respondent seemed to perceive it as a duty, another found the game too long. But someone who was not sure to be willing to play again found it interesting because it initiates reflexivity:

"INTERVIEWER: We played 2 years ago the picture game, if we're to play it again, are you willing to participate again?

E: I'm not sure!

INTERVIEWER: In general, how do you find the game?

E: It's okay. It makes you think."

Some respondents also evoked the strategy necessary to play well, and would be willing to play again as they better master it after playing once.

"INTERVIEWER: If you can remember two years ago we played with Elisabeth, if she's going to come are you willing to play with her again?

M: Yes, of course. That time I wasn't familiar with the game so I wasn't able to understand but it's okay now.

[...]

INTERVIEWER: So, about the game you were okay with it?

M: Yes, it was fun."

Based on both the perceptions of the researchers as those of the researched, we can say that we achieved to create a game which was understandable, immersive and attractive. But the experience of it may vary. Factors influencing the experience of the games are: the willingness to play of the stakeholders and their motivation at the particular moment of the game; their perceived control of the situation, which may be challenged because the activity is not usual; their capacity to pick the mechanics of the game and to develop a strategy, or their willingness to do so – that we perceived being generally higher with younger players; and more generally the interactions between the people around and in the game.

3.5. Confronting expectations with observations

The main assets of games are its data production mechanics and its particular interactional structure: the data production mechanics provide new possibilities in terms of study object, complexity, and format of the data. The game structure has a direct impact on the interactions between the researcher and the researched and offers new potentials regarding the survey context and the length of the data produced. To review the challenges and opportunities encountered in the development and implementation of Tigo-Tigo, we confront the expectations in collecting data with a game with our experience of game development and use in the field (►Table 3).

3.5.1. Data production with the game

The development of the game created a constant tension in fulfilling both the objectives and requirements of data collection and those of a game (►Table 3, Objective 1). This necessary trade-off already appeared during the delineating and developing phases of the game construction. To collect comprehensive picture data, the game should have always used the same set of 11 pictures. But a high level of freedom is necessary in the game, to leave space for strategy and surprise.

The researchers must also constantly pay attention to both the game aspects and the data collection aspects during the game session itself. In particular, researchers had to make sure that people chose well and explained their emotion-picture association. For example, some very competitive players were not talkative. To collect the data we needed, we had to ask questions about their emotion-social network-picture associations. Our role of researcher took over and the game atmosphere suffered from it.

The resulting data is both quantitative (picture choice, emotion levels and social network) and qualitative (explanations for the pictures-emoticons associations), and has been collected following an embedded scheme. We believe that it would have been interesting to also focus on the interactions between the players. How did they/we react? What were their/our strategy? Why did they/we win? We underestimated the interest of a game being an open system in itself. In a sense, we did not fully exploit the interest of a direct contact with the researched, which provides "interpretative history to draw on when seeking to make sense of the answers" (Cloke *et al.*, 2004, p.129), even if the qualitative data reveals some meanings that support the quantitative results and vice versa.

►*Table 3: Data production: confronting expectations with observations*

	Expectations and objectives of the game to collect data	Observations and conclusions based on Tigo-Tigo
1	Collect both quantitative (similar to questionnaire) and qualitative (similar to interview) reliable data	Trade-off in fulfilling both the requirements of data collection and game: systematism vs freedom; necessity to make people talk We collected picture choice, emotion levels and social network information We collected explanations. The interactions between the players is also a source of data
2	Data are retrospective emotional experiences in the environment after a super typhoon	By introducing 'gates' to the empirical world: in this case the use of pictures of people environment, emoticons and social network Respondents choose meaningful pictures A large variety of emotional experiences (strength = exploratory, weakness = lack in focus) Some emotions related to environment but *not their* environment and some emotions in their environment but *not their* emotions Possibility to be more specific in the choice of 'clues' and pictures
3	Guide the respondent to the answers structurally, adapted for complex data/ abstract study object	Via a guessing system, based on the player's common history. Via abstract visuals and tokens Resulting dataset is three-dimensional but not exhaustive The game helps to reach information people are not used to talk about The game creates ‘immersion time’ to build elaborated answers The data may be difficult to interpret

The data are retrospective emotional experiences in the environment after a super typhoon (►Table 3, Objective 2). By retrospective, we mean that the emotions are recalled rather than real-time measured. The use of pictures of people's environment and emoticons representing emotions to connect the artificial game with the empirical world was successful. Respondents chose meaningful pictures. The pictures-emotions associations concerned feelings about objects (e.g. the road is already fixed) and situations (e.g. I am happy when I see vehicles racing). Both anecdotal feelings such as souvenirs of particular events (e.g. that is the place where my friend told me that she had her heart broken and we talked in that place) and general feelings (e.g. there are no problems anymore when you go to church) were evoked. In some cases the respondents associate the environment with emotions that do not concern them directly (either because they do not refer to their environment or because they speak of someone else's emotions). While the large panel of emotional experiences may be seen as a weakness as the data may lack in focus, it is informative in the case of our study object. Our variable of interest, the Typhoon, is explored in many aspects of people's emotional experience in their environment. Finally, we believe that it would be possible to focus on particular aspects by selecting more specific clues and pictures.

The particular game mechanics guide the respondent to the answers indirectly, it is adapted for the collection of complex data (►Table 3, Objective 3). The guessing system based on the player's common history – combined with familiar visuals – guide the respondents to elaborate and share complex information. The dataset created is three-dimensional: picture/emotion/respondent. To enable the guessing (and the pleasure of surprise associated with it), it is not exhaustive. As a consequence, further quantitative data treatments necessitate to reduce the number of dimensions, and densify the data for comparisons. A questionnaire would have been more exhaustive.

The game is particularly adapted to complex and abstract study objects. Relating emotions to the environment is not straightforward. We observed that some respondents took a lot of time to select the emotions to be associated with the picture, trying to find the right experience to share, and the right emotions and social network to associate with it. As if the game created an 'immersion time'. As an example, many household heads turned and re-turned the picture cards with the Velcro on in, successively selecting some emotions and re-checking the picture associated with it.

Finally, given the particular data construction mechanics, the data may be difficult to interpret. What does the data exactly say about the selected pictures/emotions and the ones that were not selected? Are they really more meaningful? Is it dependent on the moment of the game? What is the exact influence of our choice of pictures? Are the experiences meaningful for the household head only or for the whole household? What does it say when the household partner was not able

to guess? Answering those questions may be impossible, but raising them is necessary for a cautious use and interpretation of the data.

3.5.2. The interactional structure in the game

The game setting particularly favours pleasure, reflexivity and team spirit while an interview or another data collection technique have a different impact (►Table 4, Objective 1). Players mostly enjoyed the activity. But the game does not provoke a complete 'let it go' effect. We perceived the level of 'control' as varying from one game session to the other for both the respondents and the researchers. In the case of the researchers, fatigue, stress, and the complex game/research trade-off were important factors disfavouring the immersion in the game. Moreover, the game atmosphere is easier to create during the first game sessions, when the suspense is also high for the researchers. It becomes more difficult when the researchers already played the game many times and get used to it. As with questionnaires and interviews, we could speak of 'game fatigue'.

Further, while the motivating and particular setting of the game was expected to help gathering long data because of its motivating character, it proved not to always be the case. It is exemplified by the household head who did not want to play. He was actually well willing to fulfil the questionnaire. Other examples include respondents who did not get the basic mechanics of the game and had difficulties to play. While using a game to collect data, researchers must keep in mind that not everyone is interested in playing a game, or feeling capable to do the proposed activity.

The game reduces the translation barrier (►Table 4, objective 2). Instead of asking questions, the respondent is asked to follow a set of rules. Therefore, being able to play constitutes a guarantee that the objective has been well understood. As such, the role of the translator may be less crucial than in a classical interview. However, those game benefits do not compete with the advantages of a direct exchange and communication in a shared language remains preferable. Moreover, using a game to collect data necessitates to introduce an animator to explain the rules – preferably in the local language – and facilitate the game. The translator-animator had to convince people to play, participate in building a gaming atmosphere, encourage the respondent's team, etc. Another strategy to lower the translation barrier is stressing visual communication. It constitutes an opportunity in certain cases and a challenge in others, particularly with elderly people with a failing eyesight.

►*Table 4 : Interactional structure: confronting expectations with observations*

	Expectations and objectives of the game to collect data	**Observations and conclusions based on Tigo-Tigo**
1	Game experience: Impact of the structure on the interaction between researcher and researched, adapted for long data	Immersion, complicity. Players mostly enjoyed the activity Variable distances between the researcher and the researched. It is impossible to create a complete 'let it go' effect Difficulty to be both a player and a researcher, to focus both on the game atmosphere and the data collected Game fatigue
2	Using a game lowers the obstacles related to translation	Direct interaction between researchers and researched lowers potential translation distortions thanks to [1] the material (by using tokens people can manipulate and visual elements) [2] the rules (clear actions) Need of a translator-animator to explain the rules and lead the game New obstacle = the complexity of the game. It depends on the players

3	Using a game lowers cultural barriers, survey fatigue, power imbalance, and expectation	The moment of installation of the game is interesting to establish the contact. Installing and playing the game contribute to moderate cultural prejudices An activity which the respondents appreciate in itself but not always successful. No responsive strategy observed during enjoyable sessions The game changes the participation status. In this case the game artificially inversed power relations. Not only expectation but also resentment and thankfulness Depends on the level of immersion in the game
4	The quality of the game experience serves as an indicator for the quality of the interactions and the data	The challenge of creating a successful game draws the researchers' p attention on the quality of the interaction and its impacts on the data produced The requirements of games participate in the framing of the data: e.g. social network

If the game is well designed, the researchers can expect to lower cultural barriers, survey fatigue, power imbalance and expectation (►Table 4, Objective 3). First, by introducing the game in more than sixty households, we realized that the moment of the installation of the game was interesting as such because it coincided with the moment of getting in touch and influenced the interactions between the participants: we placed piles of emoticons, boxes containing social network drawings, we distributed the card with the pictures to each of the players, and placed our sand timer and the token used to count the points. The installation coincided with the moment of getting in touch, it necessitated time for doing nothing but arranging the space, moving a chair, a table, changing seats. By accepting (un)comfortable positions and exchanging amused, curious or suspicious looks, both parties were already disclosing themselves. The positive or negative interactions during the game were also built on that moment; and being playful in general contributed to moderate cultural prejudices.

In our research context, survey fatigue was expected and there was little. Many respondents enjoyed playing and researchers had fun during most of the game sessions (►Figure 13). As a consequence, the time passed quickly, everyone was motivated all along the game and to some extent forgot about the data collection context. We did not detect any strategy to manipulate the information shared during the enjoyable sessions and if there was survey fatigue, it disappeared throughout the game. Those were quality experiences with a certain level of immersion of the participants. It highly contrasted with the moment of submission of a questionnaire to the same respondents just after the game session. Instead of making the most of the ice-breaking effect of the game to pursue the discussion, we used the remaining time of the interview for surveying, which we would not recommend in this type of settings.

Another interesting aspect of the game experience is that roles are assigned to the various stakeholders and their interactions are organized via the rules and the use of tokens. The interactions are related to the 'participation status' temporalizing in the situation – here and now (Cefaï 2010: 455). The game has an influence on those participation status. For example, our game artificially inversed powers: by being the ones who knew the environment displayed on the picture and associating emoticons to them, the researched were given power that the researchers did not have. As the game forced the researchers to introduce more freedom for the respondents during the data collection, it contributed to reduce the distance due to power differentials during the data collection interactions. The roles also directed the 'answer' of the household head (the picture-emoticons association) to his/her partner via the use of tokens, instead of directly addressing his/her response to the researchers. We wonder if it may change the impact of social desirability and improve the quality of the data collected. But we don't have any clues to assert it.

►*Figure 13: A game session (16th of July 2016). The researchers are sitting on the left, the household head is on the right, his partner is in the back with the fan, and the translator is sitting next to the camera, wearing a lined long sleeves t-shirt. Family and neighbours attend the game. The translator explains the rules (top left), the household head selects emoticons (top right), both the partner and the researchers try to guess (bottom left) and finally, the card is discovered (bottom right)*

However, it does not eliminate the structure above the respondents as expectation, individual experiences and power differentials. In the case of the lady who played the game as if she was actually interviewed, the distance between the researchers and the respondent was very high. She had a lot of resentment against foreigners because she had been considered as too rich to receive help in the aftermath of the Typhoon. We apprehended expectation and power imbalance, here we observed another form of structure influencing the interaction. The status of participation were predefined by our perceived affiliation to the organizations that came after the Typhoon. In other words, it appeared to depend on the individual specific experience people had with foreigners before. In many cases we experienced thankfulness, in some other cases expectation and in this case resentment. Most of the time, it was a complex mix of those various aspects and probably others that we were not able to perceive. But we believe that – in general – the game activity positively influenced the participation status of the various stakeholders, reducing some distances and favouring direct interaction, especially during successful game sessions. Structures as power differential, prejudices, etc. are very strong and probably impossible to overcome in such a short amount of time.

Finally, making the game 'work' draws the researchers' attention on the quality of the interaction and its impacts on the data produced (►Table 4, Objective 4). Making the guessing work forced us to add social network information to the game which proved to be valuable in understanding our object of analysis. Interestingly, while "involvement of the researcher in the direct framing of questions is a significantly powerful process in the construction of data" (Cloke et al. 2004: 129), the researcher has a lesser control on the framing of the questions with a game, and it seems to be both an advantage and an inconvenient.

3.6. Chapter conclusion

This article analyses a field-based game designed as an alternative to a questionnaire or an interview. The game was developed and used to collect data on people's emotional experience in their environment, in an area hit by a typhoon. All data gathering techniques necessitate to define the problematic under study very specifically, to pay attention for biases, but also for the complexity and the duration of the data collection activity. Creating a game to collect data was even more challenging: games do not exist to create data, their objective is to generate an experience. As a consequence, using games to gather data added important constraints: first, it had to be transformed in a way that it produced interesting and reliable data. Secondly, researchers must remain faithful to the characteristics of games. For example, a data collection game should be fun and compelling; it should be a contest, etc.

In general, data collection requirements were met and the data produced is valuable and reliable. It is both quantitative and qualitative, and people shared specific and complex information due to the particular way they were led to do so. The variable of interest, the Typhoon, is explored in many aspects of people's emotional experience in their environment.

However, some difficulties appeared. First, it is difficult to be both a player and a researcher and the game necessitates a translator-animator. Each person's role during the game should be precisely defined as the experience of the game and the quality of the data necessitate high vigilance and active participation at various levels. But role attribution can be used to change the stakeholder's status of participation. For example, Tigo-Tigo inversed powers and allowed direct contact between the researcher and the researched. Secondly, a good game session requires players willing to play and feeling or being capable to understand and apply the rules. The more the players are motivated, the more the game gets them to let go and be open and true, which enhances the quality of the experience and of the data collected. Finally, the game requirements do frame –and restrict- the data, but they also bring innovation in the data material.

Further, we believe that many types of games could be relevant in many different contexts. We are convinced that the potential of games to collect data in the field has not been fully exploited yet. Games get people to act and interact in a well-designed and immersive setting. In particular, observing the players behaviours during the game is a great source of data that we did not exploit. We encourage social science researchers to innovate in their data collection techniques with the use of games and to further analyse their potential. New data collection methods yield alternative data, and this diversification enhances our knowledge building capacities.

Chapter 6:
Conclusion, discussions, perspectives

6.1. Conclusion

This thesis presents three explorative research steps aiming to make a place for emotions in climate (non-)migration research (►Figure 8, section 1.4). The first one is a methodological piece, the second presents empirical results and the last one discusses a data collection proposition to meet this thesis overall objective. They are imbricated, but they contribute to three different research fields. Their main contributions and limitations are first restated below. In the next sections, they are further discussed successively, pointing how they influenced each other, in their contributions and limitations.

First, a field-based game designed as an alternative to a questionnaire or an interview was analysed (Chapter 3). The game was developed and used to collect data on people's emotional experience in their environment, in an area hit by Typhoon Haiyan. Creating a game to collect data was challenging: games do not exist to create data, their objective is to generate an experience. As a consequence, using games to gather data added important constraints: first, it had to be transformed in a way that it produced interesting and reliable data. Secondly, researchers had to remain faithful to the characteristics of games.

In general, data collection requirements were met and the data produced was valuable and reliable. It was both quantitative and qualitative, and people shared specific and complex information about their emotional experiences related to their environment.

However, some difficulties appeared. First, it is difficult to be both a player and a researcher and the game necessitates a translator-animator. Each person's role during the game should be precisely defined as the experience of the game and the quality of the data necessitate high vigilance and active participation at various levels. However, role attribution can be used to change the stakeholder's status of participation. For example, Tigo-Tigo inversed powers and allowed direct contact between the researcher and the researched. Secondly, a good game session requires players willing to play and feeling or being capable to understand and apply the rules. The more the players are motivated, the more the game gets them to let go and be open and true, which enhances the quality of the experience and of the data collected. Finally, the game requirements do frame –and restrict- the data, but they also bring innovation in the data material.

The places-emotions associations data collected with the game were then analysed following a mixed method scheme (second step, chapter 4). Its objective was to explore the diversity of place-based emotional experiences in a post disaster context. Indeed, post-disaster emotion-environment research was so far focused on the ways disasters affect people, mainly investigating their emotional experiences related to their environment or place as a whole.

Through our results and discussion, complexities and diversities traditionally overlooked were highlighted. In particular, we show that the impact of a disaster is complex, not necessarily negative and difficult to capture with simple objective variables such as damages, flooding risks or climate change perception. The large panel of descriptive results indeed uncover a multiplicity of place-based emotional experiences, intertwining tangible and intangible facets of the person-environment relationship. A variety of emotions and situations, of place-Typhoon interactions and of individual and group concerns and experiences before, during and after the disaster combine to provoke contrasted place-based emotional experiences.

Further, as the data concerns a large range of places and their physical settings, they provide a nuanced picture of a post-disaster emotional landscape. Moreover, the various roles played by the tangible features of the environment in shaping the emotional experiences of and in places appear in their whole complexity. The physical changes provoked by the Typhoon that are traditionally mainly researched as neutral and 'cold' entities thereby acquire meaning and connect with an emotional reality. One could investigate people frequentation of places in the

aftermath of a disaster in light of those findings. Indeed, physical and social settings are not merely a backdrop to people everyday experiences: they frame and affect them.

Based on the former, the third study called for a rethinking of the way the impact of climate change is accounted for in climate (non-)migration research. In other words, it pointed to the existing limits of current data collection strategies in terms of their capacity to accommodate emotions, and it proposed an alternative.

Place-based emotional experiences was introduced as a conceptual tool assisting in a shift of data collection target. Its aim is to support the collection of emotional –intangible- data connected to the tangible features of people-environment interactions, and relevant in the study of migration (non-)decision making. Further, the data structure allows for the analysis of both idiosyncrasies –as emotions are intimate phenomena- and tendencies, to link them back to the climate or the environment and the ways they might change, and migration (non-)decision making.

Place-based idiosyncratic and general emotional experiences are understood to contribute to people deciding (or not) to migrate. In our angle of approach, emotions indeed inform people's preferences and choices for particular blocks of the earth surface and the meaning they ascribe to them: places. By deciding (not) to migrate, people choose to experience some places more closely than others, to remain attached to or to somehow detach from them. While it provides a proper place to emotions in climate (non-)migration research, this way of explaining the decision (not) to migrate however challenges its current research framework, by reversing the traditional focus on actual and perceived physical changes over local's relations to places.

However, the proposition presented in this paper emanates from a specific strategy: climate (non-)migration research is here viewed as an evolving research field to be adapted, not fundamentally questioned. We provide an alternative research framework without profoundly questioning climate (non-)migration research assumptions and questions. Second, it was based on principles of economic migration research and its way of considering place-based emotions in the decision (not) to migrate, while existing migration research offers many other perspectives such as a focus on migrant social networks, legal systems, macro-political systems, differences between ethnic groups, etc. Third, it particularly discussed the physical setting of places, relegating their social characteristics to the background, while place-based emotional experiences are equally –if not dominantly- related to places' social components.

6.1.1. To introduce the following discussions

In practice, this exploratory thesis consisted in clearing the field and making a way. Therefore, the resulting strategy adopted was somehow intuitive, drawing on various approaches to emotions, and acceptingly relying on common sense and personal experience.

> "In any study, there are only bits and pieces that can be legitimated on 'scientific' grounds. The bulk comes from common sense, from prior experience, from the logic inherent in the problem definition or the problem space. Take the review of literature, the conceptual model, the key variables, the measures, and so forth, and you have perhaps 20% of what is really going into your study— from which you will then make a 100% interpretation. And if you look hard at that 20%, if for example, you go back to the prior studies from which you derived many assumptions and perhaps some measures, you will find that they, too, are 20% topsoil and 80% landfill." (Huberman, 1987, p.12)

In the following sections, I incorporate and discuss a share of the traditionally hidden '80% landfill' within this thesis. Taking a step back, I discuss the choices that were made and what has been left out. It discloses the doubts and the regrets… or should I say the 'limits' and 'perspectives'? This thesis indeed strives to articulate the rational and the emotional.

Throughout the entire research, the emotions and the 'how to deal with' those emotions have never been fully outlined. I find in the following discussions a place to expose and reflect on my uncomfortable but assumed non-positioning between definitions and impressions, the one conveniently accommodating the other according to circumstances.

6.2. Collecting data

6.2.1. The context

A first fieldwork experience took place one year before the game fieldwork, in the same area. It included a couple of interviews. By that time, locals and local researchers kept telling me that "the Typhoon is not everything" and I got convinced that the impact of a typhoon on migration had to be explored within the wider context of people's everyday lived environment. Climate (non-)migration indicators for 'the environment' had to be questioned.

More importantly, I had no experience with interviewing and certainly not in that particular context. I felt uncomfortable, embarrassed in many occasions by the language barrier, but also by the expectations, the power imbalance, and my cultural '*faux pas'*, elements that I did not understand by then. The use of an alternative data collection methodology did not only appear necessary to improve the data quality, I also needed it for myself.

Expectations were especially difficult to deal with. As Askins (2009), I wanted not being 'extractive'. I felt the need of giving something in return for the respondent's time, other than a small material gift – and participatory research was not an option. I came up with the idea of the data gathering as an activity that the respondents could appreciate in itself, rather than a classical survey or interview.

As long as I can remember, I have been playing board games with my family. Without knowing it, I was trained in disentangling the game complex mechanics. In order to higher my chances of winning, I had to understand the precise functioning of the game and the player's behaviours going with it. Based on this experience, I was convinced that a game could be designed as a data collection tool/medium and that it would be very appropriate in this particular context.

The game was designed to collect quantitative and qualitative data inductively through associations of pictures of 'the environment' with emotions. The definition of what emotions are, and how they would relate to the pictures, were left open. The decision of collecting both quantitative and qualitative data emanated from my quantitative background combined with a great interest for qualitative methods and questions. I was convinced, and I still am, that all methodologies and tools are valuable, and that combining them has an even greater potential. The quantitative vs. qualitative divide inside of the literature on emotions and the environment/places is however remarkable and somehow overwhelming. By intuition, I nevertheless adventured myself somewhere in the middle, as results and discussions emanating from both realms made sense to me. Viewing research strategies as faillible (see section 2.1) left much space for various approaches, and for experimenting my own.

6.2.2. The data collected

The emerging data content was surprising because physical settings were originally expected to elicit emotions as such, in a rather simplistic way. In fact, a more targeted data collection strategy would probably have allowed to collect such 'environmental preferences' data. Emotions data may then have been collected next to other characteristics of the environment such as ugly-beautiful and monotone-diversified (Moser and Weiss, 2003). Instead, the game led the respondents to associate emotions to places in a less controlled way (admitting that there is a possibility of control, which I doubt).

I must thus concede that it is difficult to grasp what exactly has been collected with the game, and what has been left out. I however identified some of its contours based on the qualitative material collected through the game and on my own game experiences.

First, the emotions are mainly what I would call 'explicitly situational'. Indeed, while emotions are always situational, the game seemed to lead the respondents to start with identifying a particular situation and then to select the applicable emoticons. I think that the social networks tokens that were added in a second phase of the game construction only made those situations more obvious to enable the guessing. In turn, while trying to pick the right picture based on the emotion and social network clues, the players let the clues evoke a situation related to the depicted place. It explains why the gathered qualitative material mainly describes situations. However, I think it is not always the case, which could explain why some emotions were more difficult to explain. In those cases, the pictures directly evoke particular emotions. They could be called 'implicitly situational'.

Second, the choice for those situations is not accidental. While a same place can be related to a variety of situations (either frequent or not), a respondent spontaneously picks one of them. Why that one? To what extent are places tied to emotional experiences? I think it depends on the variety of activities that a place shelters for a respondent and his or her partner. It also depends on the possible hegemony of one particular emotional situations over the others related to that particular place.

Third, the emotions collected correspond to a recollection of an experience, not to the experience itself. When someone picks a specific emotion, is it really how he/she feels, or rather how he/she *thinks* he/she feels? What would it actually mean to be 'really how he/she feels'? After all, the separation between cognition and emotions is not a clear one, and various theories co-exist around the subject (Rimé, 2005). Coming back to my data, I found a partial answer in a discussion about the definition of experiences: "a lived experience is not only something that is experienced, "its

being experienced makes a special impression that gives it lasting importance" (Gadamer, 2004, p.53)". I understand the data collected as corresponding to this special impression, to what is relevant in someone's life from his/her point of view.

More generally, the collected emotions do not only correspond to the place, but also to the respondent, as they are a phenomenon emanating from an interaction. With the game, the respondent's partner probably also participates in the interaction. For example, I continue to wonder whether the fact that the clues were addressed to a partner rendered them somehow less relevant, or on the contrary particularly authentic. Regrettably, I did not record the game sessions: I wasted the data that could have informed those aspects of the data collected. Deeper meaning ascribed to the emotions were indeed very probably underlying both the person's explanations in their own words and the dialogues prompted in and by the game.

Further, the researcher's grasp of what has been collected depends on his/her own definition of the object on which data has been collected. In the case of emotions, I think there is more at stake than a definition. In practice, the researcher indeed constantly calls upon his/her own sensations and impressions. One could argue that it is then particularly crucial to define at least the researcher's own understanding of the object under analysis, as to reduce interpretation biases between communicator and communicated. I think so too, yet I believe that one should also accept partial non-definition as an inherent characteristic of emotions. Next to trying to define, the researcher must also seek to express his/her sensations and impressions as well as possible when describing and explaining them, as he/she actually needs to 'speak to' his/her audience's own emotions. It is particularly obvious when I describe place-based emotional experiences as being "a coloration of the subjective experience (i.e. produced by the individual mind) of and in places" (Sections 4.2 and 5.2). What does it mean to be 'a coloration of'? I do not think it is defining, neither that it is sufficient to explain how I intimately relate to emotional experiences, nor that it does exactly correspond to what the reader should grasp in order to understand them exactly as I do. Yet, it is the best expression I could find to describe them. I borrowed it from Rimé (2005), as I found it particularly meaningful.

6.2.3. A game to collect place-based emotional experiences data?

In the previous sections, I discuss the particular context in which the game emerged and my questionings about the resulting data. The use of a game to collect data is further discussed below and possibilities for amelioration are presented.

I think I failed to avoid being extractive. As in many data collection contexts, the researched gave time and disclosed themselves without getting much in return. I

perceived this failure even more strongly when the game did not create a good atmosphere and when people obviously expected more in return. Orienting the research according to people's needs remains the best option to avoid being extractive. Going back and presenting the results of the research appears to me now as being a minimum necessary step in any non-extractive research. Further, structures as power differential, prejudices, etc. are probably impossible to overcome, especially in such a short amount of time. A real change of attitude would necessitate more time, more energy and more participation to deepen the interactions and develop an appropriate return-way in the exchange.

However, the extractive –or not- attitude of the researchers during the data collection per se should being further examined based on the experience of the game session and the question of the status of participation. For the respondents who declared having had a good moment during the game, loving the team spirit and being willing to play again; or for the one who admitted that it made him think, then the game may have left something positive behind. It is not to say that an interview or another data collection technique could not have had the same impact; but the game setting particularly favours pleasure, reflexivity and team spirit. The fact the researchers participated in the game and interacted differently with the respondents possibly have also had a positive effect.

As recounted in section 2.3.1, I gathered more data than those collected through the game. I also gathered secondary data and I submitted a questionnaire to the players after the game sessions. One year after the game fieldwork, I hired my field assistant to conduct supplementary interviews that were recorded and transcribed. However, among all those data, the game data happened to be the richest, providing more ground-breaking information and best targeting what I was exploring.

Yet, the game is an experimental device. As explained earlier, many aspects of its functioning remain unclear. To some extent, it can be attributed to the difficulties to draw clear contours around emotions. For the rest, one could better use and understand the functioning of the game by testing alternative versions and the resulting data. In particular, it would be interesting to test the game:

- with other players than the household head and his/her partner vs the researchers,
- with and without the social network clues,
- with various sets of emotions,
- with other pictures,
- against other data collection tools, in particular one that does not use proxies for the environment nor for the emotions,
- in another cultural and environmental context,

- with something to depict the emotions closer to a scale (instead of numbers of emoticons),
- with a new game mechanic that would further encourage the sharing of meanings behind the emotions.

As another limit but also as its main contribution, the game conditioned the rest of this thesis research. The limits of the data collected restricted the analytical possibilities, but the challenges it posed were a source of reflexion and innovation. In that sense, this research could not have been done without the game. Further, the main limitation is actually not inherent to the game; but to the way the data elicited with the game has been recorded, both qualitatively and quantitatively.

6.3. Interpreting the data

The second study has a particular status in this thesis. It is an intermediary: it was the necessary analytical step for getting to know the data gathered with the game, and reflecting on data collection in climate (non-)migration research. The question posed in chapter 4 is indeed framed by the general objective of this thesis and the constraints and possibilities framed by the dataset forces and weaknesses.

The data content and the way it had been recorded, but also its structure, were challenging. Many provisory results appeared to be failing, as the data was not robust enough to ascertain them. Limited in the search of deeper meanings and in the exploitation of the quantitative data, I turned to another questioning and analytical strategy. The data-collection dispersal and the fact that the data was first focused on the physical environment were used as a strength: it allowed detailing an otherwise overlooked diversity of place-based emotional experiences.

Further, making sense of the empirical results necessitated to position them within emotion-environment-(post)disasters research. A particular approach to the emotion-environment-(post)disaster research nexus emerged and an original research question was developed.

6.3.1. Integrating the emotion-environment-(post)disasters research nexus

►Figure 21 was initially drawn to introduce the study presented in chapter 4. It was removed in a later step of the paper development. I insert it here to illustrate my personal conception of the emotion-environment-(post)disasters research nexus; and to reflect on how it relates to the global question addressed in this thesis and the challenges posed by the data collected.

In this thesis, emotions are understood to be a phenomenon connected to both intangible and tangible features of the environment through the lived experiences of and in places. The emotions related to the environment are observed by the researcher to get a sense of the dynamics of the people-environment relationship and to reveal the aspects of those dynamics that are important to people, that affect them. Emotions, in a sense, are situated at the interface between humans and their environment both as separate and merged entities.

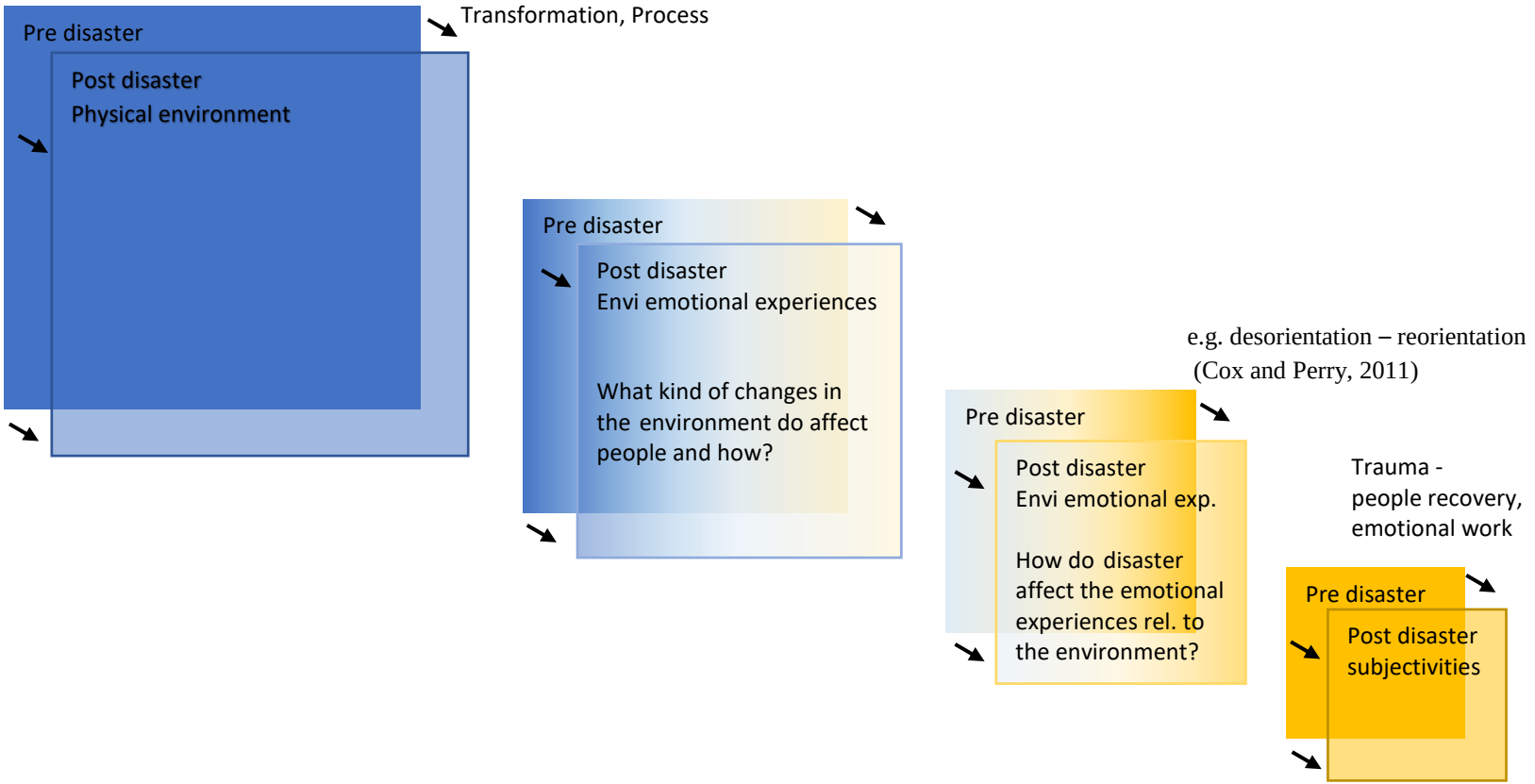
Indeed, various theories defend arguments around the idea that the distinction between physical and sociocultural environments is obsolete and that the dissociation of humans from their physical and/or sociocultural environment is a construct (Lutz, Prskawetz and Sanderson, 2002; Descola, 2005; Tetsurô, 2011; Mariani-Rousset *et*

al., 2016; Dürr and Pascht, 2017). For example, psychologists developed theories about a self-body-environment continuum (Mariani-Rousset *et al.*, 2016); the anthropological perspective of Descola (2005) suggests to understand the world beyond a nature-culture dichotomy; and Tetsurô (2011) philosophically examined the environment-culture relationship from the inside and introduced the concept of Fudô around this relation, apart from those two objects that are related.

Loosely based on those ideas, I developed a personal conception of a research continuum, from the objective/tangible to the subjective, making a space for hybrid research subjects in between. This personal conception was developed during the maturation of the second study, made of back-and-forth between the emotion-environment-(post)disaster literature and the empirical data. This empirical material itself was framed by my questioning about the way climate change data were traditionally collected in climate (non-)migration research; and the way I collected the data was influenced by an original objectivised/tangible conception of the environment.

The personal conception about a gradient in emotion-environment-(post)disasters research that I developed is illustrated in ►Figure 21. As a pile of cards spread on a table, the visual perspective places the physical environment in the back and people's subjectivities at the top; it is anthropocentric. The four pairs of rectangles represent four groups of research questions, necessitating reflecting on -and collecting data about- pre-disaster conditions, post-disaster conditions and/or the differences and processes between the two. The yellow and blue colours illustrate the dichotomy between the physical environment vs. people's subjectivities; and research questions that are hundred percent focused on either the physical environment or on people's subjectivities are attributed a pure blue or yellow colour.

The two categories in between correspond to the emotion-environment-(post)disasters research field. They are coloured with a blue-yellow gradient, illustrating the investigation of people-environment interactions as a hybrid research subject. I distinguished those two categories within the emotion-environment-(post)disaster research field in the form of questions (see section 4.1). The first one focuses on people: how do disasters affect people, and in particular, their emotional experiences related to their environment? The second one questions the role of the environment: How do disasters change the lived environment, and in particular what does affect people's emotions and how? I then explained that my research adopts the second perspective.



► *Figure 21 : A gradient in emotion-environment-(post)disaster research. Illustration of a personal conception*

Actually, this conception emanated from a necessity to conciliate my first approach to the subject (quite 'blue') with new perspectives that the research process allowed me to envision and gradually understand. Rather than rejecting the former, I found a way to accommodate both. Further, fully embracing the emotion-environment-(post)disaster research perspective would have invalidated the contribution of my data: it was limited in terms of the search for deeper meanings (qualitatively) and inter-individual tendencies (quantitatively). In other words, I had to position my approach and my results within a research field that tended to provide theories about the subjective experiences of persons and communities, while the data I collected were rich in investigating the diversity of places and their both tangible and intangible specificities. The second question (corresponding to the blue-light yellow box in ►Figure 21) emerged and the data could be interpreted as providing explorative results to preliminarily answering that research question. Accidentally, the fact that I –somehow naively- expected to directly connect emotions to the tangible environment shed a new light on the emotion-environment-(post)disasters nexus.

However, it was also an impediment. One of the greatest limit of this study (and also of the entire thesis) is indeed the lack in explanatory penetration about the psychological and social facets of [1] places as physical-sociocultural entities and of [2] emotional experiences of and in those places. For example, this research would have been improved if concepts such as place attachment or place identity had been integrated into the research framework. As suggested in section 5.5, it would also have benefitted from a deeper reflexion on ways to better integrate and/or distinguish the social and physical dimensions of places.

6.3.2. Learning-by-doing human sciences

This second study illustrates how geography produces innovative transdisciplinary findings about population –environment subjects. However, it also exposes its limits: as geographers, we only provide a generalist insight. Further, my geographical training was rather about 'physical' than 'human' geography, and the related competences. Consequently, a lot of human sciences know-how has been learnt in the field, in the literal sense as well as the figurative. This research would have benefitted from more beforehand competences in psychology, sociology, anthropology, and more. I hereunder further illustrate this important limit/regret with a discussion about the 'social network tokens', a specific segment of the dataset that I decided not to process. It is indeed particularly striking that the 'social network tokens' appear in a second phase of the game construction, betraying a rather initially limited understanding of the complex interplays existing between emotions, people, and their social-physical environments.

As a foreword, the analysis provided in chapter 4 is not invalidated by this choice of not processing the social network tokens data. On the contrary, it would have added supplementary imprecisions and confusion to include them in the data processing and interpretation. For example, someone explained the emotions calm and dominant associated with a picture of the church (picture 59, ►Figure 14, section 4.3.3) by the fact he feels calm at the church. His social network token for that picture evoked 'me alone'. He explained his choice of that token by the fact he goes alone to church. However, church celebrations are social events. Does it mean that he goes to church when there is nobody there and that he avoids celebrations? Or that he *feels* alone even while he is surrounded by the church community? Or that, in practice, he goes alone to church rather than with his relatives or neighbours? Further, to what extend then is 'me alone' related to the emotions calm and dominant? Moreover, given this large panel of possible interpretations, what supplementary information does 'me alone' add to the church-calm and dominant association?

I simply did not have enough information to analyse and interpret the social network tokens data because they were not considered part of the research focus during the game sessions: while I was particularly interested in understanding –and getting a feeling of- the relation between the emotions and the pictures as representing physical entities, I did not ask questions about the social network tokens. In fact, they were presented as secondary clues to the respondents. In a large majority of case, the social networks tokens were selected by the respondents after he/she picked the emoticons.

However, if they had been handled differently from the start, they could have added valuable information to the study. First, they could have been used to inform the social features of places and the particular situation to which the emotions referred. Second, they could also have informed the reason why people had selected those particular situations and those emotions, thereby revealing possible biases in the selection of a particular emotional situation over another. Finally, transformed into codes or into a variable, they could have been used for further categorization, thereby revealing social tendencies and social explanations for the diversity of place-based emotional experiences in the recovery period after a disaster.

6.4. Elaborating a data collection proposition

6.4.1. Drawing on the limitations of the dataset revealed by the second study's data analysis

The proposition presented in chapter 5 has been developed by reflecting on the challenging format of the game dataset. I explain hereunder how the analysis evolved during the second study and how it led to a focus on place-based emotional experiences.

During the initial phases of data analysis, I tried to distinguish places based on the emotional data material that had been collected. By computing the means and analysing the descriptions, I tried to identify the "emotion signatures coherent with the way they [the places] have been impacted by the Typhoon and with the interdependence people have with their environment" (section 3.4.1). To a certain extent, it was successful. However, the results were not strong enough; the tendencies I tried to bring to light were fragile as they masked a high variability.

For example, based on computations that I could not test statistically, I observed that people selected calm emoticons in relation to the sea more often when they were speaking of the Typhoon compared to when they did not. On the other hand, they selected calm emoticons in relation to randomly vegetated places less often when they were speaking of the Typhoon compared to when they did not. Quantitatively, it seemed to appear that the effect of the Typhoon on place-based emotions differed from one place to another. In this case, Typhoon-related emotions were rather calm for the sea while rather not calm for the random vegetation. In fact, people particularly associated the sea with calm when they evoked Typhoon-related experiences, and they particularly associated random vegetation with calm when they evoked non-Typhoon-related experiences. However, the explanation related to those emotions did not allow providing a coherent interpretation for those quantitative results. They corresponded to various situations informing various facets of Typhoon-related emotional experiences. The provisory results showed that it was more pertinent to focus on experiences than trying to provide a coherent message about 'emotion signatures' of places.

Further, the dataset can be seen as full of 'holes'. People were crossed with pictures, but not systematically: I did not have emotional data for each possible individual-picture crossing, as people only associated emotions to 10 pictures of their choice. Again, the dataset was actually not focused on places, but rather on meaningful situations for each individual in particular places. In other words, it was possible to provide a coherent message about emotional experiences anchored in places, not on places themselves.

In any attempt to provide a coherent theory based on the empirical material, I was confronted with the particularity of the basic data units of the dataset that were neither the individuals nor the places, but the crossing between the two in a particular situation: place-based emotional experiences. Further, I realized that neglecting that disaggregated level of data collection had been a primary obstacle in my search for placing emotions in climate (non-)migration research.

As a first step in placing emotions in climate (non-)migration research, place-based emotional experiences were thus introduced as a concept structuring the data, a new way of 'sampling' the reality. Metaphorically, one can imagine an empty box, waiting to be filled in with data content. To be fitted for the box, the data content must correspond to an experience related to a specific place. It is focused on the emotional coloration of this experience, as a signal indicating how people feel in situations associated with the place. It corresponds to a specific, meaningful (for example because it is recurrent or emotionally important), circumstance.

Place-based emotional experiences contribute to climate (non-)migration research by enforcing a specific focus on circumstances, where traditional climate-change related data in climate (non-)migration research are disconnected from people's everyday emotional experiences, and lack anchoring in the places that host and relate to those emotional experiences.

6.4.2. The contribution of an explorative data-collection approach

Climate (non-)migration research keeps pointing at the same limitations without providing concrete ways out: as explained in section 1.2, the study of climate (non-)migration lacks emphasis on the way people experience changes to the environment and on the cultural dimensions of climate change (Piguet, 2012; Adger *et al.*, 2013; Parsons, 2018). Further, studies integrating an emotional dimension (or even only mentionning it) are almost inexistant (section 1.1 and 1.2).

Those limitations are pointing an important challenge for climate (non-)migration research. Those that attempted to take up that challenge provided ground-breaking theoretical insights such as a the potential contribution of the concept of translocality (Greiner and Sakdapolrak, 2016) or that of structuring the emotional landscape of climate change migration (Parsons, 2018).

With a data-collection approach, this research opens up a new area of development, situated at a methodological level. Rather than questioning theories, it examines practice; and the third study provides a concrete proposition. It offers a

conceptual tool, equipping researchers in the field with a new lens, a lens that I lacked myself while exploring the place of emotions in climate (non-)migration research.

The above discussion presents the journey of an exploratory researcher coming from a quantitative background. To a certain extent, the proposition presented in chapter 5 emanates from my own discomfort in the field, my lack of human sciences background and my specialisation in geography.

6.5. Being touched (in the sense of moved emotionally) and/or being analytic?

This thesis approach is original, twisting the purpose of games, playing with analytic tools, and developing a data collection concept. While a lot of freedom has been taken, I also sought to remain faithful to the main characteristics of games and to the data content; but also, most importantly, to what emotions are.

Paradoxically, my approach was essentially rational and analytic. If I look back at my research journey from an emotional point of view, I indeed identify a dynamic interplay of emotional involvements and detachments, the latter dominating over the former.

Reflecting on this paradox, I find three interconnected levels were emotions operated: the researcher's overall motivation, the scientific process, and the level of understanding/feeling of an emotionally charged research subject.

At a personal motivational level, I evolved from being personally very engaged into the subject to a certain detachment. This evolution first emanates from confronting with –or perceiving- local's scepticism about the game, about the reality of climate migration itself, and about the pertinence for a foreigner to study local's emotions. It also is the result of a personal evolution from idealism to pragmatism, as I increasingly let go of initial expectations and ambitions to get the research done.

At a scientific level, I long held to my background, adopting a rational, objective posture. To a certain extent, I still am biases toward this posture; however I tried to increasingly position myself, to assume a subjective research posture, and to acknowledge my own emotions. My trials are best exemplified by the evolution in my writing from the third to the first person, from an emotion-free language to an increasing integration of emotional expressions and emotionally charged contents.

At the level of understanding/feeling of an emotionally charged research subject, I 'used' my own emotions to get a sense, to feel and to relate to the subject. Throughout the entire research process, I indeed perceived that my interpretations of the data and my data collection propositions were more adequate when I could feel them as much as understand them. Further, because of the research subject, I was forced from the start to question my emotions at the two other levels, creating a tension that I could not resolve within this thesis scope. The question thus remains open: how should I, as a researcher studying an emotionally charged research subject, articulate emotions with rational analysis?

6.6. Perspectives

Three research perspectives are elaborated in the following paragraphs. The first one presents a research path proposition on a methodological-theoretical level based on the one undertaken in this thesis, but also grounded in this thesis' findings and reflexive analysis about research practice. The second one points remaining research gaps in continuation of this thesis contribution to climate (non-)migration research; and also knowledge building about spatial behaviour in general. The last one presents how these thesis' findings could improve climate change adaptation research and initiatives more generally, a major and topical issue for society.

6.6.1. Informing research practice in climate (non-)migration research

In this thesis, the assumptions and questions of climate (non-)migration research are unravelled, specifically interrogating data collection and allowing to propose an alternative climate (non-)migration research framework. The development of the alternative emanates from the research findings; but also from my constant reflexive approach toward my research practice in search for reconsideration and improvements. As such, the climate (non-)migration research framework has been questioned from both the outside (via a confrontation of various literature strands and field-based results), and from the inside (via a questioning of how I conceived what emotions are, and my own confrontation with a research framework ill adapted to an alternative emotion-centred conception of reality).

This intimate experiential path is translated below into practical tips for researchers in climate (non-)migration research aiming to tackle similar questions. I would suggest pursuing the following successive objectives:

[1] To break down the researcher's assumptions behind the relations between expected physical changes and migration (non-)decision-making. As explained in section 5.2.2, there is an implicit expectation that 'something spatialized' impacts people's spatial behaviour. Climate (non-)migration research is thus actually based on the relations between people and places. I suggest starting any climate (non-)migration research with a closer look on the researcher's own conception of these relations.

[2] To enrich the list of expectations about people relations to places with field-based data, in the specific context where the research will be done. For example, by asking people about their habits and routines and the places that shelter them. By getting a sense of local's ways of life anchored in the environment, the researcher

should be able to broaden his/her range of possibilities in terms of data collection targets.

[3] To contemplate data collection as a focus on a small and delimited share of reality, which is made of tangible and intangible features. In this research, 'emotional experiences' are given substance in the form of 'the coloration' of particular situations anchored in the material world. They are delimited by the crossing of people with place in exceptional or recurrent situations. As explained throughout this thesis, it is experience-oriented. I believe that this is but one way of informing the relationship between people and places.

[4] To identify those parts of reality that may be impacted by 'climate change'. It necessitates reflecting on both the researcher and the researched conceptions of the climate and the ways it might change. In this research, almost all aspects of people relations to places were deeply affected by the Typhoon. Consequently, any data collected in the field would relate to the climate in one way or another. This may not always be the case. For example, people relations to places could be subtly affected by a small and slow change in perceived or effective snowing conditions or water availability.

[5] Once the data target is identified, to choose a data collection tool that is adapted to the expected data content, the field context, and the researcher's competences. The two last criteria should not be underestimated. In the choice of a data collection tool, one should keep in mind that any alternative offers specific possibilities, but is also limiting in other aspects.

[6] To select the target population in function of their migratory profile, and not to underestimate the value of a data collection focus on those who did not migrate. This research strategy is somehow oriented toward places where people end up living and why; and this question necessitates reflecting on both migration and non-migration.

[7] To investigate whether or not the changes in people relations to places implied a change in spatial behaviour. It would be interesting to consider all types of movements, from everyday places uses and routes choices to long term and long distance changes of living places.

6.6.2. Better Understanding spatial behaviour in relation to climate change

The main contribution of this thesis is based on the idea that people's use of places are related to their emotional experiences of and in places. In chapter 4, I suggest that

place-based emotional experiences may inform how physical and social settings in interaction with a disaster frame and affect every day frequentation of places in the aftermath of a disaster. In chapter 5, I explain that emotions inform people's preferences and choices for particular blocks of the earth surface and the meaning they ascribe to them: places. In other words, people choose to experience some places more closely than others, to remain attached to or to somehow detach from them. They do so in light of their relations to their living places, that may be deteriorated or improved by a climatic event.

However, this idea could be further examined with the use of 'place-based emotional experiences' to frame data collection. A deeper understanding of place-based emotional experiences would first be necessary, and their links to places uses and choices could then be further researched.

First, echoing the discussion about the game and its resulting data, the nature of place-based emotional experiences could be further described. Theoretically, concepts such as climatic-affective atmospheres (Verlie, 2019; section 1.2.2) could be up-scaled to place-based emotional experiences, by reflecting on how those in-depth theories inform the reality observed through the lens of place-based emotional experiences. In practice, other data-collection techniques could be experimented to gather place-based emotional experiences information and better define its contours. As discussed in section 4.3.2, environmental psychology proposes various tools that could be tested with the specific aim of better understanding how people emotionally experience their climate and their environment in their living places, and the ways they might change.

Second, place-based emotional experiences could be further explored in light of what is provoking them. How are they connected to political, social, and economic structures? How do they relate to environmental characteristics and individual's needs, desires and aspirations (see section 2.2)? Interpretive phenomenology would be an adapted approach in that respect, as it aims to uncover the deeper meanings that people attribute to their lived experiences (Frechette *et al.*, 2020). They idea would be to reverse the inquiry toward places rather than toward the individuals themselves.

The contribution of place-based emotional experiences to people everyday use of places, the decision (not) to migrate and spatial behaviour in general could then be further researched. A longitudinal analysis would be particularly pertinent: how do place-based emotional experiences evolve with changes in the climate and the environment? Do we observe a correlation with people every day and long-term mobility patterns? At what moment do we observe migration? Indeed, migration decision-making is a process (De Jong and Gardner, 1981; Frankhauser *et al.*, 2016).

6.6.3. Revealing the physical changes that matter

In a job offer for a PhD in civil engineering, the University of Liège (2021) exposes the following research gap:

> "Hydrological extremes (floods and droughts) are increasingly intense and frequent. Ambitious river and dam adaptations will not be sufficient to face future risk. A systemic approach appears necessary, including an important vulnerability reduction component (exposed populations, information, vulnerable people, and adaptation of the built environment).
>
> In a systemic approach, decision making rests on a modelling chain composed of four links: climate – hydrology – hydraulics – damages. The last one (damage modelling) remains the most problematic. Damage models are not mature, while they are essential to objectivize the soundness of investments to a level that meets the challenges our societies are going to face []. Following the exceptional flooding incurred during July 2021 in the Meuse watershed, the University of Liège is going to collect a large amount of damages data [] from the populations that were directly affected []." (Université de Liège - HECE, 2021, translated by the author)

The description of this highly topical research project suggests that future hydrological extremes imply important *material* damages that one tries to prevent via engineering but also through vulnerability reduction initiatives. Apparently, surveying the victims is the first step necessary toward improvement of future damage models on which decision-making should be based.

While its rationale is centred on reducing the impacts of hydrological extremes on people, the strategy of this research project is to focus on material assets. In fact, the link between material damages and people is rather implicit: one can expect that the destruction of built and natural environments will affect the concerned populations negatively. Further, this research project is supposed to inform decision-making and justify large public investments: the ultimate aim seem to be to prevent people from suffering from future disasters.

However, and as other climate adaptation research, it neglects the very accounting of what –specifically- is a source of stress and harm for the affected people. Given its objective of preventing people from suffering from future disasters through public interventions, it is legitimate to worry about the simplifications engendered by an exclusive focus on material aspects, and to suggest considering emotions as an important part of reality that should be interrogated next to- and in relation to- physical damages.

Similarly, this thesis' starting point was the accounting of the impacts of climate change on people. To inform climate (non-)migration decision making, it reflected on the subjective – and in particular emotional- experience of those impacts, in relation to the material changes predicted under future climate change. One of our main contributions is to show the relevance of structuring data collection differently, revealing through emotional experiences how people have been affected by a disaster in their everyday lives with nuance, and in relation to the physical environment. Taking a step back from migration research, our findings actually have the potential to enrich other post-disaster research as they shed light on the non-unequivocal impact of a disaster on people lived (emotional) experiences.

In fact, 'place-based emotional experiences' data collection and analytical lens has the potential of bridging existing knowledge and competences from various disciplines. In their modelling, engineers could focus on the physical components of the environment as they are experienced by those affected by the disaster. For example: the transformations and consequent recoveries that provoke happy or sad experiences (cfr 'transformations'), the raising water speed as a source of stress and feeling of a loss of control during the flooding itself (cfr 'souvenirs'), the expected behaviour of the river that passes in one's garden (cfr 'agents'), the fragility –or not- of various parts of buildings and vegetation that may induce a relative feeling of vulnerability or, on the contrary, invincibility (cfr 'awareness').

The purpose of modelling would be to project, based on past experiences, how the various facets of people everyday realities during, short after and long after the event could be affected. Thereby, public policies would be informed by meaningful accounts of the physical changes that matter.

In practice, the concept of 'place-based emotional experiences' frames data-collection with a double segmentation: from one place to the other and from one person to the other, actually focussing on the interface of people – place relationships, in the form of people every day experiences anchored in the environment. As such, emotions can be grasped and further analysed in relation to the people experiencing them and the places where they are experienced. They can also be related to the physical environment that composes those places, and its changes. Once identified, the physical changes that appear to be related to specific harmful experiences could be projected under future flooding and drought conditions; and suitable tangible and intangible adaptations could be implemented, targeting the concerned segments of the population. Further, modelling could be used to depict those physical changes, via photo editing and the use of virtual reality, in order to inform potential victims in a way that directly connects to their emotional experiences of and in their living places.

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