

Capturing the Dynamic Character of the Philippine Peri-urban Landscape: A Landscape Character System Approach for the Region of Cavite



by

Cathe Desiree S. Nadal

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"The human animal requires a spatial territory in which to live that possesses unique features, surprises, visual oddities, landmarks, and architectural idiosyncrasies. Without them it can have little meaning. A neatly, symmetrical, geometric pattern may be useful for holding up a roof, or for facilitating the prefabrication of mass-produced housing units, but when such patterning is applied at the landscape level, it is going against the nature of the human animal. Why else is it so much fun to wander down a twisting country lane?"

Morris, Desmond. 1969. 'The Childlike Adult', Human Zoo.p.245

I dedicate this research to my home country, the Philippines – presently in flux and continually struggling to be free;

Moreover, to the passionate landscape architect in every Filipino – equipped with stewardship in our hearts and primed with place narratives that can sustain our valuable Philippine landscape.

Padayon!



Lay Summary of Thesis

The lay summary is a brief summary intended to facilitate knowledge transfer and enhance accessibility, therefore the language used should be non-technical and suitable for a general audience. [Guidance on the lay summary in a thesis](#). (See the Degree Regulations and Programmes of Study, General Postgraduate Degree Programme Regulations. These regulations are available via: www.drps.ed.ac.uk.)

Name of student:	Cathe Desiree Suan Nadal	UUN	S1684799
University email:	S1684799@ed.ac.uk		
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Metro Manila, a megacity in the Philippines, is the country's centre for development and employment. This function within the national context of Metro Manila increases its population, eventually expanding the effects of urbanisation into the surrounding landscape territories.

This thesis focuses on the landscape found in the geopolitical territory of Cavite located at the edge of Metro Manila. Cavite's landscape presently accommodates Metro Manila's sprawl, with its upland to coastal environments adapting to the pressures of rapid growth and the depletion of landscape resources in the territory. As a result, Cavite's landscape has within it a highly varied character of industrial, residential, commercial, recreational, and mixed development, becoming the new dynamics of space in the fringe of Metro Manila.

The changes brought by urbanisation to the landscape territory of Cavite is a present challenge that must be addressed in the planning frameworks. To resolve this, the thesis offers a solution by means of linking Cavite's landscape character to its planning frameworks through a catalogue of landscape categories generated by adapting landscape characterisation approaches drawn from a range of international contexts. This catalogue follows a simple idea – devising a system that collates information as the basis of a more sustainable landscape-led action plan. The procedure undertaken to achieve this system synchronises the landscape's characteristics, expanding its local definition with descriptions of its different dimensional attributes. The approach also adds visualisation measures that transform landscape data into an easier-to-understand format for planning decisions.

Overall, the result of this thesis is a landscape character system (LCS) that becomes Cavite's very own landscape character database. The output of the LCS is forged through analysing the specificity of the territory to generate landscape-based actions that can sustain the quality of landscapes in a country where the value given to the landscape is minimal to none. It becomes a database of information that displays Cavite's dynamic landscape character in different visualisation measures. This system translates data gathered in the field of research in the Philippines while drawing influence from global examples of best practices. In this way, the landscape is identified as the key to producing planning frameworks for a more landscape-responsive future that can then solve the Philippine planning gap.

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Abstract

The Philippines is undergoing significant urbanisation, with Metropolitan Manila being recognised as a megacity with spatial growth affecting the broader metropolitan region and its fringe. Lower-density urban sprawl has created a dynamic of peri-urbanisation spreading into areas with suitable terrain and infrastructure access. At present, the Philippines also has an urban planning framework that is weak, with almost no understanding of the significance of landscape types as entities that must be holistically considered across local and territorial scales. Recognition of the value and the concept of landscape is a challenge, and the silos in regional planning frameworks of the Philippines prevent a coordinated approach to solving its many problems. This lack of landscape led approaches in developing planning frameworks in the Philippines can be exemplified by the following:

- Growth in spatial size and number of settlement blocks built on the national integrated protected areas in the country
- Increase in sprawl development and informal settlements towards disaster-prone areas at the fringe of Metropolitan Manila
- Rapid conversion of land for development like special export processing zones or economic zones (Remedio, 1996; Wu, 2009) prioritising economic ideals over ecological and local cultural attributes of land in the urban, peri-urban, and the countryside areas

The prioritisation of urban development and expansion over and above the capacity of the landscape to endure change within current planning frameworks is the research problem calling for a landscape-based solution.

The research in this thesis is based on the development and application of a Landscape Character System (LCS) proposed for the Philippines with Cavite, an urban region at the fringe of the greater Metropolitan Manila area, as a case study. As a proposed solution, the

LCS is designed to explore the syntactic nature of landscape character assessments while also adopting a landscape-based methodology for landscape planning frameworks. LCS as a landscape-based methodology is then brought into the context of the demand for new approaches to sustainable planning that address the global climate crisis whilst also considering local needs, thus redirecting the landscape towards nature and culture responsive actions.

As landscape assumed a more significant role as a resource and a territory that supplements plan with vital ecological and cultural information, its role in environment-responsive planning also gained interests worldwide. Landscape resources became an important component of planning, thus creating landscape-led dialogues like the European Landscape Convention and Landscape Agenda which served as baseline to a more landscape-focused management plan for the European territory. These are also examples of high level of primary research that were undertaken in the field where landscape-based actions are drawn from readings of the landscape that are situated and specific within the territory.

This situation makes it very timely research to find parallel solutions to landscape territories in the Global South – specifically landscape territories of fringe areas in the highly urbanising city found in the Philippines. These Philippine fringe areas are the territories to be studied for the problems brought by urbanisation and globalisation to its landscape. Furthermore, the research dimension is practical as landscape-based actions drawn from the specificity of the Philippine peri-urban territory must be prioritised as conditions of its environment are now threatened with this urban change.

The Landscape Character System (LCS) proposed through this thesis is found in international contexts but applied and adapted to local situations to close the gap in the Philippine context, bringing Cavite's landscape towards the narratives of sustainable planning. Cavite is one of the regions known to be rapidly populating while also swiftly accommodating the influences of urban sprawl. Aside from that, Cavite is also primarily

affected by planning directions set by a regional policy anchored on global economic advancement. Thus, it forms an ideal testing ground for the methods as proposed.

The LCS proposed in this research forms the basis for identifying multi-dimensional possibilities for Cavite's landscape. The LCS method encapsulates the landscape phenomena of the case study site – a meaningful output that will uncover essential characteristics of the region. It also includes multi-dimensional solutions for capturing geodata, place, morphogenetic, perceptive, and future scenario attributes.

Furthermore, the LCS is also envisioned as a mapping tool that scans and demonstrates the different dimensions of space and place in Cavite. The LCS traverses the complexity of the landscape condition by cataloguing information in a highly resolved GIS environment enabling potential users to understand the different factors affecting the landscape being studied. This catalogue, known in this study as the LCS of Cavite, Philippines, becomes a valuable basis for landscape recognition and landscape-based management strategy creation. The LCS also becomes a receptacle of data and a tool in moving Philippine environments towards nature- and culture-responsive futures.

Acknowledgements

I hope you find joy in reading the thesis, *Capturing the Dynamic Character of the Philippine Peri-urban Landscape: A Landscape Character System Approach for the Region of Cavite*. I would not have done it without the landscape that inspires me daily– the totality of the landscape, especially the people in it who shared my aspirations and helped in measures of kindness that I will always be indebted to. I also would not have done it without the cultural and ecological environment that prompted my quest to find meaning in places – the landscape in flux, never dull, and always compelling.

To my wonderful supervisors and the fantastic people behind the texts and the subtexts of this thesis, to my wee group of data creators, to the readers and reviewers of the content– thank you for the patience and understanding you offered for this research work. Thank you for finding time to read and give me valuable inputs for this dissertation to reach the standards imperative for a PhD undertaking. I owe this book to your impeccable eyes for research writing quality and detail.

And To Him, to my family both born and made, to the cats and dogs I met and currently live with, to my Brum fam, my Filipino friends, my one and only Rob and the extended Scottish family I have during the most challenging years of my PhD. You are all fundamental in my perseverance to finish this life work. I thank everyone with all my heart.

Cathe Desiree S. Nadal

This dissertation book is written in different locations - partially inside my car named D.J., in my home at the peri-urban region of Rizal, in random places at peri-urban Cavite, in my work office in Quezon City, in the refuge I found at Arncliffe Cote, in Birmingham, in different locations in London, in EVH Room 5.09 and 5.17, in my room at 23/4 Ferryroad Ave, in Flat 26/3 Almond House, in Flat 14/3 PSQE, in Rob's Home in Kirkliston, and mostly in my room at HRRH334, O'Shea Residence Hall, Edinburgh, U.K. This dissertation book is also submitted in October 2021.

Preface

"Landscape is therefore [an] ubiquitous entity: we live in it, pass through it every day, and it thereby affects our lived experiences tangibly and intangibly. We shape it and it shapes us. It is a value-laden entity. We see landscape continuously; nevertheless, landscape is not simply what we see, a kind of transient static scenery vacuously experience with detached contemplation" (Roe and Taylor, 2014).

Landscape architecture is a design, planning, and research field that considers the future of our planetary landscape resources, from the scale of the territory to the smallest garden. Its practice is an excellent response to the challenges encountered within landscapes across the planet that exist in a constant state of change. In this state, landscapes are in constant flux: areas that undergo adaptation to environmental and cultural impacts of growing settlements on land.

The Philippine landscape presents a highly challenging setting for landscape architectural practice. The country itself is home to a biodiverse, natural environment and a long history of colonisation moulding multicultural Filipino communities today. Its archipelagic nature is also one that adds up to its challenges, with 7,641 islands separated by waters and connected with transportation infrastructure within its boundaries.

As a researcher, academic, and practitioner of landscape architecture, I find the profession as a practical field, especially in a country rapidly changing like the Philippines. Practising landscape architecture has been pivotal in understanding changes on land that are natural and human-introduced - changes caused by its disaster-prone geolocation, socio-political drivers of change, and its multicultural societies.

This landscape setting is one that I have been discovering for the last 17 years of my life. This long history moulded from being a student and licensed landscape architect helped me see landscape as both a setting and a solution to the many challenges of the ecological and cultural environment.

One of the many challenges of landscape is its adaptation to change in the ethos of urban advancement. This challenge is partly caused by the lack of recognition of landscape in urban policy making. This is one of the many situations that shows the difference of the Philippines to its European counterparts - integration of landscape in Philippine policy frameworks plans is yet to be explored. Some evidence of this landscape contextualisation that the Philippines currently lack are policies like the Pan-European Biological and Landscape Diversity Strategy (Council of Europe, 1996; Agnoletti, 2006) and the European Landscape Agenda from the European Landscape Convention (Council of Europe, 2000), no local definition of landscape is formally established. This situation is evident despite the country's regulated landscape architecture practice that spanned almost 30 years since 1983 (PALA, 2021). In this narrative, the landscape must still become a unit of ecological or cultural significance in present-day Philippine landscape discourse.

Despite the Philippine landscape situation, local research moved forward with a focus on establishing the landscape's role in the Philippine planning scene. One that I am familiar with is research in the academe as it is being developed to provide new methods and procedures to adapt landscape in other fields of practice. An example would be the initial discoveries I made by suggesting landscape morphogenesis as an important tool in understanding heritage landscapes for planning. Some of the studies made include a volcano island park proposal during my undergraduate research where a fast-changing landform like a volcano would be considered in tandem with tourism policies, uniting sustainable development goals in an integrated manner rather than addressing them in a stand-alone way. In this case, the landscape morphogenesis method was adapted to resolve the changing processes of a heritage park. This topic continued as I resolved the challenges of Manila's church grounds through devising procedures for landscape character extraction. In a gap where church landscape was not established as a unit with intended policies, the proposal then brought the landscape definition framework as a baseline for possible landscape development plans. This study, done in fulfilment of my master's degree, also used localised scoping strategies to find the future of landscape development with triangulation of results from onsite first-hand observations, place attachment surveying, and morphogenesis mapping (Nadal and Galingan, 2013). Afterwards, the gaps in both studies mentioned assisted in developing my future perspective of the Philippine landscape – with the morphogenetic character playing a pivotal role in proposing future actions for a landscape unit constantly affected by urbanisation.

I also made a more specific enquiry related to landscape's role in grassroots planning in 2013. It was created through a grassroots-led and engaged-action place integration research method that sought the landscape's role in the challenges brought by the Filipino diaspora towards resettlement communities outside Metropolitan Manila. The project concluded with place-led actions that highlight the role of the landscape as a solution in placemaking for resettlement environments (Nadal, 2015).

Despite the richness of learnings generated from the case studies and projects like those I mentioned, Filipino communities still struggle in valuing landscape in the planning discourse. One possibility is that landscape remains undefined, with a lack of consistent terms used to define its significance, nor has it been contextualised locally in the Philippines. Another hypothesis suggests sociocultural influences of migration and the urbanised lifestyle of Filipinos as drivers of neglect of landscapes in everyday encounters as development becomes focused on urban advancement over the sustainability of the cultural and natural environments in the country.

As I sought meaning and developed a further curiosity about why the landscape is still so challenging to define or categorise, I began devising possibilities for a research method that would address landscape value and seek a new understanding of the dynamic nature of the Philippine landscape. These motivations and interests became my PhD dissertation research.

Capturing the Dynamic Character of the Philippine Peri-urban Landscape: A Landscape Character Approach for the Region of Cavite is presented as the outcome of my research for the degree of Doctor of Philosophy in Landscape Architecture at the University of Edinburgh. The research is possible with funding from the University of the Philippines Doctoral Fellowship Program, the Philippine National Commission for Culture and The Arts Dissertation Grant, the University of Edinburgh's College of Arts, Humanities, and Social Sciences (CAHSS) Tweedie Exploration Fellowship, Edinburgh College of Art's Postgraduate Research Expenses (PRE) Grant, Principal's Go Abroad Fund, Centre of Ecology and Hydrology – Natural Environment Research Council Evidence Synthesis Skills Training Grant, and the Scottish Graduate School for Arts and Humanities – Arts and Humanities Research Council Oral History Skills Training Grant. The research was also conducted under Lisa Mackenzie and Dr Simon Bell's supervision, both instrumental in guiding and supporting me through the PhD.

Along with the guidance and support of the funding bodies and my supervisors, this research work that started last January 2017 now commences as a capstone output of a thesis submitted this October 2021.

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List of Abbreviations / Acronyms

CEBC	Centre of Evidence-Based Conservation
CEE	Collaboration for Environmental Evidence
CEH of NERC	Centre for Ecology and Hydrology of the Natural Environment Research Council
DESTEP	Demographic, Economic, Socio-cultural, Technological, Political Factors
DPSIR	Drivers, Pressures, State, Impacts and Responses
CLUP or CLUPs	Comprehensive Land Use Plan / Plans
EASW	European Awareness Scenario Workshop
EBLDM	Evidence-based Landscape Descriptor Mapping
ELC or ELC 2000	European Landscape Convention of 2000
ESP	Evidence Synthesis Procedure
FDI	Foreign Direct Investments
FLSC or FLSCs	Future Landscape Scenario Cluster or Clusters
FLSW	Future Landscape Scenario Workshop
HDH	high density housing
HUC or HUCs	Highly Urbanised/urbanising City / Cities
LCA or LCAs	Landscape Character Assessment or Assessments

LCAp	Landscape Character Approach
LCAr or LCArs	Landscape Character Area / Areas
LCAr-DT	Landscape Character Area Descriptor Typology or Types
LCAr-MMC or LCAr-MMCs	Landscape Character Area Morphogenetic Montage Cluster / Clusters
LCAr-UG or LCAr-UGs	Landscape Character Area Unit Group / Groups
LCArM or LCArMs	Landscape Character Area Map / Maps
LCARr-U or LCAr-Us	Landscape Character Area Unit / Units
LCC or LCCs	Landscape Character Cluster / Clusters
LCS	Landscape Character System
LCU or LCUs	Landscape Character Unit / Units
LDU or LDUs	Landscape Description Unit / Units
LMCS	Landscape Morphogenetic Character Simulation
LWC or LWCs	Landscape Word Cloud / Clouds
LWN	Landscape Walking Narratives
NEDA	National Economic and Development Authority
PDPFP 2011-2022	Provincial Development and Physical Framework Plan 2011-2020 (Province of Cavite, n.d.)
PEBLDS	Pan European Biological and Landscape Diversity Strategy
PICO Framework	Population, Intervention, Comparator, Outcome Framework
PNFPP 2001-2030	Philippines' National Framework for Physical Planning: 2001-2030 (National Economic Development Authority, 2002)
PUL	Peri-urban Landscape
SDG	Sustainable Development Goals

Chapter 1.

Introduction

This chapter begins with an overview of the Philippine landscape context. The overview explains the ecological and cultural character of the country, including the urban processes creating its cities and their sprawl areas. This narrative develops the concept of peri-urbanisation as the spatial process altering landscape territories along the edges of the country's highly urbanised city of Metropolitan Manila.

The Philippine peri-urban landscape is the focus of the discourse as it is presently compelled to adapt to urbanisation effects. This focus on the Philippine peri-urban dynamics vis-a-vis the landscape will orient readers on the urban growth affecting the landscape in the country - a dynamism impacting highly varied natural and cultural environments. The dynamism is presented through examples of temporal and spatial forms, patterns, and stories of Philippine societies that created the greater peri-urban region adjacent to Metropolitan Manila. Included is a discourse on the urban sprawl affecting the landscape in the central core of urbanisation in the Philippines, a meaningful discussion on the appropriation towards landscape as a practice and as a concept in urban planning frameworks for Metropolitan Manila and its urban fringe regions.

A discussion of the silos of peri-urban landscape happening in the Philippines is presented as an introduction to the emerging landscape gap. This discussion also explains why the thesis should address a thorough understanding of the local landscape character of peri-urban areas.

Cavite, a region beside the megacity of Metro Manila, considered one of the most rapidly urbanising regions in the Philippines, has been chosen as the site most apt for this study. Thus, also presented as part of the discourse is the pilot site of Cavite and the challenges of its landscape. Cavite has the highest population growth rate in the Philippines and has far more areas already built upon it than other peri-urban regions around the capital city of Metro Manila. Aside from its rapidly urbanising character, Cavite as a region is expected to adapt profusely to the influences of urban change. Its vulnerability results from drivers of change brought by the peri-urban process. At the same time, choosing Cavite delimits the application of the research procedure in a way that can be managed within the research timeframe.

In a country where peri-urbanisation is hypothetically impacting regional character in ways that can change its natural and cultural environments, aims and visions to resolve it became imperative for this thesis, with the landscape being the practical solution. It will be explained further in section four of this chapter, with the gaps to be addressed explained in section five, and the questions developing from this initial challenge on the Philippine peri-urban landscape as the concluding section.

1.1. The Philippine Peri-urban Landscape Setting

The Philippines is an archipelago located in Southeast Asia (Köthke, Margret, et al., 2020). As an archipelago, it has within its boundaries 7,641 islands administratively bounded by nine bodies of water and grouped into three larger island groups - Luzon, Visayas, and Mindanao. The archipelago also lies within the Circum-Pacific belt known as the Pacific Ring of Fire, a tectonically active sea plate of complex fault systems. With this complex fault system, the Philippines is considered to be seismically active with earthquakes creating diverse landform types, some of which are active volcanoes, ranges of mountains and hills. This geologic and tectonic character is associated with the geomorphic features crucial in understanding the landscape dynamics within this country (Coxhead and Jayasuriya, 2003; Cullinane et al., 2022).

According to Coxhead and Jayasuriya (2003), the Philippines was known for its ecosystem of forest or uplands, agriculture or croplands, freshwater, coastal or marine, and urban land. This ecological character of the Philippines was influential in forming its landscape- a landscape known to be home to different life forms. Within its landscape territory were flora and fauna species of varied types among other forms of resources like fertile plains and marine areas (Coxhead and Jayasuriya, 2003; Avanceña, 2018). These natural features stemming from its biodiverse environment (Coxhead and Jayasuriya, 2003; Gaither and Rocha, 2013) drove the movement of people within and outside the archipelago, causing not just the formation of settlements but also influencing the growth and patterns of its urban areas and local industries.

Historians also discussed this ecological characteristic of the Philippine landscape as the motivator of colonisation in the Philippine territory (Coxhead and Jayasuriya, 2003; Gaither and Rocha, 2013). With the influx of new settlers came significant impacts on existing features of land and climate. Some of these impacts were driven by coastal and riparian resources, as migration of earlier civilisations in the country happened near these water networks for inter-island trade, an important industry during the earlier years of Philippine civilisation. These resources

were accessed for communal functions and needs and became one of the drivers of settlers towards these highly influential water bodies in the territory. Some of the prominent features of land stemmed from this need to access resources while also developing local industries like agriculture (Medina, 1994; Halili, 2006; Fish, 2011; Abinales and Amoroso, 2017; Boquet, 2017).

Unfortunately, this focus on resource generation and access affected the ecological system to its detriment (Coxhead and Jayasuriya, 2003; Carr et al., 2005; Posa et al., 2008), a situation leading to landscape resource challenges. One adverse effect of ecosystem change that should be addressed is the depleting forest and coastal area. The situation pressured plant and animal habitats to alter at an unprecedented rate—a destructive impact on the Philippine landscape territory. It manifested as resource depletion and pollution; as well as deforestation affecting ecosystem functions which are essential in sustaining landscape and life forms.

1.1.1. Peri-urbanisation in the Philippines

The peri-urban process was one of the drivers of territorial change in the Philippines, manifested as inadvertent changes in the Philippine landscape. Salter (1971, pp.01-04) revealed a good point of discussion related to this narrative through the subject of mobility. In one of Salter's narratives, he shared valuable insight on how movements caused by peri-urban processes in the form of migration redefined the "cultural landscape" (1971, p.04), forming significant catalysts of change in the landscape's traits, patterns, and actors. Salter's words supported the possibility that the Philippine landscape may be changing as its adaptation to this driver of change modified its landscape resources not just in the locale but on a country-wide scale.

Like global and Asian situations, peri-urbanisation in the Philippines followed an evolutionary trend. Processes related to this urban phenomenon spanned from the pre-colonial era of Manila, a coastal town in the western bay of the Philippines, to the

present-day Metropolitan Manila- the country's capital (Ortega, 2014).

Metropolitan Manila, also known as Metro Manila or the National Capital Region, is the centre of urban development in the Philippines. Migrants from all over the country flock towards this urban metropolis. This movement is driven mainly by employment and public services - industries that are available in the city. This mass movement towards Metro Manila, observed to have peaked as early as the 1950s, is also one of the reasons for the creation of national councils and policies focused on planning the city. All these initiatives serve as means of urban management of the growing metropolis (Housing and Land Use Regulatory Board, 2007).

Metro Manila's case was widely studied as a mega-region with highly urbanised cities or HUCs. Metro Manila's HUCs like Quezon City with a population of 2.76 million, Manila City with a population of 1.65 million, and Caloocan City with a population of 1.49 million are some of the largest city territories in the country (Housing and Urban Development Coordinating Council, 2014). With all these combined, Metro Manila becomes a major HUC (Regmi, 2018) with population projected to increase at an unprecedented rate (Philippine Statistics Authority, 2016). This increase in urban population size was also influential to population growth in the adjacent geopolitical territories of Cavite, Laguna, Rizal and Bulacan: the ring of provinces at Metro Manila's fringes.

The growing population size altered the countryside landscape character of these adjacent geopolitical regions, as it transformed areas into support and service facilities that can sustain essential activities at the urban core (Ortega, 2014; Iizuka et al., 2017). Its effect was felt at the spatial level as more agricultural and green spaces were converted into residential and industrial land.

Peri-urbanisation, as it spread urban effects towards Metropolitan Manila's ring of adjacent geopolitical regions, led to the diaspora of activities and services (Medina, 1994; Boquet, 2017). The diaspora was also modifying coastal land and developing

transport corridors which made the transfer of goods and spread of urban influences rapid and easy. As a result, fringe areas were being converted into transportation channels and routes of different types -maritime, land, or riparian (Chias et al., 2012). These were all useful in industries not just in Metro Manila but also in other locales and global networks of the Philippines.

The growth of Metropolitan Manila, with influences spreading to the outskirt geopolitical regions, reinforced a landscape type that Webster et al. (2014) considered as the new face of peri-urbanisation common in East Asian cities: a landscape of spill over settlements, commercial areas, manufacturing areas, and export processing zones (Remedio, 1996; Wu, 2009), amenity-oriented landscapes for leisure and transport-driven infrastructure. An earlier study by Webster (2002) mentioned the new land developments analysed in two regions around the urban core: Cavite and Laguna. Both regions were rapidly growing in population while also hosting the new leapfrog development, economic zones, SMEs, and new towns.

The city of Manila was considered an essential location for trade as it was geolocated near a strategic business channel: Manila Bay. Ortega (2014) related this strength of the city to how it became the centre of trading, dating back to old Manila. Old Manila was revered as an essential trading and migration site pre-dating Spanish colonisation.

Ortega (2014) also established Manila's importance in urban growth with references showing settlements in the form of Islamic kingdoms and Moro barangays. These were native community units in the Philippines, located near and within Manila during the pre-Spanish era. Although sporadic, the presence of the barangays created real trade networks along Manila Bay and its channels, eventually making Manila a significant centripetal force (Troughton, 1981) as it became a site for purchasing goods between natives and Asian merchants (Chias and Abad, 2012).

Manila's centripetal force strengthened during the Spanish colonial period as it hosted the walled city of Intramuros. This walled plaza complex became the seat of the Church

and State. Developing the walled city as the church's location, government, and other institutional facilities attracted more people to Manila. By doing so, a dichotomy of "Intramuros and Extramuros" emerged as a spatial planning ideology used by the Spaniards to establish a political divide in the country (Ortega, 2014). It also created a divide in socio-political demography. Intramuros became the area for Spanish residents, while the Extramuros became the *arabeles*, the "suburban neighbourhood" that became the site of native settlements and the location of some Spanish summer residences.

The creation of the Intramuros - Extramuros ideology led to the creation of the *reduccion*. This relocation policy forced the resettlement of Filipino natives from their natives-led community units into *poblaciones* or Spanish town centres (Ragrario, 2003). The proposed urban form altered the vernacularity of activities surrounding the sporadic community settlements. Moreover, the movement of the natives into controlled Spanish town plaza units purged the local identity by enforcing a promulgated set of guidelines called the *Leyes de Indias* or Laws of the Indies. This set of planning guidelines became a standard for planning towns under the Spanish regime, changing the countryside diaspora to become planned, centralised and connected (Chias and Abad, 2012).

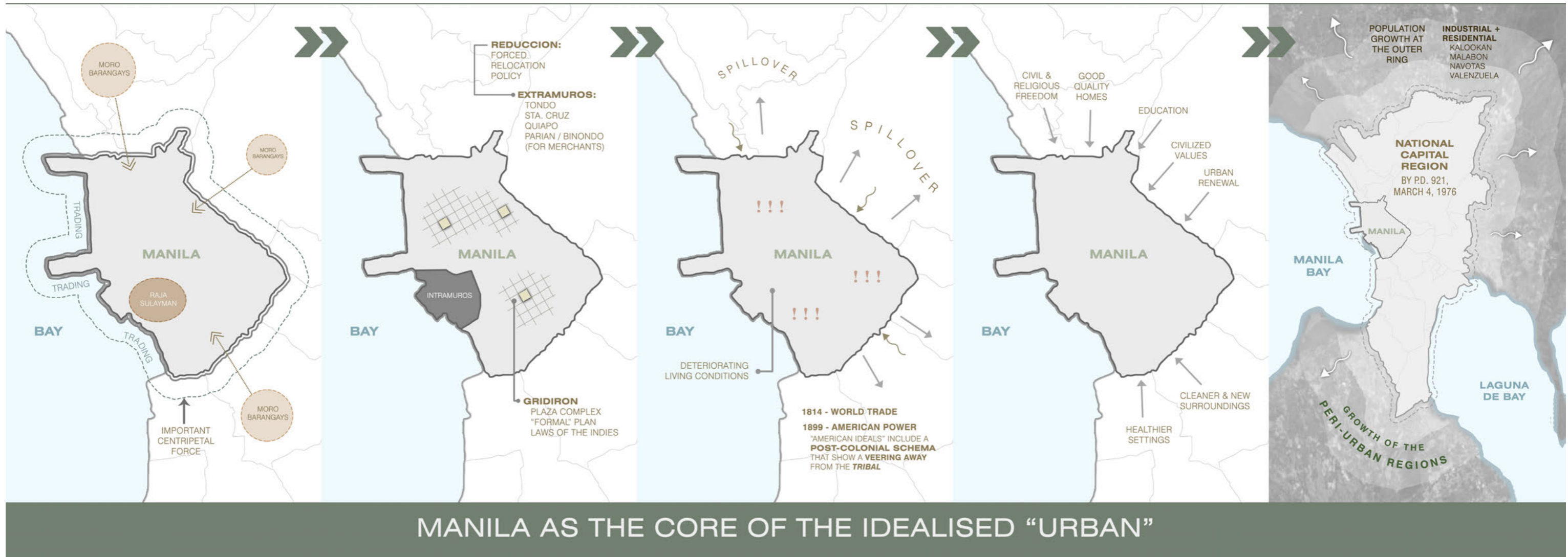


Fig. 1. An Illustration of Manila's Growth
 (Visualisation by Nadal and Aloc, 2020a)

The early concept of suburbanisation was analogous to the Spanish concept of Extramuros explained by Ragrario (2003). Ragrario (2003) showed a version of suburbanisation through the Extramuros districts of old Manila. According to him, the suburbs emerged in Tondo, Sta. Cruz, Quiapo and Sampaloc. These Extramuros districts became relocation areas for Filipino natives to inhabit. Parian, another town currently part of the present-day Binondo, became another suburb designed to follow the same formal plan but catered mostly to Chinese merchants. Overall, Extramuros towns resulted in the segregation of the inhabitants' socio-demographic character and redefined the vernacular, spatial form in the outskirts of Manila.

It was during the Spanish regime in Manila that centralisation of political, trade, and administrative functions provoked Manila to expand. The growth came from the weakness in the plan to centralise functions in Manila as the need for space in this burgeoning urban centre became rampant. As Manila experienced rapid expansion in economic and political functions, the lack of spatial hierarchy occurred, leading to the deterioration of living conditions. It continued to spill over as planning issues in the adjoining countryside and eventually enabled the decentralisation of metropolitan government power. The changes happening in Manila eventually led to sprawl in the human population and spatial functions (Provencher, 1990; Ragrario, 2003; Ortega, 2014).

Eventually during the era of American colonisation, the prevalence of new planning ideologies modified the urban plan for the capital city of Manila. American leaders took legal possession of the Philippines following the Treaty of Paris in December 1898. The existence of various community assemblages led to the search for a strategy to redefine the Philippines' culture, environment, and identity (Morley, 2012). Disassociating the Philippines from its past became the chosen approach wherein American leaders viewed political reform as a solution. It generating an American-led Philippine Commission under the leadership of President McKinley in 1899. Under this government body, the development of urban places became significant in establishing American civic virtue. Developing more urban areas helped the Philippine Commission manage the sporadic settlements. It

also helped establish an ideology for progress that veered away from the arguably tribal, post-colonisation schema. The Philippine Commission established urban reform, civic and religious freedom, access to education and good quality homes. Advancement during this era equated to new outdoor places where people could live and work. It also included the idea of urban renewal as post-war infrastructure demanded cleaner surroundings in new settlements. At the same time, the term healthy settings, as explained by Morley (2012) in his discourse about Civic Design in the Philippines, emerged as a way of reinstating civilised values while creating the familiar and comfortable surroundings that come from the American notions of space applied in the Philippine setting.

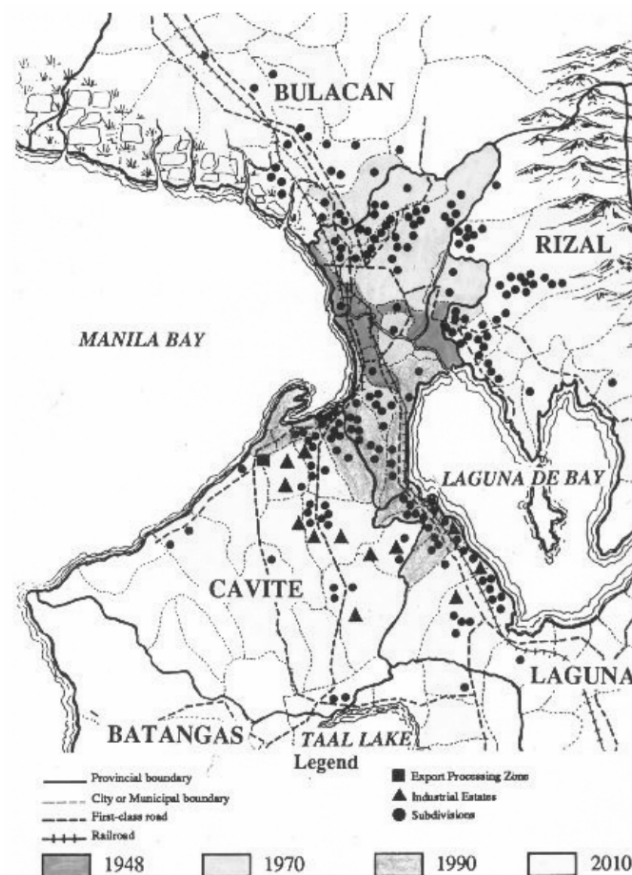


Fig. 2. A rendition of the urban expansion in Metro Manila and the urban fringe (Magno-Ballesteros, 2000, p.8)

During the post-war era, Manila and its fringes went through rapid urbanisation and landscape change (Ortega, 2014). Manila then underwent modifications from planning policies of the late 1970s to the early 1980s. Policies included the provision for incentive

schemes and Industrial Estate programs for industries relocated at the fringe. What also followed were agricultural development programs that fostered the retention of the rural population at its periphery (Magno-Ballesteros, 2000). The policies resulted in a metropolis of geopolitical municipalities like Makati, Mandaluyong and San Juan being added within the urban boundaries of Metropolitan Manila. Quezon City, Pasig, Pasay, and Paranaque were also further developed as locations for planned residential villages. At the same time, Kalookan, Malabon, Navotas and Valenzuela became sites for support facilities and factories for emerging industries (Ragrario, 2003). The agglomeration of Manila, Pasay, Caloocan, and Quezon City, in addition to adjacent municipalities, eventually formalised Metropolitan Manila as a region known as the National Capital Region. The National Capital Region or NCR was declared under Presidential Decree 921 (PD 921), issued on 4 March 1976. As of 31 December 1998, municipalities were reclassified, thus making Metro Manila a region with twelve cities and five municipalities. Metro Manila now formed the more widely known National Capital Region (NCR).

“In 1992, President Ramos identified the region [CALABARZON] as the industrial(s)ation showcase of the Philippines. Within a period of five years, industrial and techno parks, commercial complexes, and residential subdivisions mushroomed in the region. Based on the population and urbani(s)ation trends in Metro Manila and its periphery, the urban expansion by 2010 is projected to take place in CALABAR and Bulacan province at the northern part of Metro Manila” (Magno-Ballesteros, 2000, p.7).

The most significant change to the NCR region was the increase in land prices. The increasing land prices resulted in the movement of industries towards the urban peripheries. The existing body of research on Land Use Planning in Metro Manila and the Urban Fringe: Implications on the Land and Real Estate Market by Magno-Ballesteros (2000) recognised the effect of this phenomenon to adjacent regions of NCR. In this case, the land's commodified aspect shifted development towards the CALABARZON region. With cheaper land prices and a growing area for new industries, the region also had an increase in new settlements (Magno-Ballesteros, 2000). This situation signified the new urbanisation wave in the Philippines.

Urbanisation led to the Philippines' increasing population. In a global population study last 2017, the Philippines ranked 13 in population size with 105 million and an accumulated population percentage of 62.4% (United Nations Department of Economic and Social Affairs Population Division, 2017). It was expected to remain on that level until 2050 (United Nations Department of Economic and Social Affairs Population Division, 2017). The Philippines also contributed to the steadily urbanising population in Southeast Asia, with the country having more people living within its urban areas. This situation was grounded by data showing a 69.40% population increase rate in Philippine cities by 2050 (ASEAN Studies Centre Institute of Southeast Asian Studies, 2010). Furthermore, patterns of high migration of people aged 25-59, the age of most service and labour providers, could also be arguably connected with job demands in the city and its fringes. This migration pattern was also strongly associated with the need for accessible health care, better social mobilisation and, to some extent, gender empowerment (United Nations Population Fund, 2016).

Population data then showed a highly urbanising Philippines. Additional support to this claim was The Republic of the Philippines National Assessment Report by the Asian Development Bank (Singru and Lindfield, 2014), which contained a morphological analysis of the urban and rural population from 1980 to 2010. This analysis signified a rise in the number of people living in Philippine cities. It demonstrated a rise from 37.2% to 48.9% of the population living in cities during the 1980s towards 2010 (Singru and Lindfield, 2014).

The Population Density analysis from the same report showed the burgeoning population in Regions III and IV, geopolitical territories adjacent to the National Capital Region. This population growth projected an increase in population just outside the NCR, projecting movement away from the metropolis. This was hypothetically associated with suburbanisation or peri-urban development in the edges of the NCR, which then caused the sprawl of economic activities toward these directions. Another

possibility of this growing population was infrastructure and settlement development which was growing outside the NCR. It was confirmed by an increasing population size in the peripheral regions, with a 3.86% increase in Cavite, 3.50% in Rizal and 2.89% in Laguna (Philippine Statistics Authority, 2016).

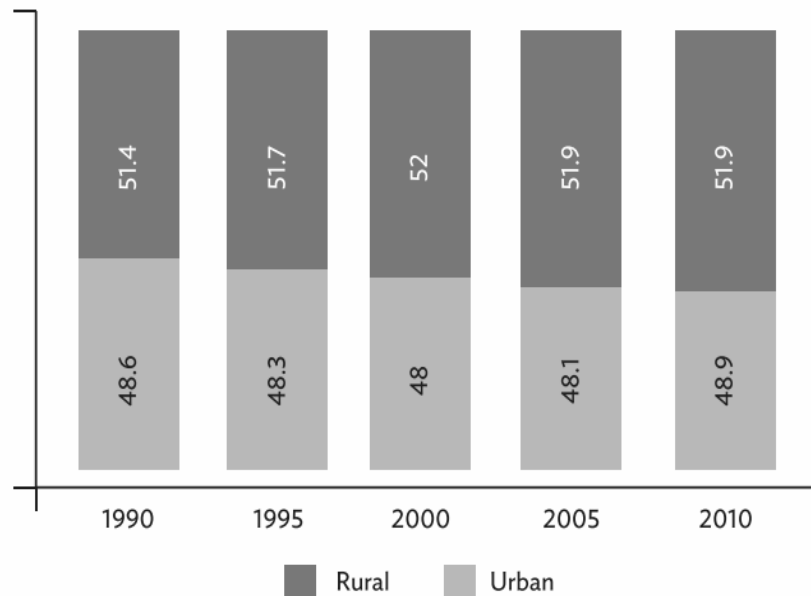


Fig. 3. Visualisation of the Growth of Urban and Rural Populations in the Philippines from 1990-2010 from the Asian Development Bank (Key Indicators 2011: World Urbanisation Prospects cited in Singru and Lindfield, 2014, p.5)

Areas in the periphery of the Philippine HUCs also changed their countryside character. These areas accommodated the growing urban core, sharing the demands for service facilities, shelter, and new industries in cities. Manifestation is felt through the increasing number of people moving to the fringe to resettle and industries relocating to new economic zones. Popular regions in Luzon following this trend were those adjacent to Metro Manila -Cavite, Laguna, Rizal and Bulacan.

The Philippines' peri-urban development was explained in a peri-urban process analysis done by Webster (2002) for East Asia, where he indicated internal and external drivers that impacted the peri-urban growth. His analysis (see Fig. 4) on foreign direct investments, a.k.a. FDI, focused on how it modified East Asian cities. FDI was felt in the Philippines' cities like Manila, where peri-urban development became an expected

outcome of FDI implementation. FDI converted land in adjacent regions of Metropolitan Manila for faster crossflow of public demands. It led to more housing and social facilities and changing cultural and ecological environments.

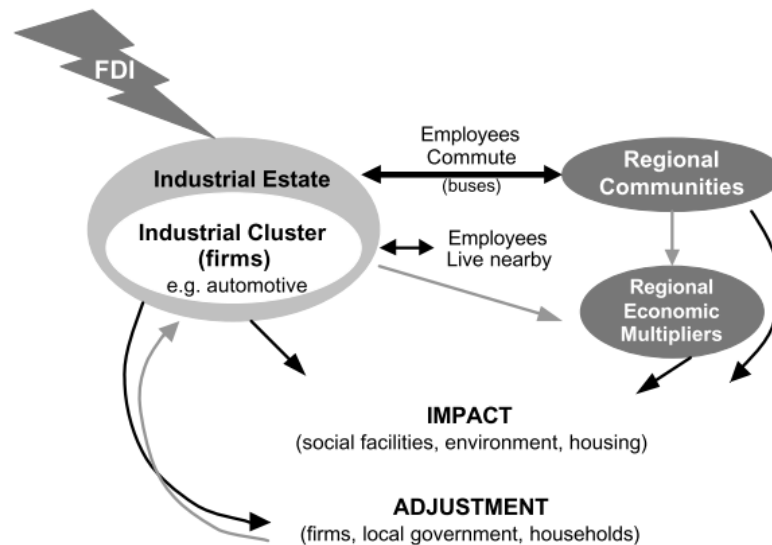


Fig. 4. The Peri-urban Process in East Asia (Webster, 2002)

With all the challenges of peri-urbanisation reaching the peripheries of Metropolitan Manila, the peri-urban regions in the Philippines became essential considerations in planning. Planning mechanisms were then developed to solve these challenges, as shown in the Philippines' National Framework for Physical Planning: 2001-2030 (National Economic Development Authority, 2002). The framework established parallelism to the World Population Prospects' goal of putting the people or population at the centre of sustainable development (United Nations Department of Economic and Social Affairs Population Division, 2017). The National Framework for Physical Planning 2001-2030, also known as the NFPP 2001-2030, was similar to the Seventeen Sustainable Development Goals stipulated in the 2030 Agenda for Sustainable Development (United Nations General Assembly, 2015). What was remarkably similar in this agenda to NFPP 2001-2030 was the eleventh goal. The eleventh goal focused on "making cities and human settlements inclusive, safe, resilient, and sustainable" (p.24). NFPP 2001-2030 contained similar visions and principles for the sustainability of the country's land and physical resources needed to support future generations. Some of the principles were focused on the following: (1) food security, (2) environmental stability and ecological integrity, (3) rational urban development,

(4) spatial inclusion, (5) equitable access to physical and natural resources, (6) private-public sector partnership, (7) people empowerment, (8) recognition of the rights of indigenous populations and, (9) market orientation. With that in mind, the NFPP 2001-2030 developed a Land Use Policy guideline that covered the rules on settlement development, production land use, protection land use and infrastructure development. NFPP aimed to address the sporadic, unplanned development that created physical planning issues and concerns at the policy level.

1.1.2. The Peri-urban Landscape of Cavite

One of the peri-urban areas enveloping Metro Manila is Cavite - a region rapidly urbanising and is presumed to be one of the most affected by Metro Manila's urban sprawl. Cavite is a region with a total land area of 142,706 hectares or 1,427.06 square kilometres, 0.40% of the country's total land area (Province of Cavite, n.d.). Cavite's population of 3,090,691 is considered the largest in the political region of 4-A in the entire country (Province of Cavite, n.d.).

With a political vision as a "First Class, World Class" province (Province of Cavite, n.d.), Cavite progressed as a provincial region with globally competitive planning aims. Cavite's socio-economic profile was also anchored to this vision, with physical development that encouraged the influx of new landscape actors consisting of real estate and economic processing zone investors, new residents from other regions, and local and international tourists (Province of Cavite, n.d.). In this highly globalised vision, Cavite enabled the new regional actors with socio-economic alterations that changed its natural and cultural environment cumulatively. As a result, Cavite became highly urbanised with planning ideologies focused primarily on socio-economic change (Cavite Provincial Planning and Development Office, 2013).

Cavite was then projected to be the most rapidly populating geopolitical region beside Metro Manila through its quantitative determinant of population density. It had the

highest population growth rate of 3.86% amongst the regions enveloping Metropolitan Manila, closely followed by the other regions that envelope this HUC: Rizal in its East with a 3.50% projection, Laguna at the Southeast with 2.89% and Bulacan at its North with 2.57% (Philippine Statistics Authority, 2016). Cavite's population growth rate was seen in its population density of 1,466 persons per sq. km and its predominant urban land area of 88.03% (Province of Cavite, n.d.). This situation was hypothesised to result from Cavite's inclusion in the CALABARZON Special Development Project, where "CA" pertains to Cavite. Development of the urban sprawl areas was one of the development project's results (Province of Cavite, n.d.).

Cavite's landscape changed rapidly with international and local migration catalysing new forms, patterns, and functions of spaces (Douglas, 2006; United Nations Department of Economic and Social Affairs Population Division, 2017). Cavite also supported nearby areas with residential developments built on once green fields or *haciendas*.

City/Municipality	Number of Barangays
1st District	143
Cavite City	84
Kawit	23
Noveleta	16
Rosario	20
2nd District	73
City of Bacoor	73
3rd District	97
City of Imus	97
4th District	75
City of Dasmariñas	75
5th District	105
Carmona	14
Silang	64
Gen. M. Alvarez	27
6th District	113
Trece Martires City	13
Amadeo	26
City of Gen. Trias	33
Tanza	41
7th District	223
Tagaytay City	34
Alfonso	32
Gen. Emilio Aguinaldo	14
Indang	36
Magallanes	16
Maragondon	27
Mendez	24
Naic	30
Ternate	10
Total	829

Source: Provincial Planning and Development Office

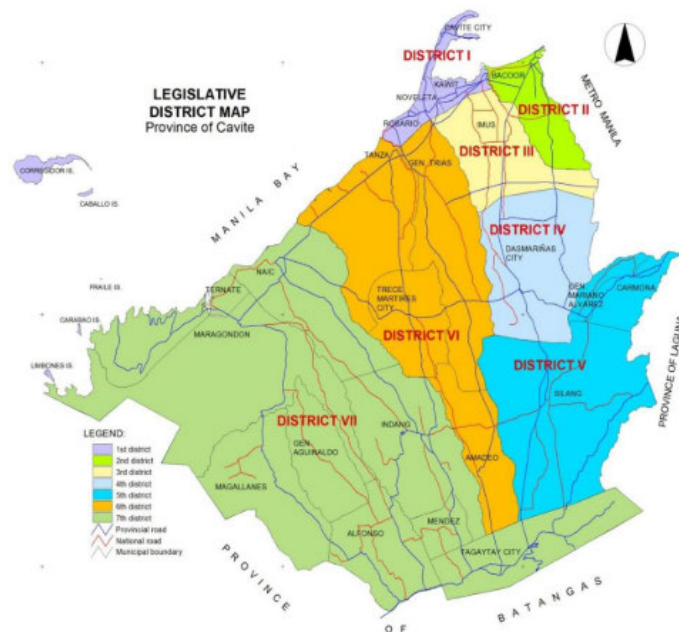


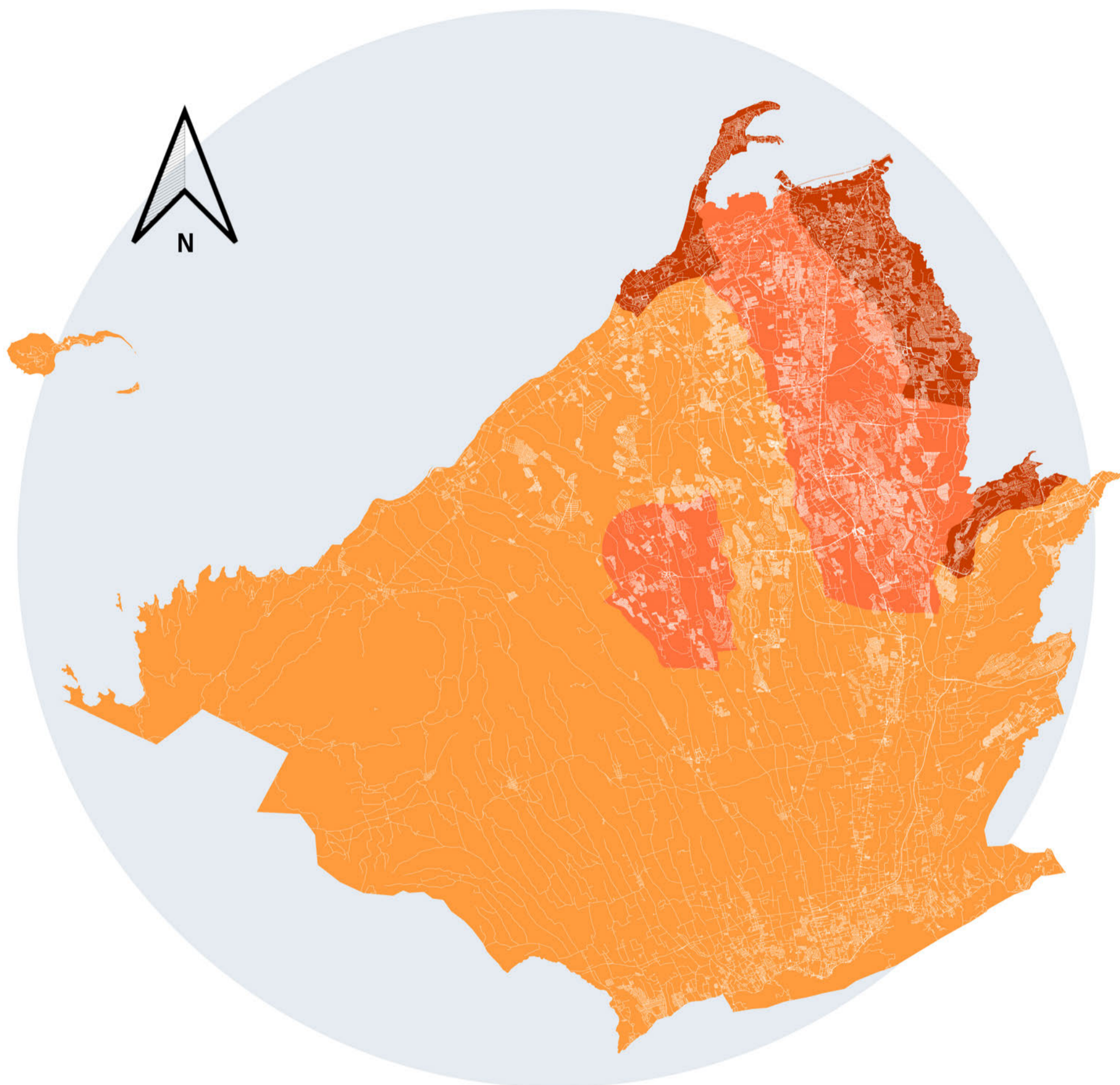
Fig. 5. The Cavite Region showing the Political Boundaries and Units
(Cavite Provincial Planning and Development Office, 2017)

Cavite's economy leaned towards achieving the "First Class, World Class" vision. To achieve this, Cavite followed a Provincial Development and Physical Framework Plan

2011-2020 or PDPFP 2011-2020 (Province of Cavite, n.d.), a 10-year plan containing pertinent data prepared as the operational guidelines of this vision. This PDPFP helped fulfil the guidelines the National Economic and Development Authority or NEDA set for processing the region's budgetary expenditures. As it is primarily grounded in economic factors, most of the information within the PDPFP focused on integrating economic and regional development that were ideologically progressive, in this case, grounded in the achievement of its global aims (National Economic Development Authority, Provincial/Local Planning and Expenditure Management PLPEM Guidelines, n.d.). As a result, Cavite's regional employment share rose to 99.56% for its secondary (manufacturing) and tertiary (retail, trade, hotels, restaurants, transport, storage, communication, finance, real estate, social security, public administration, education, health, social work, and other social/personal services) service sectors, a significantly higher number that also led to the decrease in primary agriculture sector shares to 0.43% (Province of Cavite, n.d.). This percentage share validated the agricultural land's diminishing value in a region geared towards a new spatial development trend. As the secondary and tertiary sectors influence spatial growth, they also shifted land development towards new town development, resettlement projects, export processing zones and new industrial complexes (Remedio, 1996; Wu, 2009).

Cavite's adaptation to peri-urbanisation was also felt on the regional scale, as shown in the population map in Fig. 6. In this visual representation, Cavite seemed to adapt to the urban influences from the upper northwest - the region closer to Metro Manila. The map showed this in the form of clustered development in this portion of the peri-urban region, thus strengthening the claim that Metro Manila could have been highly influential to the changing landscape character of this region.

POPULATION MAP OF CAVITE, PHILIPPINES



Capturing the Dynamic Character of the Philippine Peri-Urban Landscape: A Landscape Character Approach for the Region of Cavite

Map Generated: June 2020
 Adapted Map from References: Cavite Provincial
 Development and Physical Framework Plan 2011-2020,
 PhilGIS, and OpenStreetMap

0 5 10 15 20 km

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MAP LEGEND

- 0-2500 persons per sq.km.
- 2501-7500 persons per sq.km.
- 7500 and above persons per sq.km.

Fig. 6. Population Map of Cavite, Philippines, adapted from varied references
 (Visualisation by Nadal and Alanano, 2020)

Cavite also adapted to peri-urban forces as early as the Spanish colonial era when its upland and lowland landscape resources became essential in galleon trade. These resources drove the creation of earlier forms of capitalisation of natural resources. The harvest of these resources attracted colonists to the region for easy access to resources needed for trade and construction. The identification of these resources in Cavite also drove the creation of industries associated with the galleon trade sector, which added to the already rising agricultural industries of estate *haciendas* known as food production areas to supplement needs of its nearby town of Manila.

Aside from the population data developing narratives of urban influences on Cavite's landscape, another discourse that emerged was the effect of peri-urbanisation on the local place identity of affected regions like Cavite. This situation was linked to Troughton's (1981) evaluation of the centrifugal and centripetal forces that modified peri-urban spatial identity. He argued that a spatial cluster of residential lots, quasi-farms or rural estates became typical spaces in the peri-urban, and these new forms resulted in a prevalence of new landscape units in the rural-urban fringe. Chase, Crawford, and Kaliski (2008) also supported this claim with the discussion on lifestyle change of peri-urban dwellers. The change was manifested as the transport-driven, commuting population. It influenced the new form of transport-oriented landscape, which was argued as incoherent, repetitive, sporadic, and automobile-centric. The transport-oriented populations also led to new linear development of strip malls, supermarkets, road support facilities and sporadic vacant lots.

Understanding Cavite's peri-urban landscape was even more challenging as it accommodated the region's economic goals, shifting it away from sustainable directives. Some of the observed development directions of Cavite included three public service-oriented visions for good politics in good governance, 6-17 Challenges for better social infrastructure, and a Cavite that is open for business, allowing the development of measures that can increase the region's carrying capacity for more industries (Province of Cavite, n.d.). These regional aims developed as responses to intersectoral issues of Cavite, shifting into policies that are primarily industry driven. This focus also led to the disinterest in

landscape planning conversations with development now covering mostly industry-led development.



Fig. 7. Image of Cavite City with the present landscape of road networks, heritage homes, local transport, and utility networks



Fig. 8. Image of the uplands of Tagaytay City with the present landscape of high-rise residential buildings and sporadic land use

Despite the lack of data showing landscape resources as an essential aspect in Cavite's development, several regional strategies contained plans to sustain the quality of its cultural and natural resources. A "6-17 challenge" strategy, developed closely aligned to SDG Goal 11 (United Nations General Assembly, 2015), was one that responded to the need to sustain the quality of spaces in cities and communities. This strategy refocused Cavite's development plans on developing quality spaces through a livable environment. Unfortunately, this strategy of establishing sustainable cities and communities did not adequately articulate landscape resource planning in Cavite's PDPFP 2011-2020 (Province of Cavite, n.d.). Instead, the depleting character of landscape (see Goal 11 of the Sustainable Development Goal Agenda, United Nations General Assembly, 2015). Instead, the establishment of the SDG goals exposed the significant gap in Philippine landscape territories like Cavite as these proposals to integrate peri-urban cities and their communities in sustainable planning directives were generally not adapted in Cavite's regional plan.

Cavite's landscape functions and definitions eventually became challenged by planning policies set at a regional scale. Its landscape became units of values and meaning, a landscape that would have been a reference to the region's natural and cultural properties presently subjected to peri-urban drivers of changes. These units also formed cultural patterns from natural laws and ecological processes, making it essential to provide context-sensitive planning directives (Pagano, 2011). Hence, the challenge of understanding the culture-nature interface and presenting them in proper form and pattern was at the forefront of the discourse.

Another important key point to know about Cavite's peri-urban landscape was its geophysical environment (Cavite Provincial Planning and Development Office, 2017). The region enjoined the country's archipelagic nature by having nine islands totaling

142,706 hectares (Province of Cavite, n.d.). In addition, Cavite was also home to seven mountains, six major river networks, and nine identified springs and falls. These landforms and hydrologic system suggested a tributary flow network that connected the whole region from the Tagaytay area's highlands towards the bay and volcanic crater lake found at its lower points (Province of Cavite, n.d.). This robustness of land and aquatic resources and its adjacency to four central bodies of water, namely the West Philippine Sea, the Manila Bay, the Canacao Bay, and Bacoar Bay, made Cavite highly capable of contributing to the country's mineral and aquatic production.



Fig. 9. Image of the upland area of Maragondon, Cavite

Cavite was also known to contain four physiographic areas of division (Province of Cavite, n.d.) namely,

1. the lowest lowland area or the coastal plains,
2. the lowland areas or the coastal and alluvial plain,
3. central hilly or rolling tuffaceous plateau, and
4. the upland mountainous area of flat to rugged topography.

This geophysical environment rooted in its archipelagic and volcanic land character was also hypothesised as highly influential to peri-urban growth. It opens more industry types and tourism possibilities for the region as resource types were proven to abound.



Fig. 10. Image of the lower river area at Maragondon, Cavite

However, land suitability varied in Cavite as areas developed from agricultural roots to settlement and new commercial zones while still hosting the Mt. Palay-Palay-Mataas-na-Gulod Protected Landscapes as a protected site. This was supported with a 2017 Cavite Ecological Profile (Cavite Provincial Planning and Development Office, 2017), which thoroughly explained the landscape character of the region. The varied character of Cavite's slope and land, spanning from the mountainous upland to the central hill of its western coastal lowland was already important information that must be considered in planning. This land character of Cavite was also equated to its biodiversity index, which was relatively higher than nearby regions due to its still existing, although arguably fragmented, forested habitats (Cavite Provincial Planning and Development Office, 2017; Lagat and Causaren, 2019). This region's characteristic was also one of the reasons why it was highly vulnerable to changes caused by natural and land-based disasters.

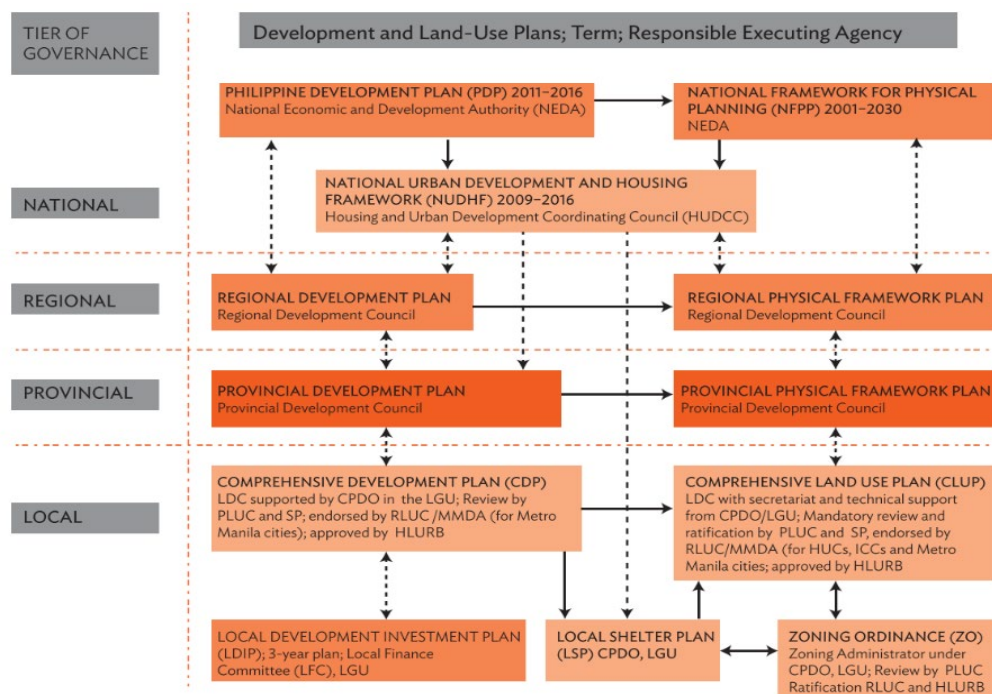


Fig. 11. Image of the Active Taal Volcano from the Picnic Grove located in Tagaytay City, a town in Cavite

One situational example involved the landforms near Cavite known as the Taal volcano – a distinct landform adjacent to the region best viewed from the highland areas of Tagaytay. Taal volcano started erupting last 12 January 2020 (Philippine Institute of Volcanology and Seismology 2021), which then shifted discussions on how Cavite's landscape may recover not from the peri-urban processes but rather from the forces of its natural environment. In addition, it shifted discourse to Cavite rehabilitation as the land would need to recover from the devastation of natural disasters caused by volcanic activity. This situation also prompted many high-risk areas within this rapidly developing region to halt development for a few months as caused by the volcanic eruption that started in January 2020 and continued to be active until today. The land character caused by this very active volcano situated just adjacent to Cavite also led to this hypothetical dynamism of the region – its geophysical character could be the more influential force to balance the decisions and actions towards its landscape. Despite this, the volcano and its risks had been the basis for spatial planning in the region. Although there may be attempts to profile landscape characteristics as essential components in the plan, there was none that was able to consolidate these into systematic data useful for planning at the policy level.

1.2. Identifying the Peri-urban Landscape Challenges in Philippine Planning Frameworks

This lack of a systematic procedure to synchronise landscape character data was then identified as a challenge in Philippine planning in general. The severity of the situation was felt when the Philippine comprehensive land-use plans and ecological profiles showed a landscape that was not recognised as a planning baseline, let alone integrated as a data system that can help direct development towards sustainable directions. However, the landscape seemed to exist in layers of data in the form of cultural maps and ecological maps and, although helpful, were not yet bound as consolidated landscape units that may be valuable in sustainable planning frameworks.



CPDO = City Planning Development Office, HLURB = Housing and Land Use Regulatory Board, HUCs = highly urbanized cities, ICCs = Independent Component Cities, LDC = Local Development Councils, LGU = local government unit, MMDA = Metro Manila Development Authority, PLUC = Provincial Land Use Committees, RLUC = Regional Land Use Committee, SP = Sangguniang Panlalawigan.

Source: Author's analysis.

Fig. 12. Philippine Urban Planning Framework
(Singru and Lindfield, 2014, p. 19)

Peri-urbanisation brought problems to Philippine landscape architecture research and practice. What it brought were more challenges to a developing country like the Philippines where landscape data availability and recognition remained inferior to none. This lack of landscape recognition was a problem linked to the Philippine Urban Planning framework (see fig. 12) as land in this level of spatial planning is never introduced or included in any tier of governance policies. With no management plan focused on the landscape itself, integration through recognition of these important data may be difficult to achieve in Philippine planning.

1.2.1. Challenges of Integrating Landscape Data in Philippine Planning Frameworks

For the past years, a growing awareness of landscape through the landscape architecture profession developed in the Philippines. Despite this, an increase in the challenges of creating valid landscape data as a baseline for policies and management action plans consistently accelerated. Alongside this challenge was an unprecedented increase in the many urban challenges of a country where a consensus on the definition of the landscape is not available at the policy level.

The multi-tiered approach in Philippine planning and the economic-driven aims added to its many landscape-related challenges. The number of government sectors regulating planning policies added with bureaucratic administrative structures focused on economic growth strengthens the already difficult to resolve landscape challenges to the country's planning frameworks (see Fig. 13 and Fig. 14). This planning governance structure adds to the problem of neglect in planning policies, with regulations imposed in each tier of planning and in implementing guidelines of development plans not responding to more specific goals of developing landscape-based resolutions for the Philippines.

Activity	HUDCC	NEDA	HLURB	Local Governments	Regional Development Councils	DOT	DOJ-LRA	DENR-LMB	DILG-BLGD	NAMRIA	DOTC	DPWH	Public Development Agencies	Private Sector
Policy														
National	•	•				•					•	•		
Local		•			•									
Land Use Management														
Overall planning		•												
Land records							•	•		•		•	•	
Land management								•					•	
Physical planning			•											
Monitoring local plans									•					
Mapping and data										•		•		
Land Use Planning														
Regional		•	•		•		•							
Provincial			•	•										
City and Municipal			•	•										
Development Planning														
Regional		•			•									
Provincial		•												
City and Municipal				•										

DILG-BLGD = Department of the Interior and Local Government-Bureau of Local Government Development, DOJ-LRA = Department of Justice-Land Registration Authority, DOT = Department of Tourism, DOTC = Department of Transportation and Communications, DPWH = Department of Public Works and Highways, HLURB = Housing and Land Use Regulatory Board, HUDCC = Housing and Urban Development Coordinating Council, NEDA = National Economic and Development Authority.

Note: Public development agencies include Metro Manila Development Authority, Subic Bay Metropolitan Authority, Clark Development Authority, Bases Conversion Development Authority and Public Estates Authority, and other integrated area development agencies with Urban Development Planning Functions.

Note: Orange = national; black = local.

Source: ADB. 2009b. *Philippines Basic Urban Services Sector Project*. Final Report. Manila.

Fig. 13. Areas and Responsibilities for Planning in the Philippines
(Singru and Lindfield, 2014, p. 18)

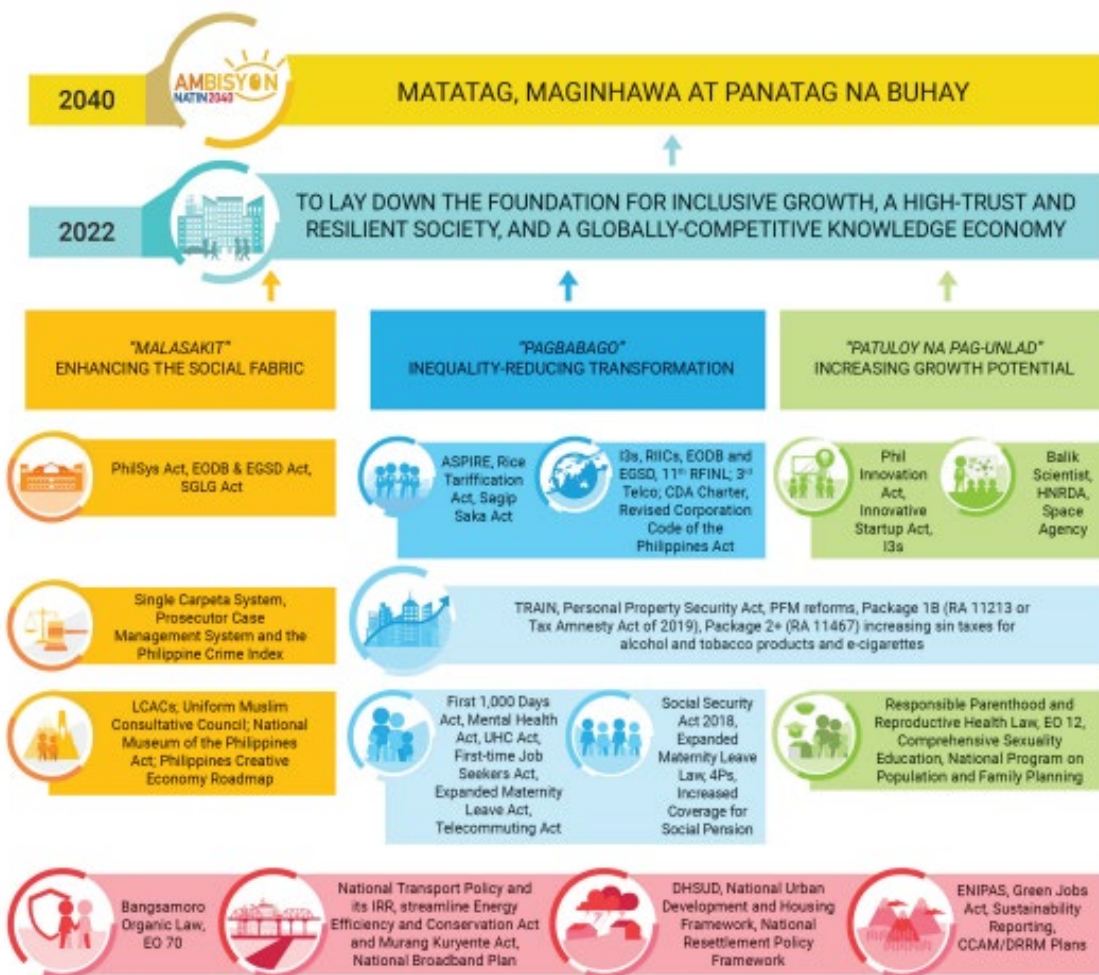


Fig. 14. Philippine Development Plan 2017-2022 or PDP 2017-2022 Overall Strategic Framework and Structure (National Economic Development Authority, Updated Philippine Development Plan 2017-2022, n.d.)

An example of a development framework that lacked specific landscape resolution was the Philippine Development Plan 2017-2022 or PDP 2017-2022 (National Economic Development Authority, n.d.). In the framework, there was clear evidence that landscape components are being considered in several policy frameworks, yet mechanisms to resolve it have been very economically driven. More often, the components are within implementation policies engaging appropriation of land towards economic goals - a challenge as landscape vulnerability became forsaken in this development proposal. Despite this, PDP 2017-2022 still contained sections where landscape opportunities were possible, mainly in the proposed policy frameworks safeguarding cultural and natural attributes of the land as heritage components to preserve and conserve for future generations. Unfortunately, the identification of these

conversations in the text was kept within cultural and tourism development programs, not specifically as the goal of the development plan.

1.2.2. The Unavailability of Landscape-based Approaches as the Sustainable Initiative Philippine Peri-urban Landscape Challenges

Unfortunately, the urban growth crisis did not end with the drive to bring landscape towards the field of Philippine urban planning. Instead, the growing city also challenged planners to resolve its effects on adjacent regions accommodating the sprawl. In this situation, it became more than just a changing landscape issue, but also a landscape that may not be sustained in cities and their fringes (Ween, 2014). The movement towards the city and its fringes became difficult for the landscape as it added pressure to the ecological and cultural environment.

In hyper-urbanisation that expanded the city and branches to the interface of urban and rural areas, peri-urban landscapes were pressed with challenges stemming from globally competitive and progressive development aims. This situation was why this thesis was timely and valid.

As possibilities became boundless for landscape in the global planning scene, the thesis also brought chances for new methodologies to be introduced, strengthening the claim of landscape as the solution to the Philippine planning scene. These became valid reasons to analyse further, what can be established as the Philippines landscape plan.



Fig. 15a. Pressures of land-use change and sprawl as shown in an aerial photo of Cavite

Going further in this narrative, the alarming situation of the peri-urban landscapes of Cavite emerged as the one that should be immediately resolved. Landscapes in Cavite faced different design conventions answering the need of the changing landscape dwellers - in most cases are migrants that relocated to the peri-urban areas outside Metro Manila (Ramos, 2015). The landscapes influenced dwellers as manifested in settlement and industrial growth. Alongside the adaptation to the increasing population, the landscapes also dictated the development potential. Cavite was rich not just with its natural and cultural resources but also with good access to prime locations - accessibility to good infrastructure networks to the urban Metro Manila. Also, the landscape was varied, with choices that range from the uplands, the riparian, and the coastal attributes (Medina, 1994).



Fig. 15b. Pressures of land-use change and sprawl as shown in a photo taken at Bacoor City, Cavite

Cavite was eventually observed as a region with cultural and natural environment potential. Cavite's high number of cultural properties, compared to the other peri-urban regions adjacent to Manila, brought it to the forefront of devising cultural management solutions. Also, the region hosted protected forest reserves, with the most distinct being the Mount Palay-Palay-Mataas-na-Gulod Protected landscape (Cavite Provincial Planning and Development Office, 2013).



Fig. 15c. Pressures of land-use change and sprawl as shown in a church ground and plaza being converted as parking and roadways in General Trias, Cavite

Supporting the list of challenges found in Philippine peri-urban areas were observations on relocation and socialised housing projects in Cavite. Populations living in impoverished communities or regions affected by disasters (Philippine Institute of Development Studies, 2014) moved from disaster-prone locations in the HUC of Manila towards the resettlement housing units planned at the fringe. The move shifted a lot of agricultural and unused land into relocation housing projects, leading to a hypothetically fragmented landscape. It was a discourse that should not be left unaddressed moving forward as it drastically changed Cavite's landscape from residential land into agricultural land use. Another effect observed in the landscape was the lower quality of living spaces created in these relocation blocks, driven by standards imposed by housing policies. Regardless of the excellent views of the countryside and the idyllic locations on the outskirts, the resettlement villages were blight - situated in the middle of open fields or in hard-to-reach locations challenging to access by public transportation. Along with this were locations situated in the middle of once forested areas converted into high-density housing (HDH) zones, housing that maximised housing units on limited land. The quality of these spaces was the direct opposite of the thematic villages and resorts also found in Cavite.

What was also evident in Cavite was the proliferation of thematic villages that resonated the "American Dream" (Ortega, 2018). The influence of the west was felt in suburbia like Cavite, shown in residential villages with idyllic gated homes. A rising number of themed subdivisions were observed in the region, along with sprawling open spaces and recreational commercial and golf club complexes.



Fig. 15d. Pressures of land-use change and sprawl as shown in a photo taken at a golf country club in Cavite

Further to this was a landscape challenge related to the relocation problem brought into the discourse through Magno-Ballesteros (Philippine Institute of Development Studies, 2014) argument on the missing link of social and environmental concerns in nation-wide planning policies. Placemaking or designing spaces that create a sense of place was an afterthought in the relocation site plan (Philippine Institute of Development Studies, 2014). It was supported by another report that Magno-Ballesteros (2000) wrote on the HDH situation of Metro Manila where the shift of the land and real estate market from agricultural farmlands towards HDH was seen to be causing the depletion of the "agricultural lands and open spaces" (p.9).

All these observations became one of the drivers to developing this research - as landscape-based approaches to solve all these challenges were still unavailable in the country. This landscape architectural inquiry became the turning point of discovery - the need that should be addressed by a landscape-based plan.

1.3. Setting the Aims and Visions of the Research Work

With the problems identified in the Philippine planning framework, this thesis was then planned. This thesis aimed to solidify the practicality of landscape in the Philippine planning frameworks as the landscape-based solution to problems brought by peri-urbanisation. It aimed to provide access to landscape data, becoming the sustainable approach to ecological and cultural challenges of peri-urban regions like Cavite. With this vision in mind, a landscape character system was suggested to become a baseline database to sustain the quality of peri-urban landscapes amidst rapid urban development.

In this vision of providing landscape data access in a form that can easily be applied in spatial planning frameworks, the proposed research product called the Landscape Character System (LCS) for Cavite, Philippines, suggested a mapping technique that can capture the dynamic character of the Philippine peri-urban landscape in the case study site of Cavite. It proposed utilising landscape data for planning to resolve the identified challenges of the peri-urban region. It combined characteristics taken from people and environment; nature and culture; old and new; rural and urban; countryside and city - all essential in understanding and solving the challenges of Cavite. From this listing of dichotomous notions of space, the landscape was considered a manifestation of values that form syntax. Through this integration, landscape attributes were synced, with the diverse landscape actors becoming valuable tools in navigating environment-sensitive to all dimensions of space and place.

Visions from Ortega (2011, 2014, 2016, 2018), another Filipino researcher and geographer who brought an expansive literature discourse on the importance of the Filipino diaspora affecting places in peri-urban Cavite, also served as a basis to proceed with this thesis. Ortega further established the need to focus research on the peri-urban area, where data is considered weak. He explained how this new form of the urban area became one that should be understood, with changes that happened within its boundaries as the spatially reliable basis to solving its many problems.

Spirn (1998) also saw the landscape as a language that can identify attributes that should be valued not just in dialogues but also in any planning decisions moving forward. Spirn's study developed measures that utilise the landscape syntax to understand and design quality living spaces.

Strengthening the need to find a solution to the landscape situation of Cavite, the landscape was then envisioned as a system and a framework for understanding its past, present, and future character. With the urban challenge at large, the landscape can then demonstrate a landscape character shaped by cultural and natural forces shaping the land. Ultimately, Cavite's landscapes must be understood as an entity that needed attention in the spatial land plans.

The overall goal of the thesis was to design the Philippine's Landscape Character System (LCS) that combines important attributes of Cavite into manageable, adaptable, and relatable forms and patterns for integration into the planning framework. The goal was congruent with McHarg (1969), Albrechts (2001), Albrechts et al. (2003), and Healey's (2007) ideas, among others, in their concept of landscape as the plane of change and discovery - the landscape itself must be understood as the receptacle of strategic spatial planning decisions.

The LCS was just the beginning in the quest to make Filipinos connect and see value in their landscapes. To begin, the LCS will become the database of the peri-urban landscape (PUL) characteristics of a region identified as Cavite. As applied in Cavite, The LCS will also provide a detailed description of the landscape typologies, expanding knowledge of landscape from its spatial patterns and multi-dimensional values as extracted from experiential landscape discoveries of Filipinos engaged in their landscape.

As one of the first research on landscape characterisation for the country's peri-urban region, the thesis also aimed to understand the specificity of this localised method as a basis for adding value judgement to one of the regional landscapes found in the Philippines.

1.4. Research Gaps

Research gaps were then presented from the challenges mentioned earlier because of the reviews on literature related to the Philippine peri-urban landscape. These gaps were introduced as encountered in scanning the Philippine landscape setting. A more detailed explanation of the peri-urban landscape setting and the literature connected to characterisation as the envisioned solution to be explained in Chapter 2.

One of the gaps identified in the Philippine landscape setting was *the lack of understanding of the landscape itself*. This lack of understanding led to the landscape's vulnerability to urban processes. This situation also pressured the countryside landscape, especially areas affected by peri-urbanisation, to adapt to the urban processes causing detrimental effects on settlements and ecosystems (Coxhead and Jayasuriya, 2003; Carr, Suter, and Barbieri, 2005). It was seen in the case of Cavite, where culture and nature attributes were pressured to change to meet its "First Class, World Class" regional urban vision (Province of Cavite, n.d.).

Moreover, *the landscape is not defined in the Philippine urban plans and planning frameworks- a challenge that continued in its fringe regions. It created a Philippine plan that lacked a landscape-based system that may express ecological and cultural characteristics as baseline references to sustainable actions for urban adaptation*. It was proven with economic-driven development framework plans in the Philippines that show problems on the detachment of environmental attributes in conversations about regional planning. Operative procedures and guidelines were also primarily focused on zoning, housing, and economic functions rather than ecosystem or landscape functions (Navarro, 2014).

Further to the gaps seen was a Philippine planning framework that separated natural and cultural attributes in local planning, thus resulting in the *lack of measures to*

integrate and intersect nature-culture attributes as the sustainable solution to challenges of the Philippine planning frameworks. The Philippine planning frameworks were crafted without properly recognising landscape as integral components to link cultural and ecological environments in planning. Furthermore, the situation became a research challenge as landscape data and essential information grounding sustainable planning solutions were still insufficient for the regional land plan. This situation was evidenced by the lack of integrated, localised, landscape-based syntactic systems. This was further supported by the peri-urban regional framework of Cavite that lacked strong landscape inclusive solutions for its planning challenges.

Ortega's spatial narrative provided a brief background on how this gap was unaddressed. In his interview with Ramos (2015), Ortega opened discussions on the missing place attachment of people to the peri-urban by emphasising the case of the Canlubang Sugar Estate. Ortega's emphasis on this case expressed the lack of spatial value that would have been useful in safeguarding culturally valued places, as examples like this now succumbed to land development. This case triggered a disappearance of land-based stories tied to the Sugar Estate. These cultural land-based attributes were intangible values known as past stories that have been forgotten. As a result, present peri-urban areas became devoid of the local character attached to them. In the quest to identifying the importance of peri-urban landscapes, Ortega's (cited in Ramos, 2015) research uncovered the need to investigate peri-urban histories and familiarity to these as essential factors towards safeguarding landscape characteristics of peri-urban areas.

This information gap on the landscape was again observed to be caused by *the lack of sustainable future actions to urbanise landscapes like Cavite's*. The lack of sustainable measures that can sync nature-culture attributes as a landscape that can become the basis for a more sustainable landscape future for the region had not been explored in the narratives for the local land plan. This challenge was essential in areas rapidly adapting to peri-urban processes like Cavite. In this case – the proposal to implement

landscape character systematisation in the Philippine planning scene, as an envisioned solution, reflected compliance with the U.N. Sustainable Development Goals (United Nations General Assembly, 2015). This additional tool in planning was developed to strengthen sensitivity to the existing valuable attributes of nature and culture. This premise grounded the possible pursuit of landscape-based tools for planning region-wide spaces in peri-urban areas.

Also, Cavite's landscape responded to urban changes, a phenomenon that necessitated the need to find management and planning solutions. The landscape needed management and planning strategies that were more often parallel with the U.N. Sustainable Development Goals (United Nations, 2015), if and only if they were in place as tangible solutions that Cavite may use to move landscape planning and development forward.

1.5. Research Questions

The gaps mentioned were effects of hyper-urbanisation (Allen, 2009; Webster and Muller, 2009) that pushed development towards the peri-urban regions like Cavite. As a result, the landscape hosted complex dichotomies of space, moulded into a conglomeration of landscape units that needed to be understood and defined.

The questions were then formed from the gaps identified in the current Philippine landscape. The question was framed with the premise that the systematisation of data was critical to solving the many gaps in Philippine planning frameworks. From the main research question, sub-questions were also prepared with points of enquiry that the thesis may be able to answer:

- 1. How can landscape-based approaches capture and systematise existing landscape character data of Cavite as a basis for the repository of information suitable for the Philippine planning framework?**
- 2. How can a landscape character system for Cavite communicate responsive solutions as the sustainable action for its landscape plan?**

The thesis became anchored on both questions. These questions provided reasons for developing procedures to systematise landscape information into sets that formed description units of image, processes, and structure attributes. It was necessary to be able to create a landscape character system that may provide a framework of nature, culture, and place attributes as a basis for sustainable solutions for challenges within the cultural and natural environments of the Philippines. This situation was hypothetically achievable with catalogued descriptions that are easy to understand or devised to help explore assessment strategies for peri-urban liveability and environmental sustainability.

The research challenge of mapping the landscape then relied on how people see the landscape in different formats highly reflective of the landscape affordances and cultural attributions presently attached to Cavite's peri-urban landscapes. In projecting its characteristics, the result of the research was then important in providing a transparent image of the man-nature engagement and the planning directions that balance man-nature ideals.

Chapter 2.

The Dialectics of Landscape in Urban, Peri-urban, and Culture-Nature-Place Theories and Models

This chapter reviews theories and modelling frameworks influential in the landscape character extraction procedure created for the Philippines. It will demonstrate a comprehensive summary of theories and global examples influencing the proposed solution to Philippine peri-urban landscape challenges.

Studies were undertaken to show how culture, nature, and place attributes are imperatively connected to the landscape, and the way in which patterns, connections, and forms are essential in preparing a comprehensive landscape character system plan. This information is included in this chapter to demonstrate the causal relationship of the landscape towards the mechanisms in culture-nature-place models where landscapes became viewed as objects and settings of cultural, natural and place expressions.

In this chapter, landscape definition in culture-nature-place definition models will become references in building a landscape-responsive planning strategy for the Philippines. These models will also be analysed in respect of the issues they surface for broader discourse in landscape and urban theory.

In Sporn's words, "the language of landscape is our native language" (1998, p.15). This perception of landscape originated not just from its syntax of spoken, written, read, or imagined form; but also from how it became perceived as a living object expressing meaning. This was regrettably not always the case. Before Carl Sauer connected dialectics of the land with the landscape in 1925, the landscape had almost no significance (cited in Robertson and Richards, 2003).

To address the issue of landscape interpretation, Wascher (2005) was one of those who provided a superb overview of the landscape notion in the arts, perception, philosophy, cartography, and the natural sciences. Fig. 16 illustrates the broad range of potential applications for its interpretation and integration - an attempt to create a landscape as a system and repository of multifaceted patterns, forms, and networks in varied fields.

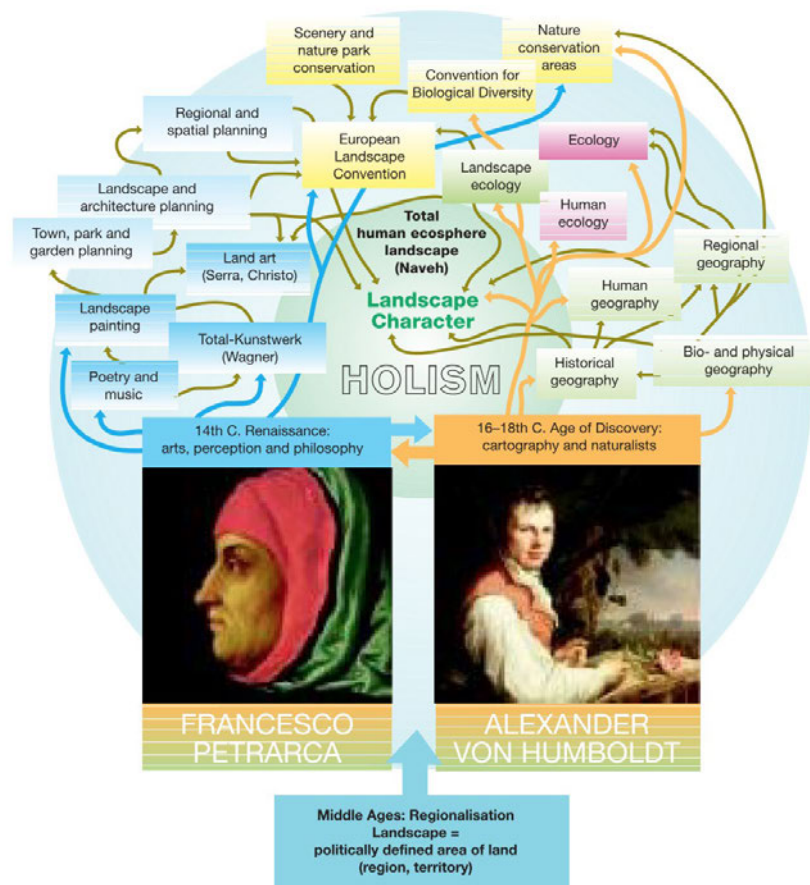


Fig. 16. A Modelling of the Historical Origins of Landscape Research (Wascher, 2005, p.2)

Supporting this claim by Wascher (2005) was literature that was not silent on the landscape as one that can be bound within different modelling systems- a phenomenon explaining the landscape because of social, political, economic, and spiritual processes. From this perspective, the landscape became a product of human interpretation of land and its character (Robertson and Richards, 2003; Taylor et al., 2015, pp. 1-5). By applying the theory of differing modeling techniques, it was possible to analyse the landscape through different sociological, cultural, and environmental lenses in order to make various interpretations of its character. What seems to be a reoccurring touchstone was a landscape that is symbolic of "...our past, our present, our future and our evolving relationship with the natural environment" (Robertson and Richards, 2003, p.2). Landscape, in a way, was not a static object, nor was it mainly situated in this ideological platform. Within the landscape were elements that change. Together, natural, and cultural attributes later shaped what can become known as place identity (Swanwick, C. and Land Use Consultants, 2002).

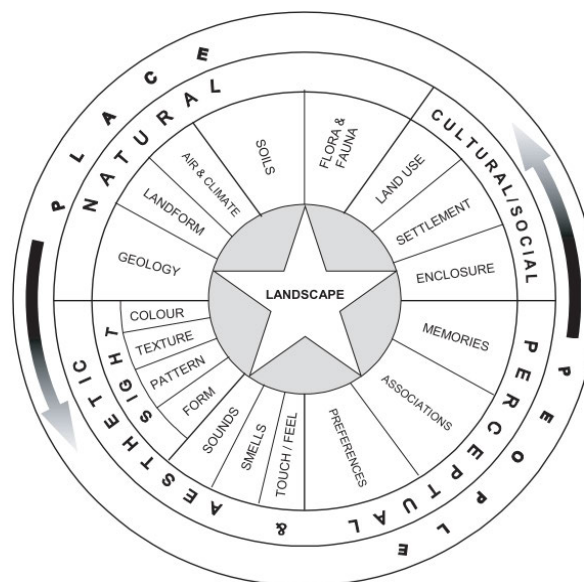


Fig. 17. A Diagram on “What is landscape?” (Swanwick and Land Use Consultants, 2002, p.2)

Seeing the landscape as a result of cultural processes began through Otto Schuler's "kulturlandschaft" (Taylor et al., 2015, p.2), a term directly translated into the English language as a cultural landscape. The introduction of the term supported Franz Boas' cultural relativism theory, which brought the landscape concept to a certain level of local cultural contextualisation (Taylor et al., 2015, p.3). Both theories by Schuler and

Boas were approaches that modelled the contextualisation of the landscape. Both approaches also became influential theories for landscapes today. As both were synced in retrospect through their more culture-based ideology, the landscape became a cultural landscape, where "cultural" was essentially dropped as cultural landscape and landscape were considered the same. This parallelism of landscape to cultural landscape gave a solid basis for the landscape's indelible connection to culture and all attributes related to it.

"Such a view of landscape—landscape as cultural construct—embraces not only the physical, practical ways in which people shape and structure their landscapes through time, but also seeks to understand the significance of the beliefs, values and ideologies that people bring to the shaping of landscape" (Taylor et al., 2015, p.2).

Although found to help develop the broader character of landscape through semantics built upon cultural models, this landscape quality also posed challenges to the landscape's meaning and identity. Some scholars criticised the connection of landscape to culture, with Salter (1971) being one of those who saw the potential risks of associating landscape with fundamental cultural processes like evolution and creation. These two processes sought to change landscape quality and identity in a way that can pressure the natural environment to change at an unprecedented rate; a situation also brought in recent texts by Ween (2014) about the urban landscape. The processes reinforced a landscape modified to support a growing population, affecting its optimum ability to support the needs of the civilisation. It then became critical to consider landscape and models to understand it: the landscape that was highly susceptible and vulnerable to civilisation processes.

2.1. Setting the Landscape Dynamics in the Global and Asian Peri-Urban Discourse

Cities were urban territories of growing societies and settlements organised within a precise location of cultural and natural systems (Laurie, 1986; Booth et al., 2012). The

consciousness of the effects of cities towards landscape resources began in a stage in time described by Gutkind as “aggression and conquest” (cited in Laurie, 1986, p.3). During this stage, these urban territories were known to have exploited its natural resources as deforestation within cities spread at an unprecedented rate. What caused this shift towards a more human-centred and policy-driven notion of space in cities was the shifting relationship of man towards nature that Gutkind described as the “I-It” relationship (p.3) - a relationship that showed man’s imposition of control towards nature that was prevalent in growing civilisations. The effect was a city narrative that lacked consensus with its natural context, as ecological systems were arguably insignificant in conversations on urban growth and development (McHarg, 1969; Melosi,1993).

Despite the pressing problems of landscape in urban planning narratives, urban development continued to expand in the Global South during the 21st century (Parnell and Robinson, 2013; Shackleton et al., 2021). As more areas in this socio-political region converted into cities through localised planning policies, research and planning interests also shifted towards understanding the changing urban landscapes in this part of the world.

Expanding cities to the countryside was one of the many urban challenges in the Global South. This phenomenon of urban sprawl became synonymous with the concept of peri-urbanisation already identified in the Global North (Webster, 2002; Webster et al., 2003; Webster and Muller, 2009; Piore et al., 2011; Nilsson et al., 2013). As influences spread to the periphery of cities in the Global South, so did peri-urban knowledge. Urban research began to explore the phenomena affecting cities. Peri-urbanisation knowledge became important references to solving the problems of rapid land conversion (Lynch and Rodwin, 1958; Squires, 2002; Sudhira et al., 2004; Kropf, 2009). Mumford (Culture of Cities, 1938) explained its inevitability through an analysis of an amoeboid:

"...growth of a great city is amoeboid: failing to divide its social chromosomes and split up into new cells, the big city continues to grow by breaking through the edges and accepting its sprawl and shapelessness as an inevitable by-product of its physical immensity" (p.234).

Renner (2018) also saw the importance of peri-urban regions emerging at the peripheries of cities. He wrote about peri-urban regions as areas that hosted the production of supplies needed by cities. Additionally, he also saw the importance of these fringe areas as the support of growing population through their provision for more residential development and industrial complexes. This perspective of Renner (2018) coincided with the perspective of scholars who saw the peri-urban as a space that existed as support to growing cities (Webster, 2002; Webster et al., 2003; Webster and Muller, 2009; Piorr et al., 2011; Nilsson et al., 2013).

Peri-urbanisation, the process that created peri-urban areas, came from the root word urban with a prefix peri- connoting an area adjacent to the urban area. Peri-urbanisation then created regions at the perimeter of the urban core. With it in place, regions at the periphery of cities changed with landscapes of diverse settlements in addition to industry-driven land use.

This peri-urban phenomenon made fringe regions highly dependent on megacities and vice versa. An alteration of landscape forms and functions was evident in the dependency process, leading to the creation of more urban areas on the fringe. From the influence of this new urban type, the emergence of semi-urban centres in the peri-urban landscape became the norm, an adaptation that led to industrial, commercial, and residential areas impacting green spaces in the countryside.

The conversion of green spaces into built areas was also one of the many concerns of urban landscape practitioners with peri-urbanisation in place (Phillips, 1999; Webster, 2002; Webster et al., 2003; Webster, 2004; Webster and Muller, 2009; Makita, 2010; Appiah et al., 2014; McGranahan and Satterthwaite, 2014; Webster and Muller, 2014;

Regmi, 2018). The understanding of this phenomenon of change affecting green spaces was also one that should be sought to provide a more precise explanation of the challenges being faced in this geopolitical area.

The existence of a peri-urban area appeared in the 1990s when McGee used the term "Desakota" (Webster and Muller, 2009, p.286) in discussing East Asia's peri-urban areas:

"...[Desakota] describes corridor development as an intense mixture of agriculture, cottage industry, industrial estates, residential development, and other uses. It typically occurs in zones that were previously characterised by dense agricultural populations, usually engaged in rice cultivation, such as Bangkok, Thailand, and Jakarta, Indonesia. It has features distinguishable from situations where the core is situated in lightly populated regions of plantation agriculture, as in the case of Kuala Lumpur in Malaysia. There are indications, however, that the desakota pattern is less persistent than originally thought. In the case of extended Manila, there is strong empirical evidence that agriculture is being "squeezed out" of former desakota regions, a process that appears to be directly related to the labour absorption capacity of manufacturing, urban trade, and service sectors" (p.286).

Desakota was the same term McGregor et al. (2006) used to explain the emerging "city village" concept in East Asia and parts of Southeast Asia. These areas became spill over areas of the urban core into smaller, unconventional-looking urban centres at its fringes. These spill over centres were once farmlands that were converted into industrial areas. Despite these changes in land function, these desakota areas retained their rural character. In this case, the desakota became a term distinctly expressing a new pattern in the landscape: a landscape of semi-urbanised centres that still resemble countryside towns and villages (Webster, 2002; Marshall et al., 2009; Piorr et al., 2011).

The peri-urban was also arguably synonymous with suburban, a term used mainly in urban research with connections found from its definition and word etymology. It came from the word *suburbium*, translated as "under the city" (Rose, 2016, p.99). Despite its similarity, the concept of the suburbs progressed differently from its peri-urban counterpart, with suburbs being more closely associated with the growth of

homesteads in America. Homesteads were new housing schemes driven by a national housing policy that made this housing form proliferate in the countryside. By residing in a suburban homestead, societies were allowed to experience living and working away from the city. It eventually expanded as anti-cities zoning codes that shaped the suburbs (Rose, 2016).

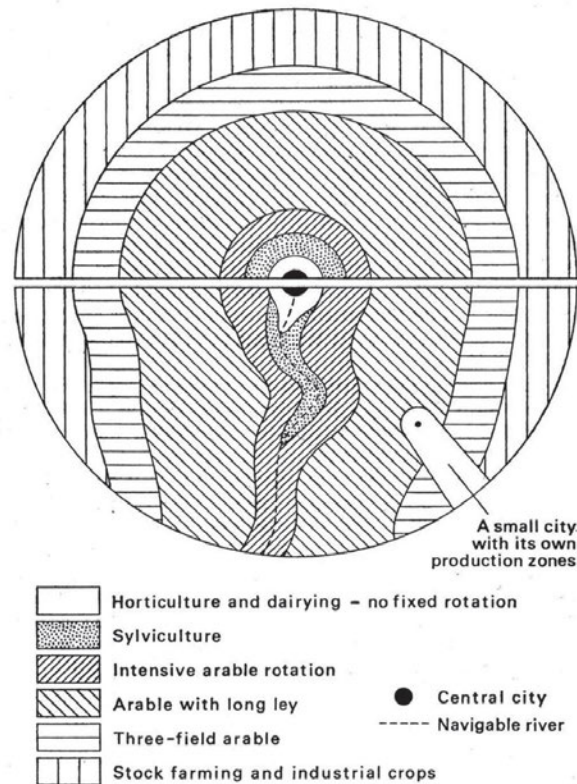


Fig. 18. Chisholm's Isolated State Model (Mandich, 2015, pp. 84)

Mandich also brought up the idea of the growing *suburbium* (2015, p.84) as an "isolated state model" designed to express this phenomenon. In this concept, Rome's urban fringe became the mirror of the suburbia, modelled as a relatively seamless connection of city and agricultural land systems achieved through the introduction of economic and transportation processes and infrastructure (Mandich, 2015, pp.83-84). Moreover, interests in the fringe system grew in Canada, as evidenced by Troughton's (1981) peri-urban identification approaches. He wrote about procedures that can identify peri-urban drivers of change. He also introduced categorisation parameters to help understand the peri-urban landscape dynamics (Troughton, 1981). He compared semantics from earlier urban researchers such as Martin and Pryor to understand and

create tangible forms of the fringe area. Troughton's (1981) central argument was that the fringe area was connected to its urban core. According to him, "an incontrovertible fact of the fringe is that it begins at the city edge; and there is little doubt that urbanisation is the dominant process at work in its creation" (Troughton, 1981, p. 219). He took the argument further when he supported prior studies by Russwurm (cited in Troughton, 1981, p.219) by arguing that the fringe was incontestably connected to the growing city: "this zone is often called the rural-urban fringe, but I delete the word rural because the outward expansion of the city creates this zone. Rural land-use activities were being replaced by urban land use activities" (Russwurm in Troughton, 1981, p.220). This exhaustive documentation of literary evidence and case studies on the Canadian analysis of the growing exurban development in Toronto, Ontario and a growing combination of fringe landscape patterns in London, Ontario, proved that literature was not silent on the existence of this fringe system in Canadian cities (Troughton, 1981).

The results of the peri-urban processes were peri-urban areas that acted as transitional zones and were known under different terms. It was then called the territories-in-between (Wandl et al., 2014), sprawl (Bruegmann, 2005), the suburbs (Connell, 1999; Webster et al., 2009; Ortega, 2018), desakota (McGee, 1991; Sheng Wu and Sui, 2016), edge city (McGregor et al., 2006) and the rural/urban/peri-urban fringe (Bunce, 1981; Troughton, 1981; Ravetz et al., 2013; Friedmann, 2011; Lambert, 2011). The terminologies listed were only some of the English translations taken for this study. These terminologies all support the existence of space like the transitional zone found just at the fringe of cities.

Although somehow similar in definition, the peri-urban terminologies expressed a diversity of non-traditional spatial forms at the edges of the cities (McGregor et al., 2006; Webster and Muller, 2009; Piore et al., 2011; Nilsson et al., 2013). In Webster and Muller's (2014) more recent discussions, these spatial constructs found at the regional level served as terminologies applied around the globe.

The peri-urban was also further explained in the PLUREL Report (Piorr et al., 2011). Coming from European examples, the report brought peri-urban areas as part of the rural-urban region (See Fig. 19). The rural-urban region became a representation of concentric and dynamic circles showing different spatial zones and divisions where the peri-urban area was one of the many components. The peri-urban area in this narrative was like what Nilsson et al. (2013) discussed in the Peri-urban futures: Scenarios and Models for Land – Use Change in Europe (Nilsson et al., 2013).

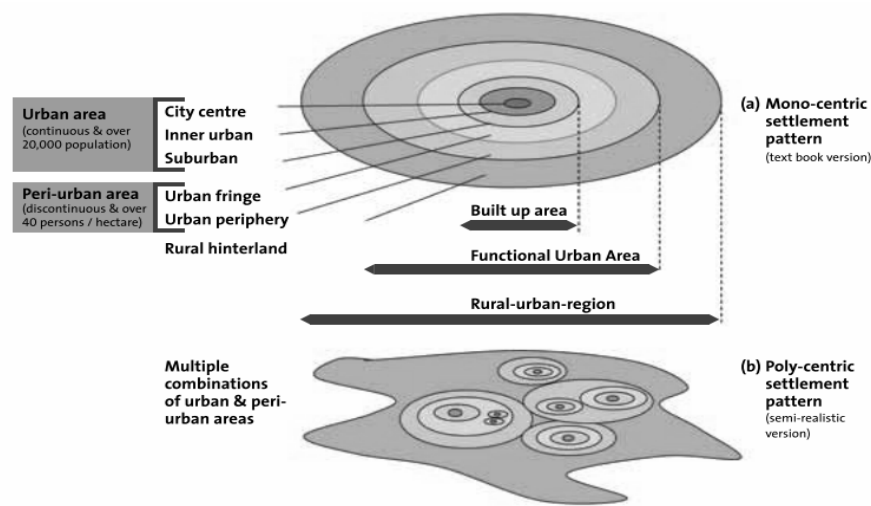


Fig. 19. Geographic concepts and definitions of the Peri-urban areas and the 'rural-urban-region' as used in the PLUREL project (Piorr et al., 2011)

Further discussion also focused on the importance of the concept of the rural-urban region or RUR (See Fig. 19) as the basis for peri-urban areas from a planning perspective (Piorr et al., 2011). The RUR became a synthesis of different area types, allowing the study of the following components as a broader urbanising system: the urban core, the inner urban, the suburban, the urban fringe, the urban periphery, and the rural hinterlands. In the RUR concept, the peri-urban emerged as an area containing the urban fringe and urban periphery, which were found at the edges of urban and rural areas with low population density, smaller settlements, industrial areas, and scattered domestic and functional agriculture patterns. Although quite comprehensive in terms of creating a common pattern language, the RUR continuum was also complex, one that may also lead to challenges if we try to bound peri-urban understanding within the RUR system.

Webster and Muller (2009) also added another dimension to the peri-urban narrative by correlating peri-urban areas to the highly urbanised cities (HUC) as its support region for shelter demands and labour resources (Webster and Muller, 2009; Piorr et al., 2011; Nilsson et al., 2013). As a region responding to the needs of the HUCs, peri-urban areas became areas for shelter developments that prioritise ease of access over quality and comfortable living. It made a region of low-cost socialised housing and informal settlements (United Nations Population Fund, 2016). The affordable residential spaces in peri-urban areas and its proximity to the core cities made it a choice for relocation. Thus, land in the peri-urban transformed from the idyllic countryside into busier, urbanising areas (Webster and Muller, 2009; Piorr et al., 2011; Nilsson et al., 2013; Beilin et al., 2015).

Peri-urbanisation was also changing the character of megacities in Asia. What was once forested countryside, coastal lands, or agricultural flatlands in the fringe of Asian cities were then converted into support facilities for nearby cities as an effect of this process (Webster, 2002; Hudalah et al., 2008; Webster and Muller, 2014). Although arguably similar in a global context, peri-urbanisation in East Asian cities was considered exceptional. Its dependence on regional economies forming arguably disposable landscapes made it unique vis-a-vis its Western counterparts. According to Webster (2002), East Asian peri-urbanisation was highly congruent with its economic dynamics, thus changing land as manifestations of conflict resolutions, corruption, technological decisions, and regional development strategies. His studies on this topic showed peri-urban development in East Asia to be driven by an imbalanced economy supported by a government structure that is "non-urban". Another fascinating discovery by Webster (2002) was the struggle of agricultural land areas in East Asia to adapt to the growing peri-urban as built environments haphazardly developed above these once farm lots. It was then linked to the creation of peri-urban landscape units synonymous with Garrido's (2019) development concept of "patchwork". Like a patchwork, the landscapes of peri-urban areas became linked to patches as they collectively became a mixture of built and natural environments.

Thailand's Eastern Seaboard displayed a manifestation of this East Asian peri-urban challenge (Webster and Muller, 2009). It also demonstrated another challenge of peri-urban areas - the lack of public investments to support better community facilities and environmental infrastructure. One case in Thailand highlighted the problem of infrastructure support leading to a more production-centric rather than user-centric development. This case was like another study by Webster and Muller (2009) in Chongqing, China. In that study, human-made infrastructure water facilities in the form of a dam led to community displacement in the rural areas. Rural communities were relocated to peri-urban areas because of the construction, leading to policy issues connected to relocation. Other similar cases in East Asia were also noted to strengthen this case, where relocation became one of the more common challenges in peri-urban areas. Relocation sites, primarily constructed in the peri-urban, were arguably haphazardly planned with no provision for adequate services and employment opportunities. These relocation housing projects were uncomfortable, poorly designed, and poorly located in disaster risk-prone zones such as steep slopes and floodplains (Boquet, 2015; Demirli et al., 2015).

Land sustainability was another pressing concern in peri-urban Asia. Hussain and Hanisch (2014) made seminal contributions on this subject through their research. In their research, community development became less of a concern in peri-urban regions in countries like India since regional change towards continuous support to cities' needs remained the main objective of developing the outskirts. It resulted in haphazard urban development that was proven not to value context, causing challenges to the natural environment and its systems, and lowering the community's disaster resilience as an effect of resource exploitation.

As found by many peri-urban scholars, all these situations were regarded as alarming challenges mainly to the Global South countries, especially to the Philippines, a country presently undergoing peri-urbanisation at a rapid speed. Countries like the Philippines were focused chiefly on technological innovation

for continuous support to urban activities instead of the management of its ecological systems, which were relatively important in sustaining communities and the totality of the landscape in the long term.

2.2. Landscape in Culture-Environment Relational Models

Despite the many challenges on defining landscape in several fields and modelling systems (Wascher, 2005), one that became a recurring theme and was constantly discussed in this thesis was a landscape that was the middle landscape or the culture-nature interface (Altman and Chemers, 1980). The middle landscape concept appeared in the book *Culture and Environment* (Altman and Chemers, 1980), where the environment was interpreted as the ecological environment. In the book, the middle landscape was the interface of balance - the plane where customs, lifestyle, and behaviour were environmental expressions. In this culture-nature model forming the middle landscape, the concept of land was then further developed as a physical environment laden with cultural components.

However, Altman and Chemers' (1980) notion of the middle landscape also related to some challenges. From this culture-environment relationship in the middle landscape ideology, cultural and natural forces' influences were exchanged in both ways. It led to the next challenge on landscape connectivity networks and their relationships.

By being in harmony, cultural and natural attributes of the land shaped spaces. An example was how climate, an environmental factor inherent in spaces, affected cultural processes like rituals and political and agricultural practices. Climate change also altered the cultural practices of civilisations, and any change in cultural practices led to changes to the physical and natural environment. This challenge was modelled in the Culture/Environment Relations Framework (see Fig. 20).

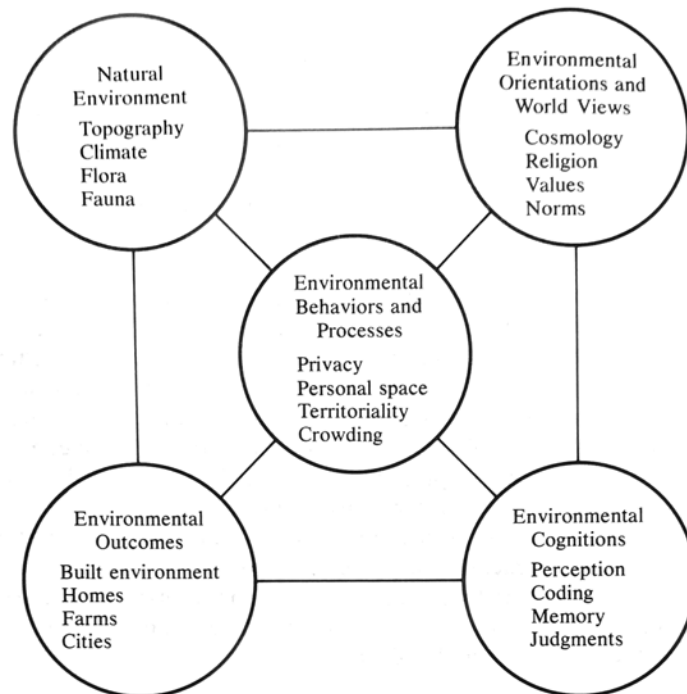


Fig. 20. Framework of Culture/Environment Relation (Altman and Chemers, 1980, p.10)

It was also essential to understand that landscape was considered as a more nature-based entity. For the longest time, the landscape was interchangeable with the terms nature, scenery and the environment. The landscape was also loosely expressed using terms connected with nature. Tuan (1974) was one of the authors who explained this parallelism, explaining the interchangeability of all these terms with the landscape. He discussed the nebulous effect of semantics on syntax or meaning to form in the case of landscape, wherein this highly relational set of meanings was suggested to be one of the reasons why nature became diminutive in the landscape through time. The effect led to the landscape being more linked to countryside and wilderness, eventually changing its descriptive quality. By being closer to the idyllic charm and the countryside's picturesque character, the landscape concept also transformed, losing precision to its descriptive associations beyond the picturesque and the idyll.

On the other hand, the scenery also deviated from its close connection to the landscape as its physicality and descriptive syntax shifted to reflect illusion or make-believe. As a term related to landscape, scenery moved towards the field of art,

moving landscape studies in that direction. However, with the landscape becoming more synonymous with art, it also lost its other characteristics in this field, with its ecological context slowly taking a less critical role in the landscape discourse.

By losing precision and connection to descriptive associations of nature, the landscape became loosely connected with its ecological character as authors developed it further in its cultural form. This situation led to the challenge of culture-nature balance in landscape semantics.

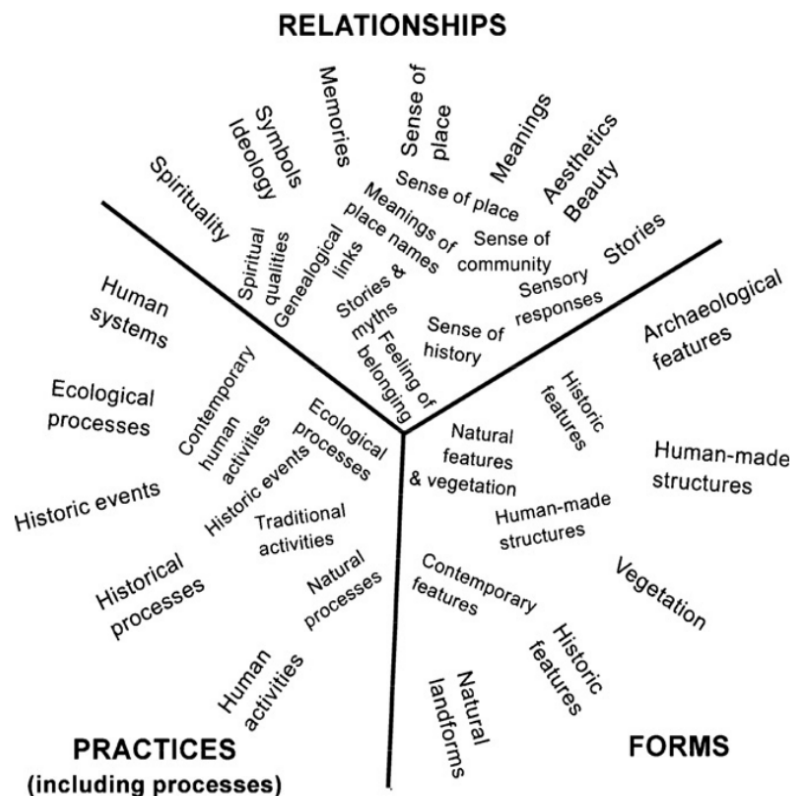


Fig. 21. Stephenson's Modelling of the Fundamental Components of the Landscape: Form, Practice, and Relationships (2008, p. 134)

Another helpful discussion on landscape semantics was brought by Stephenson (2008) through a visualisation of the landscape as an object with embedded values. Although Tuan (1974) saw a challenge to landscape seen in its polemic components of culture and nature, Stephenson, on the other hand, proved that they could be brought together through modelling of the landscape's forms, practice, and relationships. Seen in Fig. 21 were some of the fundamental components of landscape that identify it as a combination of cultural and natural components of the living environments. What was

also essential in this modelling was the homogeneity of tangible and intangible forms, practices, and relationships within the landscape's scope.

Stephenson (2008) also quoted the European Landscape Convention 2000 or ELC 2000 (Council of Europe, 2000) in grounding the landscape definition. From the one established by the ELC 2000, Stephenson (2008) saw the importance of finding measures to safeguard the cultural and natural environment through spatial planning frameworks that recognise landscape as an evaluation tool. Stephenson further supported this claim by giving examples taken from global and European counterparts where planning frameworks recognised the establishment of the landscape before management strategies were in place. From this point of view, it was then critical to see landscape as a baseline for management, and that cataloguing its attributes was one aspect that should be considered prior to establishing any plan for its future.

2.3. Landscape in Urban Place Models: Topophilia, Middle Landscape, and Suburbia Concepts

The landscape also appeared as the "middle landscape" in Tuan's (1974) urban models, eventually becoming a helpful tool in establishing the landscape dynamics of the growing urban areas (1974, pp. 225-230). This middle landscape model became the "Edenic" counterpart needed to balance the city's wilderness and the countryside. It was also loosely discussed as suburbia.

A dedicated chapter where suburbia was explained as the epitome of "inverse romanticism" (Tuan, 1974, p.225) was also valuable, as discussed in Tuan's middle landscape models. Inverse romanticism was associated with suburban towns in twentieth-century England and France. As an area undergoing inverse romanticism, areas like England and France exuded rural with city-like characteristics. As such, the regions envisioned spaces that yearned for advancement through city-like characteristics, "a step in transforming rural to urban lifestyles" (Tuan, 1974, p. 230).

4. The ideal of the "Middle Landscape" (Jeffersonian ideal: late 18th to mid-19th century)

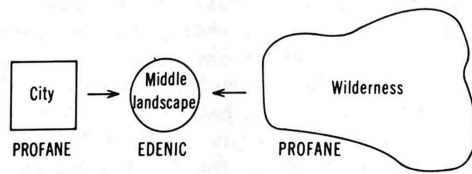
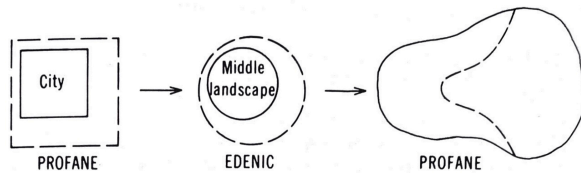
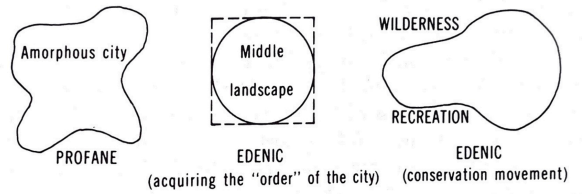


Figure 9 Wilderness, garden, city.

The "Middle landscape" of yeoman farmers is seen as threatened by the city on the one side and by wilderness on the other. In fact this was a time when both the city and the middle landscape were expanding at the expense of wilderness, thus:



5. Late nineteenth-century values



6. Middle and late twentieth-century values

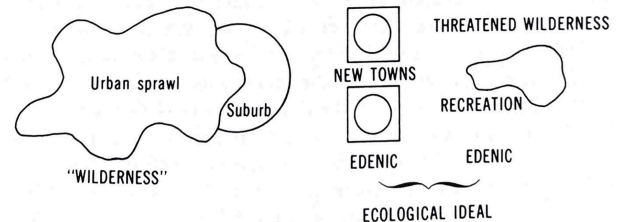


Fig. 22. Tuan's Middle Landscape Model, (1974, pp. 104-105)

2.4. Landscape Integration in Place Planning Frameworks

From examples of landscape models developing their character and identity mainly in culture, there was also a growing interest during the 1980s to link landscape to place planning frameworks. Interests to this connection of landscape in place planning frameworks developed as place-making as a process would entail discovering cultural and natural attributes that may be found in the landscape. As it contained elements relevant to placemaking, the landscape became a valuable platform for developing baseline data for implementing ideas. The landscape was indelibly linked to the concept of place with its biophysical features, human activities, social constructs and cultural meanings and values (Relph, 1976, p.66), forming an identity synonymous with the landscape. Thus, the landscape was presumed to be a receptacle of all these combined characteristics for place-making.

The landscape was further established as an entity connected to the place concept as articulated in Plato's doctrine of place (Walter, 1988). Geometry, economy, and city plans became the visualisations of urban areas - landscape association as the processes

express form while also becoming significant urban components prompting dwellers' experiences and lifestyles. This connection of urban processes built not just a distinct place character of landscapes, but also a civilisation with moral and emotional associations towards a space (Walter, 1988).

Another interesting connection of place to landscape attributes brought us back to Tuan's Topophilia (1974). The term topophilia was taken from the term "topo" or topography and "philia", which translated to the love of place (Tuan, 1974; Walter, 1988). The theoretical underpinnings of place attachment to topography or the landform were excellent references for establishing natural elements that make places. This ideology further strengthened the landscape's role in influencing human systems through their intangible connectivity to places.

As a result of these place associations with the landscape, it was imperative to look at a landscape that influenced the man-nature interface. A similar analysis by Rapoport (1982) strengthened this claim as he saw the effect of the landscape through the dwellers' shelter space attachments. This connection also described the intangible attributes of the landscape and how it was best expressed as a response to spaces forming unique expressions of man-nature interaction.

Further explaining the landscape's nexus with placemaking, Rapoport (1982) brought the narrative of human response to nature, further strengthening the claim that the landscape contains man-nature connectivity networks. Rapoport (1982) suggested several response channels of man towards nature: (1) connection through feeling, (2) connecting through activities, (3) connection through group identity, and (4) connection through self-identity. A good explanation of how these worked was shown in the analogy below:

Through feeling, a person responds to nature with affect and creates meaning based on emotional responses. Upon feeling, connection happens, and motion components are added to create activity systems that identify space-related movement types. After attaching actions and emotions to space, linkage by creating group identities may

manifest to create a more tangible form of connection expressed in the daily life cues: the similarity of clothing choices, interior, or landscape furnishing, building style, gardens, streets, and other similarities in the neighbourhood level. Furthermore, through perceptual and associational responses, self-identity connects at the personal level, man to his environment. Lastly, being a space designer and participating on the public level connects people to space through passive and active engagement. Nature, on the other hand, responds to human movement and behaviour. It communicates in cues, codes, signs, symbols, and stimuli, leading to a collective set of human responses.

From this point of analysis of previous works related to landscape vis-a-vis place planning, the importance of establishing connection of people to landscape was strengthened. This point of view helped in establishing the importance of understanding landscape resources. Responses through identity, movement, and behaviour played a vital role in how landscape as a resource, can be designed, managed and eventually, safeguarded as a critical component of place planning.

2.5. Harmonising the Landscape as the Nature-Culture Planning System in McHarg's Design with Nature

Despite the persistence of landscape in different culture-nature-place models, tensions were building in conversations on the preservation and management of landscape - may it be because of its natural and cultural attributes and the theories and practices associated with it (Spirn, 2000). The quest to bring back environmentalism as part of the landscape discourse to harmonise its culture-nature characteristics pivoted immensely towards its recognition as a procedure applied in *Design with Nature*, a book by McHarg (1969). This literature was instrumental in changing the image of a landscape in planning narratives.

Landscape characterisation became a distinctive procedure through works made like that of McHarg (1969), as the literature he wrote developed a layering procedure used to integrate ecological and cultural data categories to identify land suitability in urban planning areas. His work also provided measures to look at processes and patterns from

a regional mapping perspective, allowing solutions to be in place from a macroscale level of spatial analysis. Thus, it grounded most landscape patterns and characterisation approaches today (McHarg, 1969; Spirn, 2000; Bell, 2012).

What McHarg (1969) brought in the landscape literature was a tool that will soon be influential in many spatial planning processes in the Global North and further to the Global South countries. He suggested a procedure that puts value in natural processes in planning, notwithstanding the cultural components in understanding the suitability of development to be put on the land. He brought a symbiosis of natural and cultural processes layered in maps that eventually ground geographic information systems critical in landscape planning today.

2.6. Key points and Implications of Literary Precedents to the Philippine Landscape Character System Framework

The summary of literary discourse dealt mainly with the urban theories, peri-urban theories and culture-nature-place definition models that were previously established. Discussions on the landscape's role in various fields were also discussed, along with the weaknesses of the landscape in the three ideological fields.

Scholars established the landscape as a valuable resource in cultural definition models and eventually in place planning through narratives leading to landscape integration in planning initiatives. They also proved the importance of landscape-based measures as tools to integrate the attributes into one that can be useful should areas undergo spatial change.

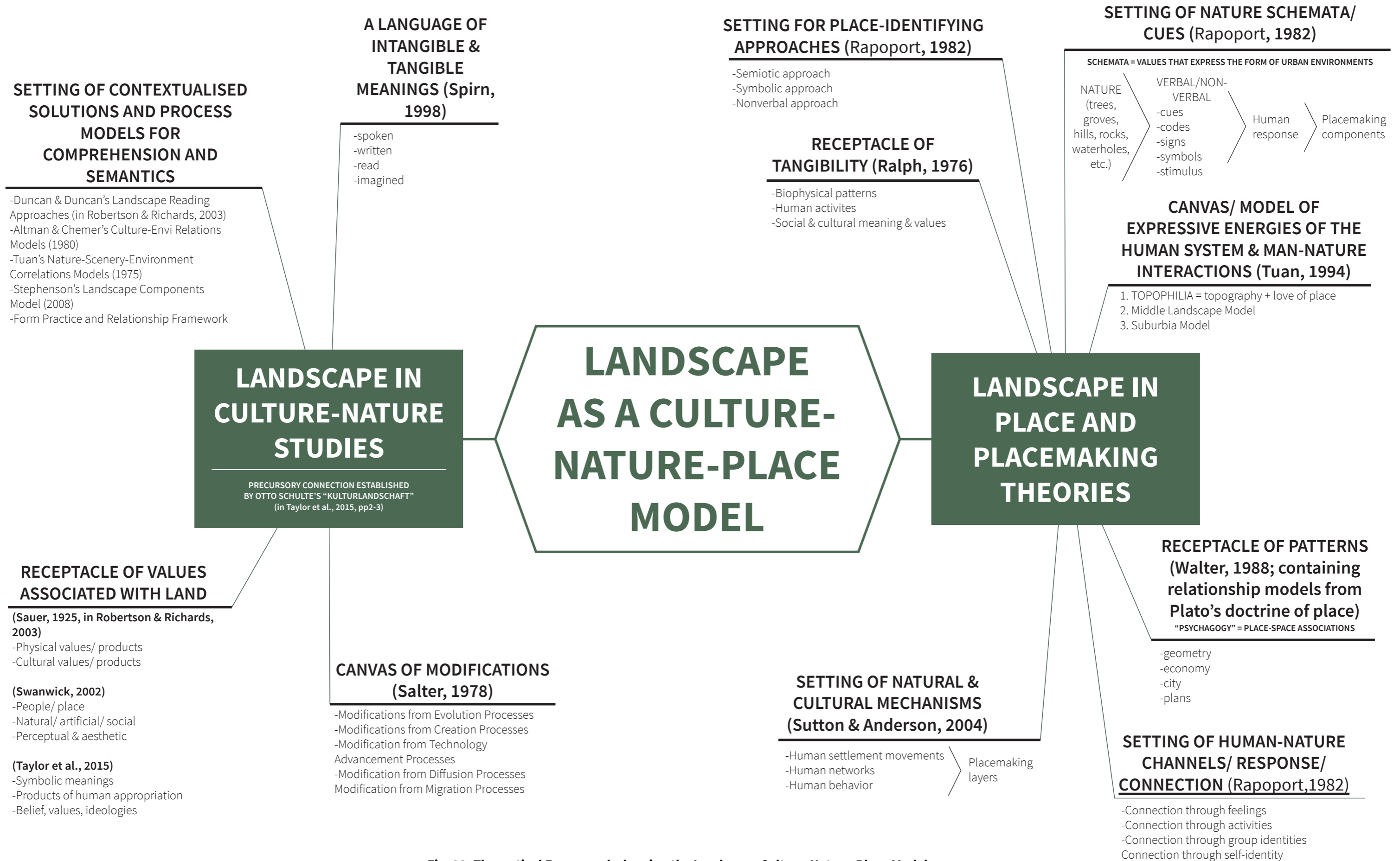


Fig. 23. Theoretical Framework showing the Landscape Culture-Nature-Place Models (Visualisation by Nadal and Barroga, 2021)

A theoretical framework from the literary discoveries on place-culture-nature models was developed to establish critical points for the proposed landscape characterisation plan in the thesis. In summary, the framework comprehensively discussed the weaknesses and advantages of landscape in various aspects of the urban-related ideologies of culture, nature, and place studies. Some of the key points I highlighted throughout this chapter were:

- **The landscape was recognised as a process-relationship system in earlier studies.** There was a relatively similar theme in cultural studies recognising the landscape as a component of the process and relations models. In this light, the landscape became a system of spaces, objects, and living entities with vital components, processes, forms, and situations that can only be understood if considered for its surface and embedded attributes. When combined, all attributes were relational—despite their polemic and multivocal nature. Viewing all these culture-nature-place attributes as the landscape was a valuable way of integrating and understanding all aspects of the living environment.
- **A landscape was a place and setting.** The landscape was also where place and spatial planning solutions were applied. In this aspect of the landscape, its semantics played a vital role in grounding strategies that can sustain the landscape's quality. Therefore, seeing the landscape as the setting demanded us to consider it as one that cannot just contain attributes but as one that acted as the plane where these were all located and interacted.
- **The landscape was not just a process and setting but also a receptacle of different attributes.** What was established through the different theoretical underpinnings of the landscape is an entity that is both a container of attributes and a product of all the attributes combined. When looked upon as such, the landscape became a container of different components where each component must be understood as part of a system.

- **Landscape's growing recognition in cultural studies moved it away from its ecological nature.** The challenge about landscape in the realms of culture was its growing detachment in the ecological environment discourse, rendering a highly cultural character. It was then difficult to see a landscape connected to nature, challenging it even more as it became detached from concepts relating to the ecological environment. In this light, authors and theorists must then try to balance the landscape's cultural and natural attributes - with the more significant challenge of re-establishing landscape's identity in connection with nature through a more harmonised and comprehensive nature-culture characterisation plan.

These key points grounded the need to look upon the landscape as a data system that can establish many of the vital information needed to frame the solution in the gaps of the Philippine planning frameworks. It strengthened even further, the importance of the landscape character system being proposed by the thesis in providing a framework for nature, culture, and place attributes to be established as the basis for sustainable solutions for the Philippine challenge being addressed by the thesis. Thus, exploring assessment strategies for peri-urban liveability and environmental sustainability was only viable in light of landscape as a critical resource defining solutions to the problems of its geopolitical regions.

The different theories and modelling cited also strengthened the need to involve people or dwellers of the landscape territory in developing the landscape character system as they can be highly reflective beings. What was then evident through these examples from various scholars is the importance of transparency of results - that man-nature engagement should be harmonised to fit the needs of both aspects of the landscape.

Chapter 3.

Landscape Planning

Frameworks and Initiatives as the basis for the Philippine Landscape Character Approach

This chapter demonstrates a comprehensive summary of theories and examples grounding the Philippine Landscape Character Approach designed for this thesis. It begins with an overview of the landscape agenda and planning strategies that integrate the landscape. From here, theories establishing the role of landscape in planning will be explained, along with the different theoretical underpinnings on which the proposed solution will be based.

Lastly, key points will be established to explain the scoping methods' role in developing the multilevel technique in landscape characterisation that is apt for the local Philippine situation.

3.1. Overview of the Landscape Agenda that prompted Landscape-based Solutions for Urban Regional Planning Frameworks

The 2030 Agenda for Sustainable Development (United Nations General Assembly, 2015) was a recent policy movement that established landscape as a solution to environmental challenges. Stemming from this agenda was a set of guidelines that supported the earlier landscape-centred initiative called the European Landscape Convention 2000 (Council of Europe, 2000; Council of Europe, 2007). Both agendas contained information stating landscape as the setting that can help achieve sustainable development goals for harmonious relationships of people, their activities, and the environment. The landscape initiatives mentioned were also the initiatives that will be discussed in this chapter as highly influential texts that provided critical information as to how the landscape was integrated into planning frameworks.

The landscape definition adopted extensively in practice today is one from the European Landscape Convention 2000: "an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (Council of Europe, 2000, p.2). The European Landscape Convention 2000 or ELC 2000 was a policy initiative focused on creating landscape-based solutions applicable to spatial and land planning. What the ELC 2000 brought into practice is a unified description of the landscape that can be used by practitioners and researchers in related fields, fostering collaboration for development policy implementation at the local and regional levels. The ELC 2000 also strengthened the European nations' efforts to implement landscape-responsive urban development policies.

The ELC 2000 broadened the landscape from a conceptual view of space and place bound within the realm of art into a practice field that can resolve scientific challenges. It suggested that among some of the projects stemming from the initiative, responsive landscape protocols like the landscape character assessments or LCAs to resolve spatial

planning challenges (Majchrowska, 2011; Erikstad et al., 2015). These LCAs tools eventually guided management approaches for new spatial developments.

The last two decades witnessed the effects of the ELC 2000, specifically on the increased recognition of landscape and its role in spatial planning. Information from the ELC 2000 strengthened the already existing knowledge on landscape-based approaches in urban and countryside planning, adding to those landscape-based approaches that preceded the initiative.

Another notable precedent to the landscape character system approach of the ELC 2000 was Mcharg's (1969) *Design with Nature*. The method shared in McHarg's book strengthened the importance of harmonising ecological and cultural attributes as the landscape itself, thus becoming one of the breakthrough procedures to the existing overlay system for visualising development strategies for earlier settlements in the US. As developed by McHarg in this book, this method was one of the many landscape-based approaches still used in planning cities today.

The overlay system of landscape attributes further improved through the discovery of the Geographic Information System or GIS (Bernhardsen, 2002; Knowles, 2008), a milestone in landscape studies. The GIS provided a digital platform that can sync landscape data into one that can serve a specific purpose in spatial planning. Since then, this digital system that grew in computational geography became vital in developing the information system (Mitchell and Minami, 1999; Longley, 2003, ESRI, 2019) used in landscape character assessments. It also provided a more accurate data modelling procedure for landscape problem solving (Visual Impact Assessment in QGIS or GRASS, 2018).

As landscape characterisation developed worldwide, mostly being bounded within heritage conservation, the approach still spanned far and wide in different territorial landscape scales, especially in countries that participated in the ELC 2000 (Jones and Stenseke, 2011; Simensen, Halvorsen, and Erikstad, 2018). The approach made the ELC

2000 one of the many breakthroughs for landscape studies as it made landscape character systems the sustainable practice and action plan for the fast-changing typologies of land in European countries. ELC 2000 also made landscape typologies, maps, and attributes crucial data for planning regional development scales (Wascher, 2005). ELC 2000 also resulted in an impressive scoping of the landscape character in the European Region, one that defined the uniqueness and identity of landscape character areas (LCAr) as expressed through the diverse typology of landscape character units (LCU) in Europe.

A more comprehensive landscape-based action emerged from a unified and European-wide recognition of landscape, establishing its characteristics as components that must be recognised in spatial planning. Also, important to note was the improvement it has given to the current disassociation of landscape with its ecological character - a gap seen in landscape studies through the years. Concerning this, it is worthy of mentioning one initiative that attempted to bring landscape's connection to its ecological roots - the Pan European Biological and Landscape Diversity Strategy or PEBLDS (Council of Europe, 1996; Wascher, 2005; Jones-Walters, 2007; Jongman et al., 2011). The PEBLDS was an action plan created by the Council of Europe before the ELC 2000 that proposed landscape-based strategies to resolve challenges in fields such as agriculture, forestry, transportation, and tourism. The implementation of this strategy brought the landscape back to its ecological roots as it shifted landscape narratives towards the natural sciences. The precedent, McHarg's (1969) landscape characterisation approach in *Design with nature*, should also be included in the attempt to bring the landscape back to the field since he also recognised ecological layers overlaid as maps in the landscape characterisation approaches for planning cities. As the PEBLDS and McHarg's (1969) strategies established the importance of interpreting and planning land through the lens of ecology, implementation of the techniques also became extensively useful in conversations related to biological resilience, coherence, responsiveness, as well as sustainability.

The PEBLDS action plans (quoted in Goriup, 1998) also strengthened the claim for the

significance of landscape awareness because it resulted in the identification of the "landscape aesthetic"(cited in United States Department of Agriculture, 1995; Gobster, 1999, p.55). The perceived aesthetic worth of the environment was known as the "landscape aesthetic." This landscape quality was typically assessed in relation to city sceneries, road networks, countryside industrial development, and national parks. The identification of landscape in connection to its aesthetics was possibly the most known quality of landscape over its intangible ones. This was still another gap that might be closed by developing landscape characterisation systems that prioritize both attributes equally.

3.2. Theories defining the Clustering procedure for the Landscape Character System (LCS) Framework

Developing the LCS for the Philippines was a challenge grounded on the idea that a Landscape Character Approach or LCAp can improve the country's current planning framework. This challenge developed from a country-wide planning system with sparse landscape data. Also, the country's landscape research was found to be relatively weak or mostly done within academia despite being established in the design field in the 70s (Philippine Association of Landscape Architects, n.d.).

Some of the existing theories reviewed for this thesis proved the importance of cultural and natural attributes in developing the LCS. Most theories presented the close connection of LCS to resource inventory mapping. These theories included McHarg's *Design with Nature* (1969), Salter's *Cultural Landscape* (1971), Hillier and Hanson's *Social Logic of Space* (1989), Terkenli's *Framework of Landscape Aspects and Methods of Landscape Analysis* (2001), and Bell's *Elements of Visual Design in the Landscape* (2004). All these theories will be explained later in the section.

Before the LCS was even considered for the Philippines, years of resource inventory mapping existed to develop global land use plans and the Philippines' own Comprehensive Land Use Plans (CLUPs). A CLUP existed as a planning reference

prepared by local government units in the Philippines, usually of a local scale, to be able to give reason to the allocation of land and water resources. It suggested, among other planning probabilities, housing and land uses according to regional economic or social activities and goals (Housing and Land Use Regulatory Board, 2007). Although proven helpful, CLUPs could be problematic if not made into one that can be understood towards a sustainable direction for the locale. Also, land and water viewed as a resource that can be used or planned were arguably the central problems in this paradigm - land and water were commodified to the detriment of its biodiverse environment.

3.3. The Landscape Character Approach (LCAp) that guided the Landscape Character Area Maps (LCArMs)

The European-wide Landscape Character Approach or LCAp (Simensen, Halvorsen and Erikstad, 2018) resulted from the growing familiarisation of landscape in practice. Possibly one of the many breakthroughs in landscape-based studies, the LCAp was the data mapping procedure needed to gather landscape data at different planning scales. The resulting data sets existed for policymaking and spatial planning development (Wascher, 2005).

LCAp, established widely in Europe, became vital in gathering landscape information. However, it was used to classify, sort, and systematise landscape data into one language that can provide the needed baseline for land development. The classification of landscape data set spanned sizes and types, asserted through Article 2 of ELC 2000 (Council of Europe, 2000, p.2) as "... natural, rural, urban, and peri-urban areas. It includes land, inland water, and marine areas. It concerns landscapes that might be considered outstanding as well as every day or degraded landscapes".

Landscape Character Areas (LCAr), as identified components from the LCAp, were presented as the more viable format of landscape attributes used for landscape-based studies. In this format, landscape attributes became easier to interpret with layers and volumes of information comprehensively showing the land's natural and cultural

characteristics. The resulting LCAr proved how the LCAp could handle extensive landscape data in a format that can guide land development plans (Wascher, 2005).

Another significant contribution of the LCAp for this thesis was the coding techniques that identified landscape character units (LCU) that compose the LCAr. From a hierarchical point of view, LCU developed for the thesis described parcels of smaller units than the LCAr. The LCAr and the parcels of LCU were results of the LCS created primarily for sorting information across different territories in the Global North. Coded LCArs and LCUs made landscape data manageable for planning at various scales. Despite this versatility, providing one coding format remained an ongoing conversation, as variations became necessary for site-specific landscape types, thus leading to the challenge of providing a global coding system for LCS. Like any language, LCS was unique in different geolocations (The Countryside Agency and Scottish Natural Heritage, n.d.).

Hierarchical data processing frameworks that involve classifying and stratifying valuable landscape data prior to analysing were also one of the many contributions of Swanwick and Land Use Consultants (2002, p.13) and Warnock and Griffiths (2015, p.265) in this research undertaking. Diagrams in Fig. 24 and Fig. 25 were examples of these hierarchical processes resulting in a more comprehensive baseline and sorting of landscape data. The hierarchical processing of identified data became crucial as it categorised information into units, then grouped as landscape data sets for the next step of adding value judgement. All these systems frameworks were vital for strengthening the thesis claim that establishing a localised system plan can help develop a landscape-responsive planning framework for Philippine regions. It also validated the essentiality of landscape attributes mapping before any judgement may be given to a site.

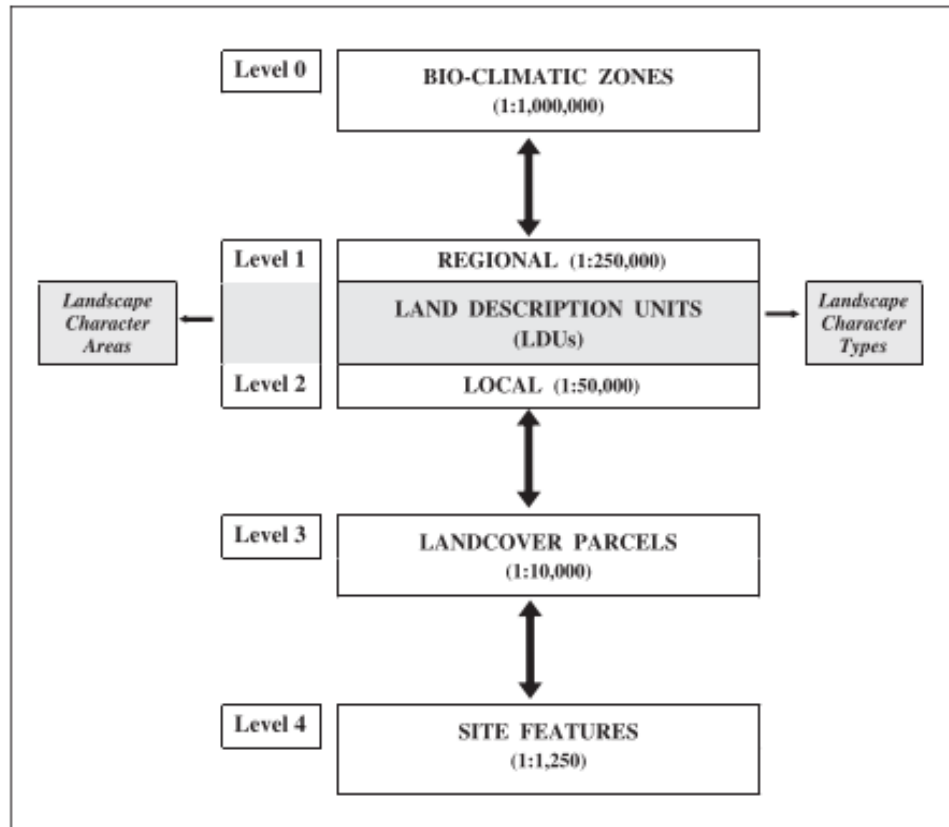
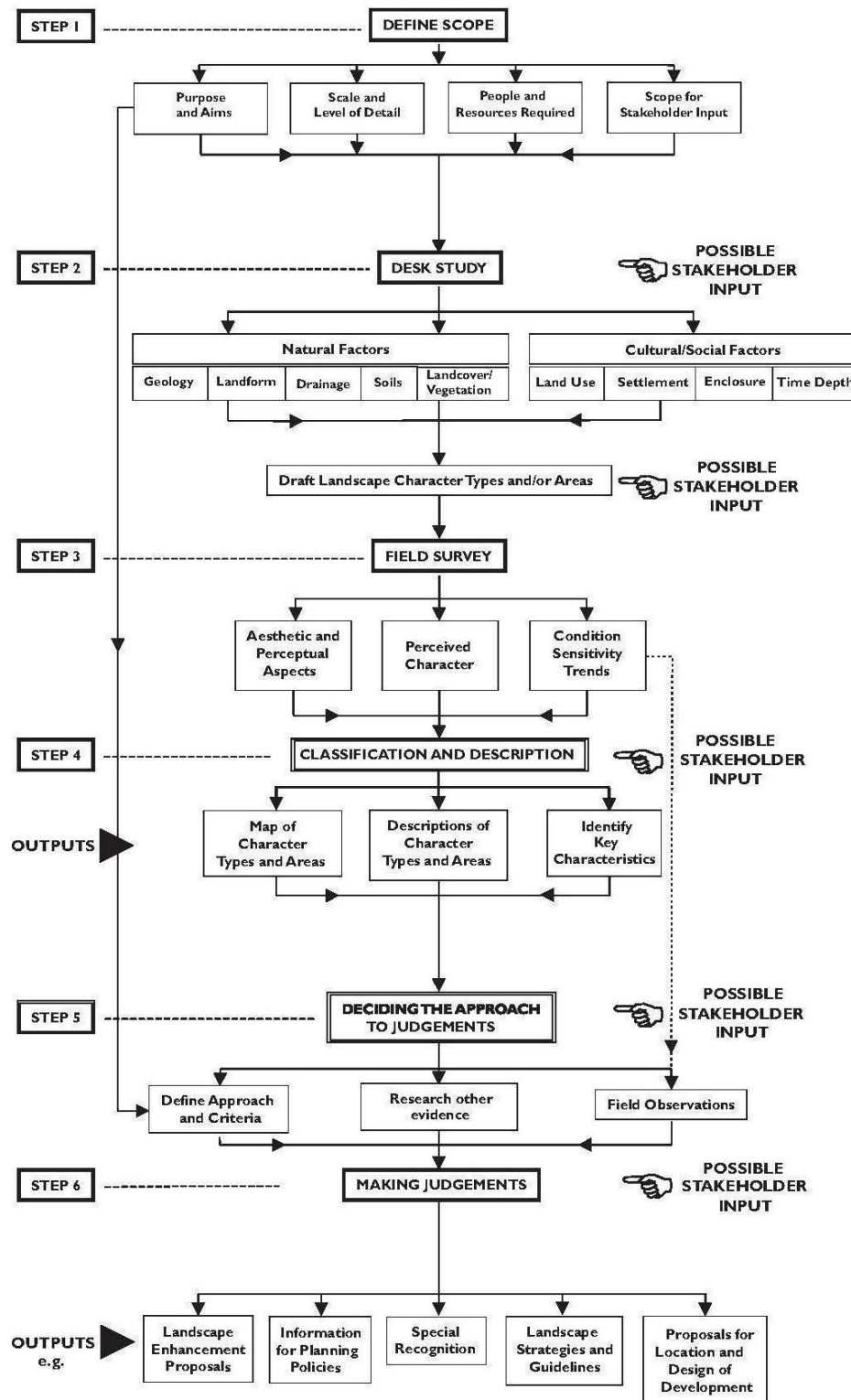


Fig. 24. The Landscape Character System developed as the Landscape Character Approach (LCAp) for the Living Landscape Project in the UK (Warnock and Griffith, 2015, p.265)

Moving forward, the multitude of data from the LCAp made a localised version of the LCS in the Philippines possible. With the Living Landscape Approach applied in the UK (Warnock and Griffiths, 2015) being the basis for the Philippine LCAp, landscape characterisation can begin with designing landscape-based frameworks to create the LCAr and LCUs.

Figure 2.4: Flow diagram of Landscape Character Assessment methodology



Footnote: Stakeholder contributions may be possible at all stages.
The whole process may be iterative.

Fig. 25. LCAp Principle and Process Flow
(Swanwick and Land Use Consultants, 2002, p.13)

Lastly, the LCAr examples established a vision of the landscape as a system of areas that can be stratified into smaller units, with hierarchical differences vital in reaching variations and similarities of characteristics to build full descriptions. The landscape character created by the framework will also become evidence of the components of a system that becomes the fundamental structure of the landscape useful for planning and management.

Returning to the discussion of resource inventory mapping, the LCS sat in the same field of geography, particularly in mapping. The LCS was an improvement of the current information through systematic processes that synced landscape data, thereby moving mapping forward as the new land suitability analysis technique. It was needed to create a more culture and nature-responsive plan (Hopper, 2007). From a practice that spanned from the 1890s as used in planning activities in Frederick Law Olmsted Office to McHarg's overlay "layer cake" technique (see fig, 26) discovered to be used in planning regional development in the US, resource inventory as the precursory procedure leading to LCS became the approach needed to be familiar with the landscape before proceeding with any development plan (p. 58).

McHarg's (cited in Hopper, 2007) layer cake provided a baseline data model to systematise landscape resource information. In these earlier versions of landscape characterisation as landscape resource inventories, motivations to proceed became similar. The similarity was from the goal of character conservation as the management direction of the landscape. This solution was argued to be the solution that can yield "the greatest sustainable benefit to the present generation while maintaining its potential to meet the needs and aspirations of future generations" (p.58). Viewing the landscape as a layer cake also provided an even more logical framework that can organise landscape data for better land suitability analysis.

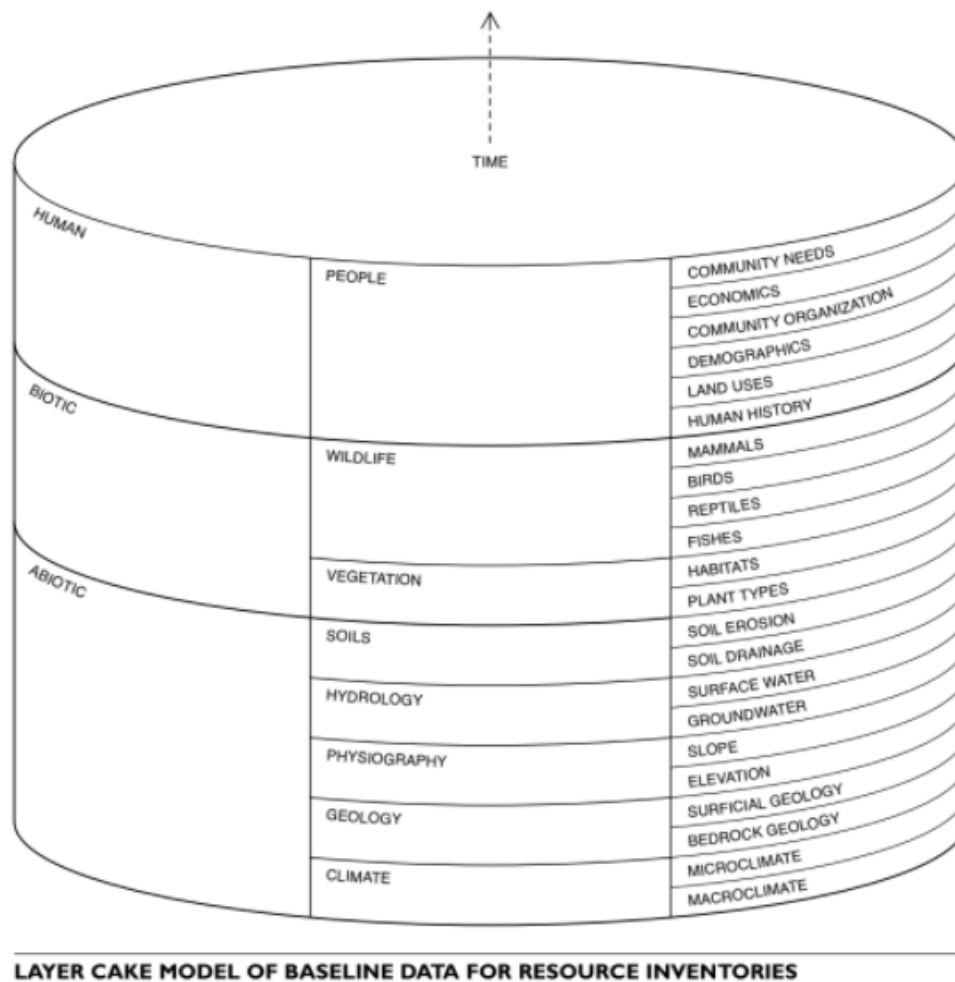


Fig. 26. Layer Cake Model of Baseline Data for Resource Inventories
(Hopper, 2007, p.58)

McHarg's (1969) theories also built on the systematisation of ecological and cultural attributes through the layer cake. This vision was helpful in developing the LCS. LCS methodologies proposed to marry the intrinsic properties of nature and culture as processes and forms that can inform the cities' design. Mcharg's (1969) methods for designing cities added value to landscape characteristics as the "components of identity, as working processes of value containing implications for new formal adaptations." (p.176). Mcharg also agreed that cataloguing information was crucial not just as a summary of information, but also as a tool in analysing the spatial transformations – the evolutions and adaptations of the site being studied (McHarg, 1969, p.181).

Bell's (2004) *Elements of Visual Design* was instrumental in introducing the importance of visual syntax - a set of landscape characteristics and descriptions. The visual syntax was connected to the LCS by being a vital process in pattern language generation. The pattern language can be used in the LCS as it fed the system with visual components of land. It was one of the many ideas Bell (2004) shared with the landscape as a receptacle containing the pattern. The patterns became the landscape's visual aesthetic - landscape qualities stratified into sets forming landscape character (Bells, 2004). All the landscape patterns became information associated with not just cultural but ecological processes, affecting the use of space for several socio-economic functions like businesses, settlements, and destinations. Despite this robustness of data in a landscape pattern, the challenge, like any landscape-based strategy, was still present in how this information was arguably neglected for landscape management strategies.

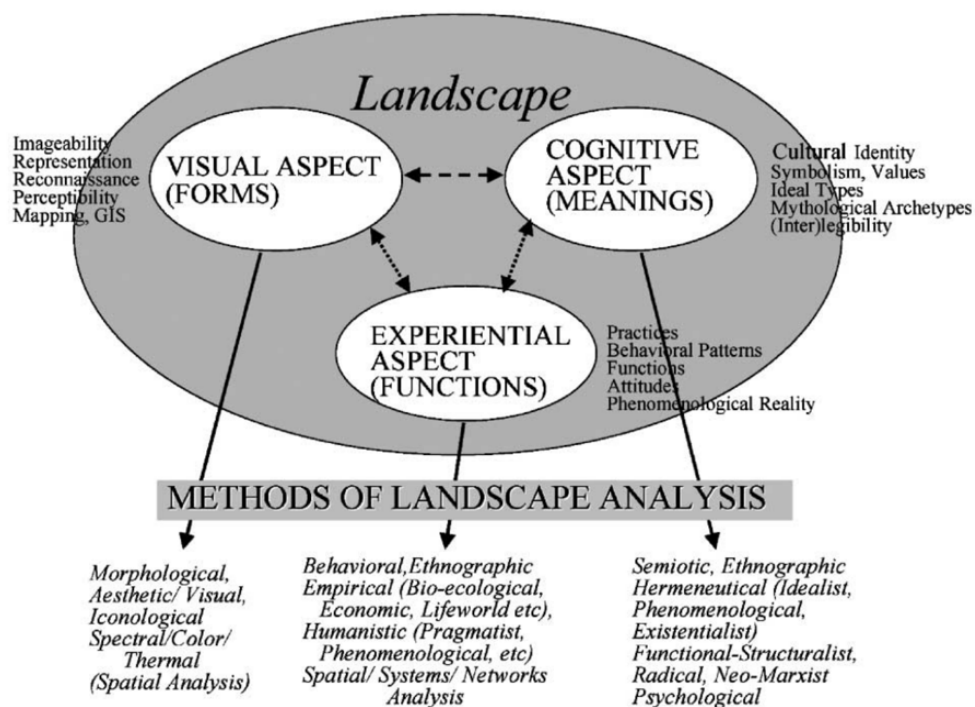


Fig. 1. Landscape aspects and methods of analysis.

Fig. 27. Terkenli's Framework of Landscape Aspects and Methods of Landscape Analysis
(2001, p.200)

Another systems approach that viewed the landscape as a repository was also introduced by Terkenli (2001, p.200). Despite the many definitions of landscape, one

that Terkenli (2001) developed was very useful as the landscape was viewed as the repository of ascribed descriptions from biological and cultural attributes. This view of the landscape made it an object that can predict scenarios, activities, and experiences that may occur within the landscape's scope. Also included in the discourse of landscape as a repository were three-dimensional views of the landscape:

1. Visual and morphological dimensions that elucidated "formal character and identity" (2001, p.200) as the landscape's tangible descriptions.
2. Cognitive and sensory dimensions that defined its "imageability, (inter)legibility, and perceptibility" (2001, p.200) as synonymous with the landscape's intangible descriptions seen in the imageability and meaning attached to its place character; and
3. The dimension of "functionality" (2001, p.200) that were discussions linked on the concept of landscape affordances (Gillings, n.d; Rietveld and Kiverstein, 2014; Heras-Escribano and de Pinedo-García, 2018).

From the three views of landscape dimensions, Terkenli (2001) also developed the importance of the intangible aspects associated with it, aside from the visual aesthetic with which it is usually associated. This view of the landscape, inconclusively linked to its experiential dimension, linked landscape actors in defining the holistic character of the landscape as they also contribute to the building of landscape aspects (see Fig. 27).

Aside from Bell and Terkenli, viewing the landscape as a space with components and processes through Hillier and Hanson's (1989) Social Logic of Space became necessary. If the landscape was viewed as space, the landscape can then be linked and follow the same systematisation. As a system, space exhibited global and local qualities, acting as a system of assemblages. This social space logic, "all human social formations appear to exhibit this duality of spatial and train spatial, of local group and category" (Hillier and Hanson, 1989, p. 42), presented another quality of landscape - that it was imorphic - it could change while also having a distinct description as fed to the system.

Thus, these assemblages were also patterns of global order with local rules, summed up with the need to "learn to characterise discrete systems in such a way as to clarify how these descriptions are retrievable in the abstract form" (p. 45).

From these theoretical pieces of evidence of landscape as a repository and a system, another theory from Salter (1971) was brought into the discourse as it looked at regional perception as an essential aspect of understanding systemic phenomena (Salter, 1971, p.145). Salter (1971) packaged data into regions, making a regional cluster of perceptive attributes. The segment clustering into regional units could then draw value judgments to each clustered regional unit. This proposal by Salter made it viable to resolve issues from the regional scale of landscape analysis.

The LCS being developed for this thesis expanded the resource inventory mapping process existing through the Philippine CLUPs with a landscape-based system that could sync all attributes needed for a more sustainable solution, particularly in the study region of Cavite. The proposed LCS suggested a method to consolidate natural and cultural resources into a systematised inventory of landscape attributes. The inventory could inform landscape planning directions on a more responsive and sustainable plan, a procedure adapted from the one crafted by McHarg.

To also consider a more apt set of processes to be added to the LCS, other processes were also reviewed and considered. The other processes presented in the succeeding sections explained its viability as the Philippine version of the LCS as applied in the peri-urban region of Cavite. The proposed addition of these processes was grounded on the provision for localisation of LCS, with landscape-related policies and data management being different from that of its Global North counterpart.

3.4. Landscape Character Area Morphogenetic Montage Clustering for Landscape Morphogenetic Character Simulation

Used for this thesis were landscape morphogenesis and the landscape montage approaches for clustering landscape data into illustrated versions. For this thesis, landscape morphogenesis became the next strategy crafted for temporal description gathering. The approach scoped the landscape character using historical data. The historical data became repositories of information where the landscape was integrated as influential forces of peri-urban development. In this additional method to the LCS, the conditions of Cavite's peri-urban landscapes became a summary of information transposed into structured categorisations.

Urban morphogenesis had long been focused on understanding the city and how it affected the different cultural dimensions of space. One of the more familiar theories related to this was Cataldi's (Oliveira, 2018) general theory on urban morphology. The process of change in urban areas, or urban morphology, was explained as a quality of cities. This morphogenetic character determined space. It also explained the cyclic formula creating space syntax crafted from a characterisation system of processual activities like reading, projecting, building, and dwelling. It reinforced the cyclic phases of morphological processes through a process-typology relationship that can define the changing urban space.

Urban morphogenesis was a field of study that created an inventory of temporal and visual landscape quality. An excellent way to adapt this in the field of the landscape was the proposed visual form inventory of resources. In the proposed process, landscape characteristics were used as research objects in the form of historical landscape montages. In this thesis, the montages are overlaid images taken from text references but were presented in a way that syned the characteristic of places at several eras of change in Cavite.

3.5. Evidence-based Landscape Descriptor Mapping using the Evidence Synthesis Procedure

The Evidence Synthesis Procedure (ESP) became the baseline for developing the Evidence-based Landscape Descriptor Mapping (EBLDM). The procedure was also adapted from Deming and Swaffield (2011), descriptive observation as an effective procedure in theoretical investigations. Although the context of the descriptive observation procedure was relatively straightforward, the quality of the research design devised to extract landscape descriptions from written texts situated the ESP in higher levels of landscape architecture research. Consequently, the procedure designed for this landscape research also considered empirical descriptions to validate the initial categorisation of landscape attributes that will be fed into the Philippine LCS as applied in the case study site of peri-urban Cavite. The plan to add methods that could make a systematic observation strategy was to also, hopefully, advance the Philippine landscape architecture research processes (Brink et al., 2017) by starting a data extraction plan that was syntactic and valid.

As applied in this thesis, ESP was a descriptive research procedure that used literary or text information to extract landscape data. The ESP could become the tool to scope literary precedents of landscape character in creating initial landscape types coming from published sources. It became the basis for the Evidence-based Landscape Descriptor Mapping (EBLDM) designed for the LCS.

The literary information used from texts were variables that can be systematically extracted to produce the pieces of text evidence needed to answer queries during literature reviews. As part of the ESP, this information minimised bias and created a more quantitative result for qualitative research, usually by limiting the search protocol and criteria (CEE, 2013).

ESP was not new and was typically used in the health sciences category rather than in the social sciences. The structured format of the approach followed a similar

methodology applied for meta-analysis. In the sciences, discovering the evidence synthesis approach created a new dialogue on how researchers can adequately collate different pieces of evidence, thus making headway in proving any scientific query (CEE, 2013). In recent discussions on evidence synthesis approaches, the visions of most research groups and organisations included the use of the methodology to make pieces of evidence reach the management and policy level as basis for sustainable solutions related to environmental futures. A good listing of evidence synthesis approaches applied in ecological research was discussed in the online collection of the Centre of Evidence-Based Conservation (CEBC), and the Collaboration for Environmental Evidence (CEE) team for the collation of evidence syntheses that can contribute to environmental policies and practices at a public level. The various approaches employed included evidence protocols that tried to synthesise multiple research outputs at a global scale to bring forward evidence that could answer the queries related to the environment. One example of its application in environmental studies (Stratford et al., 2017) was a general evidence synthesis procedure done to prove the relativity of forests, and river flooding through a question defined, "Do Trees in UK-relevant river catchments influence fluvial flood peaks?". A simple query on trees' effectiveness grounded data extraction in creating results that answer the effectiveness of trees in flood control. The evidence synthesis suggested some vital flood peak management approaches using trees.

Related to this discussion were several published papers that used ESP in gathering baseline data on environmental impacts resulting from human activities. Searching online databases, grey literature, bookshelf collection, and expert literature recommendations made ESP a sought-after approach in recent data discovery to minimise bias regarding data that may be extracted. Policy-based organisations and government agencies worked toward creating evidence-based policies and systems to prove possible policy-based queries using available pieces of evidence in the sciences field. The advantages of this approach relied on the minimal bias of the methodology and the efficiency of it in answering scientific queries (Booth et al., 2012; CEE, 2013; Collins et al., 2014; Stratford et al., 2017).

3.6. Mobile Strategies and Place Perception Identification Measures for the Landscape Walking Narratives (LWN) Procedure

From the interdependency of psychology to the landscape, it was decided that the Philippine LCS designed for Cavite could be more robust with landscape data taken from human perception. At present, the everyday lifestyle of those who live in Cavite adapted to migration. Thus, a procedure should be considered to extract data from the text and stories of those who experienced the effects of urbanisation processes.

The Landscape Walking Narratives (LWN) was an added procedure for the LCS. It was developed from Guy Debord's Psychogeography theory (Coverley, 2006), where the relationship of geographic areas to perception was explained to yield place identity. In Coverley's (2006) analysis, the interface of psychology and the geographical layers of the environment expressed the emotions and behaviour of landscape actors, particularly the people, thus becoming the characteristic of the place. This notion was solidified by Altman and Chemers (1980) as they considered the two types of psychological activities, namely mental activities and behavioural activities, as interdependent expressions of humans to their physical environment. Mental activities identified were cognition, perception, beliefs, attitude and interpretation of the physical environment through the senses. On the other hand, behavioural activities were the actions made towards culture and the environment interpreted through privacy, territorial control, migration movement, and land usage. With psychological theories joining in the human-nature discussions, it was then hypothesised that place attributes can be developed from one's interaction with the landscape.

The concept of the *Dérive*, or an aimless walking process used in the field of psychogeography (Coverley, 2006), was consulted to develop the Landscape Walking Narratives Procedure (LWN). Synonymous with the drift, the *dérive* was a form of walk designed to discover the character of the urban ground through a free walk around the

city. It was designed to be such to be able to minimise bias in the walk, allowing the character of the city to reveal itself slowly in the process (Coverley, 2006; Knabb, 2006). The Dérive was also structured to be unplanned and designed to develop chances in the walk.

The most recent application of the Dérive applied innovative technology in the project plan. (The Dérive App, n.d.). This project, headed by Eduardo Cachucho, used the unplanned exploration of urban space using the boundaries of the digital application. It used the structure of a game, where one strolled the city following what they call urban tasks to direct people in a semi-controlled stroll of urban space using search protocols like – finding architecture, urban, and social points of interest to detect place importance.

LWN was an adaptation of this Dérive procedure. The LWN followed the structure of the Dérive, where the person or persons engaged in the process would disengage from other activities while exploring the city. This part of the process, adapted from the Dérive, strengthened the LWN by putting a value on the free walk as a tool that extracted landscape attributes.

Aside from the Dérive procedure, further research on the walking method for the LWN was done for this thesis. Considered in this research was the role of the moving bodies as a variable in extracting data from walking. Macpherson (2016) analysed the moving bodies' role in influencing the walk's different aspects. The effect of the moving body was considered essential in the process as it was subjected to different aspects of space like route, distance, duration, and terrain (Macpherson, 2016).

Walking could also be considered as the research object that was an essential variable in the procedure (Pierce and Lawhon, 2015). Pierce and Lawhon (2015) considered walking as a geographical-experiential prompt.

A gap in the LWN was still apparent, as qualitative data was still arguably biased. Cataloguing human perception of places still posed issues on regional validity. As a solution, delimitations were set in place with the walk. This included the control of the setting to create spatial and temporal boundaries (Brown and Raymond, 2007; Pierce and Lawhon, 2015).

Also added in the LWN were processes from Oral History, particularly the concept of cataloguing information from narratives as a reference for landscape data. Central to this procedure was not just the narrative as a reference for landscape data but also recalibration of the walk as a performance. The performance was then the research tool where the individual engaged in the process became the narrator. The landscape also became not just a background but a multi-sensory narrative source. The structure was also designed to collect audio material from the walkers' narratives as embedded in the audio walks. However, what one should understand about the Oral History is its three-way conversation structure (SGSAH/SS Spring Into Methods Programme, 2018); thus, an interviewee should be able to provide limitations through the queries imposed to limit results towards the direction needed for the study (Bradley, 2012).

However, a challenge still appeared in the transcriptions and their tabulations due to the LWN. It was the emergence of this challenge that made the application of grounded theory (Glaser and Strauss, 1967) necessary. It was a theory widely used in social sciences for qualitative research. Applying the grounded theory for the LWN added a framework to the results and strengthened the LCS with landscape attributes generated after grounded theory techniques were applied. The grounded theory allowed the simulation of codes or cluster descriptions that brought qualitative data and layers of landscape character interpretations to the surface. It also verified the existence of intangible components of the landscape from the narrative. Lastly, it allowed the qualitative data being produced to be evidence and process based.

3.7. Character Extraction using Future Landscape Scenarios

Another approach to enrich the LCS with landscape data was a pedagogical procedure where design thinking (Rowe, 1987) opportunities may be applied to extract landscape attributes. Mainly focused on how future landscapes can be added to the LCS, the following procedure became quite challenging for there was presently no definite plan focused on the landscape in the Philippines. Also, developing narratives from dwellers who were part of the landscape and whose presence within the landscape influenced its future directions was entirely coming from the hypothesis that landscape character may be projected if the consultation of stakeholders or landscape dwellers was regularly done as part of the regional development plan.

The future landscape scenario workshop (FLSW) was devised for the LCS to answer this challenge. The FLSW was grounded on theories of social constructivism (Applefield et al., 2000; Amineh and Asl, 2015), adventurous learning (Lensmire, 1994; Beames & Brown, 2016), and engaged action research (Deming and Swaffield, 2011). In the FLSW, the landscape character units were the outcome of the nature-culture interface perceived by the participants of the design thinking dialogue (Rowe, 1987). Social constructivism (Applefield et al., 2000; Amineh and Asl, 2015) also became helpful in crafting the FLSW by strengthening the notion that cognition of the landscapes happened at a social level of interaction of people and the environment. Thus, engagement through the FLSW created a more objective research protocol and catalysed the growth of knowledge by suggesting a culture of respect and openness to shared learnings, circumstances, and experiences.

Additionally, discussions on landscape connections and how landscape actors perceived themselves within Cavite's landscapes were also considered. Spirn (1998) had been vocal on how landscapes stories reflect connections and how these form the language with nature and cultural attributes forming its syntax. Thus, adding these procedures supported Spirn's claim.

As FLSW was being developed, other query strings proved to be vital. What attributes of the landscapes should stay, and what should change in the process of adaptation to peri-urbanisation? The research challenge relied on understanding and building landscape character according to the cognition of its dwellers, both as an individual and a social construct, as they may be vessels of landscape definition syntax. By engaging different landscape dwellers, was then important in finding different landscape forms: texts, images, and sketches. It also led to the next challenge of understanding the resulting self and group reflections, ultimately creating future scenarios of the peri-urban landscape.

As part of pattern and attribute finding being developed for this research, approaches done by Deming and Swaffield (2011) were adapted, particularly the social constructivist pedagogy through Engaged Action. Engaged action research used landscape cognition to empower individuals and communities as thinkers in a socially constructed data extraction process. The engaged action research was more often designed in a workshop format, an alternative learning environment where moderators, facilitators, researchers, and participants were engaged in an activity that could develop results. Structuring Engaged Action Research in a workshop format was supported years ago when workshops provided alternative formats to the standard school learning practices (Lensmire, 1994). The exact format was also supported by Beames and Brown (2016) in the theory of adventurous learning, where the workshop format was considered the practical option to format engagements for its aspect of authenticity, agency, uncertainty, and mastery. Workshop as an adventurous learning setting could also maximise the opportunities for participation. It opened room for growth and exploration of new ideas while leading to innovation. Also, the adventurous learning format encouraged reflective practice and critique of the conventional form of learning towards reshaping the learning environment where landscape data will be generated.

In summary, a proposed FLSW was to follow this engaged action process, where a pedagogical approach in the landscape architectural planning for peri-urban areas of

the Philippines was applied. As there was still a need and opportunity to explore a different inquiry format in phenomena mapping, the proposed FLS Workshop was developed as a new technique that could create the future landscape scenario clusters (FLSC), which were vital in developing the collective image of landscape needed to direct it towards a more sustainable future.

3.8. Key points and Implications of Landscape Planning Frameworks and Initiatives to the Philippine Landscape Character System

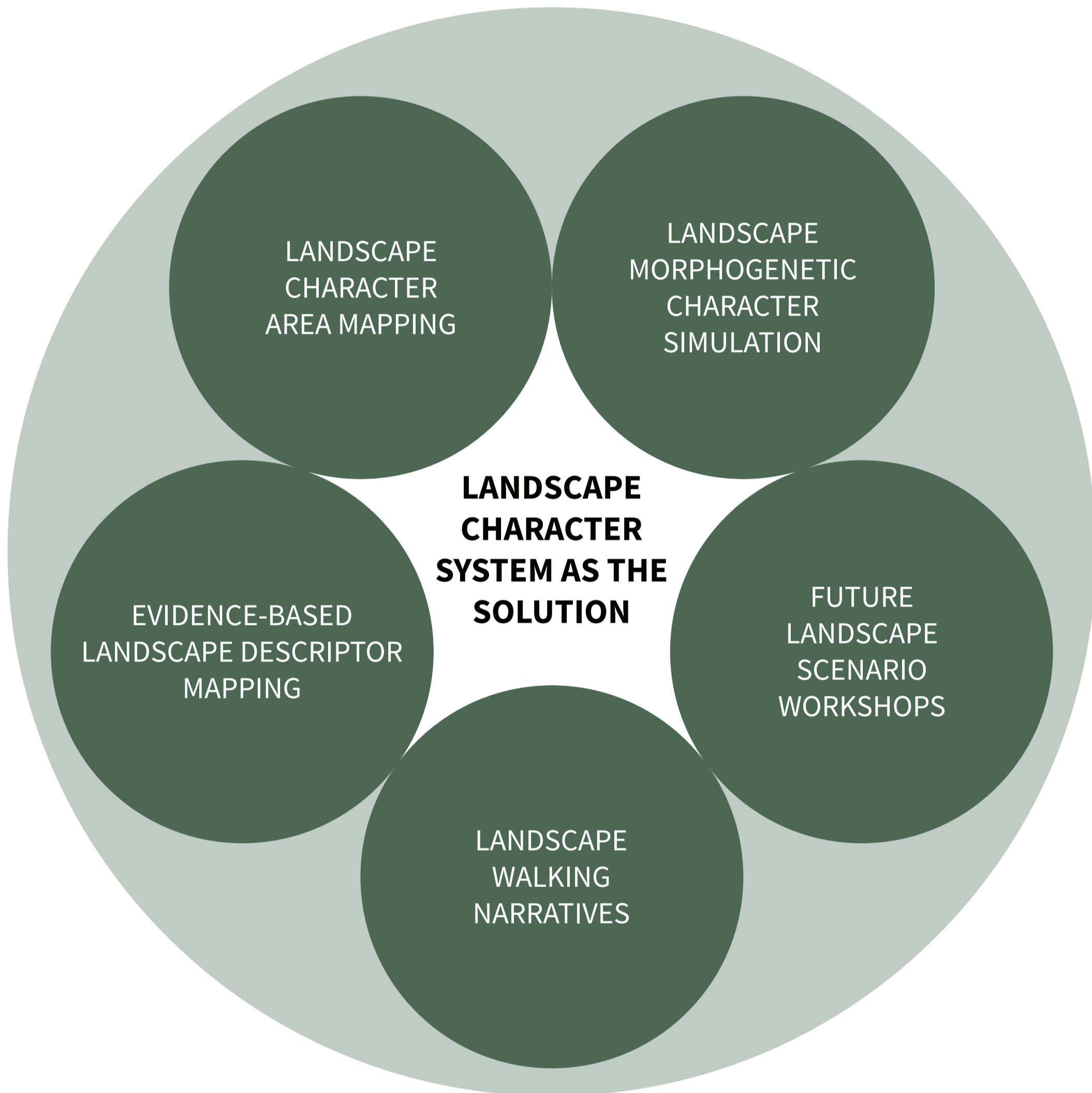
With all the references consulted, the LCS became a consolidated set of procedures due to the theories and literature reviewed to localise the process for the Philippines, particularly Cavite. What was noticeable in the reviews made for the LCS was the commonality of intention to bring the landscape closer to environmental health and well-being, as landscape knowledge could guide planning towards a more sustainable direction. What was also commonly seen is a landscape character being threatened by the growing civilisations' constant aim for urbanised advancement.

Below were several key points identified during the discussion on several general theories:

- **Landscape recognition and integration in planning was a challenge in Philippine urban planning narratives.** The situation of Philippine landscapes continued to be dismal as tangible solutions seem to become different with bureaucratic processes in place. The diffusion of logistics and policies into different parcels and scales made it even more challenging to render landscape-based solutions. Moreover, it became more confusing as the Landscape Agenda did not reach local planning applications.
- **Recognition of the landscape as a tool with multidimensional layers capacitated planners and related field practitioners with the knowledge to**

solve its present regional problems. The examples and theories found in the literature brought landscape's value in theory formation, process analysis, grassroots planning, and regional levels of place and spatial planning. A particular focus was made on landscape character data as it became clustered using a comprehensive and holistic approach for landscape recognition. Therefore, landscape character systematisation was a chosen option to be explored for Philippine landscape awareness. The approach could help view landscape as a receptacle of values: the language of the Philippine landscape for sustainable regional planning. It could also become an agglomerated nature-culture solution for planning and management.

From these critical points, the persistent challenge of the landscape was brought back to this thesis – that the landscape remained polemic and pragmatic, which was the reason for its polyvocality in culture and nature studies. From these literary encounters, valid points for the thesis methodology were created, thus validating the need to create a landscape character system that could overlay different aspects of the landscape as components to be integrated into the Philippine planning frameworks.



**Fig. 28. Theoretical Framework guiding the creation of the Landscape Character System Approach
(Visualisation by Nadal and Barroga, 2021)**

Chapter 4.

Research Methodology

This chapter explains the multi-dimensional and landscape-based methodology developed as the Landscape Character System (LCS) for Cavite, Philippines. The LCS is a baseline data format forming a systematic characterisation framework applicable to the Cavite, Philippines, study site.

As discussed in this chapter, the LCS and its application in peri-urban Cavite contextualise the procedures used to extract data and visualise the landscape data as vital components in the systematic characterisation framework. The multi-dimensional and landscape-based methodology manages the landscape attributes presented as a catalogue of landscape text descriptors, landscape character maps, historical landscape montages, coded perceptive word clouds and future landscape scenario visions. Overall, the strategies used to form the LCS method as the thesis product- the Landscape Character System is the new body of knowledge suggested to solve the gaps in the spatial planning frameworks of peri-urban regions like Cavite in the Philippines.

This chapter also contains sub-sections on each research procedure built within the landscape-based methodology for mapping the dynamic character of the landscape. The subsections will include a brief of the approaches adapted and applied in the LCS, the data tables and illustrations of procedure-specific landscape data collection, and the steps undertaken to generate the comprehensive inventory of Cavite's landscape descriptions. Lastly, this chapter collates the procedures into the LCS as a method and becomes the landscape-based inventory tool for the landscape challenges in peri-urban Cavite.

4.1. The Landscape Character System: A Brief on The Multi-dimensional Methodology as the Landscape Character System Approach for Cavite's Landscape Planning Framework

"Landscape is an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors" (Council of Europe, 2000, p.02).

The landscape character approaches applied in the Global North were references consulted in designing the Philippine LCS (Swanwick, 2002; Wascher, 2005; Wascher, 2007; Mü Cher et al., 2010; Warnock and Griffith, 2015; Fairclough et al., 2018; Simensen, Halvorsen and Erikstad, 2018). As a reference, these approaches helped set forth the format, structure, and the research objects that must be prepared and extracted for the LCS.

What was unique in adapting the LCS for the Philippines was the addition of procedures taken from related fields of psychology, history, ecology, geography, and planning to achieve a system that can resolve the unique challenges of the Philippine landscape. Not all landscapes were the same, and the additional procedures to be added were necessary to capture data that was not readily available in Philippine resources.

Aside from finding procedures that could suggest the LCS for the Philippine landscapes, the LCS was also developed to become a research tool. As a research tool, the LCS was designed to include objectivist data-capturing tools like describing and modelling data and constructivist data-capturing tools like classifying and interpreting landscape data for structuring information. Information as applied in a system could improve the landscape data inventory for local landscape research. It also added subjectivist data-capturing tools like engaged action through the landscape scenario workshops. Overall, combining all different tools made the LCS a reflexive research methodology (Deming and Swaffield, 2011) to gather different data types.

Also included in the LCS were landscape character clustering procedures for the specific site of peri-urban Cavite. These procedures were necessary for landscape practice and planning. Adding these data extraction, classification, and visualisation procedures to the LCS generated an inventory of essential attributes for landscape characterisation. The LCS then became an inventory process that consolidated data into a catalogue of landscape characteristics of Cavite that could provide a more landscape-responsive spatial plan.

Adopting varied strategies or procedures for the LCS added variety, volume, and velocity of data discoveries essential for research and practice in the country (Russom, 2011; Chen et al., 2013; Cartledge, 2016). Looking at the landscape as a data set transformed the conversations into operable terms for data analytics where the data objects, in this case, landscape attributes, may operate under applicable data systems, such as land planning frameworks. Provisions for visioning the results as landscape data became an opportunity for the results to be beneficial in land planning databases. With data becoming manageable components of a database, they are now transformed into a format that can be used on a massive scale of analysis. Thus, data may be used for hierarchical lumping and consolidating, bringing in these data for descriptive, diagnostic, and predictive solutions to landscape challenges.

4.2. Precursory Scoping of Procedures to be used for the Landscape Character System (LCS)

To scope the variety of procedures applicable to the LCS, a scoping of research procedures took place from 2017 to 2018. The scoping was followed with methodological trials done on-site to find which various procedures can be added to the LCS of Cavite. The application of several data extractions, classification, and visualisation procedures was necessary as it sets the direction of the research method. It also showed procedures that can be eliminated according to the data it yielded.

To take the work forward and conduct a reasonable research inquiry that can resolve the lack of data access and robustness in Philippine landscape practice and research, the following tasks were done:

1. Visits and meetings to request desk research, policies, reports, and permits to conduct research
2. Landscape scanning to survey the landscape features

Visits and meetings were necessary for gathering existing information for the baseline data of the LCS. For this thesis, a visit to several municipal offices was undertaken as a necessary step. It was done with meetings to seek the endorsement of the research activities for developing the LCS for Cavite. Last January 2018, Visits to Cavite were done for site context familiarisation. The visit was a one-week immersion to the site to traverse the road networks, conduct initial landscape scanning through photos and walks, and gather literary data from government data repositories in Cavite.

With bureaucratic policies in place in Philippine local government data access, getting information for the research became difficult. This situation made research data gathering very challenging, especially during the early stages of the research. If unavailable or updated, some data will need to be collected on-site or through a process that would entail a more extended request protocol. It added pressure to the data collection process, as reflected in the extended data gathering timeline. This challenge led to a more prolonged data gathering stage than initially expected.

After the visits and meetings, landscape scanning commenced as an initial survey and testing of proposed procedures. Landscape scanning was necessary to find suitable strategies for the LCS. Landscape scanning was adapted from the "environmental scanning" approach developed as a corporate strategic planning strategy (Choo, 2001; Lesca, 2011) and as a strategic plan for the research. An example of one environmental scanning method was the popular SWOT analysis (Valentin, 2001; Gurel and Tat, 2017), a procedure that was not precisely created within the field of landscape architecture but

was relevant in developing landscape observation frameworks that could lead to better landscape design solutions to site challenges. In this study, landscape scanning became ideal for creating a landscape diagnostic framework helpful for identifying strengths, weaknesses, opportunities, and threats within the study site. It strengthened the research with components observed first-hand by the inquirer. It also brought the research forward with personal narratives and pieces of evidence gathered during site visits. From this example, landscape scanning became essential in visually scoping the site character with the possibility of testing preconceived notions.

One of the landscape scans done for the LCS included analysis of peri-urban regions adjacent to Metropolitan Manila, thus expanding the data collection to the peri-urban regions of Bulacan, Rizal, Laguna, and Cavite (see Figs. 29a, b, c, and d). The scanning helped evaluate the extent of peri-urban effects felt by the regions. Scanning these peri-urban regions were also helpful in justifying the viability of the study site of Cavite as the site for the LCS, limiting research to an area that was apt and manageable for the thesis.

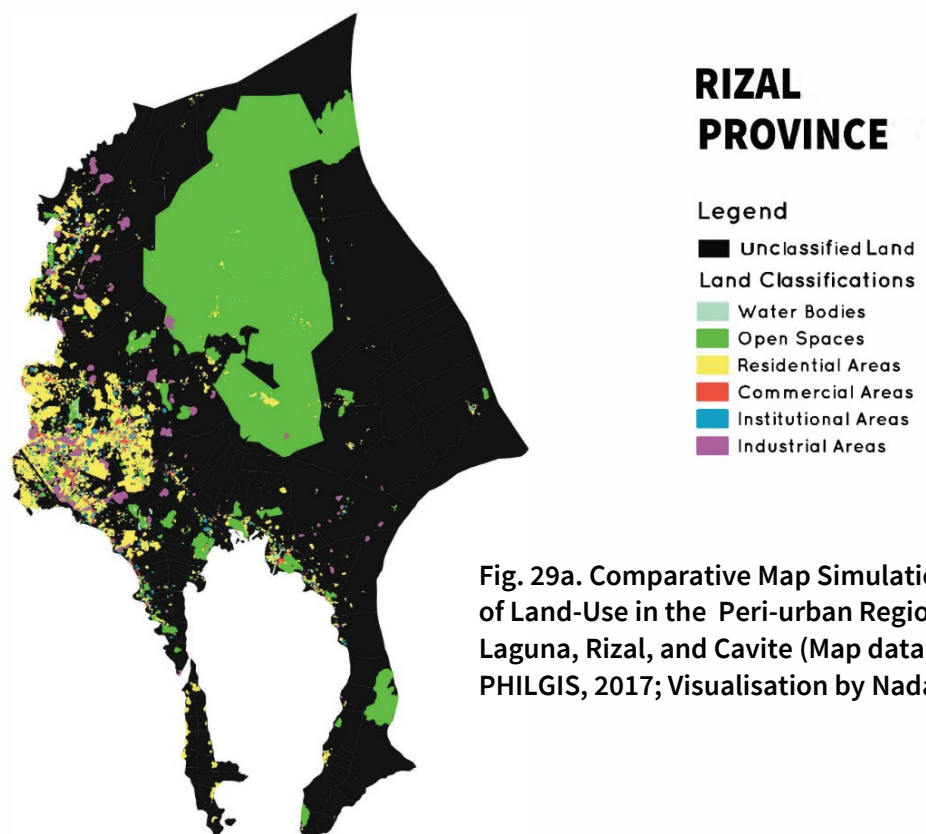
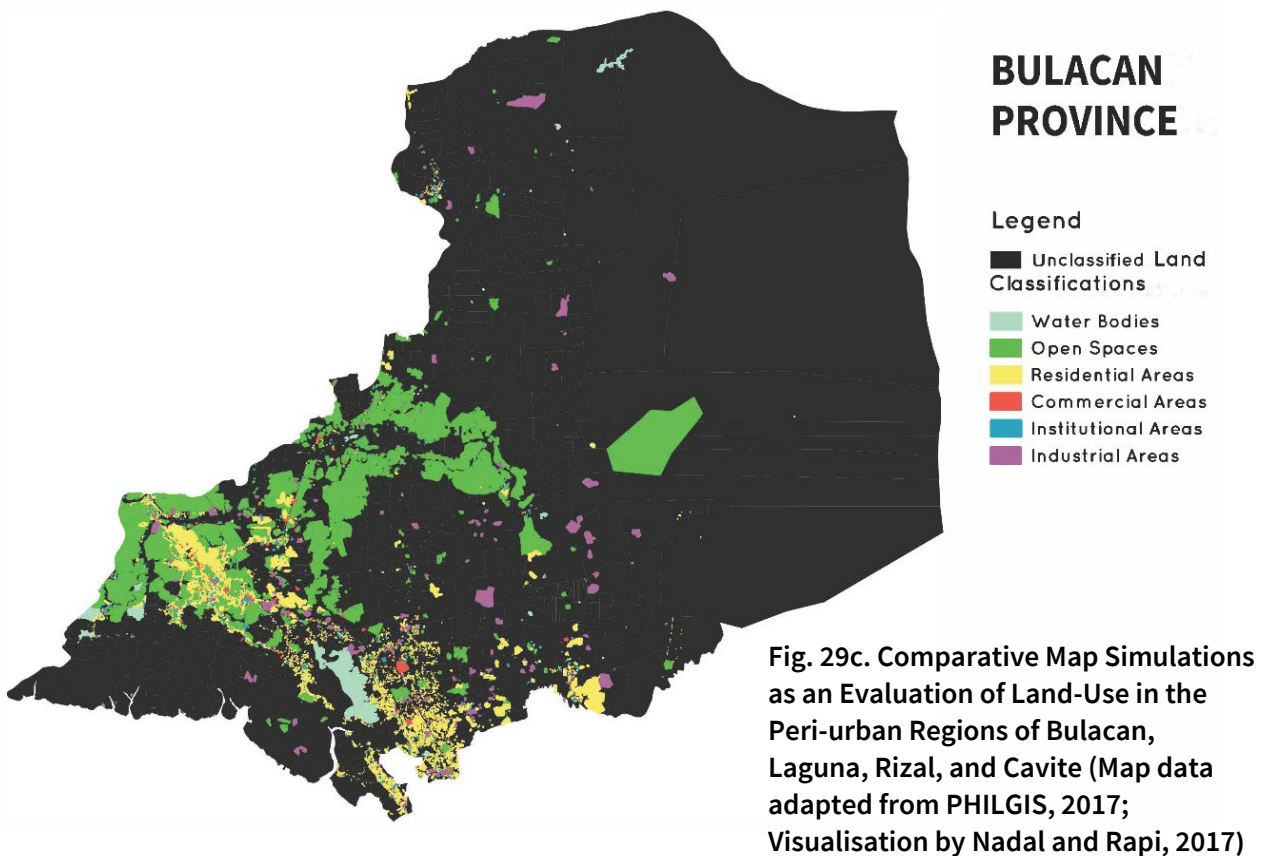
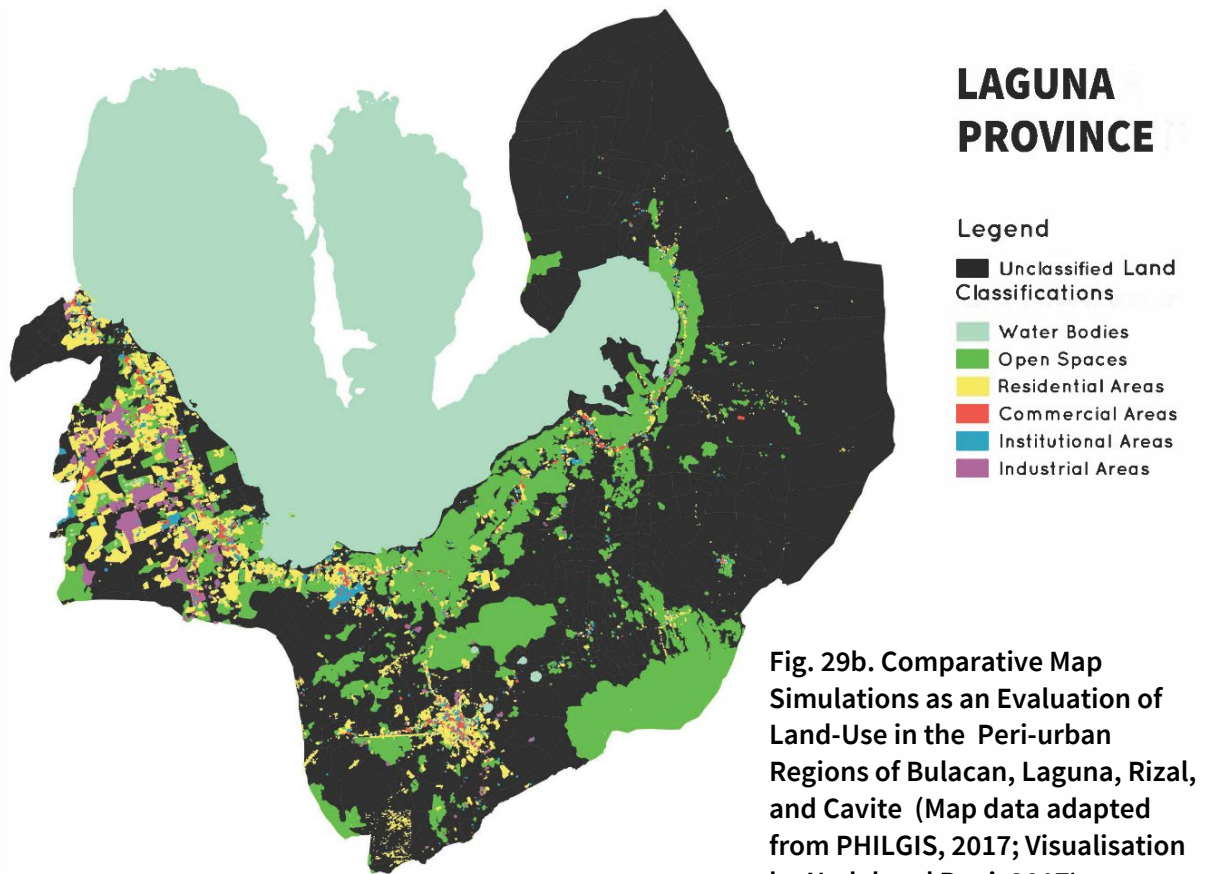
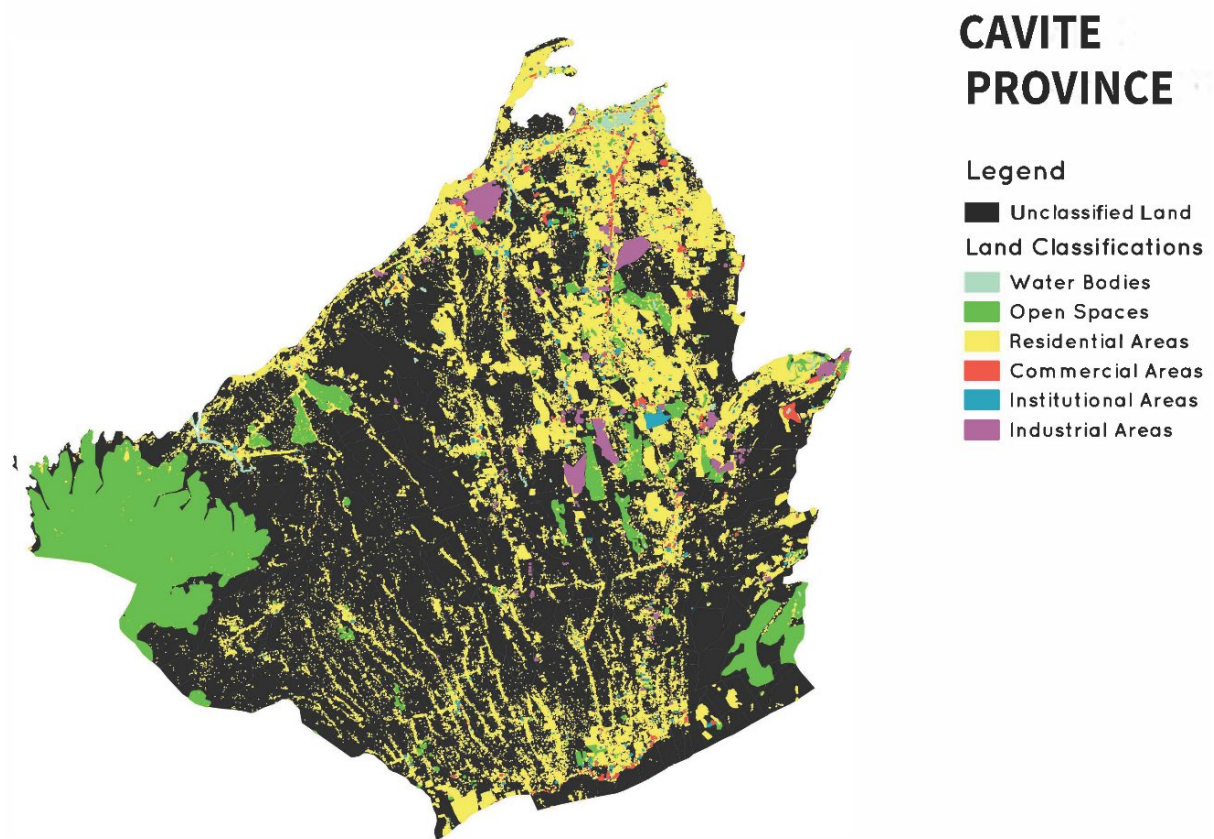


Fig. 29a. Comparative Map Simulations as an Evaluation of Land-Use in the Peri-urban Regions of Bulacan, Laguna, Rizal, and Cavite (Map data adapted from PHILGIS, 2017; Visualisation by Nadal and Rapi, 2017)





**Fig. 29d. Comparative Map Simulations as an Evaluation of Land-Use in the
Peri-urban Regions of Bulacan, Laguna, Rizal, and Cavite
(Map data adapted from PHILGIS, 2017; Visualisation by Nadal and Rapi, 2017)**

The scanning took a two to three-month mapping simulation procedure, which involved the processing of readily available land-use data sets from PHILGIS. During this research stage, the landscape scanning of the peri-urban growth in Bulacan, Rizal, Laguna, and Cavite showed land fragmentation in Cavite. Fragmentation, in this case, was equated to the number of parcels visually observable on the map vis-a-vis land utilisation. Cavite showed more parcels than the other regions adjacent to Metropolitan Manila. This observation became crucial in determining which among the four regions the LCS will be initially used for this study.

In the map shown (see Fig. 29d), Cavite's development radiated from two ends - the north-eastern portion closest to Metropolitan Manila and Manila Bay and the southern portion closest to the Taal Volcano. These significant landforms were predetermined drivers of change in the peri-urban region of Metropolitan Manila. With the bay and the

volcano becoming added drivers of change to Cavite, Cavite's peri-urbanisation process was fascinating as two magnets of development were seen at its north-western end, pulling development towards these portions in contrast to the north-eastern portion of Metropolitan Manila. The uniqueness of its peri-urban growth was also intriguing as ecological attributes became magnets of change, affecting the spread of development in the region. Also evident from this map was a growing land use of all forms and sizes across different areas in Cavite. With all these factors combined, Cavite became the site for the thesis. It was also supported even further by the population growth rate of the area, with it having the most rapidly increasing population growth rate during the year the research commenced (Philippine Statistics Authority, 2016).

4.3. Research Design: Data Extraction, Classification, and Visualisation Procedures for Landscape Character Clustering

The next step after the precursory scoping was the development of the extraction, classification, and visualisation procedures for landscape character clustering. These assemblages of data, or descriptions of qualities were referred to as clusters or landscape characters clusters (LCC). Additionally, it was essential to determine these LCC to be able to find data types that could be included in the present Philippine planning framework. Thus, it was determined later that the identified processes' practicability was capable of delivering research techniques that could offer the required data. All of these research activities were necessary to establish a viable set of information as the inventory of natural and cultural resources present but was arguably not fit for inclusion into the planning framework.

With this challenge seen at the beginning, evaluation of the procedures to be used commenced, and gathering available data sources became necessary for a more comprehensive LCS. At this point, exploration also began with digital imagery and new data-gathering tools.

For example, new digital tools like 360-degree images were considered to generate a comprehensive inventory of landscape information. These were used in the scenario

workshops and were added to the LCS to make the visual data robust with landscape information taken from the ground level and a 360-degree image perspective. From this initial example, different approaches were devised for data extraction. All these approaches will be explained further on in this chapter.

The core of the research structure was developed from the procedures identified. As a collective, the procedures became the character system framework that consolidated Cavite's landscape data into visualisation clusters necessary for data to be helpful in Philippine landscape practice and research. The framework followed examples from the Living Landscapes Project (Warnock and Griffiths, 2015). This project contained visualisation approaches adapted to fit the LCS of Cavite.

4.3.1. Landscape Character Area Mapping

As adapted from the Living Landscape Projects (Warnock and Griffiths, 2015), the LCS included geo-data processing in a format viable for analysis at the proposed study scale. The visualisation formats explored started with map creation, followed by geo-data integration and data clustering into sets of ecological and cultural groups. The approach produced variations of data sets, starting with the proposed new terminology - the Landscape Character Area Units (LCAr-U). The LCAr-U were smaller units that collectively created the Landscape Description Units (LDUs). LCAr-U were created to be able to devise a smaller format of landscape attributes. This scale also allowed a management format that could resolve issues should the LCS be adapted for planning frameworks in the future.

Four (4) map-based data from the Cavite PDPFP 2011-2020 (Province of Cavite, n.d.) and Cavite's Socio-Economic and Physical Profile (Cavite Provincial Planning and Development Office, 2013) were then consolidated. These maps were also cross-examined using other map sources (see Fig. 30-34 for the list of references used for the map visualisations) and utilised to form a map visualisation of the present situation of

Cavite's peri-urban landscape. The information utilised cross-examining other map sources to verify the validity of maps from Cavite. The maps were also visualised to give an easy-to-understand format of each category used before they were utilised as metadata in QGIS. The visualisations through maps were formatted to include map-based data as overlaid into different categories:

1. Geological map
2. Land Cover map
3. Slope map
4. Population Density map
5. Land use map

However, the land-use map, which was not readily available from the references taken from Cavite, was regenerated as shown in Fig. 34. This map was adapted from PHILGIS data taken last October 2017. The lack of this information was one of the many challenges at this research stage, which made it very important to devise a new map from raw GIS data. This generated land-use map utilised six (6) GIS data sets from the raw GIS data adapted from PHILGIS, and these were:

1. water bodies
2. open spaces
3. residential areas
4. commercial areas
5. institutional areas
6. industrial areas

With all the maps now available for overlay, consolidation of information commenced using the QGIS version 2.18 software, initially producing the LCAr-U to be used in the LCS.

**GEOLOGIC MAP
OF CAVITE, PHILIPPINES**



**Capturing the Dynamic Character of the
Philippine Peri-Urban Landscape:
A Landscape Character Approach for the
Region of Cavite**

Map Generated: June 2020
Adapted Map from References: Cavite Provincial
Development and Physical Framework Plan 2011-2020,
PhilGIS, and OpenStreetMap



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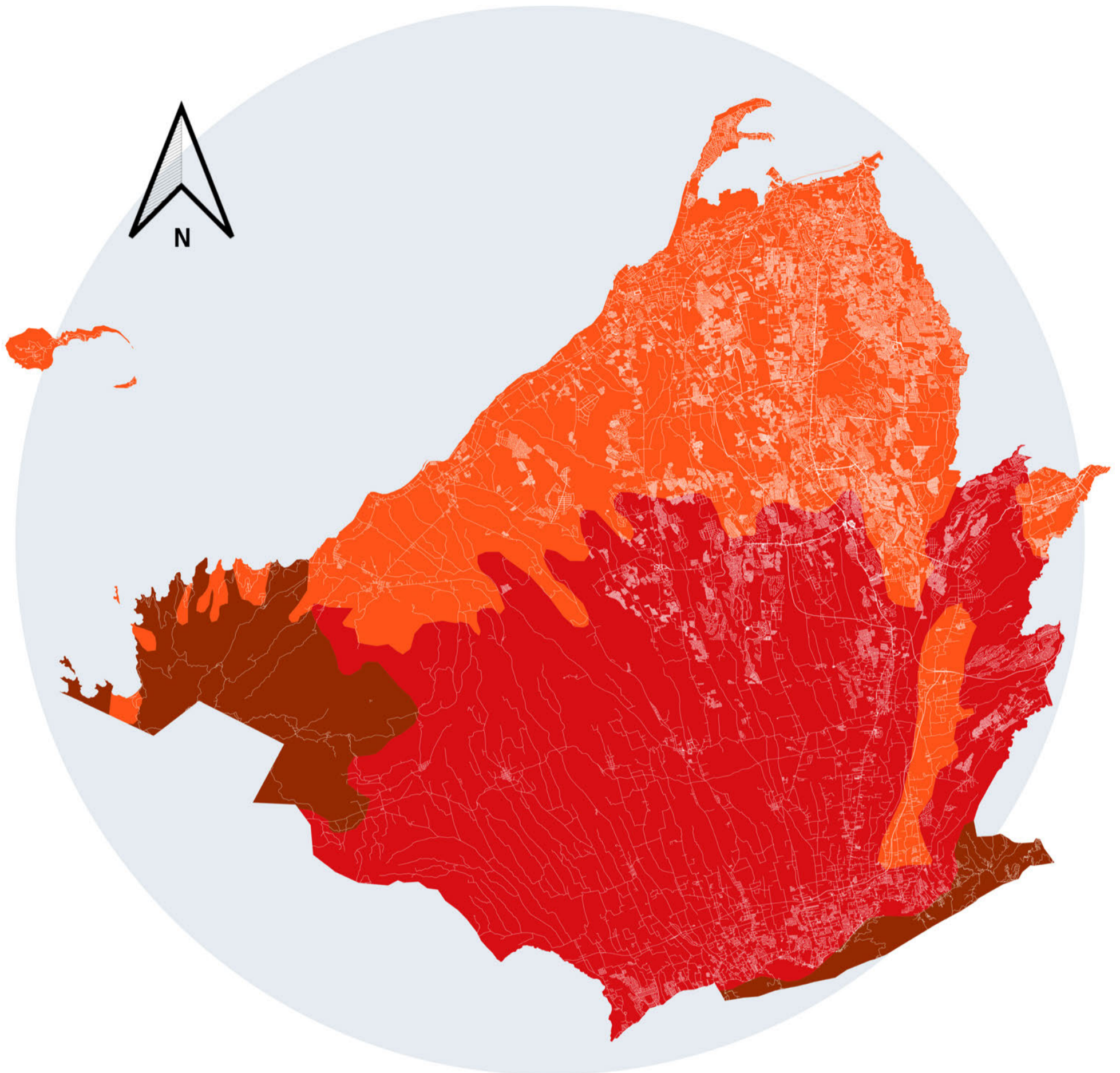
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MAP LEGEND

- Undetermined Geologic Origin
- Old Geologic Origin
- Recent Geologic Origin

Fig. 30. Geologic Map Layer Generated as Basis for LCArC-U
(Visualisation by Nadal and Alanano, 2020)

SLOPE MAP OF CAVITE, PHILIPPINES



Capturing the Dynamic Character of the Philippine Peri-Urban Landscape: A Landscape Character Approach for the Region of Cavite

Map Generated: June 2020
Adapted Map from References: Cavite Provincial
Development and Physical Framework Plan 2011-2020,
PhilGIS, and OpenStreetMap

0 5 10 15 20 km

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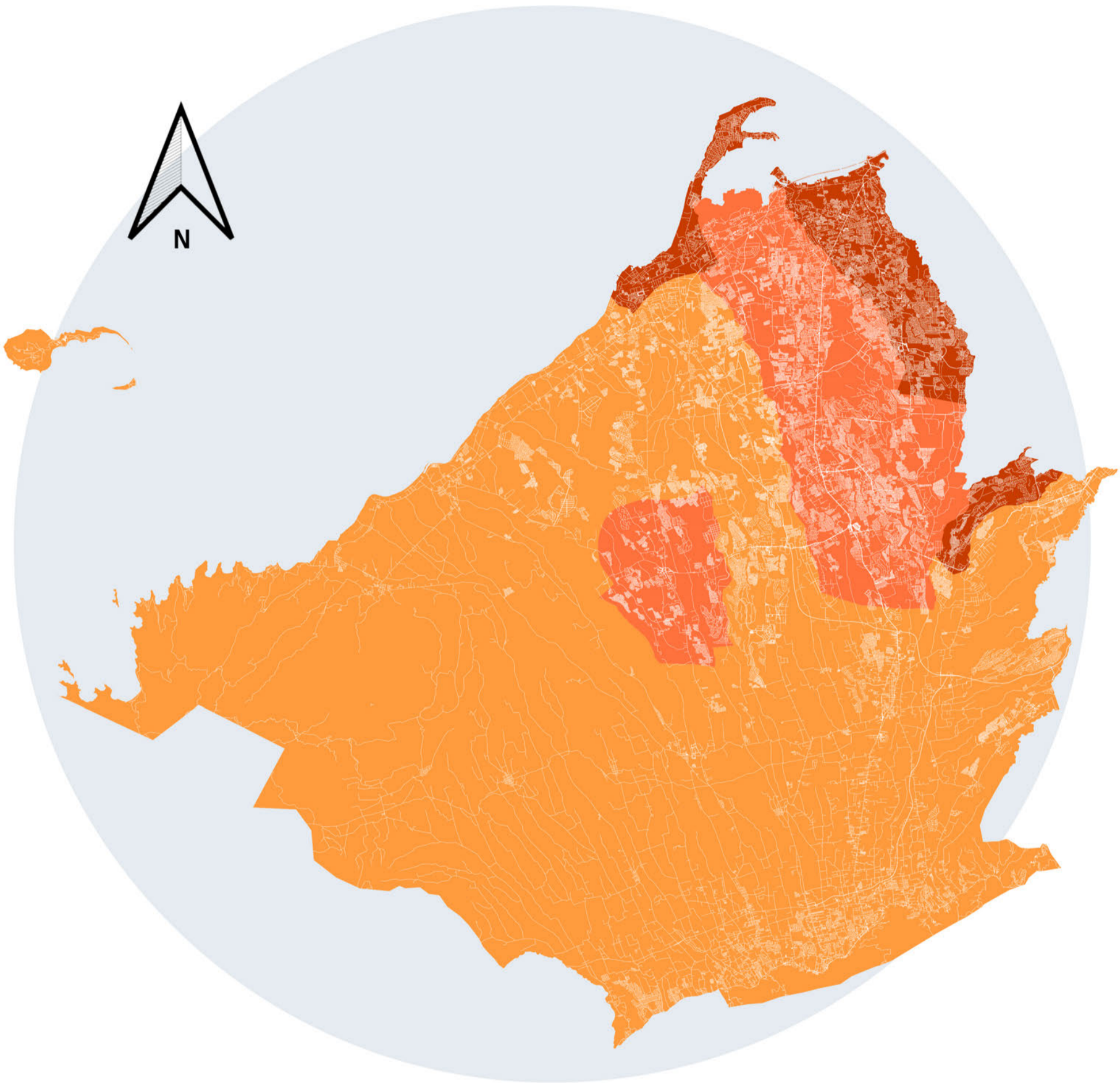
Province of Cavite (no date) Cavite
Provincial Development and
Physical Framework Plan 2011-2020.

MAP LEGEND

- Steep to Very Steep
- Undulating to Rolling to Moderately Steep
- Flat to Gently Sloping

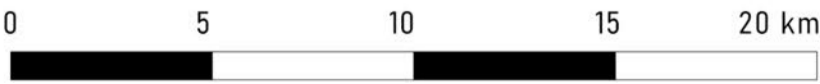
Fig. 31. Slope Map Layer Generated as Basis for LCArC-U
(Visualisation by Nadal and Alanano, 2020)

**POPULATION MAP
OF CAVITE, PHILIPPINES**



**Capturing the Dynamic Character of the
Philippine Peri-Urban Landscape:
A Landscape Character Approach for the
Region of Cavite**

Map Generated: June 2020
Adapted Map from References: Cavite Provincial
Development and Physical Framework Plan 2011-2020,
PhilGIS, and OpenStreetMap



REFERENCES

Cavite Provincial Planning and Development Office (2013) Cavite Socio Economic and Physical Profile 2013. Trece Martires City, Cavite.

OpenStreetMap contributors. "Cavite." OpenStreetMap, www.openstreetmap.org/node/305704568. Accessed 4 Sept. 2018.

PHILGIS. "Cavite | PhilGIS." Philgis.Org, 2011, philgis.org/province-page/cavite. Accessed 4 Sept. 2018.

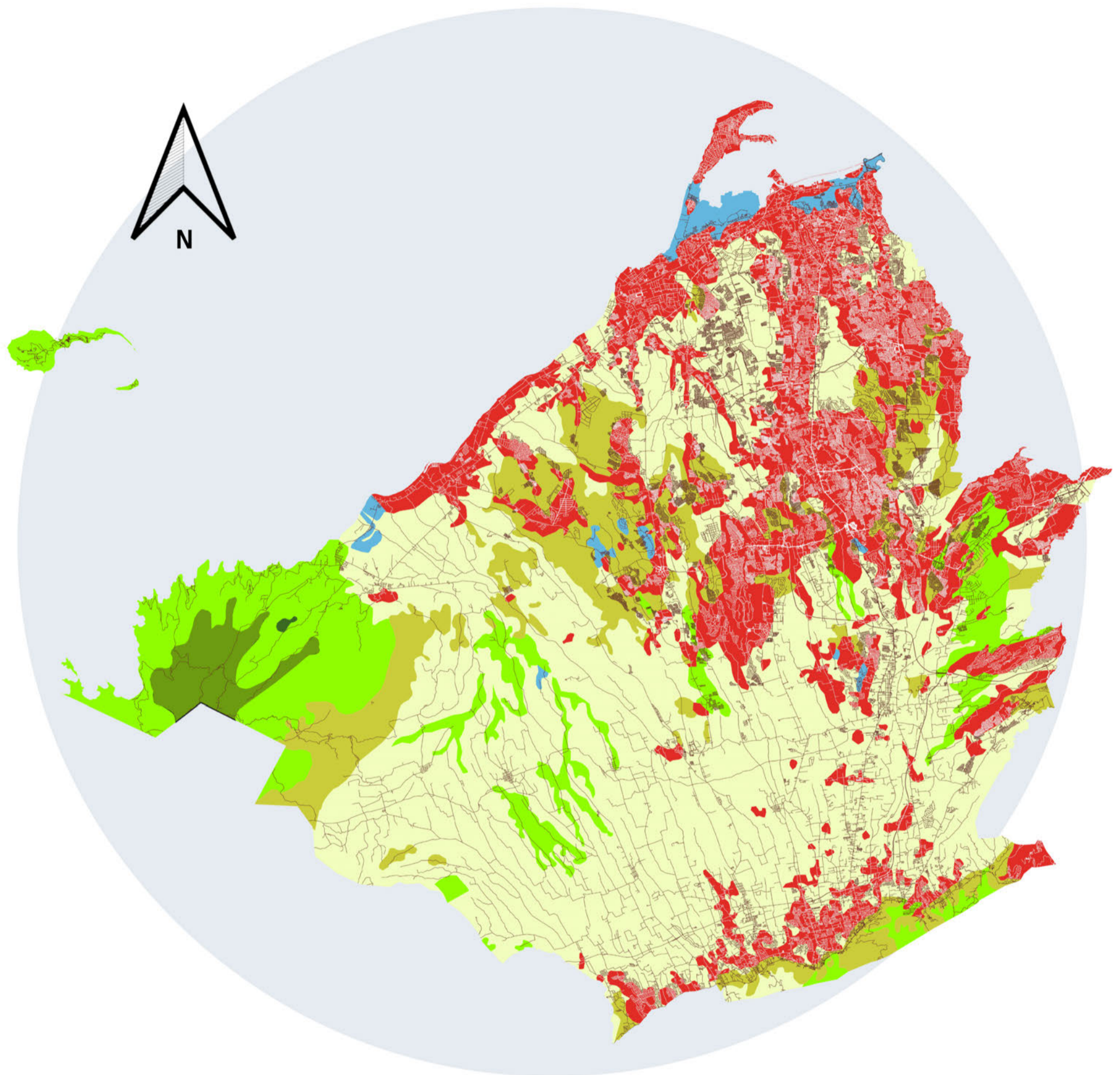
Province of Cavite (no date) Cavite Provincial Development and Physical Framework Plan 2011-2020.

MAP LEGEND

- 0-2500 persons per sq. km.
- 2501-7500 persons per sq. km.
- 7500 and above persons per sq. km.

Fig. 32. Population Map Layer Generated as Basis for LCArC-U
(Visualisation by Nadal and Alanano, 2020)

LAND COVER MAP OF CAVITE, PHILIPPINES



Capturing the Dynamic Character of the Philippine Peri-Urban Landscape: A Landscape Character Approach for the Region of Cavite

Map Generated: June 2020
 Adapted Map from References: Cavite Provincial
 Development and Physical Framework Plan 2011-2020,
 PhilGIS, and OpenStreetMap

0 5 10 15 20 km

REFERENCES

Cavite Provincial Planning and
 Development Office (2013) Cavite
 Socio Economic and Physical Profile
 2013. Trece Martires City, Cavite.

OpenStreetMap contributors.
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www.openstreetmap.org/node/305704568. Accessed 4 Sept. 2018.

PHILGIS. "Cavite | PhilGIS."
 Philgis.Org, 2011,
philgis.org/province-page/cavite.
 Accessed 4 Sept. 2018.

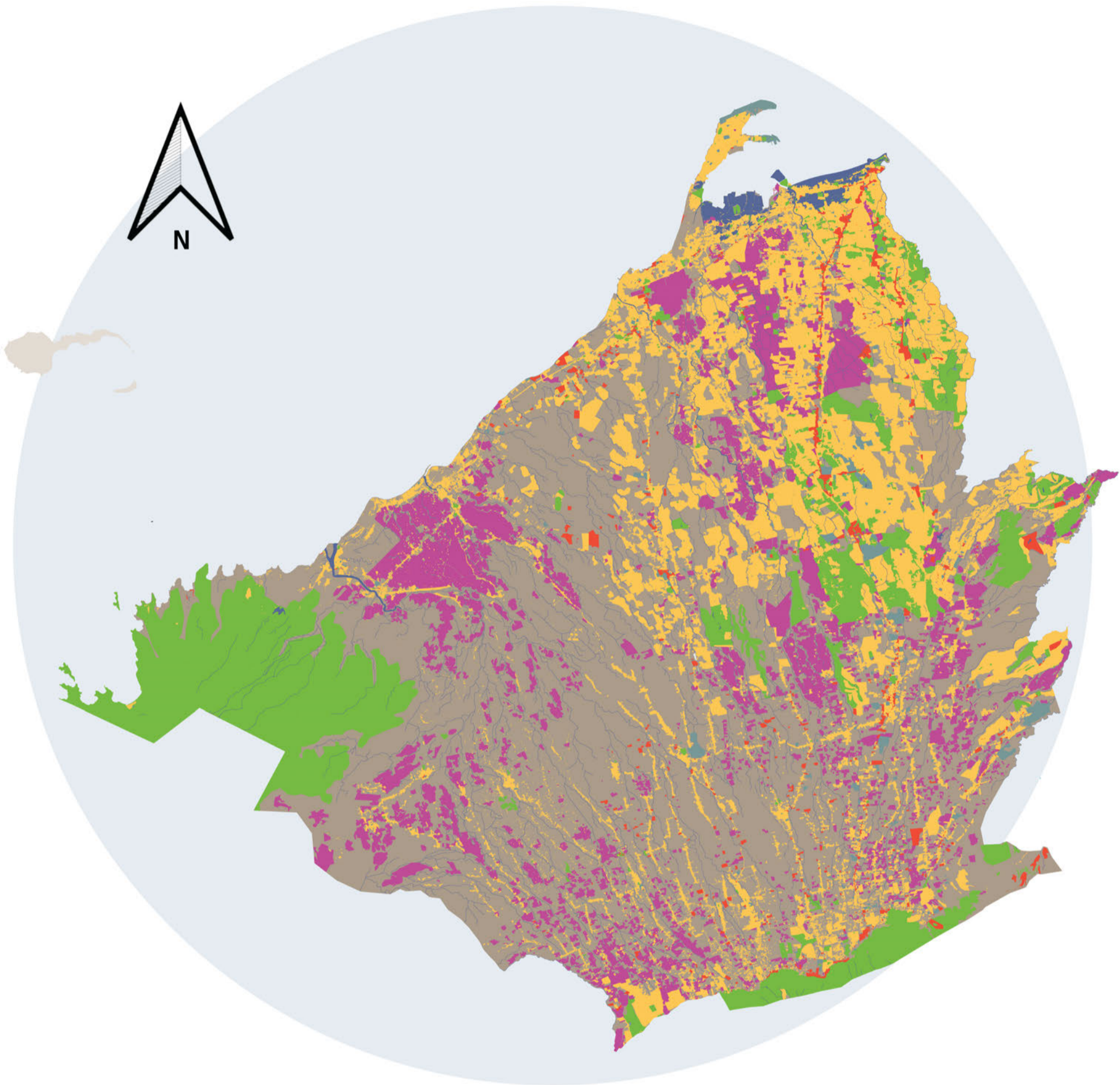
Province of Cavite (no date) Cavite
 Provincial Development and
 Physical Framework Plan 2011-2020.

MAP LEGEND

- Built-up Area
- Cropland
- Forest Plantation
- Grassland
- Open Forest
- Shrubs
- Water Body

Fig. 33. Land Cover Map Layer Generated as Basis for LCArC-U
 (Visualisation by Nadal and Alanano, 2020)

LAND USE MAP
OF CAVITE, PHILIPPINES



The Peri-Urban Landscape
Phenomena of Cavite, Philippines

Map Generated: December 2020
Adapted Map from References: Cavite Provincial
Development and Physical Framework Plan 2011-2020,
PhilGIS, and OpenStreetMap



REFERENCES

Cavite Provincial Planning and Development Office (2013) Cavite Socio Economic and Physical Profile 2013. Trece Martires City, Cavite.

OpenStreetMap contributors. "Cavite." OpenStreetMap, www.openstreetmap.org/node/305704568. Accessed 4 Sept. 2018.

PHILGIS. "Cavite | PhilGIS." Philgis.Org, 2011, philgis.org/province-page/cavite. Accessed 4 Sept. 2018.

Province of Cavite (no date) Cavite Provincial Development and Physical Framework Plan 2011-2020.

MAP LEGEND

- Commercial Areas
- Industrial Areas
- Institutional Areas
- Open Spaces
- Residential Areas
- Water Bodies
- Undeveloped Land

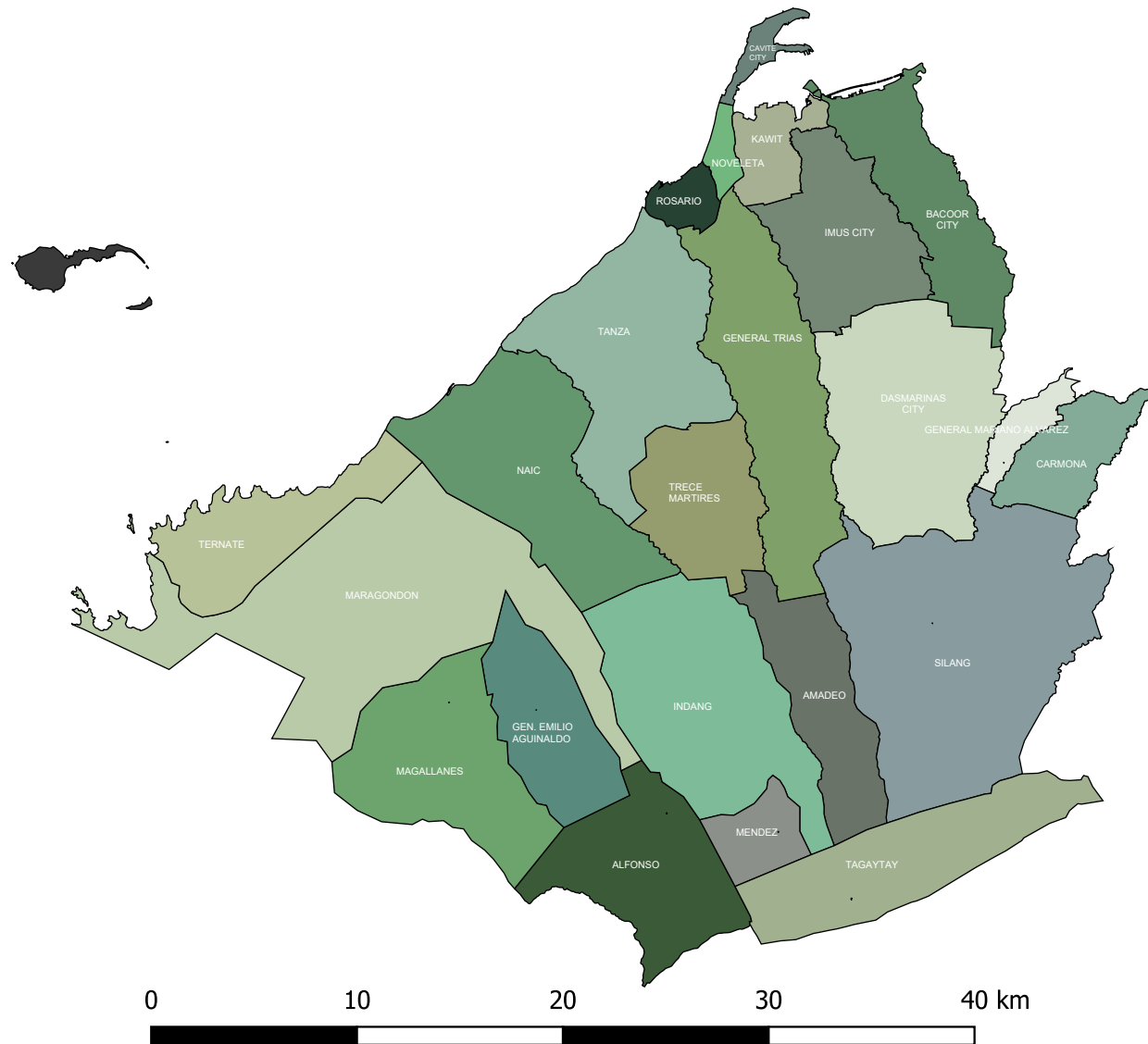
Fig. 34. Land-use Map Layer Generated as Basis for LCArC-U
(Visualisation by Nadal and Alanano, 2020)

With the maps as layers, additional map clustering was necessary to create data manageable for analysis. It was when the municipal or geopolitical boundaries were sought, albeit landscape to be arguably boundless, as added layers of clustering for ease in handling data. Cavite is divided into twenty-three (23) smaller units (see Fig. 35), following the existing administrative divisions in Cavite. The layering made the analyses viable at an administrative scale. This scale was also sought to generate information for each municipal planning framework. It also showed the scale as to which management of landscape data proved to be complicated - planning policies and implementing guidelines of planning can be different at a small scale. Although the generation of municipal boundary meta-data could also be advantageous, LCAr-U, which included the municipal boundary names, could also show units that were similar or reappearing in different municipal units. These similarities of units could then prove to help plan all municipalities at a regional scale.

After dividing Cavite into twenty-three (23) geopolitical units, the metadata of the LCAr-U of Cavite were added with geopolitical boundaries information. At this stage, mapping started with all the metadata overlays in the QGIS software, versions 2.18 and 3.1. It was when unique polygons were generated based on the areas where the overlays intersect - becoming a set of similar polygons based on the layers available within its polygonal boundaries.

The initial plan was to use the biggest LCAr-U polygon's centroid as the point where characteristics may be gathered to control the analysis of landscape attributes on these centroid points. The centroid is the centre of each polygon, computed using the QGIS plug-in software where the centroid can be found once distinct GPS points are added to the plug-in showing the size and the GPS centroid of the polygon.

CAPTURING THE DYNAMIC CHARACTER OF THE PHILIPPINE PERI-URBAN LANDSCAPE: A LANDSCAPE CHARACTER SYSTEM
APPROACH FOR THE REGION OF CAVITE / CATHE DESIREE S. NADAL



**Fig. 35. Cavite as divided into 23 Geopolitical Subregions called Municipalities
(Visualisation by Nadal and Barroga, 2021)**

The idea of using centroid data as a reference sample was evaluated during the visits to Cavite from September 2018 to February 2019. The GPS point positions of centroids discovered using a QGIS technique were used to capture 360-degree photographs. It was thought that eliminating bias and generating related lines of inquiry would be achieved by restricting the acquisition of images from the centroid.

The centroid or center points of mapped polygons were used in demographic studies to denote the region having the highest population density (Martin, 1988). The role of centroids in drawing items together is also explained by similar studies (De Smith and Longley and Associates, 2018). For this reason, these arguments served as a useful foundation for additional study.

Fig. 36 showed a screenshot of the centroid mapping method implemented in QGIS as an illustration of how these were retrieved from mapped polygonal units. Fig. 37 showed the unique location and units generated through the procedure. Centroids appear as yellow dots at the centre of the polygon. The centroid was determined at a scale of 1:100000m using a polygon centroid QGIS plug-in that calculated and determined the centroid of the biggest polygons of each LCAr-U. Fig.36 displayed the QGIS user interface as an example of the work completed. Each centroid produced a distinct position that served as the GPS reference point for the initial batch of 360-degree photos.



Fig.36. Image showing the QGIS interface during the identification of the LCAr-U polygon and its centroid

LANDSCAPE CHARACTER SYSTEM FOR CAVITE, PHILIPPINES							
DASHBOARD: GEOPOLITICAL SUB-REGIONS DATA SETS							
ALFONSO							
DESCRIPTORS					LCAr-U CODES	POLYGON COUNT	AREA in SQM
G	LC	S	PD	LU			
U	b	urm	l	r	GU-LC_b-S_urm-P_l-LU_r	64	2,414,321.96
U	c	urm	l	r	GU-LC_c-S_urm-P_l-LU_r	1018	4,327,701.20
U	g	urm	l	r	GU-LC_g-S_urm-P_l-LU_r	6	275,757.85
U	s	urm	l	r	GU-LC_s-S_urm-P_l-LU_r	5	12,004.78
U	b	urm	l	c	GU-LC_b-S_urm-P_l-LU_c	7	33,966.25
U	c	urm	l	c	GU-LC_c-S_urm-P_l-LU_c	55	335,473.25
U	g	urm	l	c	GU-LC_g-S_urm-P_l-LU_c	4	45,636.16
U	b	urm	l	ind	GU-LC_b-S_urm-P_l-LU_ind	25	1,071,667.66
U	g	urm	l	ind	GU-LC_g-S_urm-P_l-LU_ind	4	412,346.27
U	c	urm	l	ind	GU-LC_c-S_urm-P_l-LU_ind	226	12,871,334.94
U	s	urm	l	ind	GU-LC_s-S_urm-P_l-LU_ind	11	109,497.11
U	b	urm	l	ins	GU-LC_b-S_urm-P_l-LU_ins	6	10,469.98
U	g	urm	l	ins	GU-LC_g-S_urm-P_l-LU_ind	3	13,634.44
U	c	urm	l	ins	GU-LC_c-S_urm-P_l-LU_ins	43	193,859.04
U	b	urm	l	os	GU-LC_b-S_urm-P_l-LU_os	8	710,225.42
U	c	urm	l	os	GU-LC_c-S_urm-P_l-LU_os	7	155,920.09
U	g	urm	l	os	GU-LC_g-S_urm-P_l-LU_os	3	268,456.54
U	b	urm	l	wb	GU-LC_b-S_urm-P_l-LU_wb	5	23,083.00
U	c	urm	l	wb	GU-LC_c-S_urm-P_l-LU_wb	31	249,053.14
U	g	urm	l	wb	GU-LC_g-S_urm-P_l-LU_wb	2	1,227.15
U	s	urm	l	wb	GU-LC_s-S_urm-P_l-LU_wb	3	2,439.01
U	b	urm	l	ul	GU-LC_b-S_urm-P_l-LU_ul	47	987,202.89
U	c	urm	l	ul	GU-LC_c-S_urm-P_l-LU_ul	138	31,901,765.74
U	g	urm	l	ul	GU-LC_g-S_urm-P_l-LU_ul	10	404,140.89
U	s	urm	l	ul	GU-LC_s-S_urm-P_l-LU_ul	9	363,093.08

Fig.37. Sample image of the data table showing the LCAr-U generated for Cavite's LCS as shown in the Geopolitical Sub-region of Alfonso, Cavite

Research restrictions were also imposed by using the centroid as the reference point for detected LCAr-U. Restricting the taking of images at the centroid had its advantages – it made it easier to identify the spot where representation of the LCAr-U is best taken. Unfortunately, it also led to some challenges- access to some points was restricted.

Despite this, 360-degree images taken at the centroid of polygons identified as the largest, resulted in viewpoint sample images. The images collected last 18-20 October 2018 generated approximately a hundred viewpoints in Cavite. Additional images were also added in the months that followed till March 2019.



Fig. 38. Landscape Viewpoint Images in Cavite with four sample view types




LANDSCAPE CHARACTER SYSTEM FOR CAVITE, PHILIPPINES											
DASHBOARD: VISUAL CHARACTER - VIEWPOINTS PHOTOS											
LCS-VC_VP CODE	LOCATION (LCAr-U)				LOCATION (GP-SR)	LCAr	LCAr-U PHOTO	LCAr-U GPS LOCATION	LCAr-U ADDRESS	MAP SYMBOL	
vp001_20181018	D	c	fg	h	os	BACDOR	006		14.41781228, 120.9771638	Paved playcourt and community park at Soldiers' Hills IV Subdivision, Mahogany, Bacoor, Cavite, Philippines	1
vp002_20181018	D	c	fg	h	r	BACDOR	006		14.42333381, 120.976791	Residential area at Camella Homes East Bacoor, San Nicolas III, Bacoor, Cavite, Philippines	2
vp005_20181018	B	c	fg	h	os	BACDOR	006		14.43079325, 120.9641818	Open space near Vita Toscana Subdivision, Molino Boulevard, Bacoor, Cavite, Philippines	3

Fig. 39. Image of the Visual Character Viewpoint Dashboard used to collate the LCAr-U Photos

As the controlled set-up, a Samsung 360-degree camera was used as a digital tool for taking 360-degree photos at a standard height of 1.2 metres from ground level.

Considered as additional data to the LCS were four possible views from the 360-degree images generated (see fig. 38 and fig. 39). Possible views generated were the: (1) 360-degree view, (2) round view, (3) dual view and (4) panoramic view. All four options were considered during the preliminary analysis stage, but the panoramic view was chosen as the final photograph format included in the LCAr-U, as it was found to create more realistic views of landscape attributes within the frame than the others.

Unfortunately, this plan proved problematic as some centroid points were inaccessible

due to climate, ownership, and locational issues. For example, some centroid points laid on bodies of water while some were on private land with restrictions. To resolve this issue for this research, supplemental images taken from randomised locations in LCAr-U gathered during the other dates when fieldwork was done were collected to show visual examples of LCAr-U in the LCS.

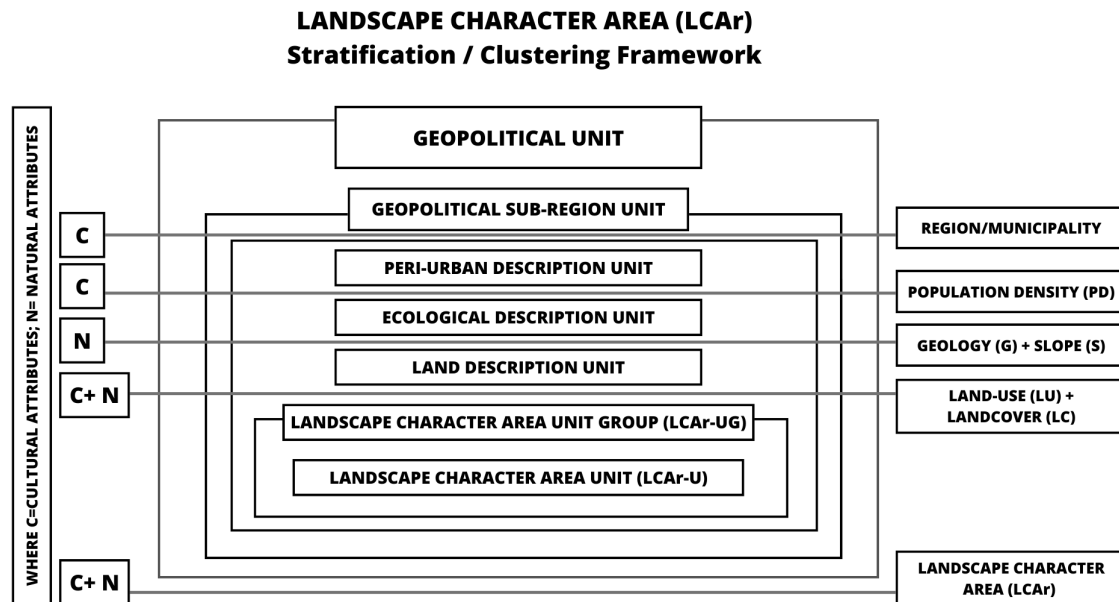


Fig. 40. Landscape Character Area Stratification/Clustering Framework

As mentioned in the sections before, the LCS for Cavite generated LCAr-U that, when combined, became landscape character area unit groups (LCAr-UG). The clustering into different scales suggested the versatility of data clustering, and its manifestation was seen in the following stratifications for the LCS of Cavite:

1. Landscape Character Area Units (Integration of 5 layers into - LCAr-U)
2. Landscape Character Area Unit Groups (Integration of LCAr-Us into LCAr-UG)
3. Land Description Units (Units of Land-use and Landcover Descriptors into LU-LC or N-C components where N=natural attributes, C=cultural attributes, LU=land-use, LC=land cover, R=residential, C=commercial, IND=industrial, INS=institutional, OS=open space, WB=aquatic areas, UL=uncategorised land area, B=built-upland, C=cropland, G=grassland, S=shrubland, WP=waterbodies, FO=open forest, FP=forest plantation)
4. Ecological Description Units (Units of Geological and Topography/Slope Descriptors into G-S or when combined, are N components where N = natural

attributes, G= geologic origin, S = slope type, FGS= flat to gently sloping land,
O=old geologic origin, U=undetermined geologic origin, R= recent geologic
origin)

5. Peri-urban Description Units (Units of Population Density Descriptors into PD or
C components where C = cultural attributes, PD = population density, L=lowly
populated, M=moderately populated, H=densely populated)

6. Geopolitical subregion/region Units (Units of Provincial / Municipal Descriptors)

7. A Unique Naming and Clustering Description for each Landscape Character Area
(LCAr Description)

In the case of Cavite, the LCS was grouped into seven (7) Landscape Character Areas or
LCAr, with population descriptions as the first layer of clustering that generated these
seven cluster groups (see Fig. 41). The clustering into the seven LCArs was an
approach used to be able to generate analysis from this volume and scale. During this
time, clarity on what characteristics may be generated per LCAr was still unknown.

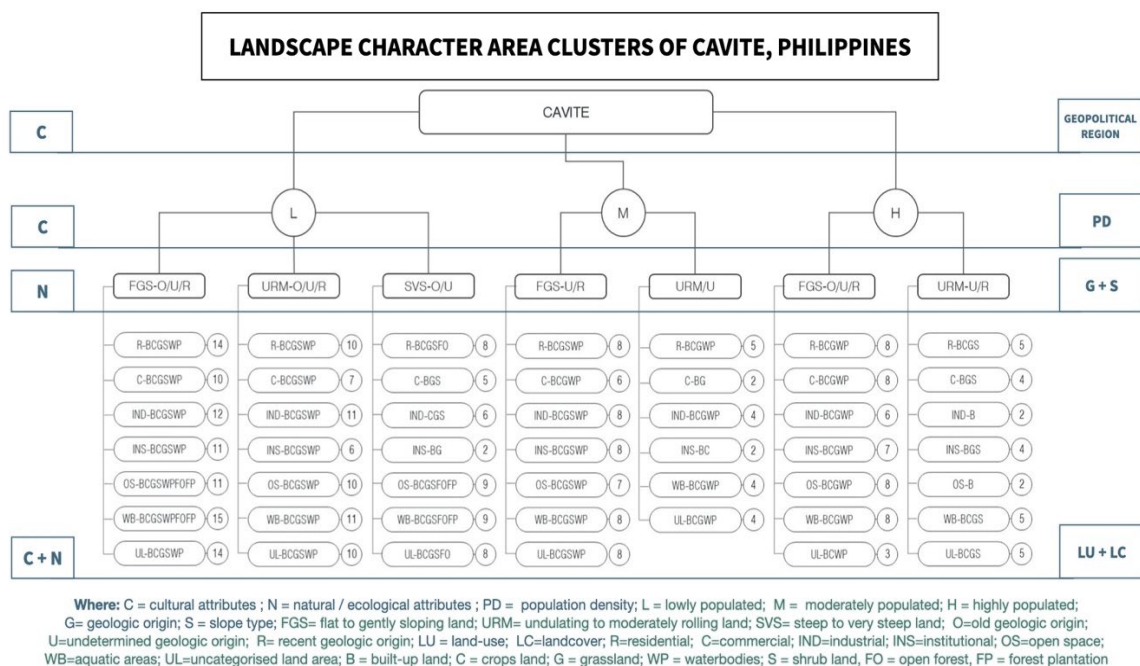


Fig. 41. Landscape Character Area Clustering of Cavite

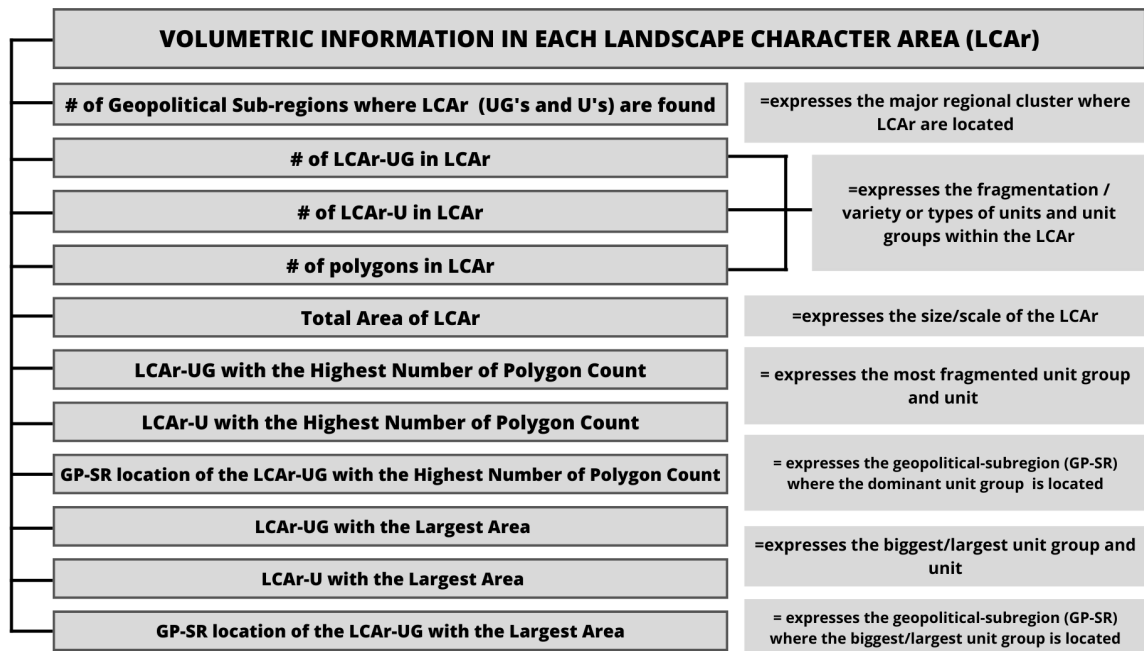


Fig. 42. Volumetric Information in each Landscape Character Area (LCAr)

Each LCAr contained volumetric information, as seen in Fig. 40-42. An LCAr contained numerous sets of data that can express different information as listed:

1. the geopolitical regions where the LCAr can be found
2. the geopolitical region hosting the most dominant or most prominent LCAr-U
3. the geopolitical region hosting the most dominant or largest LCAr-UG
4. the number of units showing the severity of fragmentation in the cluster
5. the most fragmented LCAr-UG with the largest number of polygon unit counts
6. the most fragmented LCAr-U with the largest number of polygon unit counts
7. the size of the cluster as a summation of units expressed in the area
8. the size of the largest LCAr-U
9. the size of the largest LCAr-UG

The systematisation was also designed to generate a visualisation that could capture the dynamic landscape character of Peri-urban Cavite (see Fig. 43). This visualisation followed a cluster mapping format that utilised colour and shade coded legends in highlighting different information identified through the clustering. The format expressed macro to micro scale components in infographics that were necessary for easier visualisation of the landscape character of each cluster (See

Appendix 01: Landscape Character Area Full Metadata: Metadata Dashboard of Texts, Codes, Viewpoint Images and QGis files). Fig. 43 was simply a representation of the sets of data to be shown, and colour and shade coding will be shown in the Landscape Character Area Maps (see Fig. 61-67).

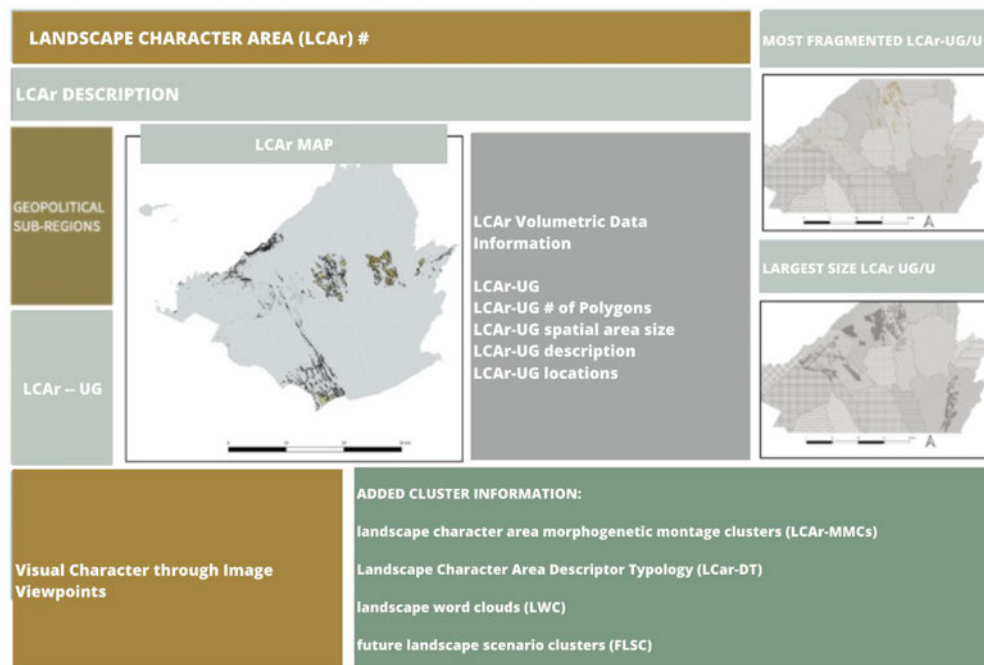


Fig. 43. Simulated Visualisation of the Landscape Character Area Maps and Data Categorisation

By this stage, we know that the LCS was developed as a localised methodology that can create landscape data for landscape character recognition in Cavite to eventually become a baseline reference for a landscape-based Philippine Planning Framework. The LCS was modified to fit this need. It provided a detailed overview of the procedures added to the LCS to be discussed in the following sections. All these became necessary in explaining how each was useful in the multidimensional methodology of this thesis.

The research design in Fig. 44 explained how data and the procedures used for the LCS were managed. This research design showed a set of data extraction procedures devised to resolve the thesis gaps in the study site of Cavite. The first data extraction procedure added to the research design was the Landscape Morphogenetic Character Simulation (LMCS) which created landscape character area morphogenetic montage clusters (LCAr-MMCs) as modelled in a collage of images. The collage technique was

utilised to collect and sort into groups the temporal characteristics of Cavite. Cavite's peri-urban landscape in image format from different dimensions of time, which can be a result of the changing landscape, was an actual result of the simulation. This data extraction procedure became very important to suggest alternative visualisation of historical landscape characteristics. The visualisation technique broke down the landscape narrative into significant waves of landscape change to assert the peri-urban landscape's changing qualities. In doing so, the resulting landscape character area exhibited cultural and natural evolutionary phases. This transformation process clarified the landscape dynamics that evolved through the years and represented information taken from non-written media such as old images and maps.

The second of the many procedures added to the LCS was the Evidence-based Landscape Descriptor Mapping (EBLDM), which created an inventory of two-dimensional evidence showing Cavite's landscape attributes. As part of data extraction, the strategy adopted the meta-data framework extraction plan from the already established method of Evidence Synthesis Procedure (ESP) and systematic reviews (Slavin, 1995; CEE, 2013; Collins et al., 2014; Oliver et al., 2018). By adapting the procedures and theories based on these established studies, data-extraction protocols were then structured using tested approaches. Search structure pattern was also already tested in formats that can diminish bias in the query search criteria.

The following procedure included the application of theories and practices from oral history as integrated into the walking process called the Landscape Walking Narratives (LWN). The inclusion of walking in the procedure highlighted the importance of the walk as a component of landscape research. For this procedure, walking was added to the gathering of stories by making the landscape actor narrate landscape narratives while engaged in the act of walking. It enriched the LCS with place descriptions. Grounded theory was also applied for landscape content analysis. The adaptation categorised verbal representations into coded landscape word clouds (LWC). The LWC generated from the transcribed stories added empirical connections of the landscape actors to the peri-urban landscape in Cavite, Philippines.

An adaptation of the engaged action approach became the following procedure, thus bringing the human actors as the data creators for the LCS. In doing so, we move the construction of meaning toward the subjectivist-inductive dimension of inquiry. This part of the research acknowledges the importance of the landscape actors as agents of change in the landscape. This procedure was called the future landscape scenario workshop (FLSW). The FLSW allowed landscape data to be constantly processed by the data creators, resulting in future landscape scenario clusters (FLSC) of Cavite.

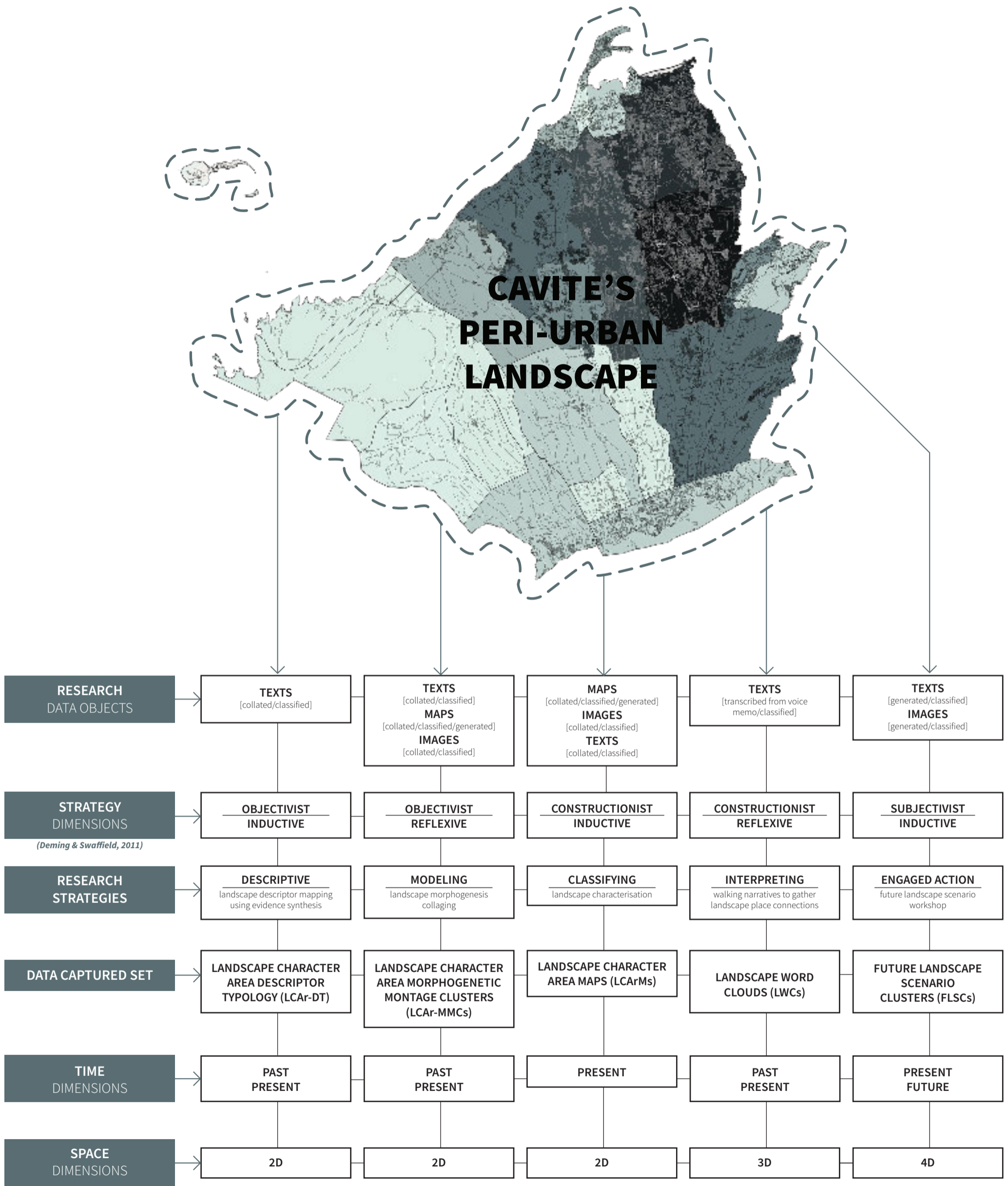


Fig.44. Research Design for Cavite's Peri-urban Landscape Character System (LCS)

The multidimensionality of the procedures was expressed in the research design through the resulting landscape attributes typology. For the two-dimensional space, literary evidence and archival records were scanned to create data clusters according to landscape character area descriptor typology (LCAr-DT) and landscape character area morphogenetic montage clusters (LCAr-MMC). The three-dimensional space was then analysed to gather walking narratives or landscape-based stories that form the landscape word clouds (LWC). On the other hand, the four-dimensional space became the space where dialogues were explored using engagement tools that created sketches and narratives visualised as future landscape scenario clusters (FLSC).

The data extraction procedures identified the characteristics of the landscape through manifestations of both tangible and intangible attributes. As applied in Cavite, the LCS produced a robust set of descriptions that can be processed to identify the degree of quality and quantity of the following landscape factors:

1. Aesthetics
2. Ecological and cultural features
3. Forms and patterns

The design of the LCS methodology was arguably complex - and it had to be for the sole purpose of data enrichment that can be used for applying judgement on the regional landscape for future planning framework integration. The design of the procedure was then made to include a mixture of different procedures to create a comprehensive inventory of information.

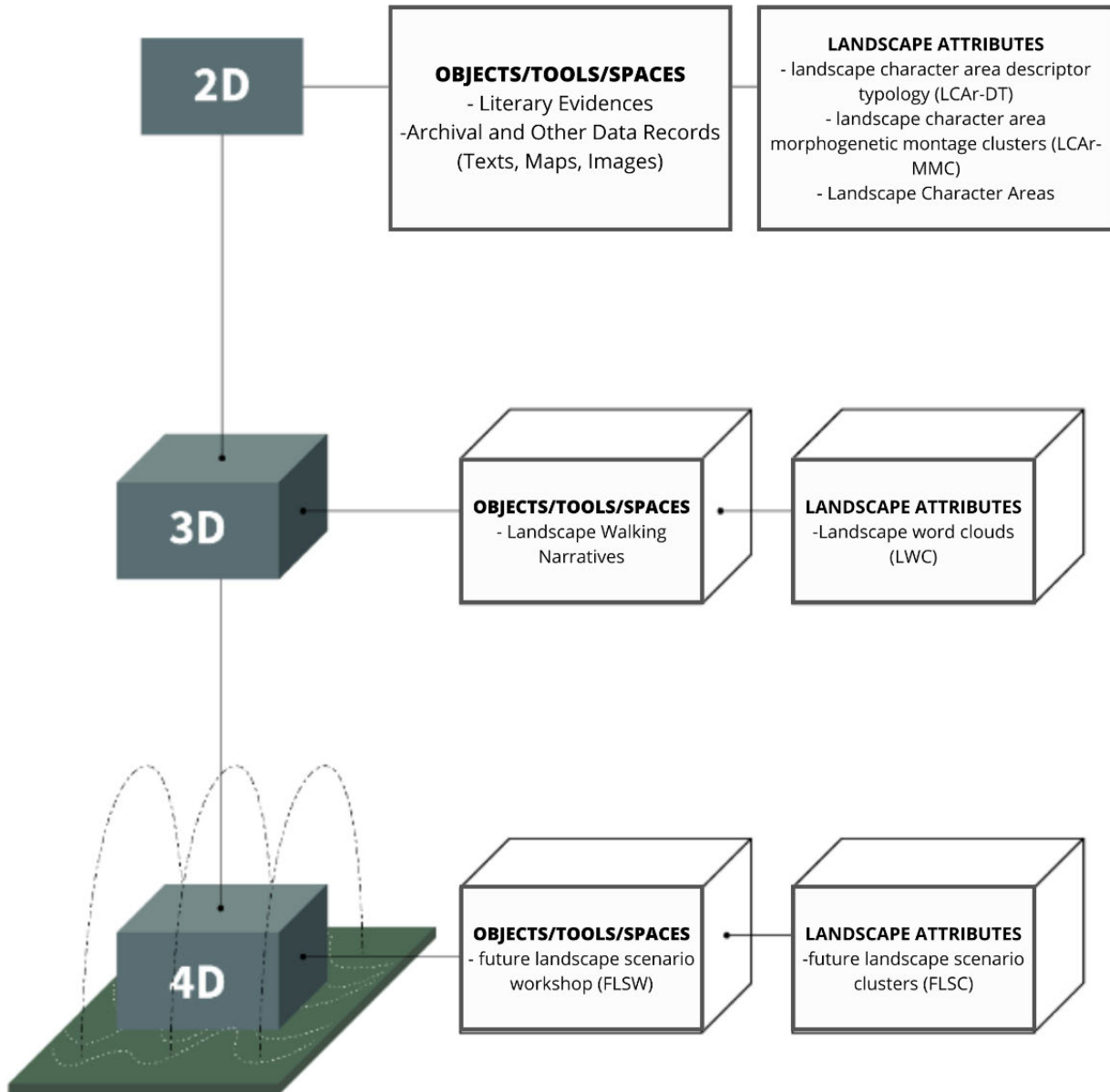


Fig.45. Dimensions Scoped and Data Produced for the LCS

4.3.2. Landscape Morphogenetic Character Simulation (LMCS)

The landscape's morphogenesis, considered one of its essential characteristics, was also chosen to be extracted for the LCS. Morphogenesis in the geomorphology field explained the process of change that could form and shape land (Mayhem, 2015). In this study, the landscape's morphogenetic character took off from this description and was considered the form of landscape as it underwent shaping and reshaping as manifested in several divisions of geologic time. The landscape morphogenetic character simulation (LMCS) also took off from the urban morphology theory (Oliveira, 2018) as it explained how it was inevitable for an urban area to be in stasis. Urban areas were considered to be in constant change, usually manifested through its spatial form and structure. This expression of change as the landscape morphogenetic character was one being sought for this thesis.

A visual manifestation of the morphogenetic character was the initial challenge for this part of the thesis. More often, the result of morphogenesis was visualised as a map timeline, which was difficult for consolidation as it is seen as a continuum rather than a set. To resolve this challenge, a procedure was added to bring this temporality into a form that could be interpreted in practice and research. It was when a different data format was suggested - the montage to consolidate old images and maps to show a comprehensive listing of landscape character forms as manifested in a landscape character area morphogenetic montage clusters (LCAr-MMCs) showing Cavite from different clusters of time.

The LCAr-MMCs were crafted as combinations of images and maps taken from different eras of change in Cavite's landscape. The addition of this visualisation approach addressed the difficulty of finding an interpretation of the intangible and highly temporal morphogenetic characteristics of Cavite's landscape. Finding a visualisation method that could express this specific characteristic was one of the reasons why the visualisation approach using the montage was added at this point in the research. The LCAr-MMCs provided a technique to collate visual data from different references into a format that can easily be added to the LCS. As we slowly bring the

importance of Cavite's landscape through text evidence as its descriptions, the use of images in landscape morphogenesis data simulation gave the photographs another purpose.

The use of LCAr-MMCs as the visualisation tool for the LMCS started with collecting research objects to be used. These research objects included written texts, images, and cartographic maps, becoming an assemblage of materials vital in producing the clustering of landscape morphogenic characteristics. After these research objects were collected, layers of changing landscape character clusters were created to sets of LCAr-MMCs (See Fig. 46).

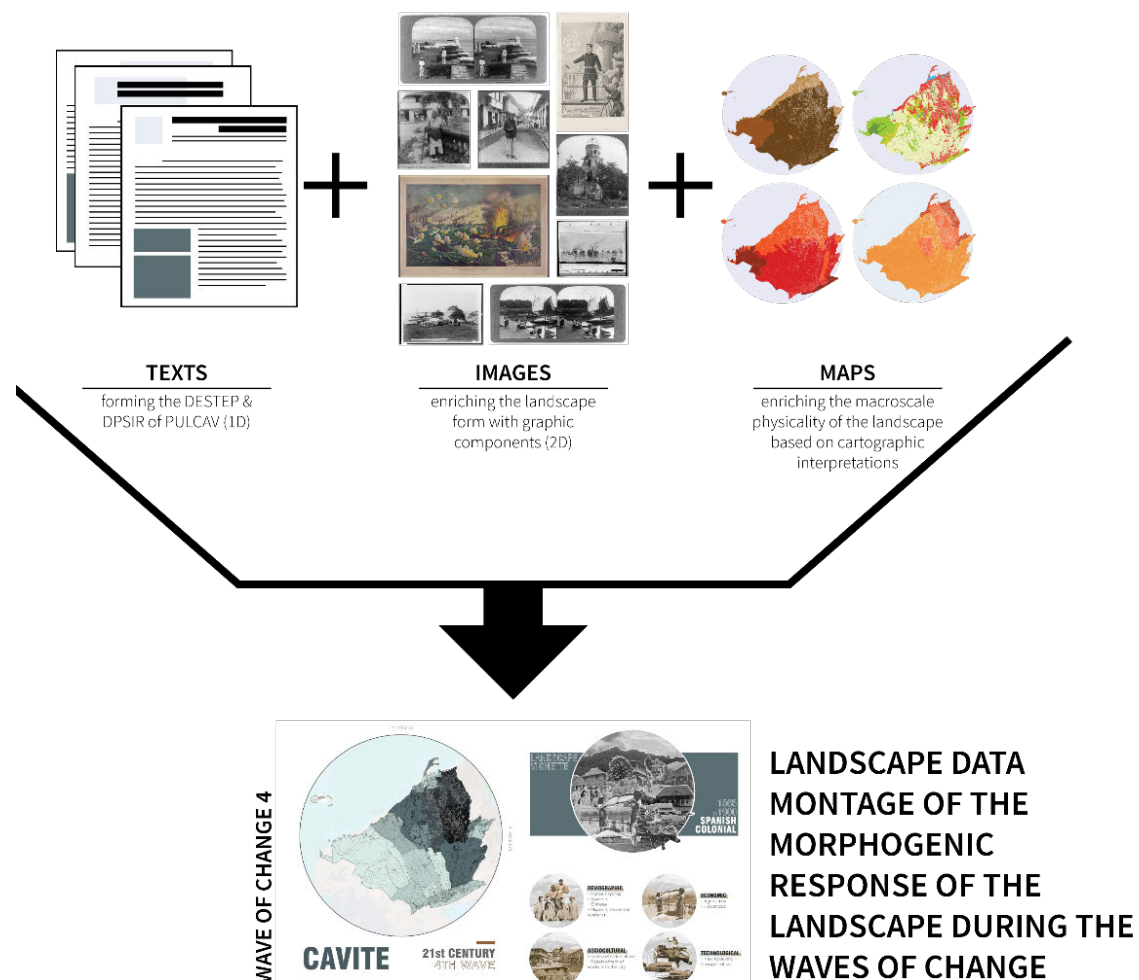


Fig. 46. The Landscape Morphogenetic Character Simulation (LMCS) as shown in the Landscape Character Area Morphogenetic Montage Clusters (LCAr-MMCs)

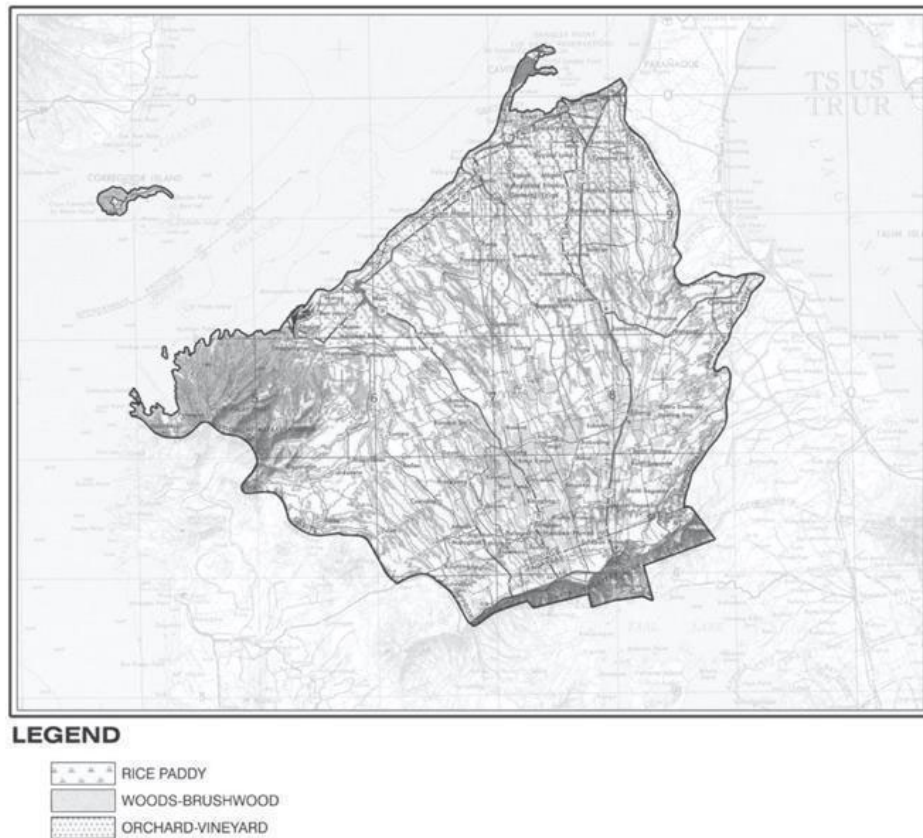


Fig. 47. Land Cover Map of Cavite during the early 1940's
(image from Cavite, Philippine Islands, 1944 as cited in Army Map Services, accessed last 2020)

It was essential to interpret the first LCAr-MMC of Cavite in its assumed form during the early stages of its land development - basically composed of landform mostly woods-brushwood at its north-west side, orchard-vineyard at its central area, and rice paddies at the north-eastern side. It was also essential to highlight the hydrologic conditions of Cavite as one of its more critical physical attributes adapted from the land cover map created in the early 1940s (see Fig. 47).

One of the references consulted for the LMCS was the study of De Wit (2009) on the Dutch lowland landscapes. In this study, De Wit (2009) saw the importance of ecological landscape components like topography in identifying morphological transformations of the urban landscape form. This study utilised visual data in identifying process-typology relationships in the landscape.

From the initial projections taken from the 1940s map in Fig. 47, more LCAr-MMCs were then developed in a process framework explained in Fig. 48. This procedure utilised DESTEP (Demographic, Economic, Socio-cultural, Technological, Political) factors (Van der Voort, Schoorlemmer, and de Visser, 2012) and the DPSIR (Drivers, Pressures, State, Impacts and Responses) factors (Kristensen, 2004; Wascher, 2007; Gari et al., 2015; Kienast et al., 2015; Lewison, 2016) to establish a list of information that can be added into the categorisation. The DESTEP, although an analytical technique adapted from the business sciences, was used as it was known to capture drivers of change in space. The DPSIR, on the other hand, was also added to expand the possibilities for the LMCS as it added landscape process impact descriptions in the LCAr-MMCs.

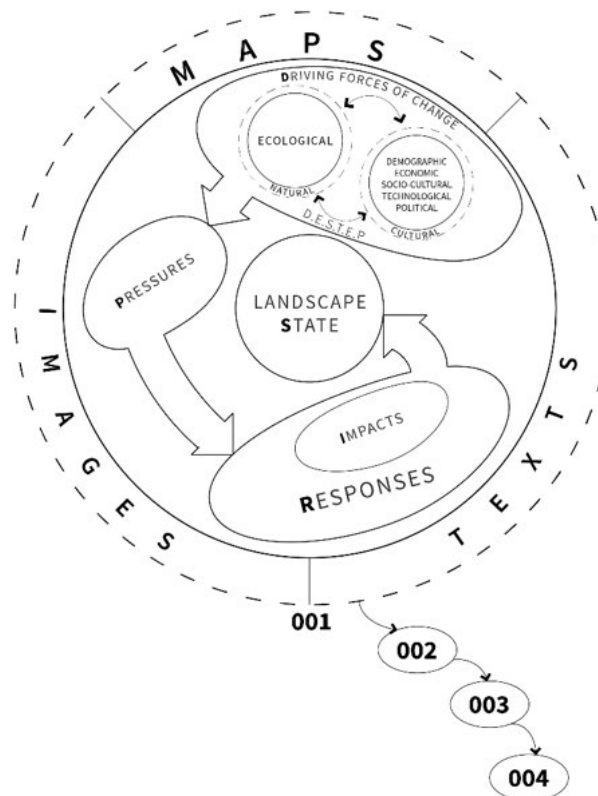


Fig. 48. Data Simulation Framework showing the adaptation of the DPSIR and DESTEP Factors in the landscape character area morphogenetic montage clusters (LCAr-MMCs) of Cavite

The result of the LMCS was explained further in Chapter 5. The other details of the references used and the results of the LMCS was also explained in Appendix 02: *Meta-*

Analysis of Varied References Showing the landscape character area morphogenetic montage clusters (LCAR-MMCs) of Peri-urban Cavite.

4.3.3. Evidence-based Landscape Descriptor Mapping (EBLDM)

A landscape characterisation procedure adapted for this research took off from the Evidence-based Landscape Descriptor Mapping (EBLDM). It helped develop a catalogue of landscape text descriptors from written texts.

As applied in this research, an Evidence-based Landscape Descriptor Mapping (EBLDM), which was an adaptation of the evidence synthesis method, was used at the beginning based on the first challenge encountered in the research. The first challenge was sorting readily available data sources from written texts expressing Cavite's landscape history. It was essential to proceed with this initial procedure because research objects from texts were still collected during that time, and landscape character descriptors were then sparse or not identified.

Steps used for EBLDM as adapted from Collins et al. (2014) was generated as shown below:

STEPS	ACTIVITIES
01	Determine a search question (use Data Extraction Sheet template)
02	Develop a search protocol (use Data Extraction Sheet template)
03	Use the search strategy and apply the search protocol (see Evidence Synthesis flowchart in developing search string protocol)
04	Screen the results using inclusion and exclusion criteria applied at several levels of the data eligibility process (see Evidence Synthesis flowchart in developing search string protocol)
05	Extract the evidences based on the Evidence Synthesis Question and Objectives (look back at the Data Extraction Sheet template)
06	Apply a critical appraisal of the results through peer assessment *robustness and relevancy of evaluations were limited on a one-day workshop held in London last February 2018. This is recommended to be done with a peer group/ review team if viable
07	Synthesise the results into Data Sets [Meta-analysis]

Fig. 49. Evidence-based Landscape Descriptor Mapping (EBLDM) Guidelines and Results: Steps Undertaken for Description Extraction in the EBLDSM

The EBLDM became the apt choice because this approach followed data sorting from the Evidence Synthesis Procedure (ESP) - a procedure with years of practical

applications in the sciences. The ESP was grounded on scientific explorations and was proven to create quantifiable evidence for scientific projects (Slavin, 1995; CEE, 2013; Oliver et al., 2018). In this research, the EBLDM was chosen to prove the existence of peri-urban landscape descriptions while sorting these into manageable formats for Cavite's LCS.

Despite all the reasons that strengthen the claim that EBLDM was the necessary procedure to be applied at the beginning of the data extraction plan for Cavite's LCS, the EBLDM also posed challenges in empirical data extraction, as tabulating information needed to be taken from different sources. In addition, inferring relationships and gathering descriptive information from prior landscape recordings through texts proved challenging to collate, especially when the current landscape character was yet to be identified. It was a challenge that could pose further difficulty if the researcher had no prior knowledge of the site being studied. Additionally, value judgement could compromise the quality of data generated about Cavite. To resolve this, the EBLDM adopted the structured format of the ESP while adding consultations of the EBLDM search protocols and design with experts in the field through a workshop and training session held last February 2018. Thus, the EBLDM provided the initial landscape characteristic catalogue.

For the EBLDM to proceed, a description-finding inquiry using the procedures for quick-scoping reviews for rapid evidence assessments was applied. The lack of published information focusing on Cavite's peri-urban landscape generated the problem of landscape character ambiguity. Most of the texts read during the initial stage of the research also lacked categorisation of Cavite's landscape character types, leading to this inquiry of finding text descriptors as a precursory course of action.

Through the quick-scoping review procedure, the ESP influenced the creation of the landscape character area description typology (LCAr-DT) finding tool. The flowchart for the EBLDM took off from this and adapted evidence synthesis reviews made in elucidating scientific queries (JBI, n.d.; Valdés et al., 2014; Helfand

et al., 2017, 2018a, 2018b). The EBLDM clustered text data to prove the existence of landscape character area types at peri-urban Cavite. It also followed examples from the NERC Quick Scoping Review approach (Collins et al., 2014), where documentation of references became part of the meta-analysis. The EBLDM was helpful for the LCS as it synthesised secondary observation data into quantified clustering of landscape character area types.

Specific objectives for the EBLDM were the following:

1. Interrogate ecological and cultural literary narratives that contain descriptions of the peri-urban landscapes of Cavite, Philippines
2. Create a structured list of descriptions that maps pieces of evidence showing Cavite's peri-urban landscape character.
3. Extract contextual information that states the central issues leading to the changing landscape character of Cavite
4. Create a landscape character typology – a list of landscape types based on the qualitative statements gathered from the final reference screening process

The scoping of academic publications and research projects' content was helpful in the landscape data categorisation at this stage of the research. The research materials used in the scoping process were from various fields of study, not focusing only on landscape architecture materials. The reason for diversifying the list of literature came from the difficulty of finding site-specific texts related to peri-urban landscapes in Cavite and therefore required the search for references beyond the subject at hand. Also, the scope of various literature while applying the evidence synthesis approach could create a descriptive spatial baseline that could hopefully fill in the gap in the landscape character unit data needed for the research inquiry.

A PICO (Population, Intervention, Comparator, Outcome) Framework helped populate search queries with good text strings. The PICO framework used for this research query is written below:

- **POPULATION:** landscape quality; landscape character; landscape typologies

- INTERVENTION: Peri-urbanisation - systems, drivers
- COMPARATOR : before / after; with / without; current / old; countryside / urban
- OUTCOME: new landscape typologies; ecological values; cultural values

The PICO Framework (Booth et al., 2012; Collins et al., 2014; Stratford et al., 2017) contained the Population, Intervention, Comparator and Outcome text strings. Collectively, the PICO Framework became the search protocol. The framework was the basis for the query, *"What landscape character typologies exist as pieces of evidence resulting in the altered ecological and cultural landscape valuation in the rural-urban region of Cavite, Philippines?"*. Arguably, this framework may still not capture all the relevant pieces of evidence to support the query.

The PICO framework was utilised for the strength it gave to the EBLDM. The PICO created the needed structure to limit the results. It also maintained integrity as it limited the landscape typology results to what can be manageable within the timeline of this method. It also helped minimise first-hand observation bias by applying the needed filters in the search. The PICO framework is then intended to raise confidence in evidence extraction.

As a next step, the PICO framework applied Boolean text operators in designing a search string protocol. The addition of Boolean text operators helped limit the resulting references generated from the electronic reference database, Google Scholar, last 5 February 2018. Limitations were necessary to find the top searches that include Cavite landscape information. Thus, the search syntax used started with:

(Philippine AND Cavite) AND effects AND landscape AND environment "peri-urban"*

The next step in the EBLDM included the assessment of the PICO Framework. The problem of devising a PICO Framework if designed by a sole researcher emerged as the next challenge, as the capacity of creating possible alterations to the search string protocol and structure was then limited to the criticisms of the sole researcher. Group

criticism for this stage was unavailable yet seemingly necessary to these research inquiries (CEE, 2013; Collins et al., 2014).

To answer the challenge of creating a more robust PICO framework, an evaluation of the search string protocol in an Evidence Synthesis Workshop held in London last 28 February 2018 was considered. The search syntax was then revised in this workshop, as it was subjected to criticisms and alterations as guided by experts from the Centre for Ecology and Hydrology of the Natural Environment Research Council (CEH of NERC) and other participants who contributed to identifying nuances in the search string. The corrections happened in a group presentation setting where comments for improving the search string became the result. A one-to-one consultation was also held to develop further the process proposed. As a result, a new search protocol was created on 8 March 2018. It included alterations to the specificity of pieces of evidence from "Philippines and Cavite" as an addition to the text strings:

“(Philippine AND Cavite) AND (landscape* OR environment* OR ecolog*) AND (quality* OR value*) AND (periurban* OR peri urban* OR peri-urbanisation OR peri-urbanization)”*

From this alteration to the search string, null references were removed along with the irrelevant search results, thus rendering an initial finding of one hundred articles. Controlling the results to < 1000 papers were considered excellent practice for methodologies following the ESP.

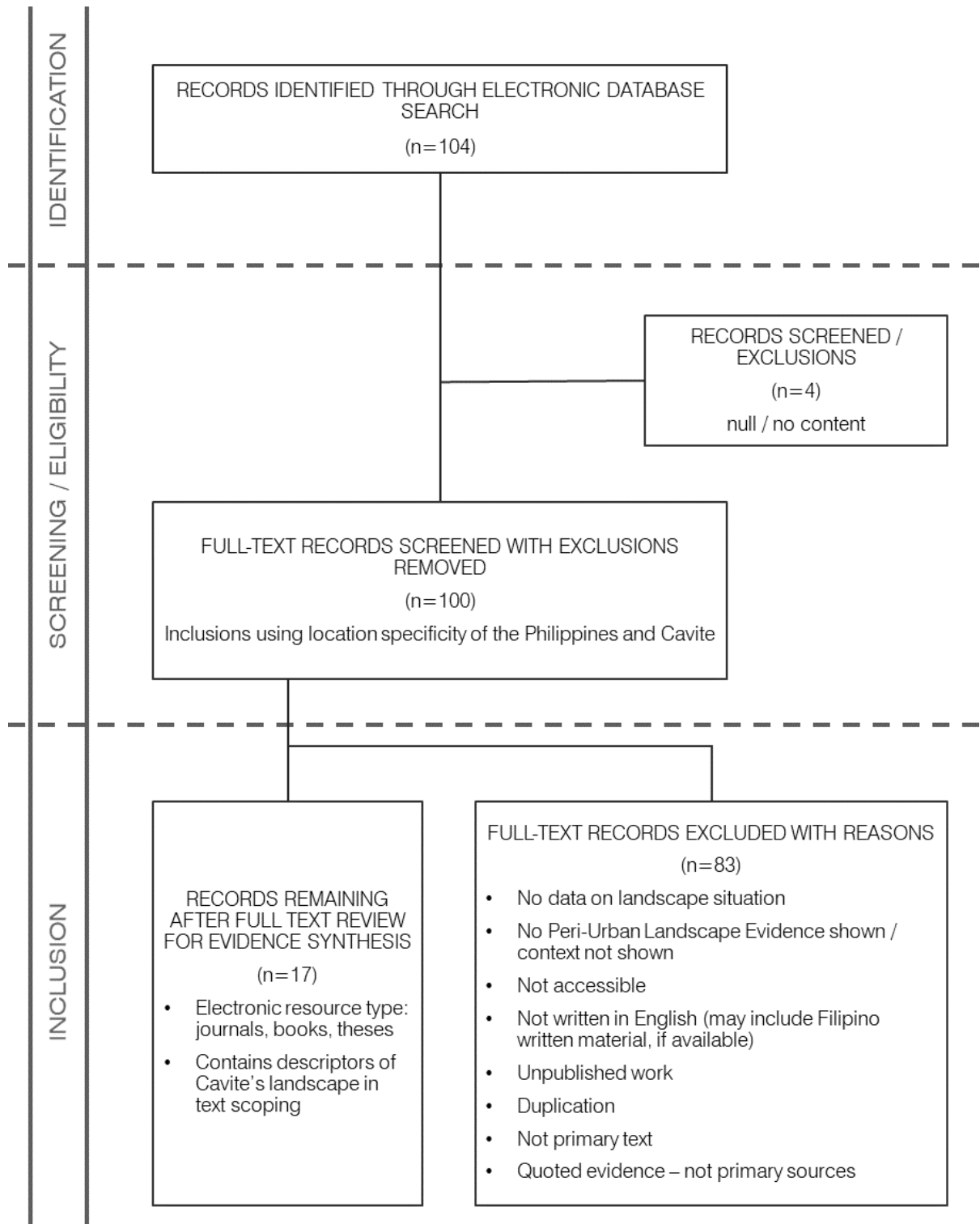


Fig. 50. Evidence-based Landscape Descriptor Mapping (EBLDM) Guidelines and Results: Flowchart used for generating the Search String Protocol for the Discovery of Cavite's Peri-urban landscape character area descriptor typology (LCAr-DT)

Other exclusion criteria were also added in the EBLDM as written below:

1. No data on the current landscape situation of Cavite,
2. No pieces of evidence that show the peri-urban landscape character of Cavite,
3. No content that can be accessed and read for analysis,
4. Not in the English Language (but may include Filipino-written material)
5. Unpublished work,
6. Duplicate copies of published work and are
7. Quoted evidence from other published work; not primary evidence in the text

Providing inclusion and exclusion criteria were essential in filtering the text results in the EBLDM. Being able to filter texts to be analysed helped limit landscape data while still being able to focus on finding valid evidence to support a claim. Coping literary content that supported a claim also helped in the data analysis stage and hopefully created landscape data based on a systematic search framework.

In this study that followed the flowchart in Fig. 50, seventeen (17) relevant papers were set for full-text reviews removing eighty-three (83) other irrelevant documents as they fall under the exclusion criteria. The ability to filter a selected set of literary pieces of evidence resulted from most ESP-related studies. One of the reasons why this methodology was adapted for the EBLDM was this filtering technique established through years of research projects. ESP results had proven to help reach a good set of evidence to support a theoretical claim. Despite this, gaps in the structure of the ESP as applied in scientific studies still emerged because of several factors. First, search engines were limiting results to be within the language capability of the search engine, primarily based on the language selected by the researcher who criticised all the documents for evidence extraction. Second, the specificity of the subject may not be readily available in the texts consulted. In this case, Cavite's landscape was not precisely the topic of texts identified by the search string. Lastly, the exclusion that led to the remaining one hundred papers may also include some articles that can be beyond the

main category of published journals, PhD theses, and printed books.

Sometimes, ESP research assumed confidence in the online database algorithm, although its temporality proved to be a risk in creating timely and sound results. Understanding that a digital database algorithm could give an exhaustive list for research could sometimes challenge validity. Results may be vulnerable to the design of the online database algorithm that was beyond the researcher's control. To avoid this, search string lodged into the reference database underwent the same algorithm as designed by the researcher and the digital reference database used. Hence, there were challenges already in place once digital reference databases were used for the ESP:

1. The confidence in the search algorithm
2. The confidence in the accuracy of search results
3. The validity of the timeframe when search results were made

Additional procedures were added to the LCS to minimise the risk of encountering these limitations to the EBLDM.

From the seventeen (17) papers to be used in the EBLDM procedure, additional measures were added to ensure that duplication of variables will be avoided. For this study, counting landscape character descriptions as the resulting variables will be kept to one (1) per paper. Thus, repetition of the same description will not be added to the tally. Each type can only have a maximum of seventeen following the number of references assessed.

After gathering evidence of landscape character description types in Cavite, results were modelled into the predetermined 11 land cover types found in Cavite based on the map-based data from Cavite's PDPFP 2011-2020 (Province of Cavite, n.d.) and Cavite's Socio-Economic and Physical Profile (Cavite Provincial Planning and Development Office, 2013). These were then expanded into 29 landscape character descriptors that emerged from the EBLDM.

Landscape Architecture Research Question									
Landscape Architecture Research Objective/s									
Search Strategy for Evidence Synthesis Review									
Relevance of the Evidence Synthesis to Landscape Architecture Research									
Research Database/s for Scoping									
Date Generated		YYYY-MM-DD							
Level of Evidence Synthesis Extraction									
PICO Framework									
Population		Intervention			Comparator			Outcome	
Screening Tools									
INCLUSIONS Criteria					EXCLUSIONS Criteria				
No. of References Included					No. of References Excluded				
Items Included									
Item No.	Author	Title	Other Important Reference Details	Main Issues/ Problems/ Challenges / Effects Identified for Descriptor Classification	Interventions Proposed to identify Evidences for Descriptor Classification	Landscape/ Land -use / Land Typologies Identified for Descriptor Classification		Evidence Scoped	REMARKS (Other Potential Information containing Landscape Mechanisms, Processes, and Outcomes based on the Reference Evidence)
						Before	After		

Fig. 51. Evidence-based Landscape Descriptor Mapping (EBLDM) Guidelines and Results: Data Extraction Template Used

Additional information and a detailed explanation of the procedure can be seen in *Appendix 03: Landscape Character Area Descriptor Typology (LCAr-DT): Full Meta-Analysis of Text References used for LCAr-DT Mapping for Peri-urban Cavite's Landscape Character System*.

4.3.4. Landscape Walking Narratives (LWN)

One of the thesis hypotheses was that landscape consisted of intangible components that may be used in planning its future. In this hypothetical narrative, the landscape was looked upon as an object with qualitative attributes that affect places. It was what the following procedure was designed for - to find the intangible attributes of the landscape.

The following procedure was the Landscape Walking Narrative (LWN). The LWN used a data extraction plan that adapted oral history techniques to gather narratives while applying mobile walking methods. The LWN was designed to integrate intangible attributes of the landscape from narratives of people engaged in a walk into a visual format that expresses perception description for the LCS. These intangible attributes are non-physical, usually in stories, activities, and narratives. Visualising these intangible attributes was challenging but was eventually resolved through the

landscape word clouds (LWC) that transformed perception attributes into a visual format. These LLCs took the form of word clusters establishing a more straightforward clustering of perceptive quality of landscape from the landscape walkers.

This method introduced a walkers-based landscape cataloguing procedure. As it was walkers-based, people's perceptions of their environment while they were walking were regarded as essential aspects to be collected. Walking was used as a data-gathering procedure that captured narratives from the landscape actors within the peri-urban landscape. Walking is therefore categorised as the research instrument, with the structuring of the walk being the research procedure observed to be overlooked in most landscape studies (Macpherson, 2016). With the challenge of enhancing the walking method, its application in the LWN suggested that walking may create structured information. Walking brings the following variables for the LWN – the physical, mobile, human body, a tool containing descriptive social and physical aspects, and the landscape as the space containing descriptors where the walk is done. This part of the LWN considered the walking process and the narration as the output of the interaction of the body and the landscape as components of the walk.

Walking in the LWN was the extraction process, and the landscape components in the form of narratives are the resulting research objects to be sorted into LWCs. The researcher and the walkers became embodiments and producers of data as mobile instruments that move around the landscape. The research and the walkers were considered data production units where data are words and narratives that can be processed qualitatively and quantitatively.

The LWN was designed to explore the cataloguing of intangible characteristics of landscape gathered from the narratives on Cavite's peri-urban landscape as the walkers engage in the walk. The procedure adopted the mobile walking method with oral history research methods as its data extraction procedure. When combined as the LWN, both techniques valued the walks and narratives from landscape actors as a tool in description mapping.

The location for the LWN had to be limited to an area where a view of Cavite is visible from the walk. The limitation was set to be able to make any of the walkers, who will be coming from different parts of Cavite, recall narratives related to the landscape being studied. The LWN was also designed to be a free walk similar to DeBord's Derive (Debord, G. in Coverley, M., 2006) so limiting it to a site with established boundaries became necessary. This limited access to space controlled the production of variables within the time frame allotted for the research project as agreed upon by the researcher and the walkers. Aside from controlling the site and access to spaces as one of the variables of the walk, the walker who agreed to become part of the research process also had to be able to identify Cavite spaces and must then fit within the many categories of walkers identified for this research. It was essential, especially with walkers needing to share narratives of the space through a stroll. Having prior information on Cavite became helpful in the production of LWCs.

Part of testing the LWN before applying it in this research was the integration of the researcher's experiences and observations during field surveys as the landscape data instrument that can facilitate the cataloguing of landscape characteristics from the landscape actors' narratives. Integrating the self in the research process is adapted from geography and anthropology and is described synonymously to ethnographic research (Pierce and Lawhon, 2015), where participation in the study design of the researcher is commonly integrated. This step helped sort the landscape data after the walk.

Categories of Walkers

Walkers were categorised according to gender, residential background, and industry sectors. These three categories were considered essential information to group perception descriptions into clouds.

The gender subcategories were divided into two main biological types – male and female with an option for the participant to prefer not to say their gender. The

residential background was categorised as resident and non-resident with the primary purpose of categorising information relating to the landscape from internal and external landscape engagements. The categorisation was also focused on the industry sector to test the hypothesis that landscape perception may come from engagement with landscape according to industry type, thereby possibly answering the query on how urban processes significantly affect the change attributes of the peri-urban region of Cavite.

Reviewed for the categorisation of walker groups was the document containing the most recent industry profile of Cavite (cited in Cavite's Socio-Economic and Physical Profile from Cavite Provincial Planning and Development Office, 2013). What it generated was different sector groups for this research, namely

1. The primary sector of Cavite - agriculture, livestock and fishery;
2. The secondary sector of Cavite - mining, manufacturing, electricity and construction;
3. Moreover, the tertiary sector of Cavite - includes retail, hotels, transport, real estate, public administration, education, health, and social.

Added to the categorisation was a nonworking category to identify factors expressed by those not engaged in industry sectors. Belonging in this added category were those not categorised within Cavite's income-generating economic networks. Adding this categorisation also limited the primary industry into four (4) types, limiting conclusions and results within the research scope—table 01 details how these categories were sorted for the LWN walkers.

LWN Walkers for this part of the research were recruited based on their sector type through reverse snowball sampling. As such, a brief along with the data management plan and consent form were presented to possible participants who fit the 16 categories identified prior to their participation. All these documents were included in *Appendix 04: Meta-Analysis on the Landscape Walking Narratives (LWN) Strategies and Results through Landscape Word Clouds (LWC)*. All participants were then recruited by direct contact done through verbal communication prior to the facilitation of method and also while on site.

Table 01. Table of Coded Categories for Landscape Walking Narratives Walkers

Code	Gender	Residential Background	Industry Sector Type
M-R-P-01	Male	Resident	Primary
M-R-S-02	Male	Resident	Secondary
M-R-T-03	Male	Resident	Tertiary
M-R-N-04	Male	Resident	Non-working
M-NR-P-05	Male	Non-Resident	Primary
M-NR-S-06	Male	Non-Resident	Secondary
M-NR-T-07	Male	Non-Resident	Tertiary
M-NR-N-08	Male	Non-Resident	Non-working
F-R-P-09	Female	Resident	Primary
F-R-S-10	Female	Resident	Secondary
F-R-T-11	Female	Resident	Tertiary
F-R-N-12	Female	Resident	Non-working
F-NR-P-13	Female	Non-Resident	Primary
F-NR-S-14	Female	Non-Resident	Secondary
F-NR-T-15	Female	Non-Resident	Tertiary
F-NR-N-16	Female	Non-Resident	Non-working

Walking Location, Conditions and Facilitation

An initial traverse of the route was also done to observe the visual components present in the proposed site for the walk. The initial traverse was necessary for analysing the sensitivity of the walker to natural and cultural components that may be present at the site. Safety and security were also considerations. The timeframe for the walk was set on a 9 am to 4 pm schedule as it was during this time that the site was well lit, and physical attributes were evident.

People's Park in the Sky was where the walks were done. It was a park in Cavite chosen for the following reasons:

1. Its location in the higher altitude areas made the views of the Cavite region visible from the walk point
2. The site and path walks were open and accessible for walking
3. The weather in the park is conducive to walking during the chosen dates

One of the challenges found during the LWN's conduct was the walkers' manageability on each fieldwork day. Visits had to be divided into different days. These were then set on different dates, with walkers being able to choose from February 02, 03, 09, 10, 23, and 24 last, 2019. These walking dates gave enough windows for the walkers to choose from for their walks. The dates were also chosen for convenience, given the availability of both the researchers and the walkers.

Several pre-walk surveys were also done, assimilating different site conditions. It was done at the University of the Philippines by a group of facilitators. This part of the study was done last 01-02 February 2019. The resulting data referenced how the walking narrative and the walking guide should be calibrated for the walks.

The facilitators then engaged in a trial walk. Conditions that were tested include the following listed below, and these were rechecked for scenarios that may render it impossible to create a good narration for landscape perception extraction. The trial walk conditions considered were:

1. the length of the walk
2. the query designed for the walk
3. the conditions during the walk

Walking facilitation also included management training where the facilitators learned skills in research facilitation management. By doing so, ethics of research facilitation and the format adapted from the Derive and Oral History were again explained to them, so that format and facilitation followed similar protocols. Furthermore, the procedure had to undergo further testing until the conditions were established. Research goals and facilitation rules and procedures were also established during the pre-test.

The walking facilitation was done by two (2) Master of Tropical Landscape Architecture students and me as the researcher with research assistants who checked the completeness of the informed consent and recording agreement forms before walking. All three walking facilitators and research assistants underwent a series of meetings and familiarised the walking procedure designed for this research to ensure that ethics and walking protocols were understood and applied. All of these research facilitators and assistants were helpful in facilitating the LWN. They established modifications to the procedures to fit the localised conditions and addressed the weaknesses in the walking narratives design before the procedure commenced.

Walking Narration Recording Protocols

The walking narrative was recorded using audio and video and transcribed into text format. Any content summary or direct quotations from the interview were made available but anonymised in academic publications.

An informed consent and recording agreement form were also included as the reference for the participants and the research team engaged in the LWN. A data management plan (DMP) for this part of the landscape character system approach was also sent as an additional reference. All walking participants were also given a few minutes to browse through the agreement forms right before they engaged in the walk for them to be able to review these forms. This part of the procedure was also vital to place the walkers' consent as an integral component of research management.

Walking Questions

A list of probing questions was prepared as a guide for the walking facilitators. These questions were redesigned with further input from the pre-walk survey held last Feb 1, 2019. From the pre-walk survey, it was evident that the continuity of the walker's narration is a challenge and that longer walking time also created challenges to discontinuity of the narrative. It became vital to include a set of probing questions in the one main question to foster a discourse during the walking timeframe.

Table 02. Table of Questions used for the Landscape Walking Narratives

Main Question <i>(the main question is the query trigger that is given to the walker at the start of the walk to start the narration process)</i>	Probing Questions <i>(probing questions are queries given to the walker when narration stops when the walk is still in progress)</i>
What comes into your mind from what you see now?	Tell me more about what you are thinking now?
	What do you mean by this?
	What is it used for?
	When was this? Is it during the time when you were...?
	When did it happen?

The questions also included texts written in the Filipino language to foster flexibility and a better understanding of the query being lodged during the walk. Participants were also allowed to shift into Filipino and English in the discourse, as this was a common approach in using the Filipino language. Opening the query in a format that can make the walker feel at ease was prioritised as it can open better discussion and perceptive expressions.

Walking Process Flow

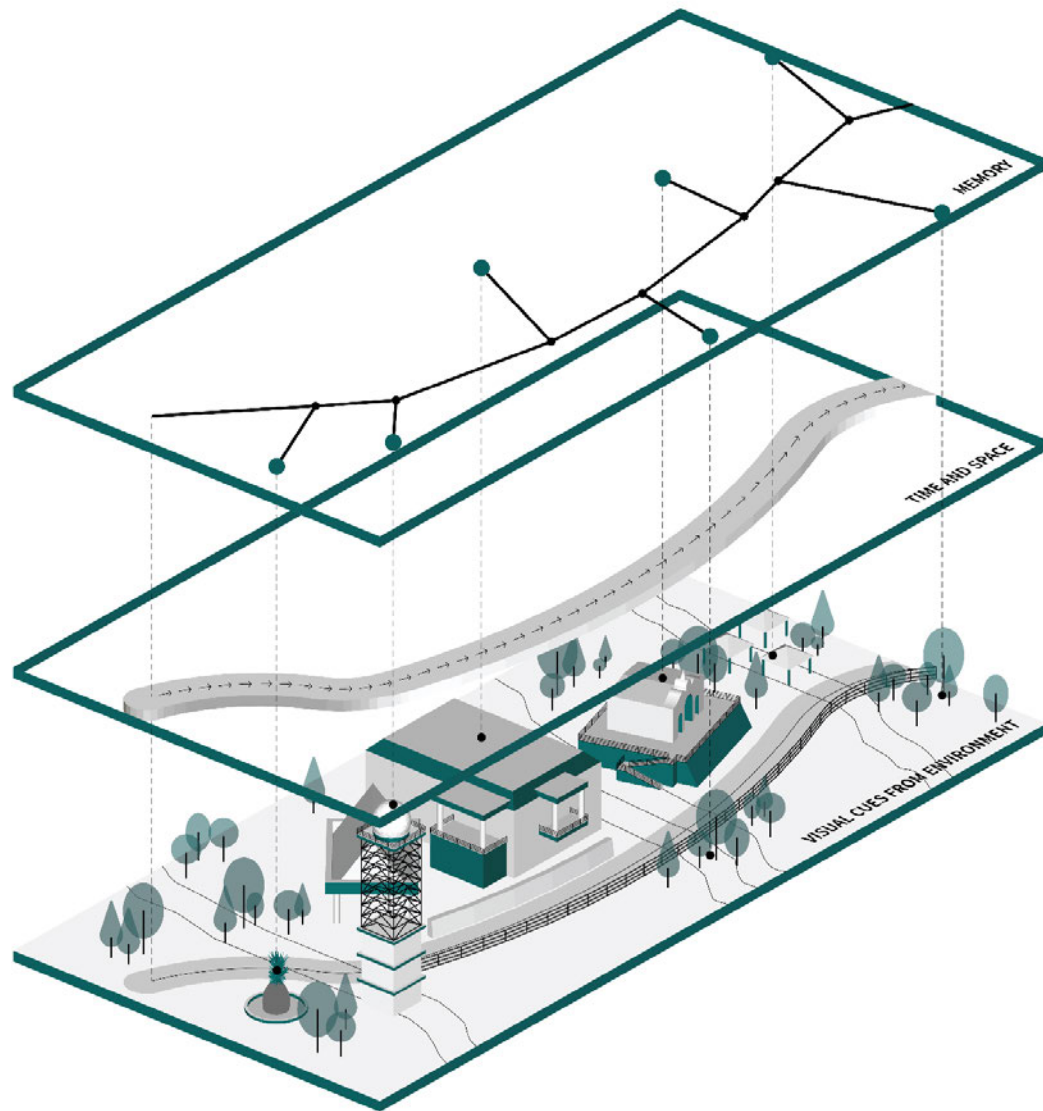


Fig. 52. Visual Rendition of the Transect Map showing Landscape Attributes being collected from narratives of walkers engaged in the Walking Narratives

The walk started from one of the thresholds found in People's Park in the Sky - the chosen site for the walk. This identified threshold was a congregation point where a panoramic view of Cavite is visible. This point was also essential as it contained not just views of Cavite but also an appropriate mix of public and private alcoves, opening the possibility for the walker to move the narration towards more comfortable spaces. Provided in Fig. 52 was the digital rendition showing the dimensions of the landscape being explored as perceptive attributes are collected.



Fig. 53a and 53b. Images of the Starting Point of the Landscape Walking Narratives in People's Park in the Sky, Tagaytay, Cavite, Philippines taken last 2019

The site was traversed along paths chosen by the walkers. The concept of the walk followed the derive as the walker strolls unbounded spaces and paths. Walkers were then given an option to walk anywhere if it was within the 3-minute walking timeframe.



Fig. 53c, 53d, and 53e. Images of the Walker as they engage in the Landscape Walking Narratives at People's Park in the Sky, Tagaytay, Cavite, Philippines last 2019

The application of the *dérive* in the LWN was evident in the narrative stroll – where the drift commenced as the walker narrated.

Narrative Themes Extraction and Visualisation Approach

LWN resulted in audio transcripts as the primary form of word descriptors. This set of words underwent categorisation, transforming them into coded landscape word clouds (LWC).

The LWN included transcribing texts from the voice recording and then generating these into text transcriptions. The text versions of the narratives contained words that were tallied with the number of times they were used in the transcription. The tally underwent transcription description rules where common words were then grouped. The commonality was language-specific, where English and Filipino counterparts were considered, similar texts depending on their linguistic equivalent. A detailed tabulation of the results can be found in *Appendix 04: Meta-Analysis on the Landscape Walking Narratives (LWN) Strategies and Results creating the Landscape Word Clouds (LWC)*.

The words were then inputted into a coding framework from the tabulation of text results, as shown in Fig. 54. This tabulation framework was adapted from the grounded theory (Glaser and Strauss, 1967; Wertz et al., 2011; Lawrence and Tar, 2013). The lack of information on the intangible attributes of Cavite's landscape made it imperative to explore the Grounded theory's application in this part of the research. The grounded theory became the basis for the processing of the LWN audio text transcriptions to be able to code data into LWC for analysis.

The grounded theory (Glaser and Strauss, 1967) was one of the critical theories in qualitative research widely used in social sciences. Applying the grounded theory in this research suggested the generation of a stronger claim on the existence of the intangible landscape attributes in Cavite. Supporting this part of the research with the grounded theory allowed the simulation of codes as a basis for the qualitative data that was open and flexible to layers of interpretation. It also verified the hypothesised perceptive qualities of the landscape being studied. A systematic process followed a study-specific set of guidelines called codes was applied while also hoping to produce a conclusive and comparative iteration of information anchored to a broader scope of the studied area. It allowed the qualitative data being produced to be evidence and process based.

The process flow in developing the visualisation included the following:

1. Labelling and categorising of words as data collected for coding,
2. Hypothesising a discovery of intangible landscape attributes and landscape processes found in the initial layer of word data,
3. Inductively constructing abstract categories as input to the process flow,
4. Refining the categorisation based on the theoretical sampling in item number three (3),
5. Writing the landscape descriptive memos for analysing the codes and words being made and,
6. Formulating the theoretical framework that establishes the different clusters as LWCs created

METHODOLOGY FOR THEME EXTRACTION VISUALIZATION

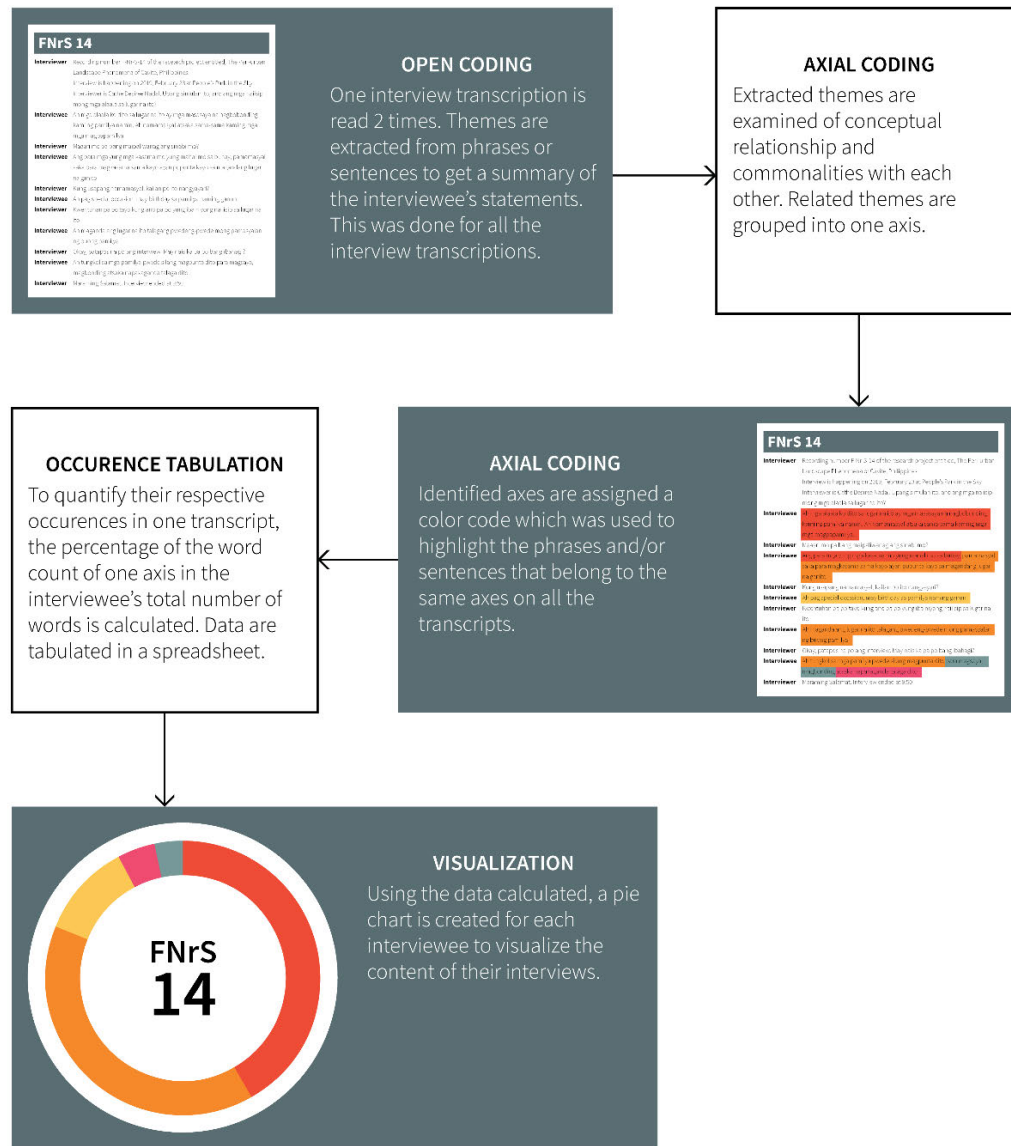


Fig. 54. Theme Extraction and Visualisation Process for the creation of the Landscape Word Clouds (LWC)

The output of the LWN was LWCs. It was still expected that the LWCs may change as the strategy proposed can still be affected by new interpretations and new theoretical directions for data clustering. The design was then challenged not just to be versatile but also to be, among others, helpful in leading to LWC development, characteristics

identification, and hopefully, integration to landscape practice and research of the LWCs created.

The open coding was formed right after the texts were transcribed and grouped. Open coding was the first layer of data categorisation where words were categorised based on commonalities. It helped reduce the data into sets of thematic landscape attributes. Data was read several times in the open coding process to create a preliminary categorisation that summarises the data labels.

From the first data categorisation, axial coding was transposed to summarise words collated into conceptual families. The coded sets underwent axial coding using the interpretative lens of the researcher, and then the first coded sets were reclassified or grouped according to another layer of conceptual attributes.

Lastly, selective coding was applied, turning the conceptual families of landscape attributes into a more formal network of landscape variables showing not just words but interrelations of landscape to the walkers. Selective coding was created with occurrence tabulation into clusters selected to explain the narratives used in the walk. It was supported by rational discussions expressed as the data word clouds, which will be explained further in Chapter 5.

4.3.5. Future Landscape Scenario Workshops (FLSW)

The Future Landscape Scenario Workshop (FLSW) was a landscape architectural research procedure applied to find Cavite's future landscape scenario clusters (FLSCs). FLSW utilised a scenario format, a participatory procedure, and a pedagogical process that Deming and Swaffield (2011) regarded as Engaged Action Research. This procedure involved social engagement in landscape investigation and pedagogy for future management and policy directions.

The FLSW in this thesis was the landscape characterisation procedure that included participatory tools like reflective practice, shared actions, and adventurous learning protocols to explore the application of social constructivist theories in developing the LCS for Cavite. In the FLSW, social attributes were crucial in elucidating Cavite's future spatial character. These consisted of the human components in a landscape, also known in this research as the landscape dwellers. They represented a different sectoral grouping- young leaders, planning members, non-government visionaries, community members, and landscape practitioners and researchers. The landscape dwellers were the participants in this part of the research process, providing data informatics results that were multilevel and highly participatory.

With the application of the FLSW, the landscape dwellers strengthened the LCS with results coming from the landscape actors - providing those engaged first-hand with the landscape, the ability to create a landscape catalogue of future spatial characteristics in a scenario format. The FLSW also resulted in different scenario formats:

1. Text adjectives gathered from reflective practice as an initial workshop engagement of individuals living in Cavite,
2. Conceptual photo montage showing Cavite's landscape character gathered from the shared perception of present Cavite and,
3. Conceptual sketches of Cavite's futures from collaborative engagement and design.

The resulting texts, images, and sketches are crucial for the LCS as they become visualisations of the future landscape scenario clusters. These will establish the directions that Cavite's landscape is heading. Also, the results will create a catalogue of future landscape characteristics — characteristics formed from notions of space made by the landscape dwellers.

As part of this research, The FLSW was facilitated last March 2019 through a research design adapted from the European Awareness Scenario Workshop or EASW (Gnaiger

and Schroffenegger, 2003). In the EASW, learning protocols were designed in a participatory format to discover rising challenges affecting living areas in Europe. In this adaptation of the EASW procedures, the FLSW followed a similar vision that will postulate Cavite's future landscape spatial character through the perception of its different landscape actors. The FLSW was slightly altered to gather information on the hypothetical landscape scenarios, which may become crucial in creating management targets for the sustainable future of Cavite's peri-urban landscapes. Also, this procedure was designed to involve different landscape dwellers from policymakers, scientists, and specialists in planning, as well as the community members (Hatzilacou et al., 2007; HUNT, 2010; Nilsson et al., 2013), adapting the future landscape scenario dialogues approach true to the social integrity of the EASW.

The involvement of different stakeholders from policymakers, scientists, planning specialists, and community members made the FLSW as inclusive as the circumstances permitted. In this case, the selection process used was able to target dwellers as selected with help from the local government office. The landscape dweller types selection follows the format in the adapted EASW. The landscape narratives that resulted from the FLSW (Hatzilacou et al., 2007; HUNT, 2010; Nilsson et al., 2013) also became scenario formats which was the aim for the inclusion of this procedure in the LCS. In essence, the engaged action research (Deming and Swaffield, 2011) format that the FLSW followed also provided venues for individual and social interactions, with culture being a component that influences the interplay of all factors in the process. The interactions of the different dwellers became scenario attributes with texts and images created by the landscape dwellers.

Precursory Steps, Workshop Details and Facilitation Process Flow

The FLSW began with preparing landscape dwellers, or those who live within the Cavite region, as the participants in the pedagogical process. The landscape dwellers were vital components of the research framework, becoming the social constructs in the learning procedure. They were engaged in the educational experience through several

learning protocols as they became individuals and teams creating scenario statements in texts and images. They also created action plans as they engaged in dialogues for scenario mapping. This part of the process was helpful as it helped participants and facilitators engage and understand Cavite's landscapes in the process.

The FLSW added considerable engagement from landscape dwellers in the design thinking process. The collaborative format for landscape planning is not standard in the Philippines and was seen as a component essential for landscape understanding (Nadal, 2015). This format for revealing landscape attributes was a deviation from the standard practice in planning. Although a deviation, the FLSW became an eye opener on the potential of collaborative engagement with community members and landscape architecture professionals from the grassroots level as they enjoin the LCS extraction plan.

Procedural considerations in designing the FLSW included the following:

1. the framing process design for the future scenarios
2. participant, moderator, facilitator, and venue selection and,
3. facilitation and participatory communication process to be adapted

(Hatzilacou et al., 2007; Escobar, 2011)

In the case of Cavite, the output of the FLSW became an essential component of the LCS. Adding this information enabled the researcher to see the categorisation of descriptions and images directly from those who utilised spaces in the landscape.

As explicitly considered in the workshop process design, communication protocols were carefully selected to adapt to the public engagement procedures. Moderators were also engaged in a pre-workshop briefing session where the dynamics of facilitating dialogues were thoroughly explained and built. These key components included safe spaces, openness, respect, collaborative inquiry, common grounds and spaces to explore differences, thus balancing advocacy and inquiry (Escobar, 2011). One of the

tasks that the FLSW moderators had to focus on was creating collaborative and engaging spaces for dialogue for diverse types of FLSW participants. Also, FLSW moderators were expected to have prior skills in workshop facilitation – with communication skills that invite landscape dwellers to participate in individual reflections and group dialogues. The FLSW moderators were also expected to follow ground rules agreed upon by the participants and explore common grounds and differences for a respectful exchange of ideas about the peri-urban landscape of Cavite.

Another workshop component was building the presupposed landscape scenarios as a precursor to the workshop (Hatzilacou et al., 2007). One of the considerations during workshop planning included mapping associated notions of moderators and facilitators to the challenge at hand, ensuring bias on the possible results are kept to a minimum. In this case, the FLSW moderators and facilitators were expected to bring minimal notions of Cavite that may let them control the explorations that the participants may create for future scenarios. Although it was assumed that the FLSW followed a more outcome-based format, it was still expected that the FLSW moderators' and facilitators' prior knowledge of the peri-urban landscape of Cavite will not affect the clustering of ideas from the participants.

A meeting was held to brief moderators and facilitators on the FLSW. Doing so ensured that the challenges were kept to a minimum. Also, this became crucial in creating explicit consensus on possible scenarios from the participants, which will be helpful once the clustering of words and images was created. Although identifying possible scenarios before the workshop could be arguably full of bias, establishing this early on could also be helpful in consensus mapping of different moderators and facilitators should this emerge from the landscape discourse.

Workshop Output/Materials

A critical component of the FLSW was the development of different data formats for landscape character mapping. Some of the data formats resulting from the procedure were:

1. Visions for Cavite's landscape futures in the form of text/photomontages/sketches
2. Master plan concept for Cavite's future landscapes in a plan format (on-site)
3. Future Scenario Dialogues in a presentation format to the Province of Cavite (on-site)

These tangible outcomes were vital in developing the expected future spatial character of Cavite that may be necessary to create management and sustainable solutions for its landscape.

Programme and Workshop Venue

The FLSW was held at a plenary hall inside the Provincial Capitol of Cavite. The venue was selected through coordination with the provincial government representatives, who were very helpful in providing the venue that fits the criteria:

1. Conducive for 4-5 break-out thought-showers sessions,
2. Has tables and chairs that can be moved into different group interaction sessions,
3. Has enough space for participants to engage in dialogue and sketching sessions,
4. Have digital tools needed for the workshop, i.e., availability of projectors, monitor, and sound system

The FLSW held last 13 March 2019 was designed for a one-day intensive participatory discourse in Cavite. Initially planned to last from 9 am to 4 pm but pushed through around 10:12 am to 3:00 pm. The FLSW schedule was a deviation from the EASW workshop format that needed two separate days to restructure and process the results into thematic groups for presentation. The FLSW was also redesigned to fit a one-day workshop with the programme, as shown in the table below:

Table 03. Future Landscape Scenario Workshop Programme

Schedule	Activity
9:00 am – 9:30 am	Introduction on the Peri-urban Landscape of Cavite (Checking-in)
9:30 am -10:30 am	Plenary Session 1: Perceptions of Cavite (Cluster Groups)
10:30 am – 11:30 am	Plenary Session 2: Cavite’s Landscape Projections (Thematic Groups)
11:30 am – 12:00 nn	Design Thinking Session 1: Development of Future Scenarios (Thematic Groups)
12:00 nn – 1:00 pm	Break (Lunch)
1:00 pm – 2:30 pm	Design Thinking Session 2: Cavite’s Future Scenarios (Thematic Groups)
2:30 pm – 3:30 pm	Plenary Session 3: Dialogue on Results and Action Plans
3:30 pm – 4:00 pm	Feedback Round and Farewell (Follow-up Dialogue/Meeting if needed at the end of the workshop)

The FLSW programme followed a schedule that gave the workshop participants personal and group interaction spaces ranging from reflective practises to thematic group dialogues in almost an hour per activity block. The communication techniques ranged from individual to group sessions, starting with introductions and continuing into reflective practice. It also contained activities that foster understanding of the participants' levels of knowledge about Cavite's landscape, probing through group clustering and exploring ideas in plenaries and group stations.

Selection of Workshop Participants

The selection of workshop participants was given to the discretion of the provincial government through its Provincial Planning and Development Office. Although the provincial government was responsible for finding the workshop participants, the following criteria were still strictly followed in participant selection:

1. Participants must be able to communicate their ideas with the team,
2. Participants must know Cavite,
3. Participants must live in Cavite,
4. Participants must consist of the following demography: five (5) government employees, five (5) community members as intermediaries, and five (5) non-government organisation members.

Workshop Facilitation Team

Aside from the workshop participants pre-selected by the local government planning team of Cavite, another actor group in the FLS Workshop was the facilitation team. This team of skilled individuals knew the design process and were orientated on how moderation and facilitation should be done throughout the procedure. Chairing each break-out session into cluster groups was critical as the facilitators must also be able to express the ideas of the workshop participants rather than their own in the design thinking process. The workshop facilitation team included:

1. Five (5) facilitators of actor groups
2. Two (2) Observers (research student and research assistant for documentation)
3. Two (2) Plenary Moderator/s

Landscape Scenario Mapping Process

The FLSW was designed to provide venues for collaboration between different types of landscape dwellers. Unfortunately, the clustering into groups into smaller and more prominent group sizes was only successful if the dwellers were already creating

networks that created relations among the stranger protocols. Amin (2012) considered these to exist in present-day knowledge capitalism. According to Amin (2012), humans could create networks with strangers and show loyalty, trust and reciprocity regardless of their anonymity if the situated practice or engagement transform the social dynamics. Creating human networks (Argyle and Henderson, 1985), which was seldom quantifiable through its density of linkage, will be helpful when the goal of situated practises like the workshop delved on included social influence. In this case, human networks developed in the FLSW should seek the density of networks to provide cohesive results and more unified future scenario ideas.



Fig.55a, 55b, 55c, and 55d. Interactive Networks of Workshop Participants – individual learning spaces, simulated round-seat cluster group station, thematic group sketching stations, plenary sharing (Images taken by Nadal and Del Rosario, 2019)

The collaborative engagement happened through different interaction procedures (See Fig. 55). From individual reflective practice to interest and thematic group discussions - the variety of interactions became different communication formats. It also resulted in sets of different landscape visions for the peri-urban landscape.



Fig. 56. Human Bingo cards used to facilitate interactive engagement during the Introductions (Image taken by Nadal and Del Rosario, 2019)

Deepening the understanding of the landscape and the interactions and perceptions connected with the landscape was still a challenge, which led to a review of different communication process designs that could be used for this research. It led to the discovery of dialogue techniques as suggested by Argyle and Henderson (1985) and Escobar (2011). Considered were the procedures they suggested to create an interplay of different activities and networks as techniques that could create a more empathic list of perception outcomes. As adopted, the FLSW continued with cluster group sessions that probed the participants' Perceptions of Cavite through a query, "What Word described Cavite?". The participants were then provided three different interaction types:

1. quiet time for individual reflection on meta cards
2. pooling of cards into cluster stations for collaborative sharing
3. plenary presentation to open the individuals to a larger group with a more varied set of results

In this procedure, the almost non-reactive participants from the Introductions who did not interact with other participants became more open to ideas. Some members of the local government who were part of the participants opened discussions on the words they found amusing about Cavite, and a lot continued to share their meta cards results (see Fig. 57).

Although the communication procedure opened the room to personal and shared spaces, the challenge of clustering ideas was still evident as the moderators guided most of the work. There was still difficulty clustering information with participants' apprehension to share in the discussion at this point in the workshop. Most would still rather be non-reactive in more extensive group settings and it led to weaknesses in clustering information with the time restrictions. In this case, the moderators and facilitators were helpful during the plenary, especially with their prior knowledge of Cavite also working in place.



Fig. 57a, 57b, and 57c. Images of the meta cards clustering session where results were grouped into themes by the participants (Images taken by Nadal and Del Rosario, 2019)

In the following plenary, the image character of Cavite's landscape was generated using the question, "What images will stay in Cavite ten years from now?". In this next session, the landscape image was sought through the participants' analysis of picture cards. For this plenary session, thirty-nine (39) picture cards were used in the analysis. The picture cards were exhaustive of the landscape viewpoints that resulted from the scanning

procedure. The images represented Cavite as visualised from the other procedures made earlier in 2018.



Fig. 58a, 58b, and 58c. Images of the FLSW Plenary sessions where picture cards were used to identify future landscape scenario clusters (FLSC)
(Images taken by Nadal and Del Rosario, 2019)

Continuing the plenary sessions are the Design Thinking Sessions, where the development of future landscape spatial characters through scenario mapping took place. In this case, the groups developed their networks with a facilitator assigned to properly guide them on their thematic cluster groups. The result was a communicated listing of landscape attributes that explained notions on the peri-urban landscape. In the end, a dialogue on the results and proposed action plans were held, with a discussion during the Feedback and Farewell activity culminating in the FLSW (see fig. 58-59).

The FLSW fostered an analytical learning environment that mobilised different communication procedures to develop future landscape characteristics. The rest of

the metadata related to this method was shown in *Appendix 05: Metadata of the Future Landscape Scenario Workshop provides a detailed explanation of this methodology.*



Fig. 59a, 59b, 59c, 59d, 59e, 59f, 59g, and 59h. Images of the Design Thinking Sessions during the FLSW- Set 1
(Images taken by Nadal and Del Rosario, 2019)



**Fig. 59i, 59j, 59k, and 59l. Images of the Design Thinking Sessions during the FLSW- Set 2
(Images taken by Nadal and Del Rosario, 2019)**

Chapter 5.

Results and Discussions

This chapter explains the resulting data generated for Cavite's Landscape Character System (LCS). It explains the data extraction, processing, and visualisation for the LCS. Also included in this chapter are discussion points made to evaluate the versatility and viability of the LCS framework for Cavite.

The chapter begins with an explanation of the landscape character clusters (LCC) forming the attributes of Cavite's LCS, namely:

- 1. landscape character area morphogenetic montage clusters (LCAr-MMCs) from landscape morphogenetic character simulation (LMCS)*
- 2. landscape character area descriptor typology (LCAr-DT) clusters from Evidence-based Landscape Descriptor Mapping (EBLDM)*
- 3. landscape word clouds (LWC) from Landscape Walking Narratives (LWN)*
- 4. future landscape scenario clusters (FLSC) from the future landscape scenario workshop (FLSW)*

The chapter also contributes to the discussions needed to explain the comprehensive systematisation and visualisation crafted for this landscape in the Philippines. Along this discussion, the chapter then expounds on the inventory made - a dynamic catalogue of intangible and tangible attributes framed into a system of forms and processes that becomes the man-nature networks of this specific landscape. Finally, the chapter will establish the validity of data extraction approaches, the data formats used, and the information gathered as the baseline for landscape-responsive and sustainable decision-making for a Philippine landscape planning framework.

5.1. Overview of the Landscape Character Clustering for the Landscape Character System of Cavite

The catalogue of all the landscape characteristics and procedures to extract, process, and visualise the landscape information became Cavite's LCS. This catalogue was the research output and formed the core of the thesis. It was considered the most crucial contribution of the study to the landscape architectural field of practice and research in the Philippines as it brought in a comprehensive data framework and a new systematisation that combined different results into one inventory and manageable system for future planning.

The catalogue was structured under different landscape character clustering. These clusterings were explained in the following sections as the results and discussion points for the LCS. Together, the clusters became the information lodged in the LCS.

The Landscape Character Clusters (LCCs) created the fundamental data framework for the LCS. It framed the landscape data into manageable sets of landscape attributes. Once processed as part of an LCC, landscape characteristics also became tangible images and maps with coded forms and patterns.

The LCCs also created a more graphic data format for the LCS, becoming not just a repository but a processing approach for data to be formatted for value judgement. It presented information into stratified units of landscape description sets that were versatile for processing. It also allowed landscape information to be consolidated using data overlays. The LCCs resulted in representations of landscape information as potential Philippine landscape-based tools. With its application in the peri-urban region of Cavite, the LLCs also became the visualised representation, mapped in the following pages of clustered information.

5.2. Landscape Character Cluster 01: Cavite's Landscape Character Areas consolidated as Landscape Character Area Maps (LCArMs)

Landscape Character Areas (LCAs) was the LCS's first LCC designed to consolidate landscape character data. The presentation of this cluster used the Landscape Character Area Maps (LCArMs) - a format that provided structured visualisation of the landscape characteristics as metadata gathered in the QGIS software.

LCAs were formed to subdivide data according to the landscape culture-nature attributes. These culture-nature attributes clustering were landscape description units (Swanwick and Land Use Consultants, 2002) adapted from the European Landscape Character Areas of Wascher (2005), Swanwick and Land Use Consultants (2002, p.13) and Warnock and Griffiths (2015, p.265), among others.

This categorisation came from the evaluation of polygonal units and unit groups generated within the software language of QGIS. Naming these units and unit groups as categorised became one of the significant outputs of the LCS as it gave another identity to the peri-urban landscape of Cavite - as units that could be identified beyond its political boundaries with cultural and natural attributes unique to each cluster set.

The seven (7) Landscape Character Area Maps (LCArMs) forming the seven (7) Landscape Character Areas (LCAs) were segments within the LCS presented in this thesis. These maps were synthesised into Cavite's diverse, robust, yet fragmented landscape units. Listed below were the descriptions of the LCAs arrived at upon the combination of their nature-culture attributes:

1. LCArM 1 forming LCAr 001 are landscape units of lowly-populated mixed-use area with water bodies, forests, and mosaic vegetation cover on flat to gently sloping land with a varied geologic origin;
2. LCArM 2 forming LCAr 002 are landscape units of lowly-populated mixed-use area with water bodies and mosaic vegetation cover on an undulating to rolling moderately land with a varied geologic origin;
3. LCArM 3 forming LCAr 003 are landscape units of lowly-populated mixed-use area with forests and mosaic vegetation cover on a steep to very steep land with an old and undetermined geologic origin;
4. LCArM 4 forming LCAr 004 are landscape units of moderately-populated mixed-use area with water bodies, built-up, and mosaic vegetation cover on a flat to gently sloping land with an undetermined and recent geologic origin.
5. LCArM 5 forming LCAr 005 are landscape units of moderately-populated mixed-use area with water bodies and mosaic vegetation cover on an undulating to moderately rolling land with an undetermined geologic origin.
6. LCArM 6 forming LCAr 006 are landscape units of densely-populated mixed-use area with water bodies, built-up, and mosaic vegetation cover on a flat to gently sloping land with a varied geologic origin.
7. LCArM 7 forming LCAr 007 are landscape units of densely-populated mixed-use area with built-up and mosaic vegetation cover on an undulating to moderately rolling land with an undetermined and recent geologic origin.

Appendix 01: Landscape Character Area Full Metadata: Metadata Dashboard of Texts, Viewpoint Images, and QGIS Files contained the information lodged into the LCArMs. This document was crucial for review, should further studies on the proposed LCC be adapted, as it contained the more technical components of the data used for the mapping. It was also created to relay vital aspects of the data that can be combined or separated for updating or further studies related to Cavite's landscape.

The LCArs initially contained an overlay of description unit layers using the consolidated map-based data (see fig. 30-35 for the visualisation into LCArMs). The description unit layers used in the LCArs included the following landscape attributes:

1. Peri-urban Description Unit Layer (Cultural)
 - a. Population density
2. Ecological Description Unit Layer (Natural/Ecological)
 - a. Geologic and slope type
3. Combined Description Unit Layer (Cultural and Natural)
 - a. Land-use types
 - b. Land cover types

A review of the many sources of landscape data references served as the foundation for the data layers chosen in this list. Although the idea of expanding the consolidated data sets was once considered, the restrictions on this given set of data layers turned out to be the best option as a minimum number of unit layers to be evaluated considering potential outcomes for landscape description coming from these layers alone. Restrictions to these layers were also enforced to make data layering manageable within the duration allotted for this thesis. Finding data for biodiversity and ecosystems related maps to utilize in this thesis was challenging, and was an added difficulty leading to the selection of these prospective maps. Additionally, it would take more time than was anticipated for this research to develop the missing maps for the thesis. Characterizing the landscape using the five layers alone took a year to complete because the polygons used for these layers were also developed from scratch. With these limitations in place, it was determined that the best course of action would be to see if the layering of the selected data layers could produce meaningful data that could eventually direct planners for value judgment in the future. Another basis for choosing these data layers were methods already in use in global landscape characterisation strategies (Swanwick, 2002; Stephenson, 2008; Wandl et al., 2014; Erikstad, Uttakleiv, Halvorsen, 2015; Warnock and Griffiths, 2015; Dalglish and Leslie, 2016; Primdahl and Kristensen, 2016; Fairclough et al., 2018; Simensen et al., 2018).

The LDUs were chosen to reach a general categorisation of cluster overlays. This decision was reached during the attempt to remove the place-based bias in clustering data from this scale for analysis.

From all prior landscape characterisation approaches, clustering layers into easily identifiable alphabetical codes was proper once lodged into a metadata dashboard. What was advantageous with this coding technique was how it tagged information with easy-to-identify yet unique text descriptions or naming conventions. Below were the codes used to establish description unit labels for each information lodged in the LCS. The codes also served as the nomenclature of layers produced for this study.

Table 04. Table of Alphabetical Codes and Description Units for the Landscape Character System

Description Unit	Alphabetical Codes
1. Geologic Units	G
a. Undetermined	U
b. Recent	R
c. Old	O
2. Slope Units	S
a. Flat to gently sloping – 0 – 8%	fgs
b. Undulating to rolling moderately – 9-30%	urm
c. Steep to very steep – 31% or higher	svs
3. Landcover Units	LC
a. Forests (special categorical description used for the mixture of both open forests and forest plantations) i. Open Forests ii. Forest Plantations	fo fp
b. Water Bodies - all types, including riparian corridors and ponds	wp
c. Built-up land	b
d. Mosaic * unique categorical description used for the mixture of shrubland, cropland, and grassland i. Shrubland ii. Cropsland iii. Grassland	s c g
4. Land-use Area Units	LU
a. Uncategorised Area	ul
b. Aquatic Areas – all types including coastal, freshwater, riparian	wb
c. Residential Areas	r
d. Commercial Areas	c
e. Institutional Areas	ins

f. Industrial Areas	ind
g. Open Areas / Green Spaces	os
5. Population Units	PD
a. Lowly populated (l)	l
b. Moderately populated (m)	m
c. Densely populated (h)	h

Also shown in Fig. 60 was the metadata dashboard used to collate landscape data in its coded form. The metadata dashboard was one of the critical components designed for the LCS that served as a portal or a data management system. The dashboard could be interpreted into qualitative and quantitative forms and patterns of information. Generating this metadata dashboard used Google Sheet cloud software, providing a reasonably similar spreadsheet format with capabilities to collate, compute, and visualise data in a table. Additionally, Fig. 60 contained some image snippets of the metadata dashboard components used for the LCS as a reference as to how the output looked like in the software.

CAPTURING THE DYNAMIC CHARACTER OF THE PHILIPPINE PERI-URBAN LANDSCAPE: A LANDSCAPE CHARACTER
SYSTEM APPROACH FOR THE REGION OF CAVITE / CATHE DESIREE S. NADAL

[illegible]

**Fig.60a. A snippet of the metadata dashboard forming LCAr 001
(see Appendix 01: Landscape Character Area Full Metadata: Metadata Dashboard of Texts,
Viewpoint Images and QGIS Files)**

LANDSCAPE CHARACTER AREA DATA					
LANDSCAPE CHARACTER AREA # 01					
PERI-URBAN DESCRIPTION UNIT (C) (PD)	L	where C = cultural attributes, PD = population density, L=lowly populated			
ECOLOGICAL DESCRIPTION UNIT (N) (G-S)	FGS-O/U/R	where N = natural attributes, G= geologic origin, S = slope type, FGS= flat to gently sloping land, O=old geologic origin, U=undetermined geologic origin, R= recent geologic origin			
LAND DESCRIPTION UNIT (C + N) (LU-LC)	R/C/IND/INS/OS/WB/UL - B/C/G/S/WP/FO/FP	where C=cultural attributes, N=natural attributes, LU=land-use, LC=landcover, R=residential, C=commercial, IND=industrial, INS=institutional, OS=open space, WB=aquatic areas, UL=uncategorised land area, B=built-up land, C=cropsland, G=grassland, S=shrubland, WP=waterbodies,FO=open forest, FP=forest plantation			
Landscape Character Area Description (C + N)	Lowly-populated mixed-use area with waterbodies, forests, and mosaic vegetation cover on a flat to gently sloping land with varied geologic origin	where C = cultural attributes, N = natural attributes			
LANDSCAPE CHARACTER AREA UNIT GROUPS (LCAr-UG)		LANDSCAPE CHARACTER AREA UNITS (LCAr-U)			
LANDSCAPE CHARACTER AREA - UNIT GROUPS	LANDSCAPE CHARACTER AREA - UNIT GROUP DESCRIPTION	G	LC	S	PD LU LCAr-U CODES

Fig. 60b. An Example of the Sub-units and Coding used for the Landscape Character System Metadata Dashboard

LANDSCAPE CHARACTER AREA INVENTORY IN VOLUMETRIC DATA		TOTAL (per LCAr)					TOTAL LCAr-U IN LCAr
							87
# of Geopolitical Sub-regions where LCAr are found	11						
# of LCAr-UG in LCAr	7						
# of LCAr-U in LCAr	87						
# of polygons in LCAr	12,011						
Total Area of LCAr	271,599,390.05						
LCAr-UG with the Highest Number of Polygon Count	5602	R-BCGSWP					
LCAr-U with the Highest Number of Polygon Count	2219	U	c	fgs	l	r	GU-LC_c-S_fgs-P_l-LU_r
LOCATED IN LCAr-UG		R-BCGSWP					
Geopolitical Sub-region and LCAr-U Sub-unit with Highest Number of Polygon Count	GENERAL TRIAS	U	c	fgs	l	r	GU-LC_c-S_fgs-P_l-LU_r
LCAr-UG with the Largest Area	149,410,723.79	UL-BCGSWP					
LCAr-U with the Largest Area	52,816,738.15	U	c	fgs	l	ul	GU-LC_c-S_fgs-P_l-LU_ul
LOCATED IN LCAr-UG		UL-BCGSWP					
Geopolitical Sub-region and LCAr-U Sub-unit with the Largest Single Polygon Area	TANZA	U	g	fgs	l	ul	GU-LC_g-S_fgs-P_l-LU_ul
Landscape Attributes as seen in Images	CARMONA	R	c	fgs	l	r	Copy of Copy of LCS-VC1A47.L47
	MARAGONDON	U	c	fgs	l	c	Copy of Copy of LCS-VC1A67.L67
	NAIC	U	c	fgs	l	ind	Copy of Copy of LCS-VC1A102.L102
	ROSARIO	R	b	fgs	l	ins	Copy of Copy of LCS-VC1A146.L146
	GEN TRIAS	R	c	fgs	l	os	Copy of Copy of LCS-VC1A148.L148
	TERNATE	O	s	fgs	l	wb	Copy of Copy of LCS-VC1A95.L95
	TERNATE	O	c	fgs	l	ul	Copy of Copy of LCS-VC1A93.L93

Fig. 60c. An Example of the Landscape Character Volumetric Data Results and Various Information that can be generated from the description clustering from the Landscape Character System Metadata Dashboard

The Landscape Character Areas (LCARs) came from the volumetric data generated from the metadata shown in Fig. 60. LCARs were comprehensive sets of quantitative information containing smaller cluster groups that were also identified as possible information that can be generated just using these five layers.

The volumetric data within each LCAR also became quantitative information that can guide several conclusive statements for the LCS. Once decoded, the data served as landscape characteristics ready for the next stage of landscape assessments - these can then be used to provide necessary judgments to landscape actions.

The volumetric data became useful when sets of information proved some qualitative and quantitative descriptions of the LCAR-Us. By looking at this collated set of information, grouping items and identifying distinctiveness and similarities were also easily assessed, or conclusive evidence suddenly became available. The overlay process for the data also became more accessible as the metadata dashboard can easily map similar polygonal results in QGIS. This categorisation tool was beneficial, especially once data volume became challenging to manage at this level and scale.

Although advantageous in categorising landscape data, one observation in this scale of analysis was a relatively high number of unique overlays leading to a possible challenge in the landscape of Cavite - Cavite's landscape was highly fragmented. In this case, it was evident that some LCAR-UGs (landscape character area- unit groups) with LCAR-U's (landscape character area - units) could be repetitive in each LCAR and even within each political sub-regions of Cavite. Duplication of LCAR-UG and LCAR-U polygons was expected, and the duplication in some areas was very high as the number of polygons created per type also became high. This situation proved to be challenging to manage if not grouped into clusters.

Other discussion points included observations on LCAR-UGs and LCAR-Us. These data clusters showed incompatibility of both ecological and cultural attributes. An example was the LCAR-UG and LCAR-U's with SVS (steep to very steep land areas) codes containing

b-layer or built-up land cover. It would not have been buildable if policies on building within safe zones were in place and recognised, yet the resulting maps provided proof that these units existed. Another example was the *b* layer or built-up land cover on the *wb* layer of aquatic area, meaning that several areas of built-up land sit on the water. Like the first example, this incompatibility may not have been seen if not for the layering technique added for the LCS. One possible way to move forward with this result was to reassess the landscape data of the Philippines or to provide management strategies that can solve these challenging relationships of existing landscape attributes.

Also included in the LCS were the proposed visualisations for the landscape character. The visualisation in the following pages showed the volumetric data coming from the metadata dashboard of LCArs as explained using the two-dimensional (2D), three-dimensional (3D), and four-dimensional (4D) attributes of Cavite. Also shown as repetitive components in the seven (7) LCArs were visualisations interpreting landscape metadata into different formats for landscape analysis. With limitations of data gathering already in place for this research, providing other approaches for formatting and visualisations was also recommended to test the versatility of the LCS design, especially for the Philippines.

Moreover, data in the form of portraits and panoramas were also included in the LCS. The inclusion of images began during the early stages of the research, where the 360-degree camera was then a vital tool used in gathering images from the humanistic perspective of space as interpreted as viewpoints, thus becoming the visual character cluster sets in the LCS Metadata Dashboard. The initial images were samples of polygonal centroids viewpoints, but eventually, the metadata dashboard was fed with more images of Cavite taken as random samples in different locations. A possible discussion point in the future is the value of these images in landscape evaluation. Images taken are also repositories of different information that was not yet considered for extraction for the LCS at this point. First-hand observations of the viewpoint images already proved the existence of a robust set of characteristics captured in these images. Another observation is that data in each image contained a seamless mix of built-up and vegetated land covers. The quality and

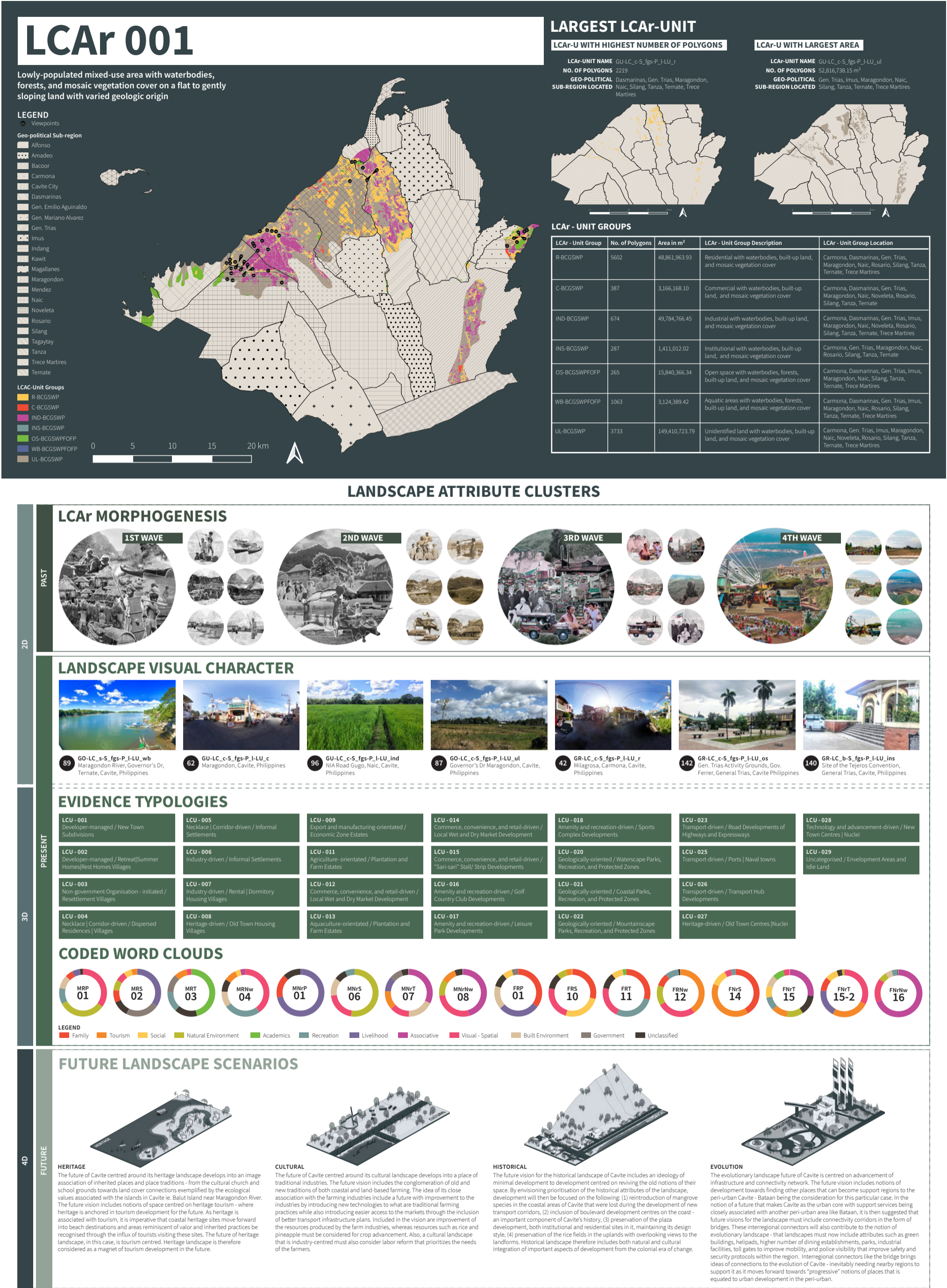
amount of information captured may be considered a vital image inventory in landscape evaluations.

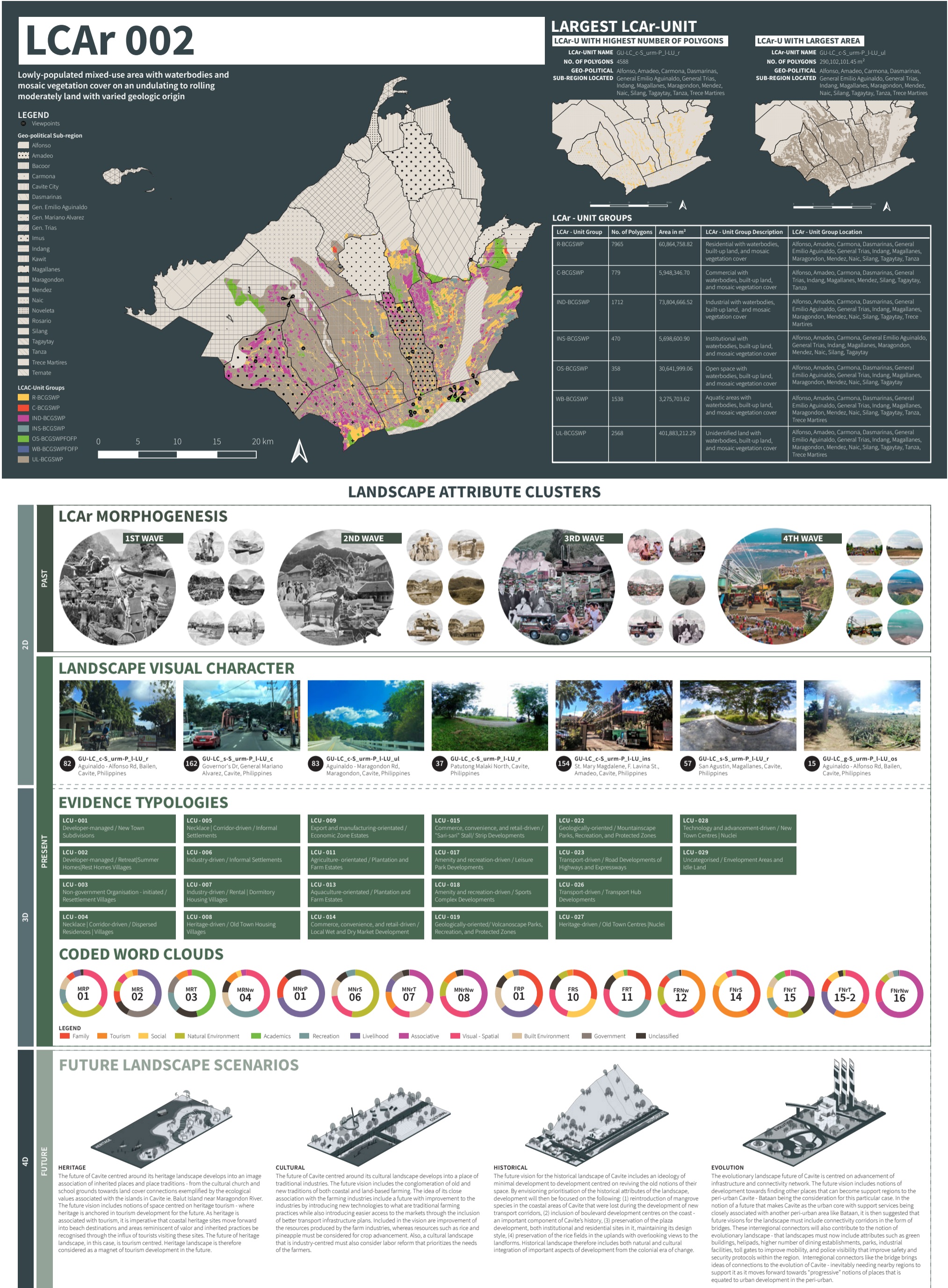
Shown in Fig. 61-67 were the LCAr-Us and LCAr-UGs visualised into the LCArMs. It was significant as visualisations play a vital role in planning, especially when communicating information to different field practitioners. Expressing information such as size, fragmentation, and granularity can only be best expressed if communication measures were applied to any coding technique created for the LCS. The intention of doing this type of visualisation was also to demonstrate the difference between data types. The visualisation approach could be a pivotal change in landscape research in the country should this be adapted, as it provided a classification system and communication style that could be used in landscape-based baseline evaluations in the future.

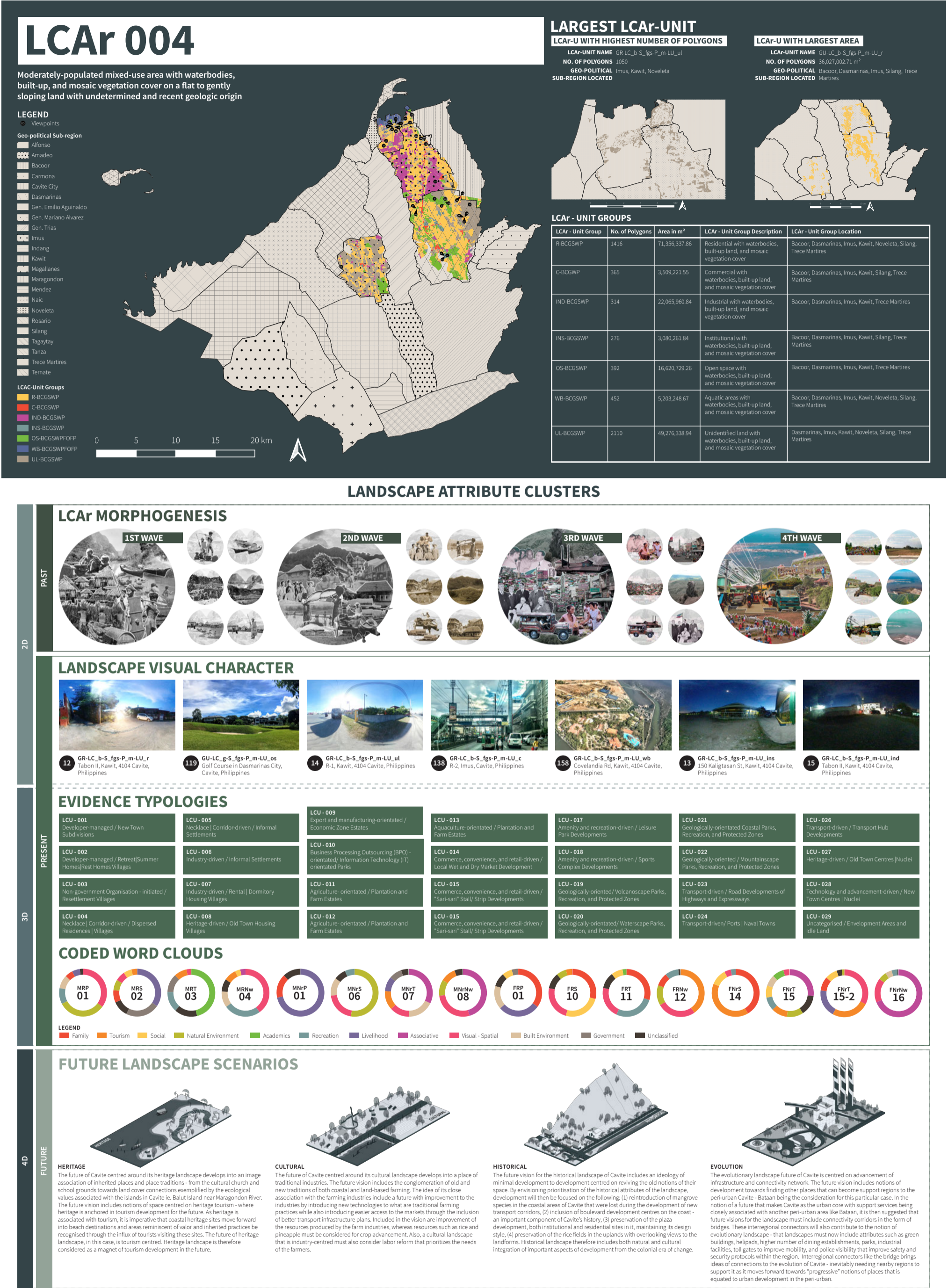
The LCArMs became landscape databases with the identification of units divided according to the geopolitical units considered vital and impossible to remove from the LCS as it also served its purpose - it allowed data to be interpreted in smaller units, which was vital in the way planning was handled in the country. Recognition of these smaller geopolitical units for the LCS was an essential consideration as the Philippines' administrative power in planning was managed at this scale. This sub-political granularity of data and policies for data use and extraction should be recognised, especially in a country where grassroots landscape evaluations and extractions could be done depending on the need and initiative of each geopolitical management unit.

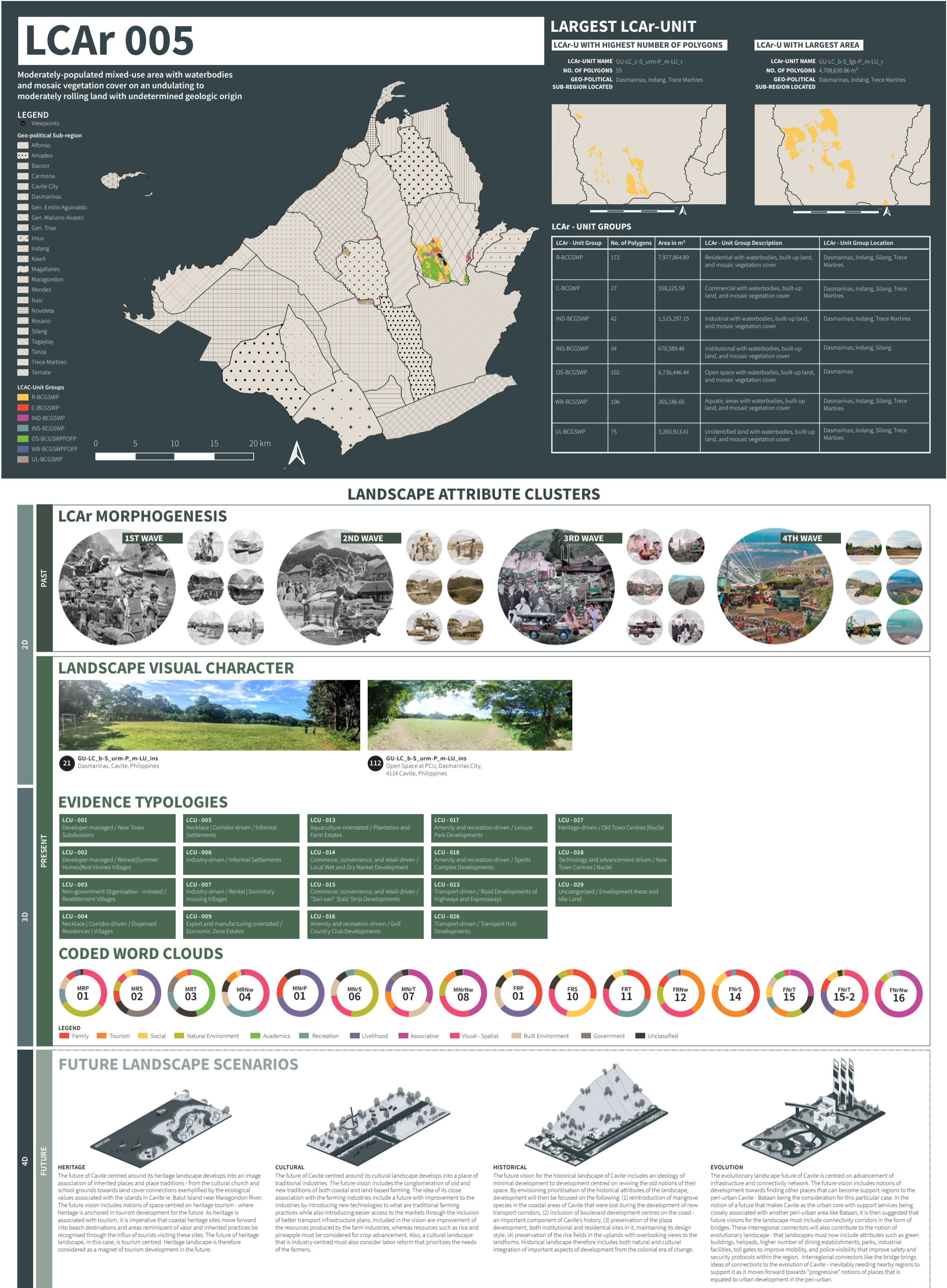
Nevertheless, LCArMs in the following pages showed seven (7) clusters generated as visual references to the LCS and its data found in the meta-data dashboard. This format was utilised to inform the readers of the possibilities of visualisations that can emerge from the LCS. Despite the highly vital information now gathered into metadata and QGIS formats, seeing it in this format would also be very useful when descriptions are requested to be summarised; thus, clustering of this form is encouraged to resolve queries usually asked at this level.

Within each LCArM are data from other LCCs, consolidated and included in the map. It was done to show the scale of influence and relationship of each clustering from the LCArM level. What will be visible in the pages that follow are the repetition of landscape character area morphogenetic montage clusters (LCAr-MMCs), landscape word clouds (LWC), and future landscape scenario clusters (FLSC) in each LCArM. It was crucial to prove how regional landscape character can be achieved in the three clusters identified. However, this can also be argued as clustering approaches that could be improved by adding more procedures to sift through data at the level and scale used for the LCArMs.









In any case, the LCS as visualised in the LCarMs became the receptacle of landscape information - allowing readers of the map to see the dynamic character of Cavite's landscape. However, aside from providing landscape character data in this format, several discussion points were also identified that provided additional evaluations of the landscape being studied. Outlined in the following sections were some discussion points identified at this analysis point. These discussion points were also presented to identify other concerns as landscape character data emerged in the LCarMs.

5.2.1. Landscape Changes found in the Landscape Character Area Maps (LCarMs) of Cavite

Regardless of the robustness of attributes, the results of the mapping revealed a landscape with the same purpose in relation to the HUC of Manila – that Cavite's landscape continued as a threshold of rural and countryside development. It was also constantly in support of facilities and industries through the years. This narrative continued even in the landscape character area morphogenetic montage clusters (to be explained later).

This narrative was to be reflected with the reminder from McHarg (1969) to consider the importance of the ecological interpretations for urban sustainability, and this is one of the many takeaways in McHarg's arguments in *Design with Nature*. He explained the need to see nature through the landscape's ecological services, a term coined for the offering of nature that works for man and expressed the need to look into it to be helpful in urban areas. He particularly expressed the need to identify these processes and thrive in the urban plan to sustain the environment. His examples included identifying surface water areas, marshes, floodplains, aquifers, and aquifer recharging areas, to name a few.

From McHarg's reminder, do we see one problem from the monotony of landscape directions for Cavite - that it catered too much to the needs of nearby regions,

accommodating through its ecological or ecosystem services the needs of a wider area and population. What may soon be problematic from this narrative is the lack of consideration for the sustainability of this role of Cavite's landscape to its nearby regions - how long can Cavite's landscape provide the needs of areas outside its region? This question should then be considered in the broader planning scheme to understand the capacity and degree of service that Cavite can provide its landscape actors in the future while also considering the sustainability of its landscape.

5.2.2. Plaza Complex as Cavite's Peri-urban Landscape Attribute

The LCArs contained viewpoints with images of the plaza complex. Santa Maria (2001) noted the importance of this landscape feature in her narrative on ceremonial spaces. In her explanation, two types of ceremonies, personal and communal, grow in a landscape that fosters activities created for the Filipinos' love for fiestas or town festivals. This intangible quality of the landscape is one reason this space should be considered for conservation.



Fig. 68a. Image of Plaza Soledad from R-b-fgs-h-os located in the geopolitical unit of Cavite City in LCAr 006

In the case of Cavite, this feature in images proved that these spaces existed in Cavite. Its existence could be managed for future developments as we see examples of the plaza in different locations and used for different reasons.



Fig. 68b. Image of Trece Martires Plaza from R-b-fgs-h-ul located in the geopolitical unit of Cavite City in LCAr 006



Fig. 68c. Image of Imus City Plaza from R-b-fgs-m-os located in the geopolitical unit of Imus in LCAr 004

5.2.3. The Emergence of "Settlement Islands" in the Peri-urban Region of Cavite

This diffusion of urban influences to Cavite's landscape manifested as highly complex spatial patterns, parallel to Nilsson et al. (2013) analysis of peri-urban futures. The spatial character of Cavite resonated with the models Nilsson et al. (2013) identified - an intermix of built-up areas with farmlands, horticultural areas, recreational parks, forests, and nature areas, connected through extensive infrastructure and transportation networks. In the case of Cavite, these emerged as components of the different LCAr-U's and LCAr-UG's identified existing at varied locations and points.

What then came as something unique at this point was the emergence of arguably different islands of settlements, usually of new town developments. This settlement island, a term coined for this thesis, is manifested in the residential LCAr-U's. The settlement islands are isolated, multi-use, peri-urban settlement districts in fragmented polygons within Cavite. The settlement islands in almost every cluster in Cavite had variations of landscape characteristics from rural hinterland views and manufactured landscapes of community parks and sprawling green spaces (see Appendix 01 for the images). At times, the persistence of the rustic appeal signified countryside values found within the region. The idea also suggests a market-driven and arguably highly-consumer-centred notion of space.

The following images showed visualisations of the fragmentation coined as "settlement islands" in Cavite. Presented were LCAr's with the highest number of polygons indicative of this phenomenon. Also shown were varied locations of these regional residential areas, where their separation as created by other land use made it almost the most fragmented category or unit type in LCAr's 001, 002, 003, 005, and 007.

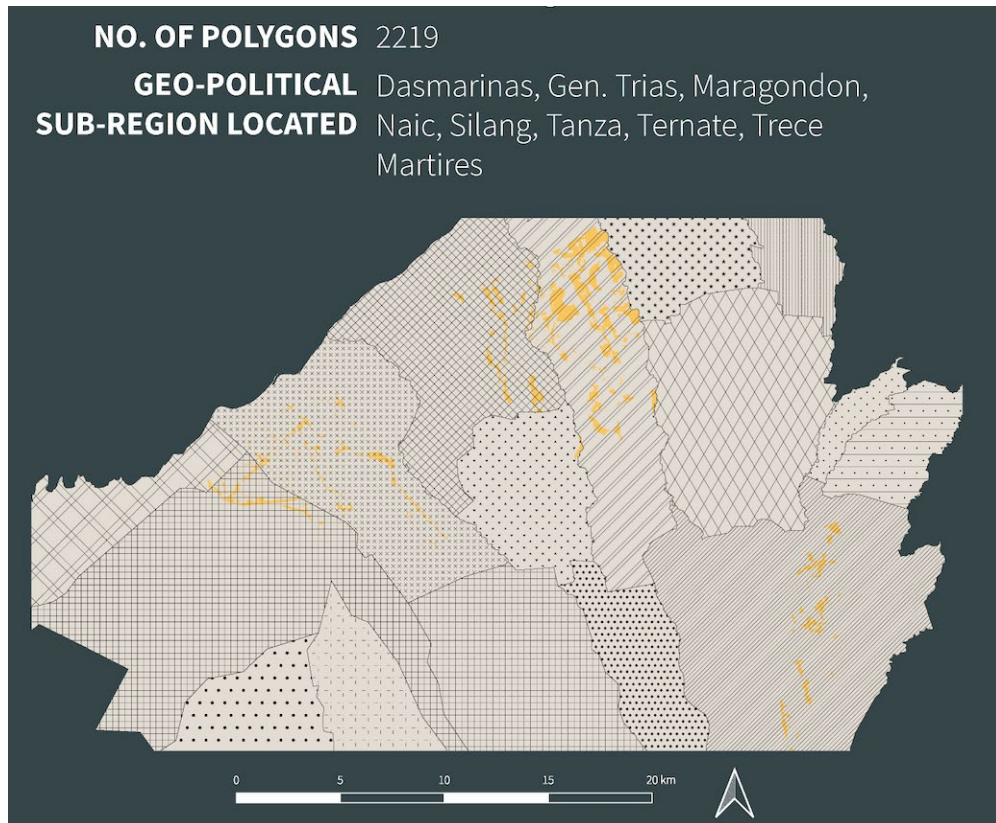


Fig. 69a. Zoomed in image from LCAr 001 of the LCAr-U with unit name, GU-LC_c-S-fgs-P_l-LU-r

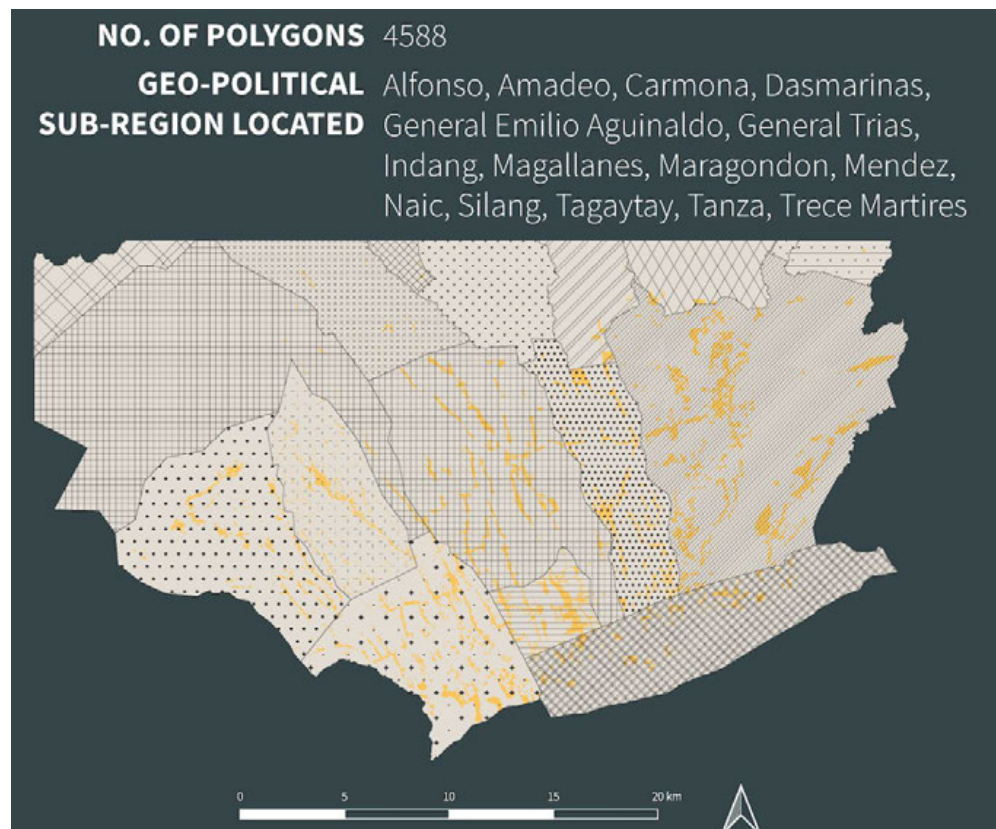


Fig. 69b. Zoomed in image from LCAr 002 of the LCAr-U with unit name, GU-LC_c-S_urm-P_l-LU-r

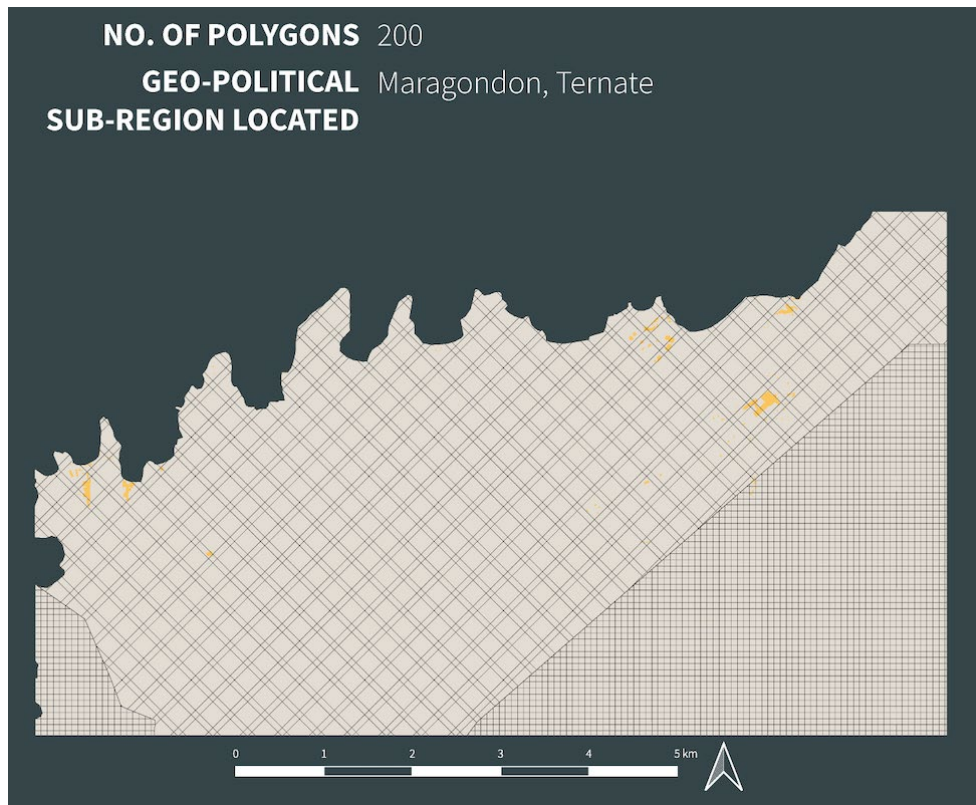


Fig. 69c. Zoomed in image from LCAr 003 of the LCAr-U with unit name, GO-LC_s-S_svs-P_l-LU-r

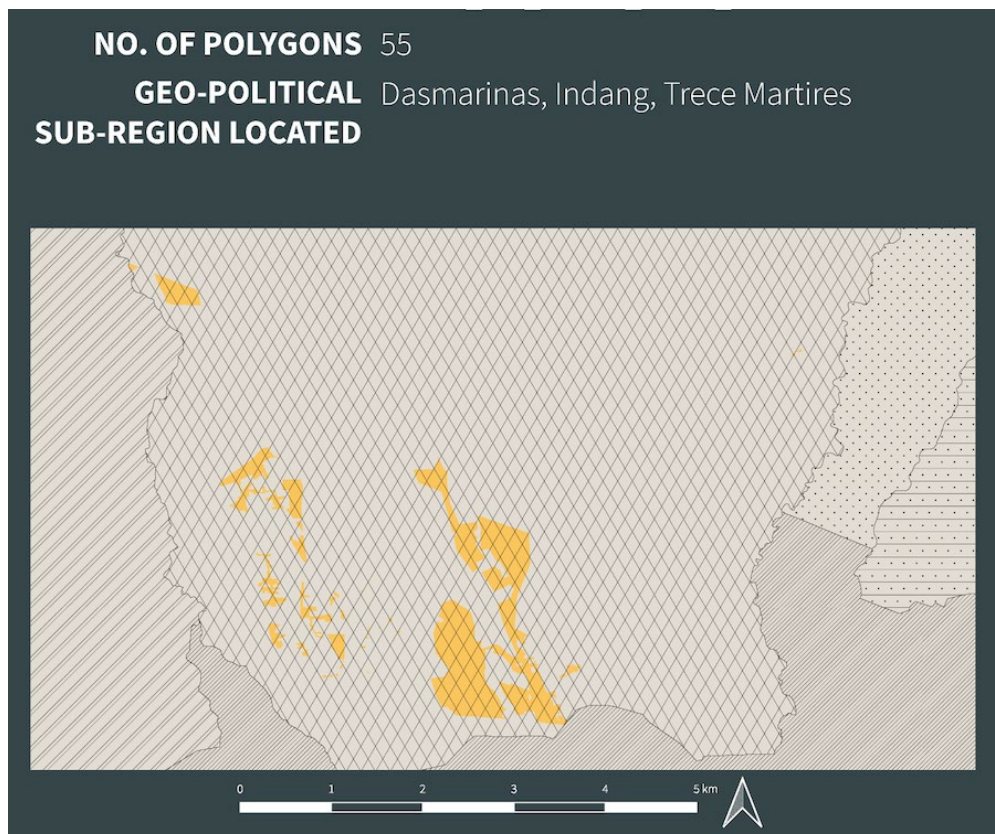


Fig. 69d. Zoomed in image from LCAr 005 of the LCAr-U with unit name, GU-LC_c-S_urm-P_m-LU-r

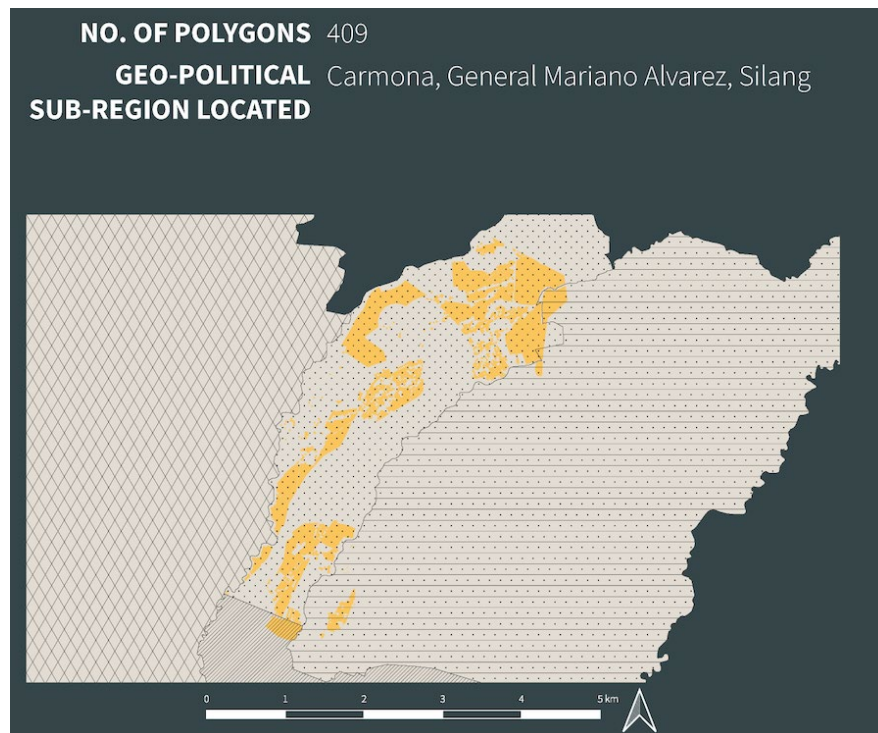


Fig. 69e. Zoomed in image from LCAr 007 of the LCAr-U with unit name, GU-LC_b-S_urm-P_h-LU-r

5.3. Landscape Character Cluster 02: Cavite's Landscape Morphogenetic Montage Clusters from Landscape Morphogenetic Character Simulation

The Landscape Morphogenetic Montage Clusters (LMMCs) of Cavite's landscape are pieces of evidence showing the chronological waves of landscape changes. LMMCs, a derivative of the LCS, provides the morphogenetic character of the landscape that is presently unbeknownst in landscape narratives of Cavite. These LMMCs define the importance of historical knowledge as it provides the LCS with information on time - data crucial in understanding the direction of change that the landscape is heading.

The categorisation into these four (4) LMMCs was based on the rigorous searches made in different forms of research objects - texts, maps, and images. The categorisation

came out as a standard segmentation of landscape changes where the change in the different aspects of the land is similar within the cluster. The four (4) LMMCs are provided below:

1. LMMC 01- the pre-colonial era of coast-orientated development (Kendall, S. H. 1976; Medina, 1994; Abinales and Amoroso, 2017)
2. LMMC 02- the colonial era of the agricultural hacienda and planned plaza town centres (Kendall, S. H. 1976; Medina, 1994; Abinales and Amoroso, 2017)
3. LMMC 03- the post-colonial era of governance-based land policies, housing development, and the industrial revolution (Kendall, S. H. 1976; Medina, 1994; Cavite Provincial Planning and Development Office, 2013; Abinales and Amoroso, 2017); and,
4. LMMC 04- the present era of massive migration towards land converted into tourism, industry, and new-town developments.

The decision to add this method verified Cavite's landscape morphogenetic character, which was highly associated with the endemic process of suburbanisation, a term used by Sharpe (1986) to express peri-urbanisation loosely. Like peri-urbanisation, suburbanisation (Sharpe, 1986) was also a cultural process that expanded urban influences to towns along its periphery. As a town that underwent suburbanisation, Cavite presumably adapted to the emerging social consciousness of the middle class, with the political influences of the middle class also affecting regional power, transportation, and infrastructure demands. This social consciousness also affected the landscape, significantly changing its land cover into built-up areas for residential development, thus covering the growing shelter demands of the middle class and the increasing number of migrants.

Another commonality in all the LMMCs was the industry-driven land use in Cavite. Despite being shared, its form and function had changed in all the identified LMMCs. For example, the most present industry sector that Cavite catered to were mostly industries of Micro and Small and Medium Enterprises (MSMEs) and the burgeoning Business

Process Outsourcing (BPOs) units that were all highly specialised and technologically advanced spaces of land use. It was not present in the earlier LMMCs. These new industrial categories added to the already existing agricultural industry that Cavite already had for years.

Nevertheless, the procedure brought another method to enrich the LCS with new information, not just the LMMCs, which were derivatives of the landscape morphogenetic character simulation (LMCS). The pieces of evidence gathered to produce this part of the landscape clustering brought into the LCS morphogenetic characteristics, which are vital components of planning a landscape. What made it vital was the results of this type of driver of space to change and how it can be easily visualised in this format.

In effect, Cavite's peri-urban landscape, once clustered into these sets of notions of space, was possibly viewed into four (4) receptacles of temporal characteristics observed in the lens of its LMMCs. These landscape clusters created manageable sets of information known as eras of landscape influences structured in stages of landscape development. The LMMCs asserted the peri-urban landscape's changing qualities and the temporality of its natural and cultural environment. These clusters then exhibited an evolutionary landscape phase that developed into its peri-urban landscape character today.

Aside from crafting montages as visualisation approaches, an assemblage of written texts, images, and cartographic maps became added information guiding the creation of the LMMCs. The following pages showed the tables and the visualised historical assemblages of LMMCs that were added as components of the primary LCS. Description of each LMMC was also included after each image to provide meaning to the visualisations made.

The references reviewed for developing Table 05 and Table 06 descriptions were thirty-six (36) texts and twenty-two (22) map and image references. The number of references

consulted for this method was not necessarily the proposed minimum of references to be analysed should other researchers adopt this procedure. What it became was the sample set for this thesis necessary in creating a sound basis for constructing the LMCS. It could actually become more robust with information should references be added to the list if further studies are done on this thesis.

A summary of the descriptions as clustered using the DESTEP and DPSIR factors were shown in Table 05 and Table 06. The tables presented the DESTEP as text descriptions becoming the Drivers of Change (D) in the DPSIR. These became descriptive interpretations of each historical cluster of Cavite. All these consolidated data became the table of information as part of the LMCS. These description clusters were also the basis of the LCAr-MMCs.

Table 05. DESTEP Characteristics as the Drivers of Change (D) in the Consolidated Descriptions of Cavite's Peri-urban Landscape Waves of Change

Drivers of Change (D)	
Wave of Change	Description
First Wave of Change (before 1565)	The first wave of change included the landscape attributes recorded before 1565, the arrival of the Spanish rule in the Philippines, and can be considered the most genuine landscape as recorded in texts and images. This era of spatial change included the acculturation of landscape influences brought by local and regional traders and settlements.
Second Wave of Change (1565-1900)	The second wave of change included the lowland-upland concept in town development that eventually altered the town planning approach in the region of Cavite. It was considered the start of the peri-urban landscape development as Cavite became the infrastructure, production, and security support to the main Spanish centre of government in Manila. As support to Manila, its landscape became robust with new development forms seen as the plaza complex, the "hacienda", the coastal trading port zones, and the mountain camps for the "tulisanes". Overall, the landscape during this era became the nucleus where development emerged and radiated in the years to follow.
Third Wave of Change (1901-2000)	The third wave of change explained the unrest caused by the changing political and economic atmosphere that affected the landscape by implementing systematic and promulgated changes in land use. This wave was considered the era of industrialisation and housing development. It also included the influences of the American colonial period in the history of Philippine politics leading to the need to fulfil the "American Dream" through the new settlement development types in the region. Also included in this era was the introduction of housing projects in Cavite, a proposed approach to decongest Manila that led to a massive in-migration to Cavite. It caused a change in the economic structure and the land character from farmlands to residential settlement developments. Also included in this era is a rise in the number of economic processing zones that became the precursor of infrastructure development. As a need to connect the support facilities towards Manila, corridor connectors from the urban Manila towards the more countryside

	areas of Cavite were constructed. It was also considered the peak of peri-urbanisation influence in Cavite.
Fourth Wave of Change (2001-present)	<p>The fourth wave of change explained the continuous migration to the peri-urban region of Cavite, leading to the shifting landscape character narrative towards tourism. At this stage of change, the landscape of Cavite hosted more idyllic suburban trends as homes of the rising middle class were constructed, leisure and recreation areas like golf courses and parks were created, and events places and beach resorts became the norm.</p> <p>Still, a support region to Metro Manila, the landscape of Cavite also continued to host infrastructure, economic, and sociocultural support in the form of highly mixed-used and industrial estates that are anchored towards the political aim to be a “world-class and first-class” region.</p>

Table. 06. PSIR Characteristics Clustered as Waves of Landscape Change in Cavite

WAVE OF CHANGE 01: PRE-COLONIAL LANDSCAPE (before 1565)			
PRESSURES	STATE	IMPACTS	RESPONSES
Pressure from the DESTP to its ECOLOGICAL components	Changing ecological environment - introduction of cultural systems to the environment led to changing ecological conditions.	Vulnerability of the natural environment to cultural systems	Transformation of land cover to accommodate new demographics, economies, societies, technologies, and political systems
WAVE OF CHANGE 02: COLONIAL LANDSCAPE (1565-1898)			
PRESSURES	STATE	IMPACTS	RESPONSES
Introduction of new sociopolitical systems	A period of land conversion - introduction of new land systems as imposed by the Spanish rule	Shifting of the landscape perspectives - highly economic-based activities proliferated, biodiversity shifted from forest-based to agri-based as demanded by the economic activities; increase of land-use	Landscape accommodated change; Landscape accommodated the growing population and growing size of hacienda lots and town centres.
WAVE OF CHANGE 03: POST-COLONIAL LANDSCAPE (1898-1946)			
PRESSURES	STATE	IMPACTS	RESPONSES
Shifting political system; introduction of new land-use in the form of industrial estates, commercial and recreational development as well as residential/resettlement development	A period of land conversion - introducing new laws to protect and define territories and boundaries of the land.	Shifting of the landscape perspectives - the vulnerability of the landscape to new systems prompting it to accommodate more activities beyond purely economic	Landscape accommodated changes that are prompted mainly by-laws and provisions - higher population of migrants and new land-use types
WAVE OF CHANGE 04: LANDSCAPE OF THE PRESENT TIMES (1946-present)			
PRESSURES	STATE	IMPACTS	RESPONSES
New consciousness on land use prompting the landscape to shift to accommodate more types of tourism, education, and commercial development to heed the aim for a global and first-class region	Continuous land conversion for more tourism activities, mainly at the uplands and central region of Cavite	Shifting of the landscape perspectives - the vulnerability of the landscape to new systems prompting it to change to accommodate more types of activities continuously	Landscape accommodated changes that are prompted mainly by new types of land-use and to follow the goal to be first-class and world-class (globalisation)

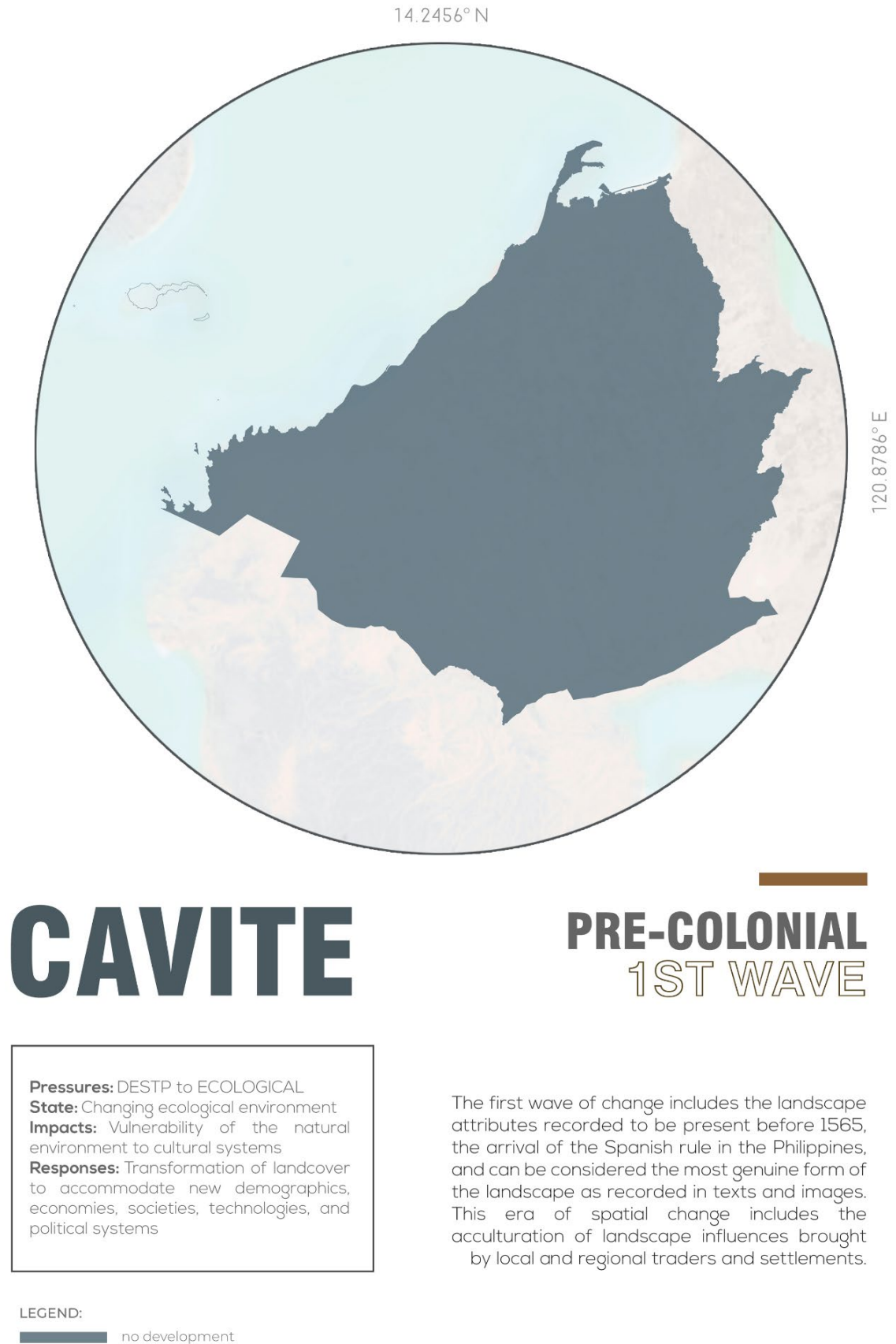


Fig.70a. Landscape Morphogenesis Cluster 01: PRE-COLONIAL LANDSCAPE (before 1565)
(Visualisation by Nadal and Aloc, 2020b)

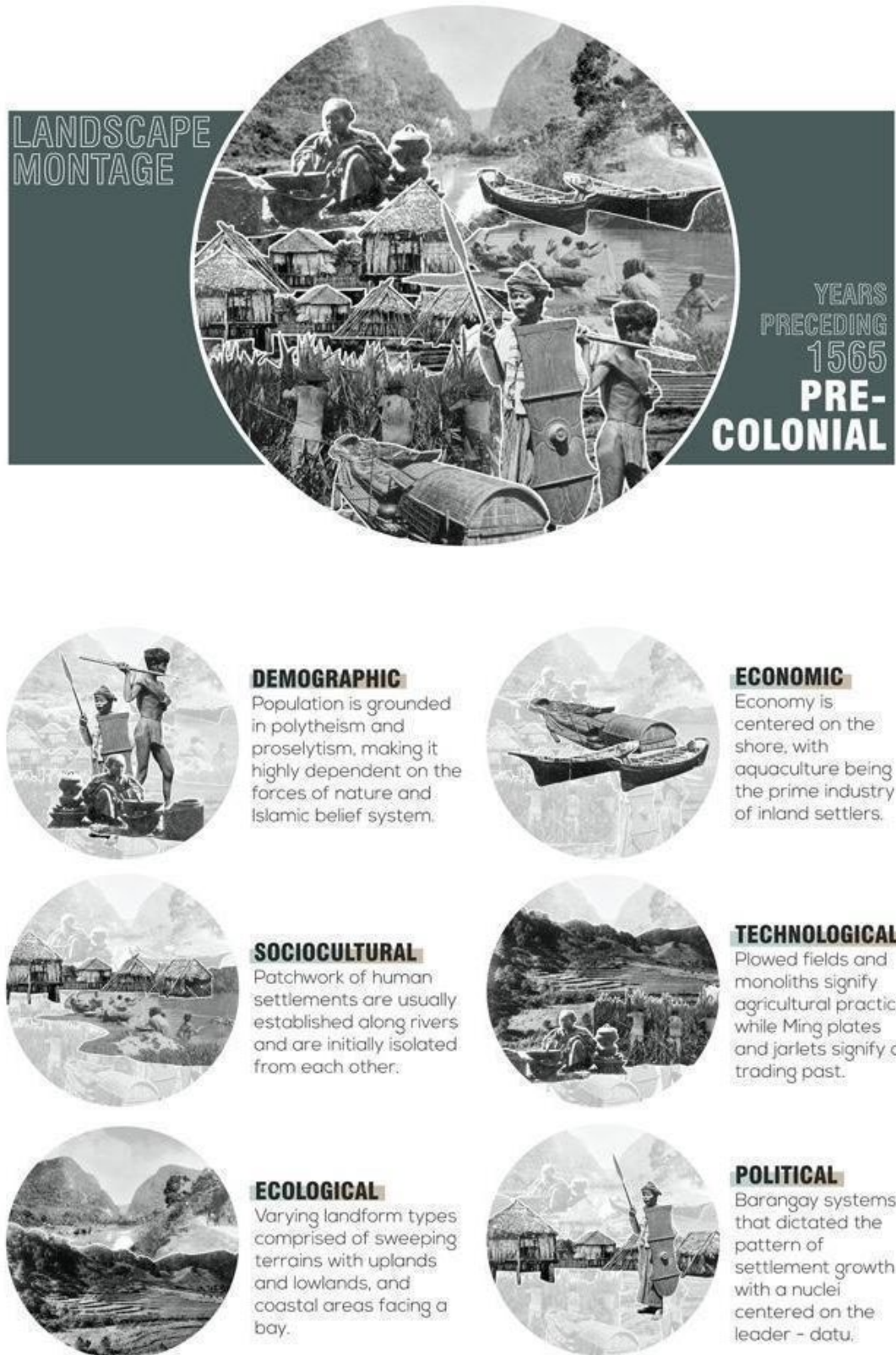


Fig.70b. Landscape Morphogenesis Cluster 01: PRE-COLONIAL LANDSCAPE (before 1565)
(Visualisation by Nadal and Aloc, 2020b)

The first wave of change was clustered as LMMC 01. This segment of landscape morphogenesis contained landscape characteristics recorded before 1565 - a crucial year of change in the Philippines as it was the arrival of Spanish rule in the country. Landscape in the country prior to 1565 was in its pure form (Fig. 70 a and b). In this LMMC, landscape changes were only coming from influences of local and regional traders, and settlements and planning systems were at a "barangay" or community scale - implemented by tribal, small pre-Spanish settlements.

Cavite in LMMC 01 showed a region endowed with forested uplands, valleys, and water bodies. These natural resources became considerably vulnerable to settlement growth as these resources changed or dwindled to accommodate settlements.

As collected for the LMMC, cultural systems were attached to the landscapes' coastal attributes (Medina, 1994). This attribute of the landscape was sought as the one highly influential in ecological and cultural processes, with valued landscapes centred mostly on attributes of the coast during those days.

Aside from the coastal attributes found to be crucial in discovering the landscape morphogenetic character of Cavite, other attributes considered influential were the two distinct topographic types in Cavite - the uplands and lowlands. These topographic characteristics subdivided the region into two significant areas, eventually considered impactful concepts of spaces. The lowland and the upland attributes became ecological boundaries that were also distinct sources of resources.

Another characteristic of the landscape shown through the LMMC 01 was a highly coastal settlement in the lowlands, supporting a landscape vulnerable to changes from the nearby seas. This accessibility to the sea affected settlement systems and policies, allowing the discovery of communities from travelling migrants entering the islands from the shores of its lengthy northernmost coastline. This coastal characteristic of Cavite also influenced place attachments, with the toponym of Cavite anchored to the coast and its landform. The best example is from the root of the term Cavite, CAUITE, or

fishhooks. The term was said to be created because of the shape of its coastline (Medina, 1994).

Naming places based on ecological characteristics is one custom explained further by Santa Maria (2001). According to her, this custom of naming places according to flora and fauna, rooted in Malayan culture, had been a long tradition that had somehow influenced environmental awareness by generations. It was shown in a counternarrative by Altman and Chemers (1980, pp.227-238) when they suggested how cities mirror aspects of the life of previous settlements as shown in the physical environment.

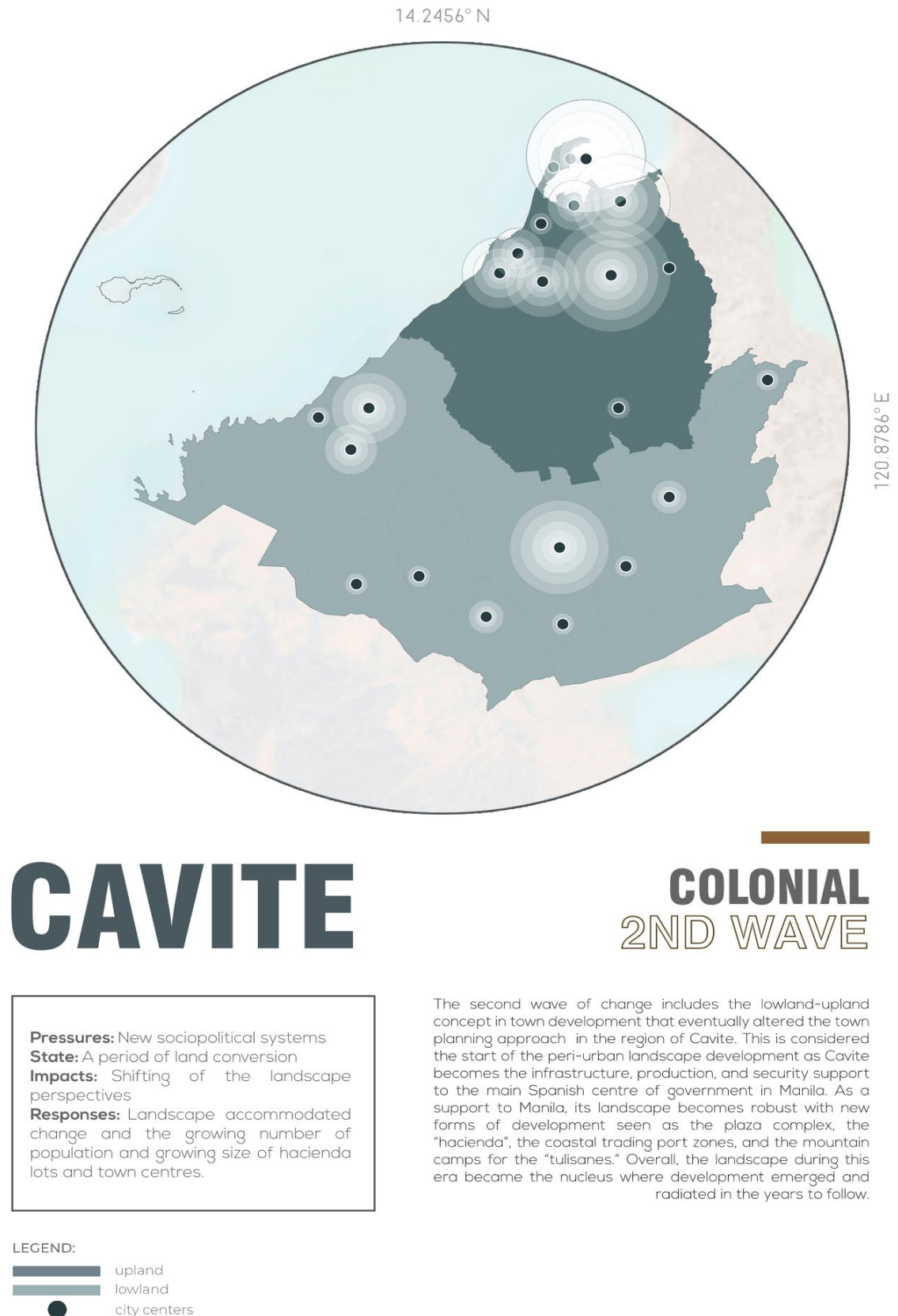


Fig. 71a. Landscape Morphogenesis Cluster 02: COLONIAL LANDSCAPE (1565-1900)
(Visualisation by Nadal and Aloc, 2020b)



Fig. 71b. Landscape Morphogenesis Cluster 02: COLONIAL LANDSCAPE (1565-1900)
(Visualisation by Nadal and Aloc, 2020b)

LMMC 02 contained evidence on the boundaries set in town development. It established Cavite as lowland-upland boundaries creating a new concept for town development. In this LMMC, Cavite's landscape development directions shifted to accommodate one of its significant drivers of change - the Spanish rule in the country.

As support to Manila, Cavite's landscape in LMMC 02 became robust with new forms of land development from the Spanish planning agenda. Manifestations were plaza complexes, the *hacienda*, the coastal trading port zones, and the mountain camps for what were tagged as mountain bandits, locally known as the *tulisanes*. Overall, the landscape during this era became the nucleus of development in the following years.

An example brought to the narrative by Medina (1994) expressed in this LMMC was the landscape's role in developing the civilised society. With Cavite's landscape being robust with resources and ecological influences, the development of societies became relatively connected with the ecological character of the land. An example was brought forward using the concept of hiding (Appleton, 1975; Stamps, 2014), whereas the landscape became one of the reasons for hiding to persist in settlement development. In the case of Cavite, the mountains of the uplands influenced the growth of *tulisanismo* (banditry), eventually affecting the region in terms of spatial growth. The growth of *tulisanismo* affected the earlier notion of the uplands rendering it unsafe for settlements. This concept of safety caused by the growing number of *Tulisan* (or natives engaged in banditry) in the mountains eventually led to a society in the lowland that was fearful of the uplands and an upland society of natives that would, later, head the revolt against the influential and affluent societies in the lowland. The landscape became entwined with revolutionary hearths transforming Cavite's landscape as the host of the country's fight for freedom during this historical era.

Nonetheless, other landscape unit types emerged in LMMC 02, like the Hacienda Estates and the Cavite Navy Yard turned Arsenal, with both being influential in changing the notions of geopolitical boundaries in Cavite. The changing of geopolitical boundaries was then included as a policy known as *reduccion* (Abinales and Amorsolo, 2017). These

two landscape units brought in varied classifications of Cavite residents - from the skilled farmers and their families, the carpenters and shipwrights from foreign lands and northern Philippine towns to the natives who became *tulisanes* as a measure to not be contained in the new spatial norms introduced by the Spanish rule. It also led to the creation of the eleven (11) main towns of Cavite during the era clustered within LMMC 02 (Medina, 1994), which then altered the linear growth of settlements along the riparian corridors and coastlines into grid-patterned towns. The shift of settlement growth also reorientated the planning framework imposed through the Laws of the Indies. As a result, land development shifted from organically laden settlements into plaza complexes that became the peri-urban nuclei of Cavite towns (Abinales and Amorsolo, 2017).

Another demographic attribute associated with LMMC 02 was the rising middle class. These new settler types in Cavite influenced its landscape with economic-driven development to trade goods – oil, abaca, coffee, cotton, and indigo (Medina, 1994). The growth of the middle-class population during the colonial wave of change was closely connected to the growth of industries like farming, fishing, and salt-making, as these industries encouraged the arrival of Chinese inhabitants. These Chinese inhabitants composed the growing middle class, settling in nearby towns like Imus and Bacoor (Medina, 1994). Eventually, the rise of the middle-class population impacted placemaking in the region, as proven by naming places with words like Inchikan, Mestizo Bridge, and Pinag-insikan. *Intsik* was a term referring to Chinese, and *mestizo* referred to people with mixed origins (Medina, 1994).

LMMC 02 also contained data on the changing agricultural industries. The rise in cattle became commonplace, and a surplus of fauna emerged as it became both a produce and a tool in the agricultural industry. Also evident in the introduction of new agricultural industries was the changes in lowland flora, or plant species, with the introduction of crops in *hacienda* and farms.

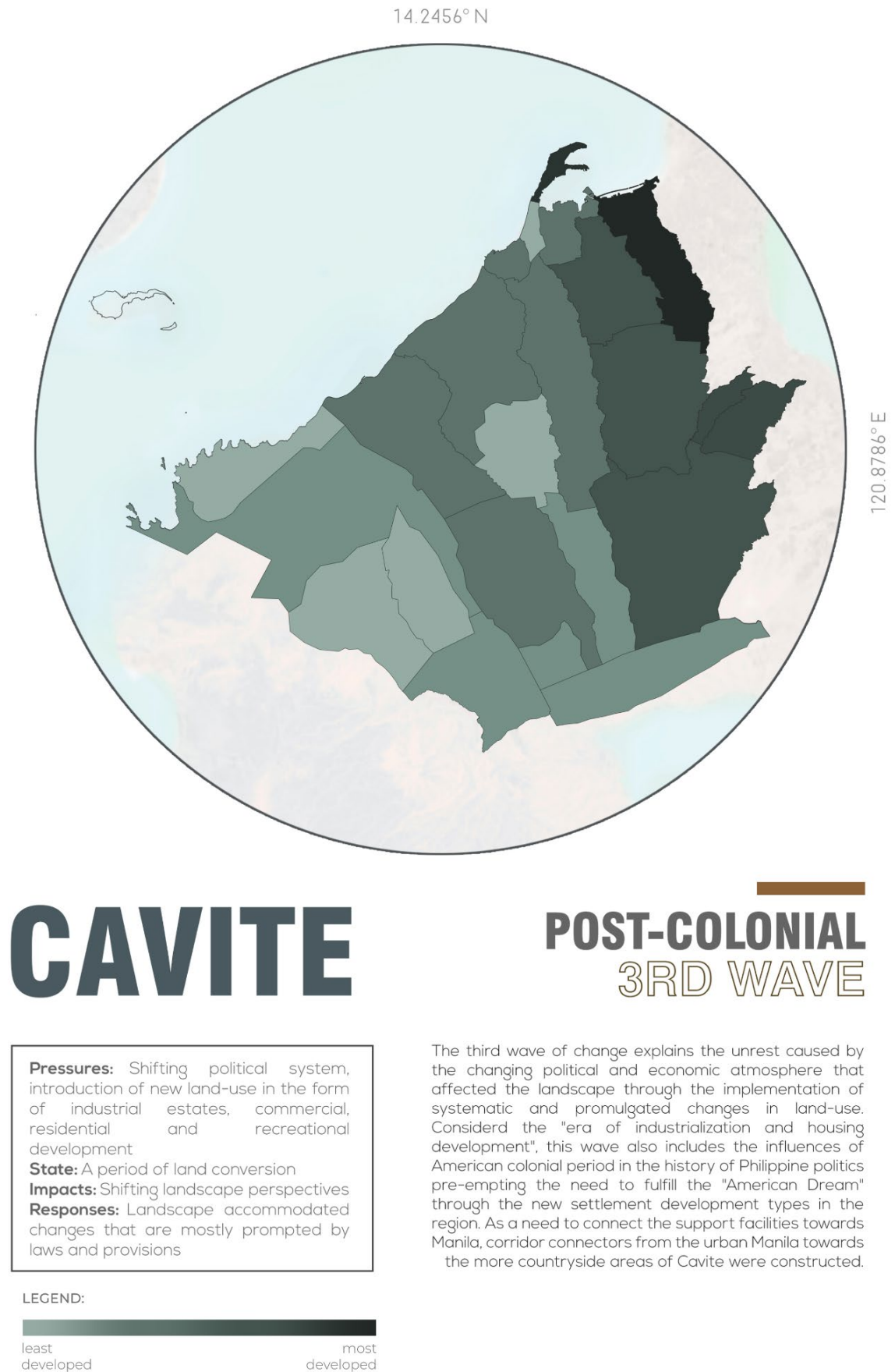


Fig.72a. Landscape Morphogenesis Cluster 03: POST-COLONIAL LANDSCAPE (1901-2000)
(Visualisation by Nadal and Aloc, 2020b)



Fig.72b. Landscape Morphogenesis Cluster 03: POST-COLONIAL LANDSCAPE (1901-2000)
(Visualisation by Nadal and Aloc, 2020b)

LMMC 03 was a collection of attributes showing a landscape undergoing a state of unrest with a long period of land conversion pressured by the promulgation set by new governance and sociopolitical systems. The landscape was then accompanied by planning frameworks where housing and extensive peri-urban development evidenced compliance to these imposed systems. It was also termed the post-colonial era of change for this thesis.

Considered the peak of industrial and housing development, LMMC 03 resonated with another changing narrative of peri-urban landscape in the region of Cavite - one associated with the effects of a dwindling Spanish influence in spatial planning as it slowly moved towards the American urban planning idealism. This change prompted Cavite's landscape to adapt to the spaces introduced by this new planning system. The regional landscape character shifted from the agricultural countryside of hacienda estates into built-up areas for industrial zones, commercial complexes, recreational clubs and parks, and subdivisions and resettlement villages. Also included in this era is a rise in the number of economic processing zones that became the precursor of more infrastructure development focused on economic growth. As a need to connect the support facilities towards Manila, corridor connectors from the urban Manila towards the more countryside areas of Cavite were constructed, thus leading to more infrastructure growth in the once agricultural land. It is considered the peak of peri-urbanisation influence in Cavite, with road networks contributing to sprawl from the growing Metro Manila.

LMMC 03 contained images of an ecological structure, its water bodies and landform as essential attributes shaping its political character. In line with this, LMMC 03 also contained pieces of evidence showing the social class and political environment - with the "persistence of a landowning elite and the predominance of patron-client relations as features of local politics far more pronounced in the archipelago than elsewhere in Southeast Asia," (Sidel, 1999, p.04). This situation challenged the landscape in the form of the new social class of landed families in Cavite's society (Sidel, 1999, p.34). The landed families became influential in the directions of regional change as they

developed the land into *hacienda* estates, eventually gaining total ownership of large areas converted according to industrial purposes.

These attributes found in LMMC 03 also led to pervading bossism in local politics (Sidel, 1999). Bossism was associated with the landscape (Sidel, 1999) through its influence on Cavite's spatial form.

The spatial form, in this case, shifted into large land estates of the Chinese mestizos from then friar estates (Sidel, 1999, p.31-32). Aside from landed families, drivers of bossism were said to be "small-town mayors, provincial governors, congressmen, as well as presidents," (1999, p.19), as they allowed land ownership to be in the hands of the landed families. Bossism has also allowed an "interlocking, multi-tiered directorate of bosses who use their control over the state apparatus to exploit the archipelago's human and natural resources," (1999, p.19).

Aside from the change in land ownership, gangster-style politics also became common in the land as an effect of this new political system in place (Sidel, 1999, P.28). Cavite's landscape then transformed to become the setting for illegal economies. Thus, attributes of the land were also changing to accommodate this change. One angle connected to the landscape, as seen in the LMMCs, is a region with a long coastline accessible to a bay - an access point for trade that has allowed entry to the region from various traders throughout history. An example of access to Cavite is Sangley Point - known not just as Cavite's strategic location for the US naval station but also as an essential access point for illegal economies. Sangley Point, for a time, was also associated with these thriving economies.

Also shown in LMMC 03 was a region associated with thieves preying on cattle and selling them in nearby Manila (p.30). This narrative on Cavite's landscape was associated with the term *la madre de los ladrones* or "the mother of thieves" (p.30), and this was because the landscape was so strategic that bandits could prey on wealthy families owning the hacienda estates. Towns near the coast like Tanza became

associated with illegal transport as smuggling was more accessible on the long coastline (p.31). It became the epitome of Ian McHarg's idea of the suburbs. In McHarg's words,

"Call them no-place although they have many names. Race and hate, disease, poverty, ranco[u]r and despair, urine and spit live here in the shadows. United in poverty and ugliness, their symbol is the abandoned carcasses of automobiles, broken glass, alleys of rubbish and garbage. Crime consorts with disease, group fights group, the only emancipation is the parked car." (p. 20)

LCArM 03 also contained pieces of evidence of successful suburban development. Residential subdivisions, golf courses, and industrial estates emerged in Cavite's landscape. Aside from emerging forms of land use, land-based policies on agrarian reform were also implemented (Land Reform Act of 1955, p.42). However, the imposition of these land policies gave more power to the mayors as they became "the province's leading real estate agents and brokers" (p.33). Although the land was slowly distributed, the people also had to pay high taxes making it harder for them to keep ownership of the land.

LMMC 03 also contained texts on the land shared tenancy implemented during the American period. This type of land-based regulation was discussed as an added pressure to land ownership of small farmers, thereby shifting the use of the land they owned into another form of industry. As the shift pressured the ecological environment to adapt, Cavite's landscape also shifted its services as it was then used as a site for new industrial support facilities for Manila. It changed the whole landscape with combined industrial, residential, and agricultural landscape units. Also added to these new land-use types were poorer suburban areas, as shown in generated LCAr-U.

LMMC 03 also contained a montage of elements anchored to the American Dream (Ortega, 2018). The cluster contained attributes associated with Cavite's response to the rising western influence in the Philippines during the early 1900s. The rise of the American suburbia archetype (Ortega, 2018, p. 108) brought the narrative back to the

post-World War II rural-urban look that still links to McGee's *desakota* (Webster and Muller, 2009, p.286).

Land Conversion pressured by the introduction of resettlement movements, housing agencies and land policies were also documented through LMMC 03. Texts explaining the landscape from 1938 to 1975 showed the implementation of housing agencies addressing the shelter issues of low-income families in the Philippines (National Housing Authority, n.d.).

When the National Housing Authority was rightly established through Presidential Decree No 757 (the Republic of the Philippines, "Presidential Decree No. 757, s. 1975 | GOVPH"), housing projects boomed, and resettlement of the urban poor became a predominant situation affecting landscapes around the country. With the establishment of the National Housing Authority, resettlement housing in the peri-urban also emerged through efforts to move the urban poor out of Metropolitan Manila. The response became tangible through land conversions felt in the peri-urban regions like Cavite. Villanueva (2010) wrote about this particular response to the landscape in the case study on the Gawad Kalinga Project.

The Gawad Kalinga Project was one of the many resettlement projects that responded to the housing demands of the country. This type of resettlement housing project also articulated another phenomenon in the landscape - the shifting of agricultural or unutilised land into residential relocation areas for households from the highly urbanised city of Metropolitan Manila. Villanueva (2010) gave a good analogy of the effects of these projects by focusing on the volume of families moving to the adjacent regions of Bulacan, Cavite, and Laguna as the key indicators (Villanueva, 2010, p.219). He saw that most relocated families were brought into the Cavite region during the 1960s, shifting the land cover of agricultural towns Carmona and Dasmarinas into predominantly built-up, residential settlements. Thus, the challenge was not just on the shifting land cover and land use of these political subregions in Cavite but also on the changing perception of people towards these towns. An example that Villanueva

emphasised were word associations (p.221) attached to Carmona as it became known as the kubeta or toilet village for how resettlement projects were perceived in the end. The pitfalls include haphazard states of completion to some and oddly became one of the pitfalls to the negative associations to the areas in the peri-urban region of Cavite.

Carmona's conversion for resettlement also changed the landscape character of Cavite (Sidel, 1999, p. 44-45). The acquisition of the People's Homesite and Housing Corporation of 900 hectares of land in Carmona last 1961 created a new social class composed of informal settlement migrants from Metro Manila. The movement to resettle in Carmona created a new social class as the migrants became residents of the housing projects in Cavite despite the squalid conditions. By 1980, Carmona geopolitically separated as resettlement communities grew into what is now General Mariano Alvarez. This separation made this sub-political region distinctly residential.

LMMC 03 was indeed a montage of landscape change. In its narrative was the land conversion by Fil-estate Realty Corporation last 1986 - four hundred thirty (430) hectares of land shifting into the Manila Southwoods Residential Estate and Golf and Country Club (Sidel, 1999). Part of Carmona, a geopolitical subregion in Cavite, was also converted to accommodate this development.

The 1980s was also when one hundred (100) hectares of Carmona was redesignated as an industrial site known as the Cavite-Carmona Development Project. This development fostered the conversion of agricultural land into technological, industrial areas.

By 1988, a Comprehensive Agrarian Reform was set, and municipal zoning ordinances changed the planning scene in Cavite.

"In the municipalities of Cavite, the historical link between land ownership and access to the state, as well as the geographically prefigured role of illegal activities in this suburban province's economy, have undermined oligopolistic arrangements among local elite landowning

families and encouraged the rise of small-time political operators to positions of local political and economic supremacy." (Sidel, 1999, p.49)

Despite these examples, the housing narratives within the LMMC 03 in peri-urban Cavite were policy-driven, becoming the grand plan to solve the challenges of Philippine urban development. Supported by the urban development movement with regulations set on the ground through housing projects, the landscape of peri-urban Cavite responded as the new residential land support for the housing challenges of Metropolitan Manila.

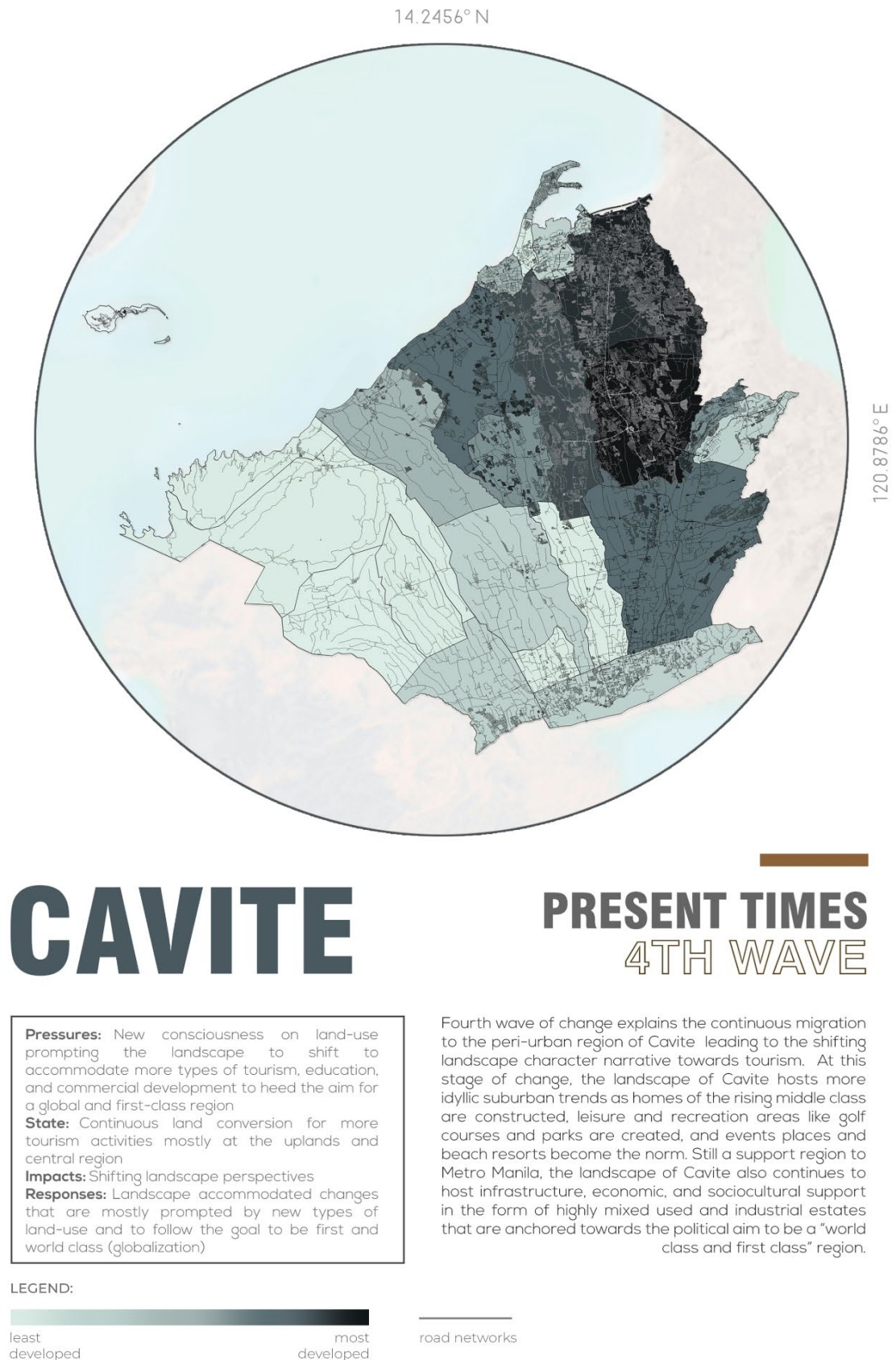


Fig.73a. Landscape Morphogenesis Cluster 04: LANDSCAPE OF THE PRESENT TIMES (2001-present) (Visualisation by Nadal and Aloc, 2020b)



Fig. 73b. Landscape Morphogenesis Cluster 04: LANDSCAPE OF THE PRESENT TIMES (2001-present) (visualisation by Nadal and Aloc, 2020b)

LMMC 04 showed evidence of a landscape that has accommodated the influences of change caused by migration to the peri-urban. At this point, Cavite's landscape became a receptacle of attributes anchored to its growing tourism sector. It was hosting idyllic suburban trends as the rising middle-class homes were constructed, leisure and recreation areas like golf courses and parks were created, and events places and beach resorts were built in the region.

In LMMC 04, Cavite's landscape bore a new social consciousness catering to the ideals of planners from the local scale while still catering to the evolving forms of land development. LMMC 04 showed a map containing a growing built-up area - visualising the rise of commercial districts in Cavite towns like Tagaytay, Silang, Amadeo, and Alfonso. It was not the only change felt in landscape data gathered for LMMC 04 as tons of new development catered to rest, relaxation, and faith practices - as new resorts and hotels cater to events like weddings and retreats. Cavite continued to be a support region to Metro Manila's growing population not only for work but also for other forms of tourist attractions.

Nonetheless, the landscape of Cavite persisted to what it was now. Its landscape became a receptacle of new attributes as needed by those who live and visit the region. The rising number of landscape units and descriptors from LMMC 01 should be noted, As Cavite's landscape proceeded with accommodating technological advancement, as shown in the images found in LMMC 04. Cavite's landscape now hosted mixed-used and techno-industrial estates to anchor its political aim of becoming a "First Class, World Class" province (Province of Cavite, n.d.). Overall, Cavite's landscape became varied yet devoted to change towards this vision.

5.3.1. The Peri-urban Landscape Adapted: How the Peri-urban Landscape of Cavite Became the Urban Milieu of Metropolitan Manila

The LMMC showed Cavite's evolutionary character. With the development of this information, Cavite's landscape was then shown in its evolving state. As it evolved, Cavite's landscape units adapted to its actors' needs. Supporting this narrative were landscape clusters showing the accommodation of industrial attributes in the agricultural land. The industrial shift during the Spanish era, as shown in LMMC 02, supported this claim with evidence of the changing industry. It was shown as the changing upland resources from the old galleon trade, the lowland resources of hacienda estates, to the coastal resources for trade and food.

Today, Cavite's landscape is part of a geopolitical peri-urban region providing industry support to Metropolitan Manila. It is also guided by regional planning frameworks that envision the region as internally progressive and globally competitive.



Fig.74. Catalogue of General Landscape Character Area Morphogenetic Montage Clusters
(Visualisation by Nadal and Aloc, 2020b)

The peri-urban landscape adaptation is best seen in the facets of its landscape morphogenetic character. Pieces of evidence of this adaptation process are projected

through the visualisations made as landscape morphogenetic montages containing the changing character in waves of change.

The landscape morphogenetic morphogenesis clusters (LMMC formed through this thesis showed a concentration of change in the fourth dimension of space and time. In this dimension, Cavite's landscape was evolutionary, homogenous, yet different, with norms on the ecological and cultural systems found to be adapting yet unalterable.

One clear example of Cavite's landscape's evolutionary norm was its industry-driven montage images. As early as the first wave in landscape morphogenesis, Cavite's land manifested transformation towards the new demographics, economies, societies, technologies, and belief systems simulated by the industries tied with the ecological attributes of its landscape. Medina (1994) saw it as coastal, depicting the views seen by the Spanish conquistador of the second wave as they set foot in Cavite. The acculturation of industry leaders, which were then highly concentrated among traders and heads of barrios, a political unit in old Philippine towns, became the driver of landscape change. All these transformations were concentrated near the coast. Also, resources needed were produced or traded on this land.

Another image of the landscape showing the adaptation to peri-urban drivers of change was exemplified by the landscape morphogenesis maps produced for this particular cluster in the Landscape Character System. The visualisations in the map show Cavite's land development, wherein ecological attributes such as landforms and water bodies were all considered drivers of change. Although growth was developing highly nearer the areas of affluence found in town centres and hacienda estates in the second wave, it eventually became almost irrelevant during the third and fourth wave of change, where growth was a fragmented land resource where development is possible.

CAPTURING THE DYNAMIC CHARACTER OF THE PHILIPPINE PERI-URBAN LANDSCAPE: A LANDSCAPE CHARACTER SYSTEM APPROACH FOR THE REGION OF CAVITE / CATHE DESIREE S. NADAL

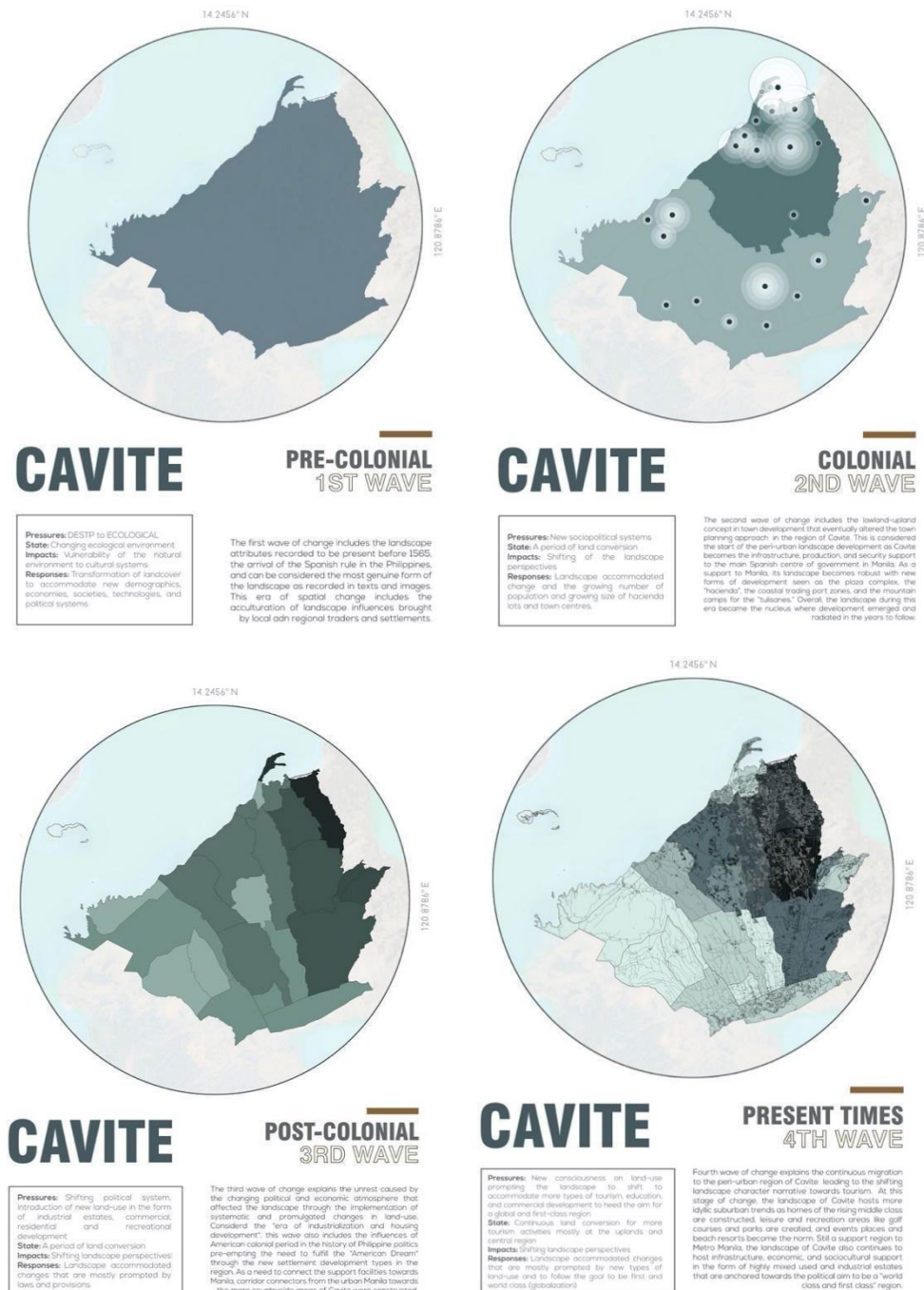


Fig.75a. Catalogue of Landscape Morphogenesis Maps showing the PSIR Components (Visualisation by Nadal and Aloc, 2020b)

A reasonable discourse by Uesugi (2020) reiterated a similar narrative of the drivers of urban change in Asia to that of Cavite. Cavite's evolutionary character was driven by its ecological environment and the cultural influences brought by religion and state. Some of the more prominent influences revolved around the introduction of socio-political systems, migration for trade, inequality and injustices in land resources caused by

affluence, state conflict and bossism, and the overall population dynamics brought by human activities. Cavite as a region is composed of a mixture of several population groups, a diversity of sociofacts that then led to cultural diffusion – industries brought by the Chinese, religion and planning system brought by the Spaniards, the lifestyle of the Visayan and the Ilocanos, and the seafaring roots of the Caviteño.

As a result of the different waves of landscape change, Cavite's landscape also showed unique characteristics, as seen in its regional function. Cavite's landscape transformed as a space to support the city dynamics of Manila while supporting other nearby regions as an entry-exit point for migrants from within and outside the Philippines. It allowed the growth of a region that was the core trading district in the first wave of change, eventually becoming the prime location for galleon production that catapulted global trade in the second wave of change. Its landscape then becomes vital in the proliferation of economic processing zones (Remedio, 1996; Wu, 2009) and relocation of housing development in the third wave of change while eventually leading on as a migration magnet for tourism, recreation, new industries and new town developments in the fourth wave of change. Its lengthy coastline being open from access on its northern side is considered one of the many drivers of Cavite's growth (Medina, 1994). Its strong connection with its island fort being the tiny island of Corregidor was also looked upon as a strategic security measure at times, with the island becoming the entry and exit stronghold should it be needed for battle in the first to the second wave of landscape change.

Also, the landscape provided the needed resources to sustain the urban processes – from food, shelter, and spaces that can shift one from the busy life in the megacity of Metropolitan Manila.

CAPTURING THE DYNAMIC CHARACTER OF THE PHILIPPINE PERI-URBAN LANDSCAPE: A LANDSCAPE CHARACTER
SYSTEM APPROACH FOR THE REGION OF CAVITE / CATHE DESIREE S. NADAL

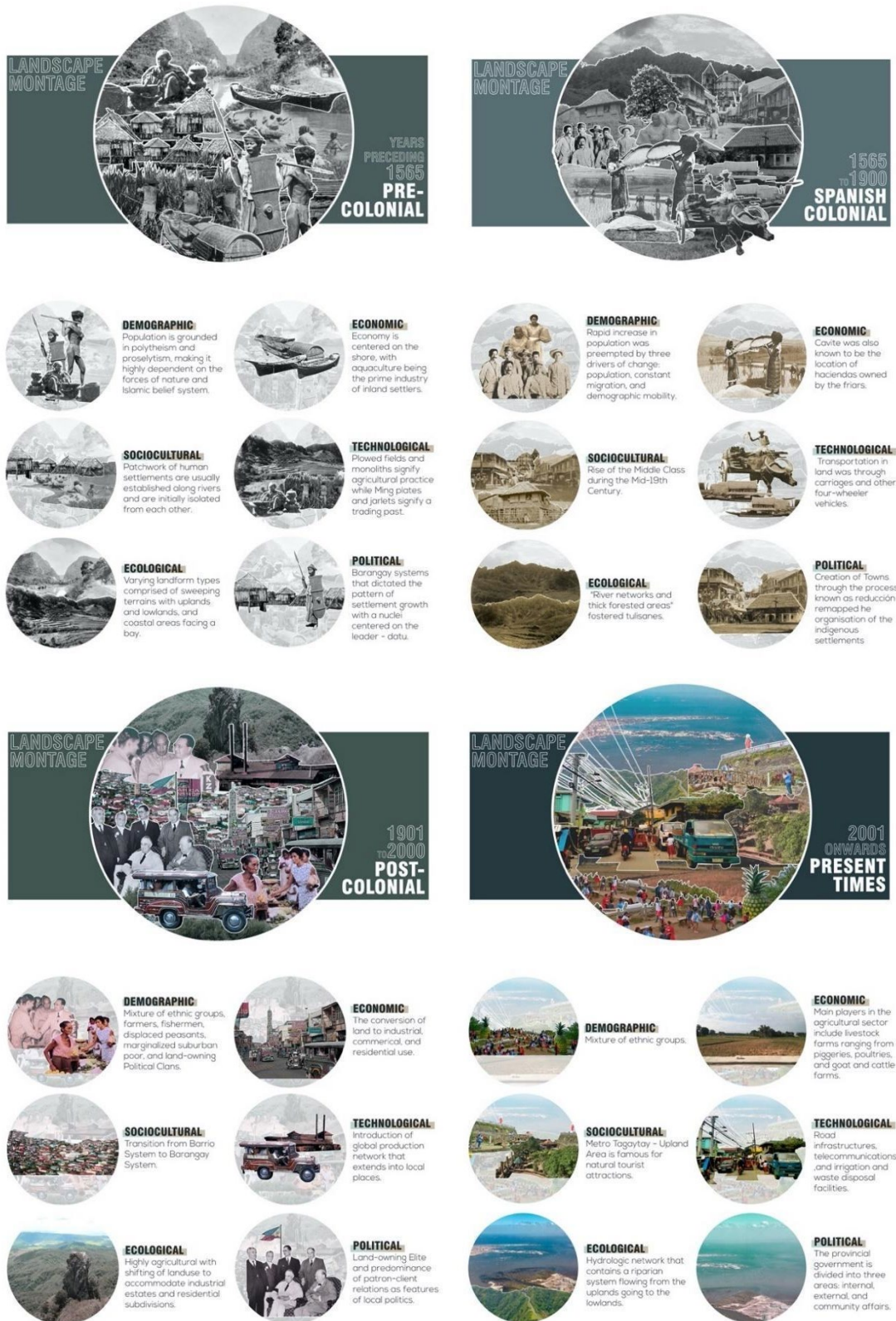


Fig.75b. Catalogue of Landscape Morphogenesis Attributes showing the DESTEP Landscape Attributes from the Landscape Character Area Morphogenetic Montage Clusters - LCAR-MMCs (Visualisation by Nadal and Aloc, 2020b)

While Cavite's landscape adapted to changes coming from a growing population, it also became subject to other drivers of change. These drivers of change were identified using the DESTEP, where DESTEP (van der Voort, Schoorlemmer, and de Visser, 2012) was to become the demographic, economic, sociocultural, technological, ecological, and political attributes resulting from these changes. Landscape characters became documented as descriptive clusters of landscape attributes from the pre-colonial, Spanish-colonial, post-colonial, and present times.

The demographic attributes of Cavite's landscape have always been associated with the process of migration, a reason why its population is composed of migrants from various ethnic groups. This reason also affected the region's belief system - as it was presently a highly varied mix of polytheism and proselytism.

The landscapes of Cavite also had economic attributes grounded primarily on their agricultural beginnings, with both land and water resources leading the industrial landscape dynamics. By looking at these industrial attributes, we see Cavite's landscape highly focused on production – a characteristic of the landscape from pre-colonial to present.

From these initial influential attributes, the sociocultural, technological, and political attributes of Cavite's landscape became a patchwork of influences and systems, leading to class struggles and bossism that stems from the politics attached to the land. Also, Cavite's landscape is palatable for development – with the location and the resources readily available and accessible in the centre of development in the Philippines, Manila.

Thus, the peri-urban landscape of Cavite, just like any other landscape in the interface, was changing and was on the threshold of rural and urban idealism. It was in a state of evolution – its structure was changing, as much as its attributes were with processes of interaction in place as it processes the influences brought by drivers of change.

5.4. Landscape Character Cluster 03: Cavite's Landscape Character Area Descriptor Typology (LCAr-DT) from Evidence-based Landscape Descriptor Mapping (EBLDM)

One of the outputs from Cavite's LCS was the two-dimensional Evidence-based Landscape Character Area Descriptor Typology (LCAr-DT). The land cover categorisation of the Philippines (Housing and Land Use Regulatory Board, 2007) guided the creation of eleven (11) landscape character unit descriptor types inferred as existing in Cavite. These types were seen in the pieces of evidence resulting from the Evidence-based Landscape Descriptor Mapping (EBLDM) procedure as shown below:

1. Residential
2. Commercial
3. High-value Protected Areas
4. Agricultural/Plantations Areas
5. Park/Recreation Areas
6. Infrastructure/ Utilities
7. Industrial/Economic Zones
8. Idle Land
9. Transport Hub Areas
10. Institutional Area
11. Uncategorised land

In the eleven identified LCAr-DT types, the transport hub stood unique from the others as it was a landscape type presently not included in the Philippine land cover categorisation. This added landscape unit type which was a derivative of the other categories and was related to transportation became persistently associated with the peri-urban discourse. This commonly used descriptor was considered an essential type to be separated from the other types, as it became reiterated in the seventeen (17) texts evaluated.

Table 07. EBLDSM Resulting Catalogue of Landscape Descriptions

Residential	“in new towns”	“necklace peri-urban communities”	“gated, walled, low density, with high amenity value”... “for executives”... “villa communities”... “exclusive”... “posh”	“rental housing”	“dorms for workers”
	“new suburbs”	“Anglo American suburban form”	“slums near employment clusters”... “squatters” ... “informal”	“relocation”... “resettlement”	“low cost apartment building”
	“second home”	“subdivisions”	“residential – resettlement – NGO’s”	“socialized”	
Industrial	“industrial estates”	“Factories”	“Export-oriented processing zones”	“Cavite Export Processing Zone (CEPZ)”	
	“Urban business centers”	“information technology (I.T.) parks”	“BPO’s, Business Processing Outsourcing area”	“manufacturing driven”	
Agricultural/ Plantations	“farms”	“arable land / coconut plantation / cropland mixed with coconut plantation”		“small plots of coffee and cacao plantations”	
	“rice-fish system”	“aquaculture”	“wet rice agriculture”	“quasi-agricul ture”	
Commercial	“shopping complex”	“wet markets/ supermarket”	“Entertainment areas, convenience stores”	“street stalls selling a mix of fruits, vegetables, snacks”	“malls”
Amenity / Recreation	“sports complex”	“lifestyle communities”... “weekend retreat/ agri - tourism”	“park-like... typical gated subdivision spaces – multipurpose halls, clubhouse, courts, pools, playground”		“high amenity value”
High-value Protected / Natural	“upland”	“volcanic lake”... “river and lakes”	“coastal areas... shoreline”	“mountainous areas”	
Infrastructure	“road”	“highways”	“expressways”		
Transportation Hub	“ports”	“mega airports... hubs”		“jeepney and poultry trucks parked along roads”	
Institutional	“schools”	“new urban centres”		“churches”	
Idle Land	“awaits further development”				
Uncategorised	“mixed character... envelopment/enveloped areas... old unchanged”				

The initial list of LCAr-DT tallied from pieces of evidence in the texts proved Cavite's highly residential character. Of the seventeen (17) reviewed texts, six (6) of which discussed landscape attributes as being highly residential, with narratives mostly on Cavite as a settlement site and relocation area (Mcgee and Robinson, 1995; Medina, 1994; Connell, 1999; Ortega, 2011, 2018; Kelly, 2013). This situation was supported with text descriptors under the terminologies "new town, gated subdivisions, and resettlement housing developments" (Connell, 1999; ICLARM–the World Fish Center, et al., 2001; Webster, 2002; Ortega, 2011, 2018; Kelly, 2013; Webster et al., 2014; Boquet, 2017). Further supporting this discourse was text content that discussed the phenomena of land conversion from agricultural to residential.

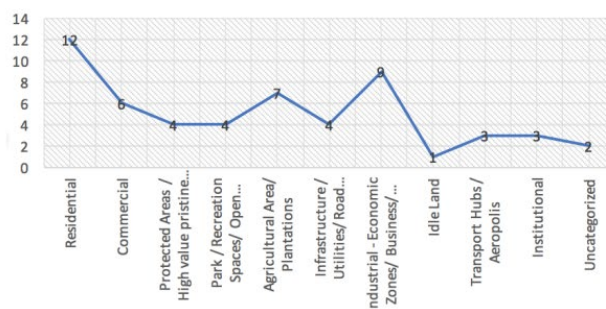


Fig. 1. Number of Sources showing Landscape Classification as affected by the peri-urban process

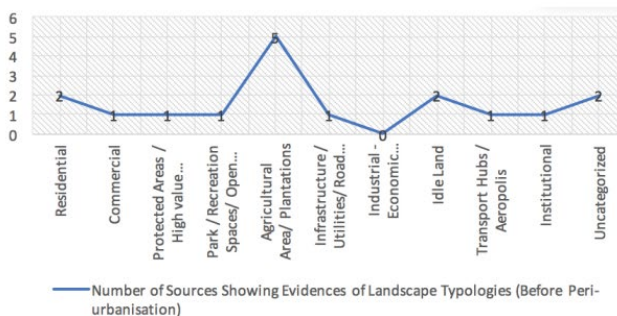


Fig. 2. Number of Sources showing Landscape Classification before the peri-urban process

Fig. 76. EBLDSM Results: Graphs Showing the Density of References Containing Text Description per Land-use Category

Other implications gathered from the reviewed references included the existence of industrial/economic zone LCAr-DT. Text descriptors supporting this type appeared as business process outsourcing developments, export, and manufacturing orientated economic zones. This industrial/economic zone was the second highly cited description set generated from the evidence-based landscape descriptor mapping (EBLDM).

Clusters of landscape character descriptions found in the reviewed references were anchored on Cavite's agricultural roots, as the tallied evidence ranked it as its third highly discussed description set. This description was closely linked to Cavite's "hacienda" plantations and was still regarded as one of the intrinsic landscape qualities of some Cavite towns.

An Extraction Table of the LCAr-DT linking to Cavite's Peri-urban Landscape Character was collated in *Appendix 03: Landscape Character Area Descriptor Typology (LCAr-DT): Full Meta-Analysis of Text References used for LCAr-DT Mapping for Peri-urban Cavite's Landscape Character System*. The extraction tables below were results of the Evidence-based Landscape Descriptor Mapping (EBLDM) to the LCS.

Table 08. Table of Categorised Landscape Descriptions based on Drivers of Change, Forms

LAND-USE TYPES	DRIVERS OF CHANGE	FORMS/PATTERNS	ATTRIBUTES/FEATURES
Residential	Developer-initiated (new town development)	Subdivisions	Gated / Walled
	NGO-initiated (resettlement development)	Socialized Housing Complex	Low Density
	Infrastructure-connected (necklace/corridor influenced)	Second Homes / Summer Homes / Retreat Homes	High Amenity Value / Posh
	Employment Accessibility /Adjacency / Industry-driven	Dormitory / Apartment Rental Complex	Exclusive
		Slums / Squatters	Low Cost
			Rented/ Rentals/ for workers
			Informal
			New Subdivisions
Industrial	Export-orientated	Economic Zones	Export
	Manufacturing-driven	Parks	Business Processing Outsourcing
	Business-processing driven	Factories	Information Technology

LAND-USE TYPES	DRIVERS OF CHANGE	FORMS/PATTERNS	ATTRIBUTES/FEATURES
Agricultural	Agriculture Industry-based	Farms	Arable land
	Aquaculture Industry-based	Plantations	Crop land
Commercial	Commerce / commercial / retail	Malls	Community-level “Sari-sari”
	Local retail	Districts	Local / Wet and Dry
	Street retail	Stores	Entertainment
		Markets / Supermarkets	Convenience
			Shopping
Amenity/ Recreation	Leisure-orientated	Clubs	Golf / Country “clubs”
	Sports-orientated	Complex	High-amenity
	Agriculture Industry-orientated	Farms	Sports
High Value / Amenity		Volcano	
		Lakes	
		Coast – shoreline – beach /front – reef	
		Mountains – ridge - upland	
Infrastructure	New development-driven	Street Networks	Minor road – highways, barangay roads
			Major road – expressways
Transportation/ Hub	Transport-driven	Ports	Coastal / Naval
		Airports	Air
		Aerotropolis	Local
		Hub – Land Transport ie. Jeepneys, tricycles, FX, vans	

LAND-USE TYPES	DRIVERS OF CHANGE	FORMS/PATTERNS	ATTRIBUTES/FEATURES
Institutional	Developer-initiated (new town development)	Centre (plaza/square)	Old
		Hubs – institutional	New
		Schools	
		Church Complex	
Idle Land	No driver		Awaits further development
Uncategorised			Unknown / mixed character... envelopment/enveloped area/ old unchanged

Table 09. landscape Character Area Descriptor Typology (LCAr-DT)
Generated through Evidence-based Landscape Descriptor Mapping (EBLDM)

Residential Landscape Character Unit Descriptor Types	
LCAr-DT CODE	LCAr-DT Description
LCAr-DT – 001	Developer-managed / New Town Subdivisions
LCAr-DT – 002	Developer-managed / Retreat Summer Homes Rest Homes Villages
LCAr-DT – 003	Non-government Organisation – initiated / Resettlement Villages
LCAr-DT – 004	Necklace Corridor-driven / Dispersed Residences Villages
LCAr-DT – 005	Necklace Corridor-driven / Informal Settlements
LCAr-DT – 006	Industry-driven / Informal Settlements
LCAr-DT – 007	Industry-driven / Rental Dormitory Housing Villages
LCAr-DT – 008	Heritage-driven / Old Town Housing Villages
Industrial Landscape Character Unit Descriptor Types	
LCAr-DT CODE	LCAr-DT Description
LCAr-DT – 009	Export and manufacturing-orientated / Economic Zone Estates
LCAr-DT – 010	Business Processing Outsourcing (BPO) – orientated / Information Technology (IT) - orientated Parks
Agricultural/Plantation Landscape Character Unit Descriptor Types	
LCAr-DT CODE	LCAr-DT Description
LCAr-DT – 011	Agriculture- orientated / Plantation and Farm Estates
LCAr-DT – 012	Aquaculture-orientated / Plantation and Farm Estates
Commercial Landscape Character Unit Descriptor Types	
LCAr-DT CODE	LCAr-DT Description

LCAr-DT – 013	Commerce, convenience, and retail-driven / Mall Development
LCAr-DT – 014	Commerce, convenience, and retail-driven / Local Wet and Dry Market Development
LCAr-DT – 015	Commerce, convenience, and retail-driven / “Sari-sari” Stall/ Strip Developments
Amenity / Recreational Landscape Character Unit Descriptor Types	
LCAr-DT CODE	LCAr-DT Description
LCAr-DT – 016	Amenity and recreation-driven / Golf Country Club Developments
LCAr-DT – 017	Amenity and recreation-driven / Leisure Park Developments
LCAr-DT – 018	Amenity and recreation-driven / Sports Complex Developments
High-value Protected/ Natural Landscape Character Unit Descriptor Types	
LCAr-DT CODE	LCAr-DT Description
LCAr-DT – 019	Geologically-oriented / Volcanoscape Parks, Recreation, and Protected Zones
LCAr-DT – 020	Geologically-oriented / Waterscape Parks, Recreation, and Protected Zones
LCAr-DT – 021	Geologically-oriented / Coastal Parks, Recreation, and Protected Zones
LCAr-DT – 022	Geologically-oriented / Mountainscape Parks, Recreation, and Protected Zones
Infrastructure / Transportation-driven Landscape Character Unit Descriptor Types	
LCAr-DT CODE	LCAr-DT Description
LCAr-DT – 023	Transport-driven / Road Developments of Highways and Expressways
LCAr-DT – 024	Transport-driven / Aerotropolis Airports Air-based towns
LCAr-DT – 025	Transport-driven / Ports Naval towns
LCAr-DT – 026	Transport-driven / Transport Hub Developments
Institutional Landscape Character Unit Descriptor Types	
LCAr-DT CODE	LCAr-DT Description
LCAr-DT – 027	Heritage-driven / Old Town Centres Nuclei
LCAr-DT – 028	Technology and advancement-driven / New Town Centres Nuclei
Idle/Uncategorised Landscape Character Unit Descriptor Types	
LCAr-DT CODE	LCAr-DT Description
LCAr-DT – 029	Uncategorised / Envelopment Areas and Idle Land

From this extraction table, twenty-nine (29) LCAr-DT types emerged and became the result that was added to the LCS. It grounded the LCS with data that became the two-dimensional (2D) description sets of Cavite's Peri-urban Landscape. At this point, results generated were not confined by geophysical and political boundaries but were instead considered to be the categorisation on a regional scale. Further research on the specificity of the information gathered may be done as an option to move this proposed

procedure forward, as detailed in *Appendix 03: Landscape Character Area Descriptor Typology (LCAr-DT): Full Meta-Analysis of Text References used for LCAr-DT Mapping for Peri-urban Cavite's Landscape Character System*.

Aside from adding these lists of written descriptors to the LCS, the results also showed the validity of landscape descriptor existence in written text - which was vital in the preliminary stage of LCS creation. It mandated the need to provide different evaluation strategies as the text descriptors would need additional layers of information to become sufficient as a reference for planning frameworks. Although considered insufficient should the cluster be used separately, it also resulted in important discussion points that will be explained in the following section.

5.4.1. The “American Dream” as a Cultivator of Change in Cavite’s Landscape

As Nilsson et al. (2013) suggested, we return to the "American Dream" as a driver of change in peri-urban areas. The suggestion was rooted in the 1931 *Epic of America* by James Truslow Adams, saying that the expansion was imperative as people dream of a good mixture of the urban ideals in a low-density, idyllic rural land. It led to the new typology of open spaces communicating man's place attachment to the more rural landscape.

With the emergence of new forms of settlement developments ironically connected with what seemed like manufactured peri-urban landscapes, new manifestations of place attachments became apparent in space. Place attachment had been different depending on how exposed industry sector groups were to the environment - some interpreted attachment as stories of their families and communities.

Discussions on place attachments of the relocated settlements of the peri-urban are interpreted in the lifestyle patterns, activities, and stories of communities living at the

peri-urban are essential alongside the landscape interpretation seen as place-making visions.

McHarg (1969, p.19 brought to the narrative a good point when he expressed the countryside as a refuge from city life, "the country is [was] not a remedy for the industrial city, but it does offer ease and some balm to the spirit". From here on, the countryside concept had been established as a quality residential space and henceforth was used as a valuable viewpoint to preserve in planning.

The Dialectic interplay with the countryside of the American Home (Altman and Chemers, 1980, p.186-198 manifested a similar space ideology in Cavite. One of the critical components of the Filipino Dream home was its parallelism to the American dream (Ortega, 2011. One piece of evidence like that idea was reflected in the affinity of dwellers to village living - where the individuality of spaces was usually reflected in each village or subdivision theme type. This manifestation in the landscape may be considered for further study should the LCAR-DT results be used in further studies.

5.5. Landscape Character Cluster 04: Cavite's Landscape Word Clouds from Landscape Walking Narratives

Another data cluster type added to the LCS was Landscape Word Cloud (LWC). The LWC, as a cluster type, was idealised visualisations of landscape-related words coming from the narratives of those who engage in a walk along the landscape. Landscape Walking Narratives (LWN) was utilised to capture this data type, thus resolving the challenge of interpreting the landscape character data from those who can experience the landscape first-hand - the walkers.

The resulting LWCs for this thesis were varied. When considered as landscape data, the words became objects that can be catalogued as identifiable attributes of the

landscape. LWCs came from a combination of gender-residence and background-industry categorisation. LWCs were examples of how combinations of this type may resolve the challenge of creating quantifiable interpretations. Through LWCs, a more versatile data format was presented and became a format where variables may be checked or may be made more robust should this be developed further. However, keeping the LWC used in this thesis was restricted to resolve challenges with the variables coming from the three (3) categorical combinations. This proposal tested the minimum capacity of the LWN to derive results that can be used for interpretation. Although arguably inconclusive considering a larger population, this categorisation has given results that can be easily interpreted as effects of gender, residential background, and industry sectors.

LWCs verified the strength of cultural attributes in place-making. This observation connects to the dichotomy of nature and culture in Philippine landscape discourse, and the LWN made it clear that landscape walkers in Cavite generated varied cultural connections to the place. LWCs were able to explain the perception of the landscape as intangible assets connected to family, tourism, society, academics, recreation, livelihood, associations, visual space, built environment, and government, among others. These clustering of ideas from the walkers became groups of different landscape expressions.

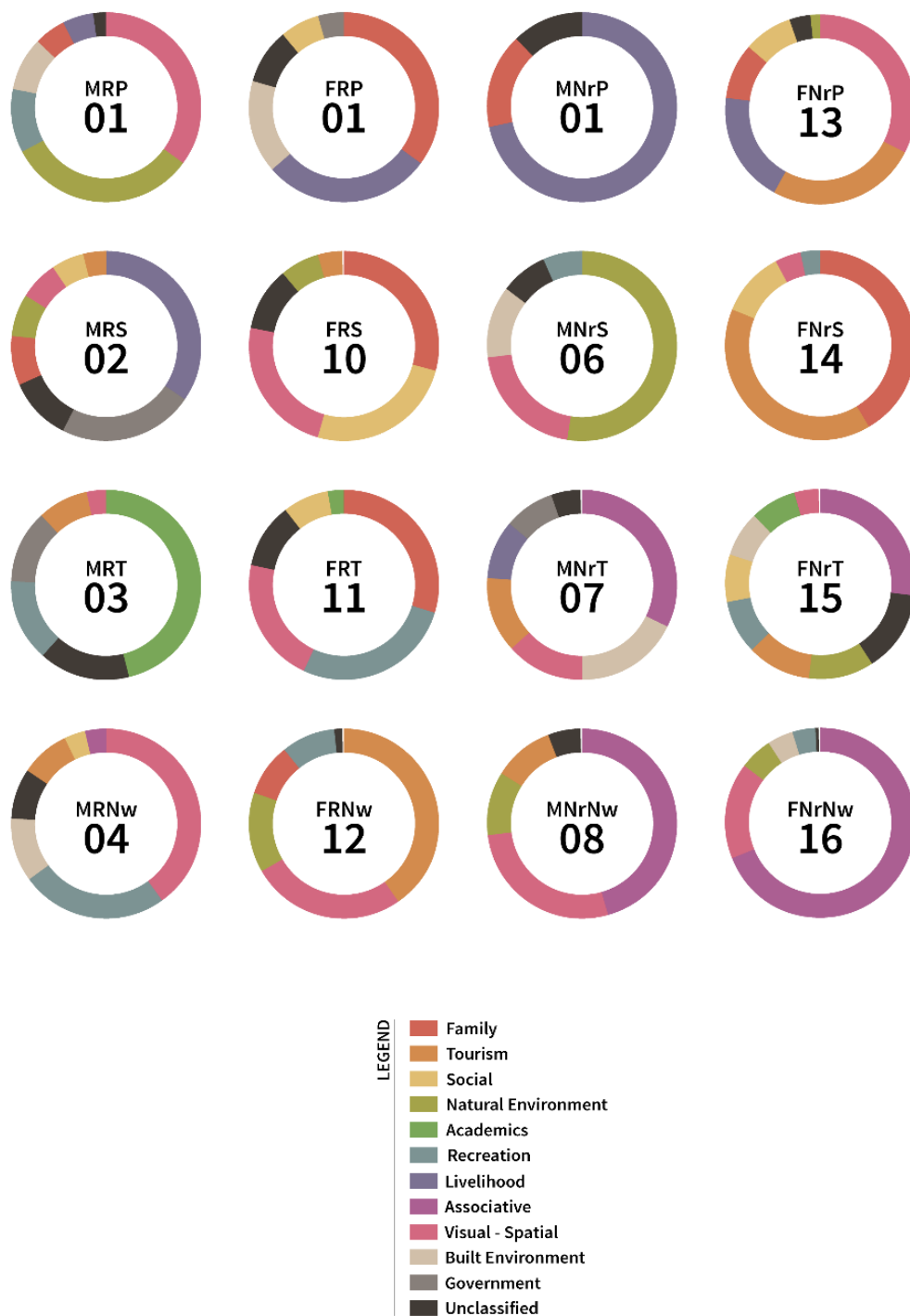
What the LWCs also expressed was industry-driven clustering of expression. Given that walkers' attributes were controlled to include only a combination of gender-residence and background-industry categorisation, it was easy to find several discussion points from the generated data.

For example, the LWCs collected show a higher percentage of word clustering towards livelihood by the male-non-resident-primary category (M-Nr-P). The same category also showed family next to the highly used word set. This revelation showed the M-Nr-P's close connection to livelihood and family.

In this case, the observation may only be accurate to the person who was recruited to walk. Despite being walker-specific, it was still a revelation to see how walkers perceive landscape as a receptacle of industry attributes through words generated from the narrative. The landscape as a receptacle of narratives about the family was also another revelation from the LWC. Both observations made it clear that the landscape was full of words and narratives of people's valued attributes related to the land they traversed.

Provided in the images that follow were different LWCs generated for the LCS. All LWCs showed clustering of words coming from the narratives and were collected to add data from walker narratives into the LCS. What was shown was the inventory of information visualising the narratives in a format that can be useful in future management and planning solutions for challenges that may arise in the landscape of Cavite.

Also shown was a sample image of the resulting text coding from the LWN as translated in Fig. 77. This sample showed how the colour coding was done and simulated based on the narratives gathered from the walkers. This image also showed how the texts were selected and grouped. Grouping was done based on the categories of information each set of words or phrases contained. Colour selection was arbitrary, yet the distinction of each perceptive attribute type became evident as colours were applied per type. With this categorisation, colour schemes became helpful in quantifying the number of perceptive attributes per walker type. Also, the text extraction using this technique suggested a more quantifiable way of understanding the qualitative characteristics of the landscape. The complete analysis of this part was explained in *Appendix 04: Meta-Analysis on the Landscape Walking Narratives (LWN) Strategies and Results creating the Landscape Word Clouds (LWC)*



**Fig. 77. Summary of Landscape Word Clouds (LWCs)
generated from the Landscape Walking Narratives (LWN)
(Visualisation by Nadal and Barroga, 2021a)**

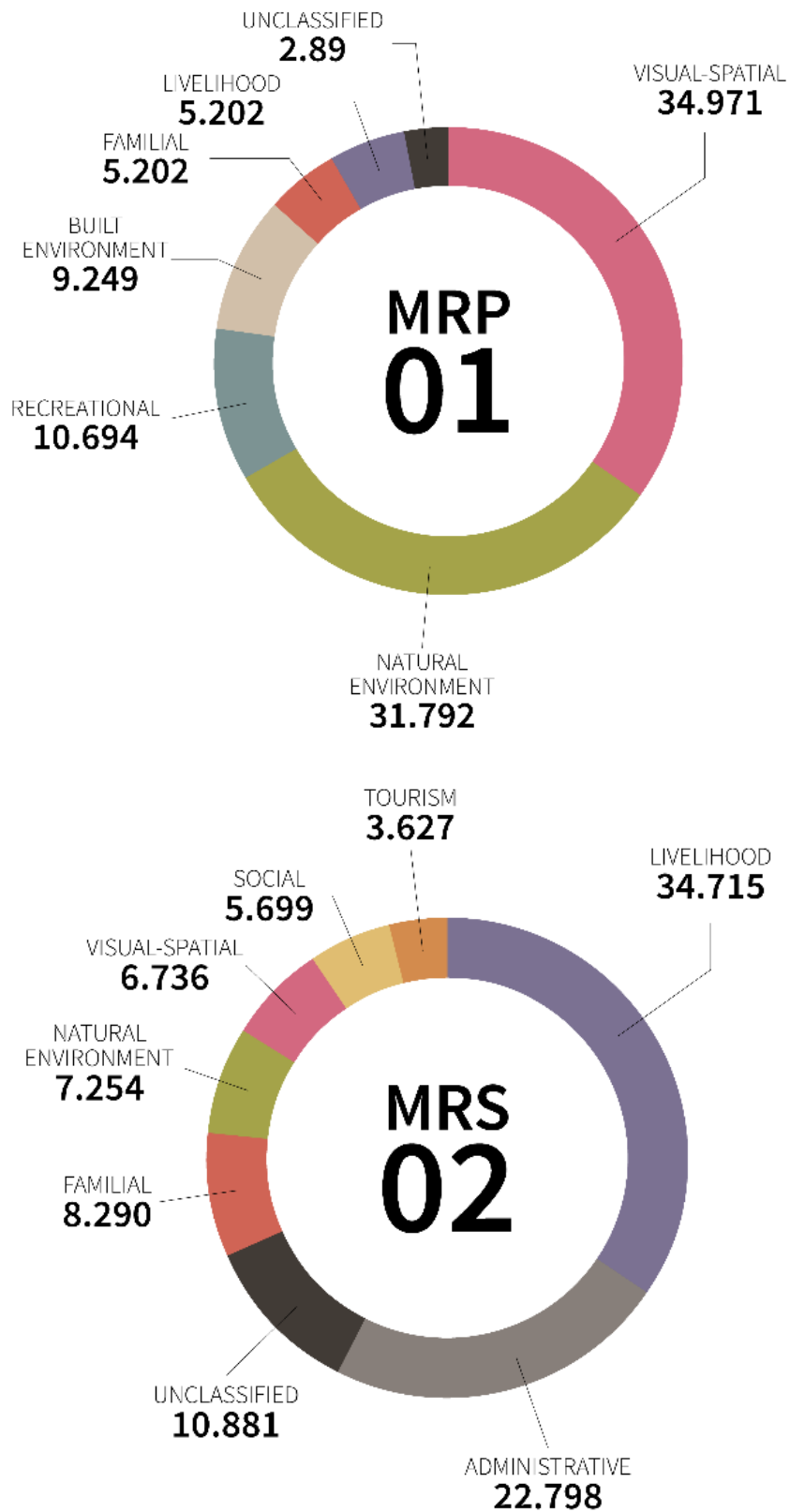


Fig. 78a.Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) – MRP and MRS (Visualisation by Nadal and Barroga, 2021a)

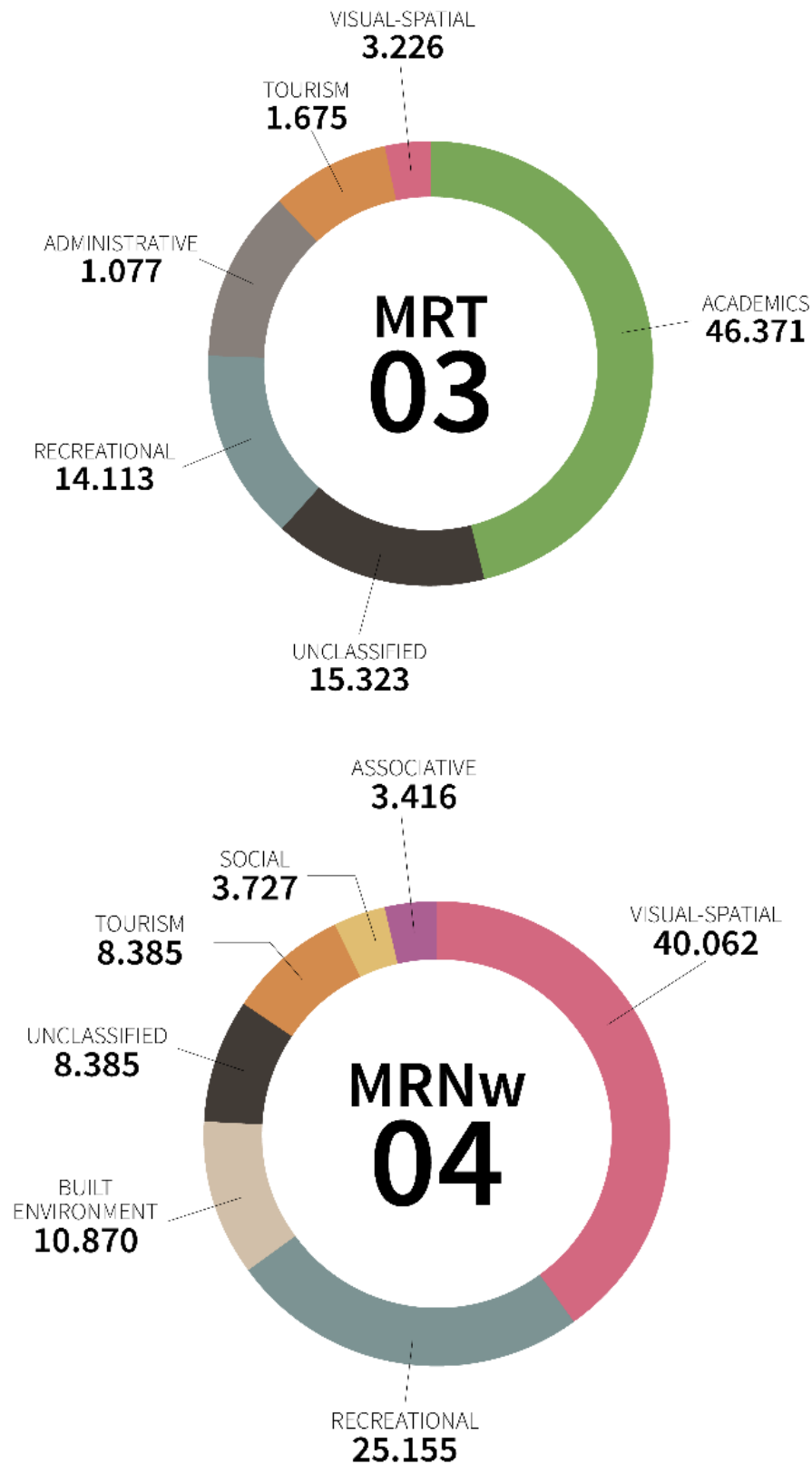


Fig. 78b. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) – MRT and MRNw (Visualisation by Nadal and Barroga, 2021a)

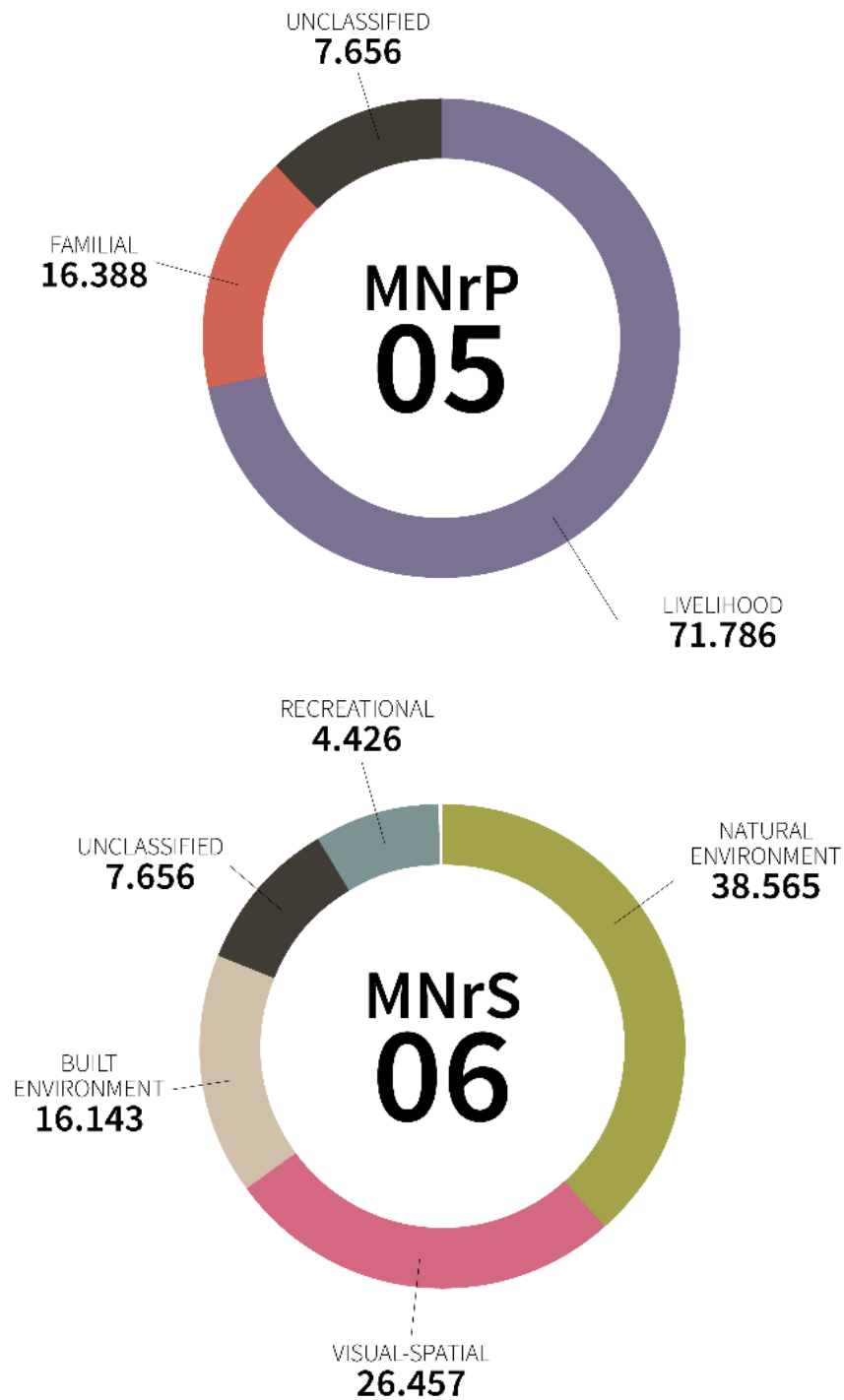


Fig. 78c. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) – MNRp and MNRs (Visualisation by Nadal and Barroga, 2021a)

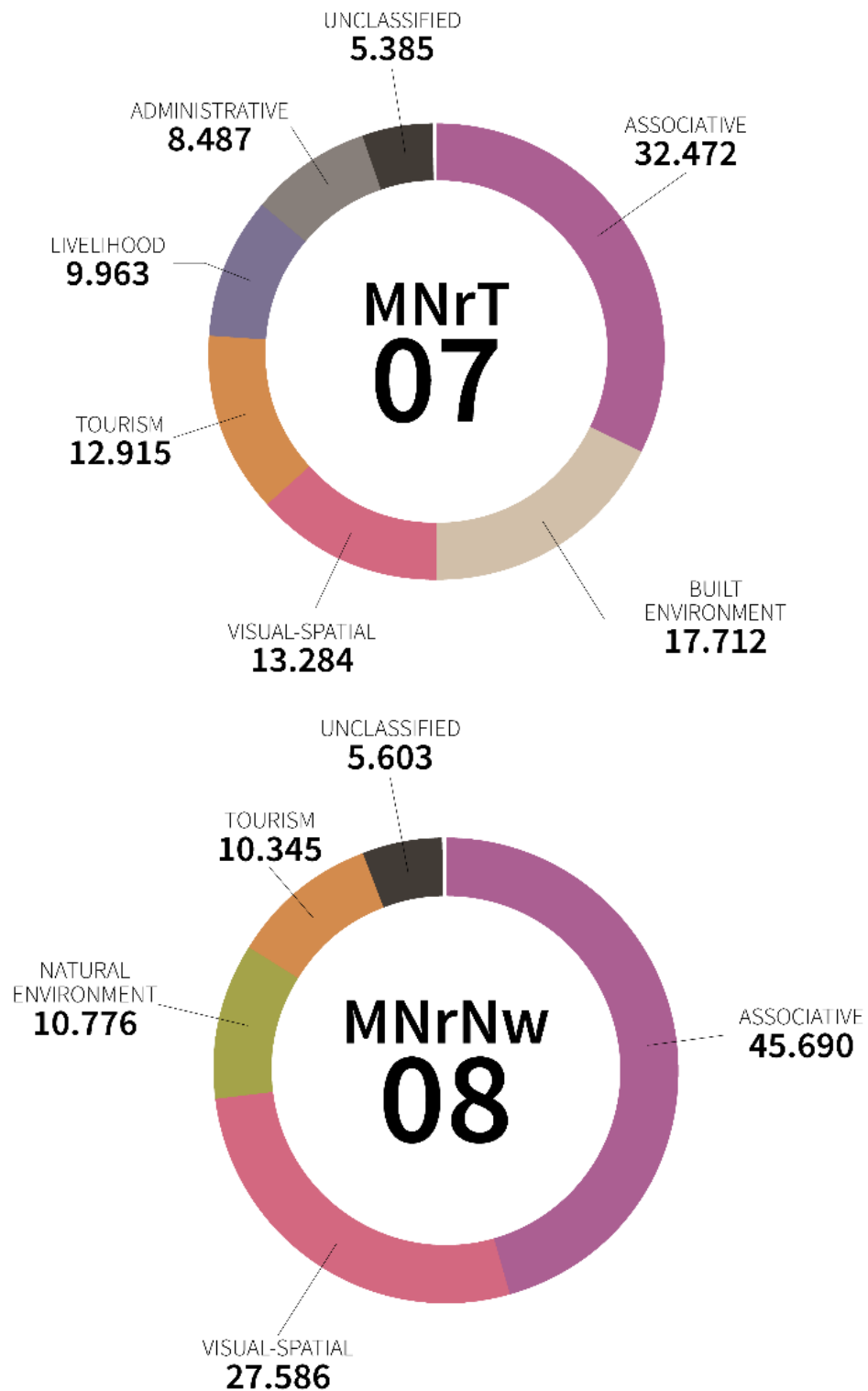


Fig. 78d. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) – MNRt and MNRNw (Visualisation by Nadal and Barroga, 2021a)

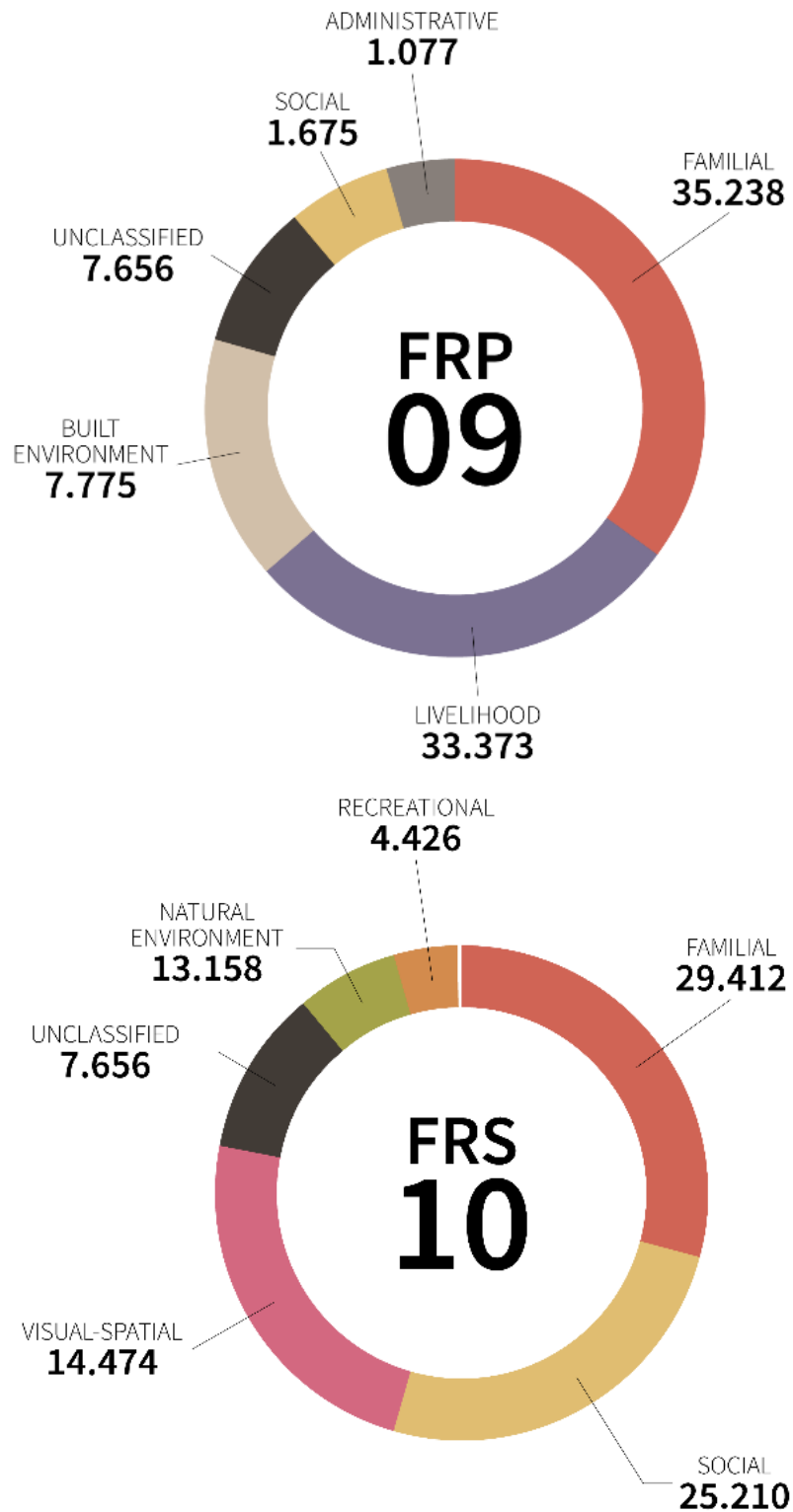


Fig. 78e. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) – FRP and FRS (Visualisation by Nadal and Barroga, 2021a)

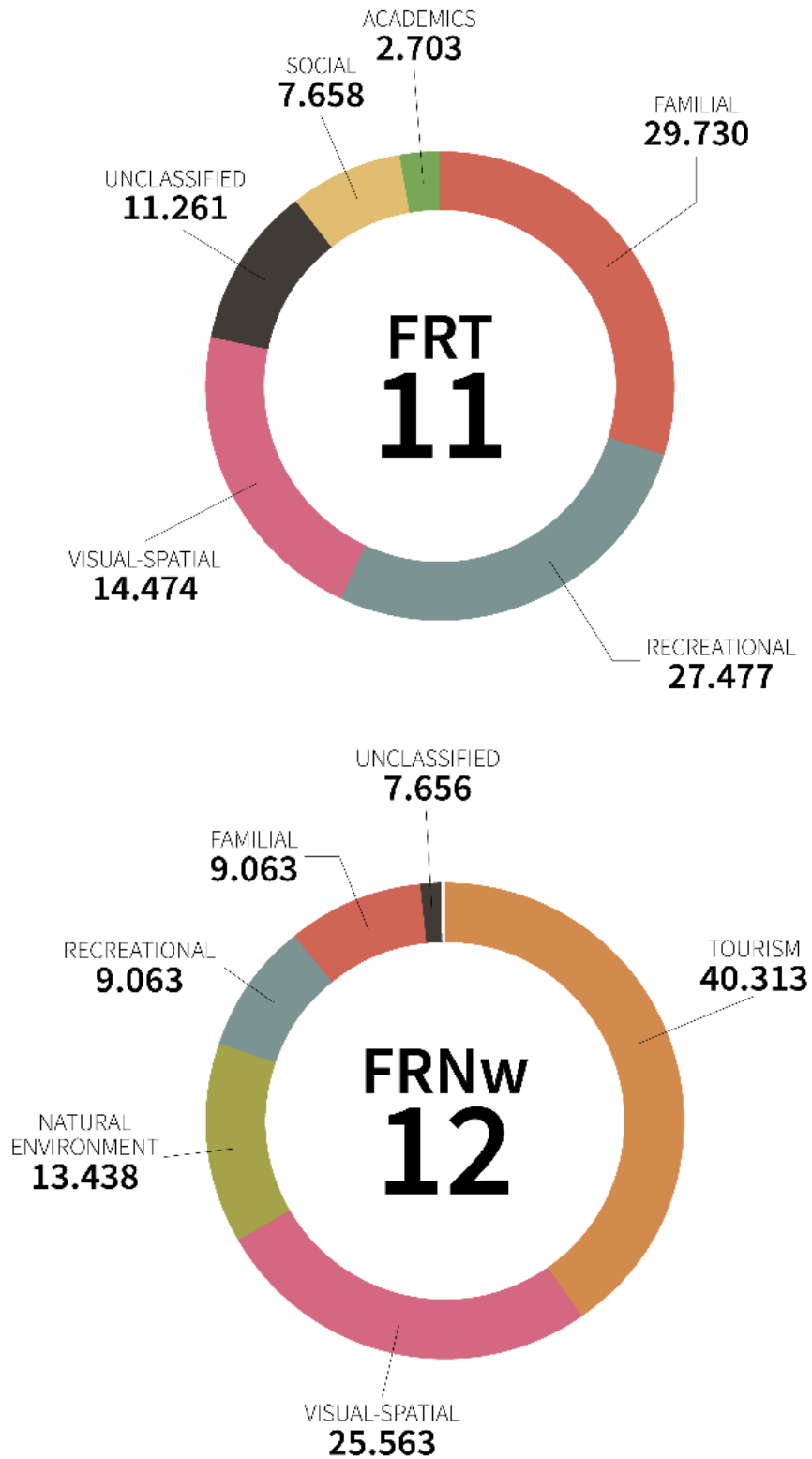


Fig. 78f. Landscape Word Clouds (LWCs)
generated from the Landscape Walking Narratives (LWN) – FRT AND FRNw
(Visualisation by Nadal and Barroga, 2021a)

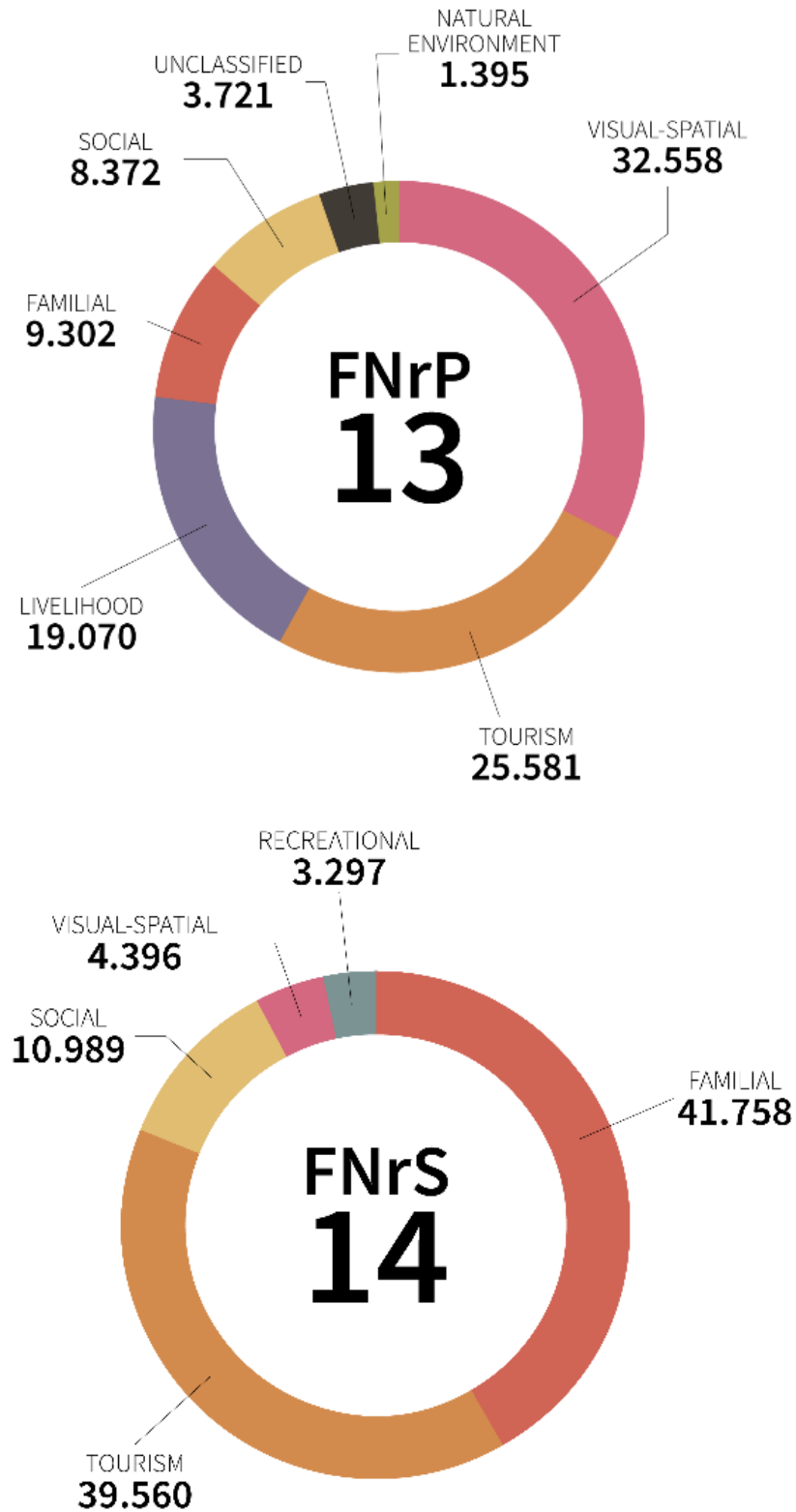


Fig. 78g. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) – FNRp and FNRs
(Visualisation by Nadal and Barroga, 2021a)

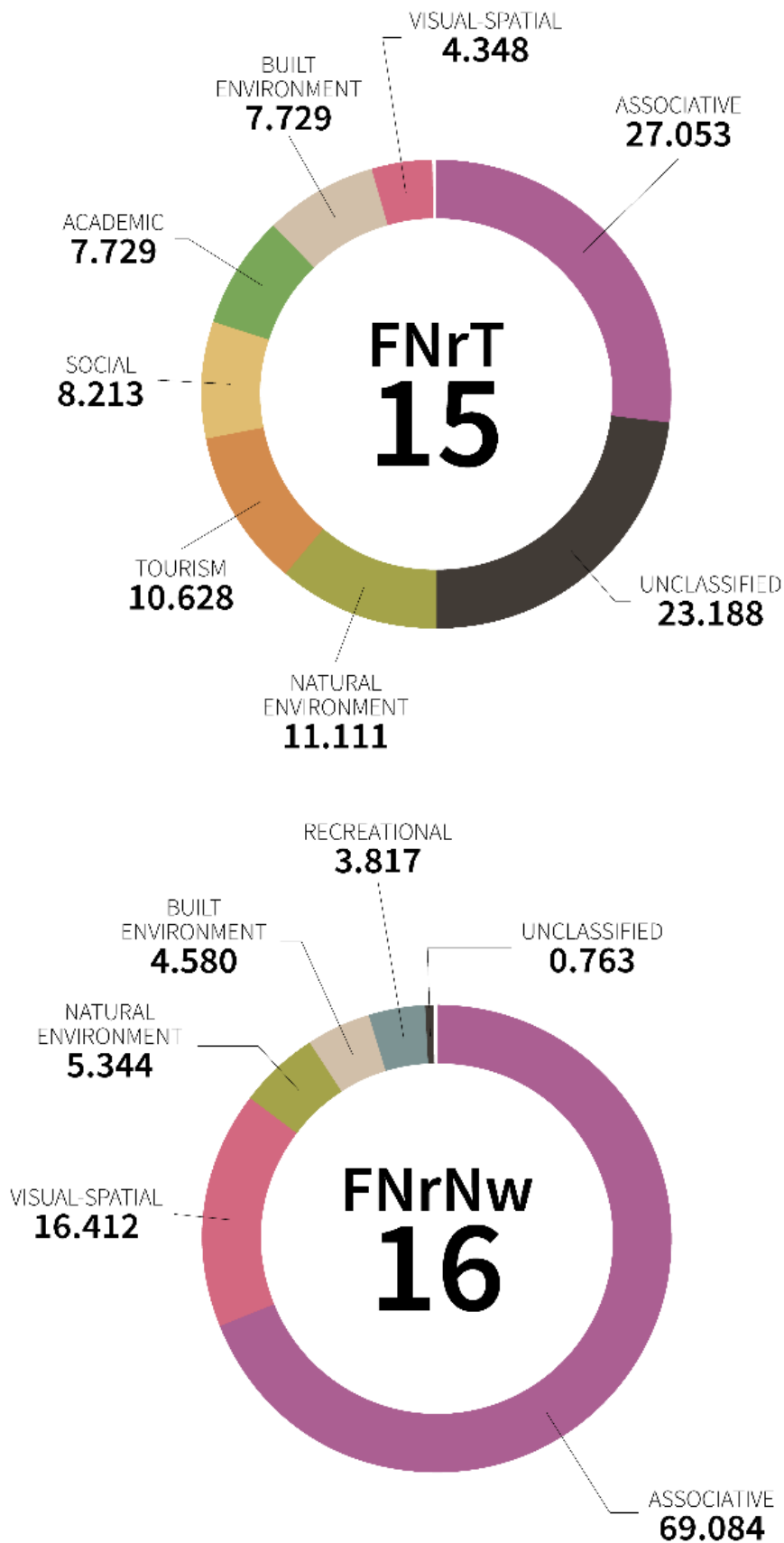


Fig. 78h. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) – FNrT and FNrNw
(Visualisation by Nadal and Barroga, 2021a)

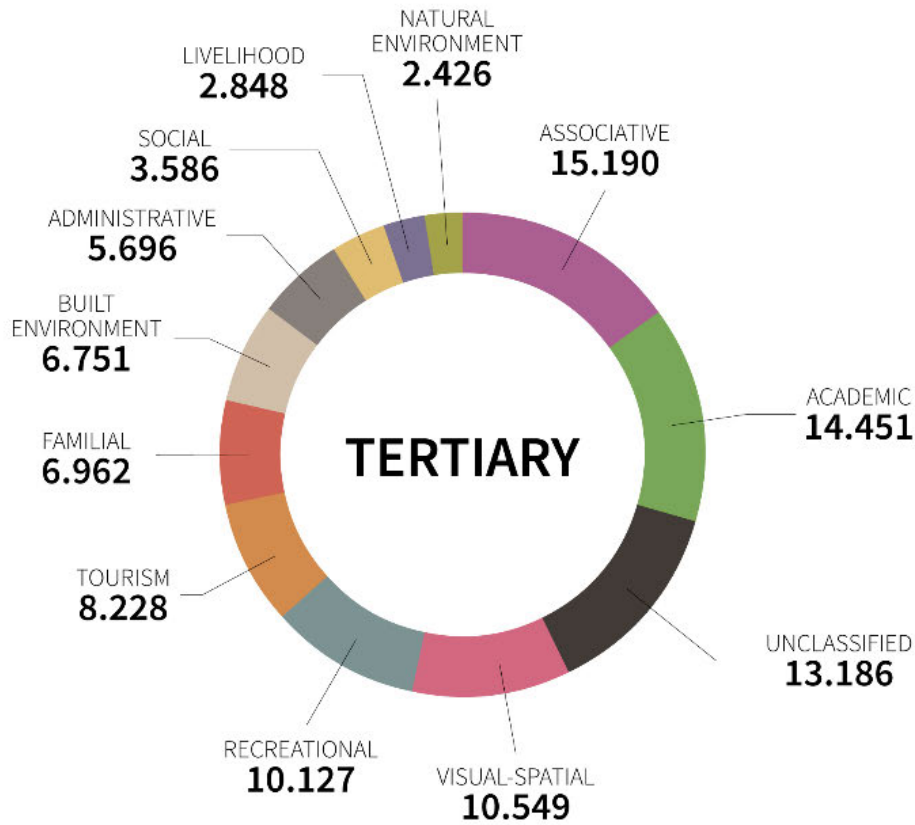


Fig. 78j. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN)- Tertiary Group Category
(Visualisation by Nadal and Barroga, 2021)

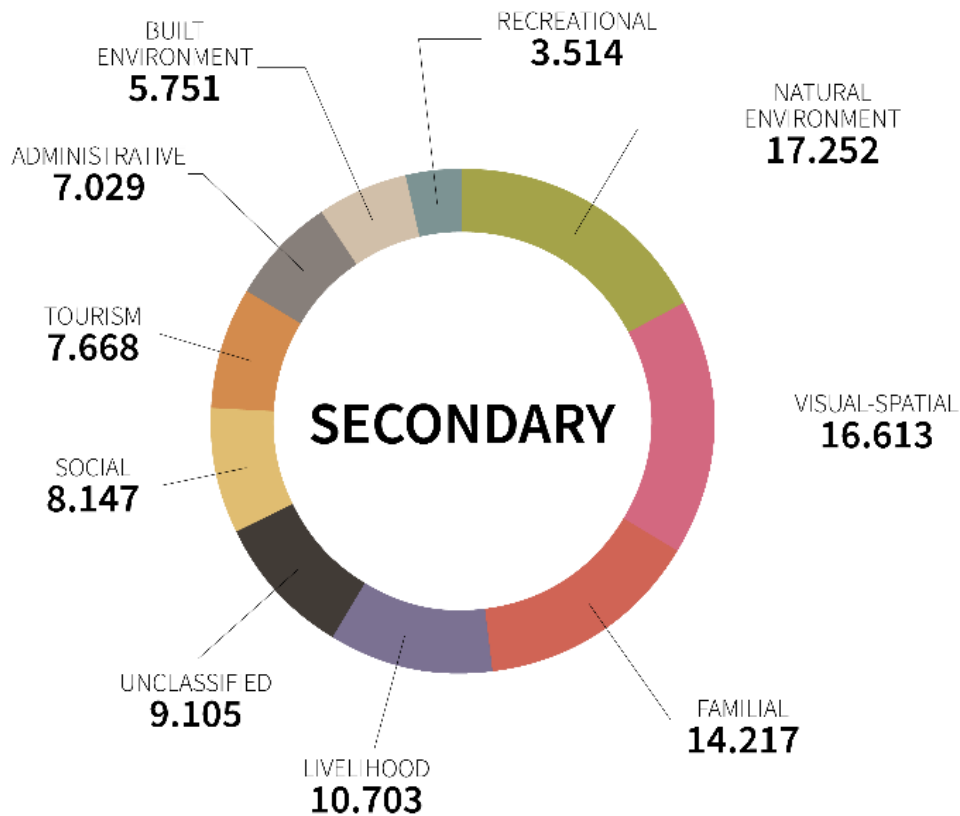


Fig. 78k. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) - Secondary Group Category
(Visualisation by Nadal and Barroga, 2021a)

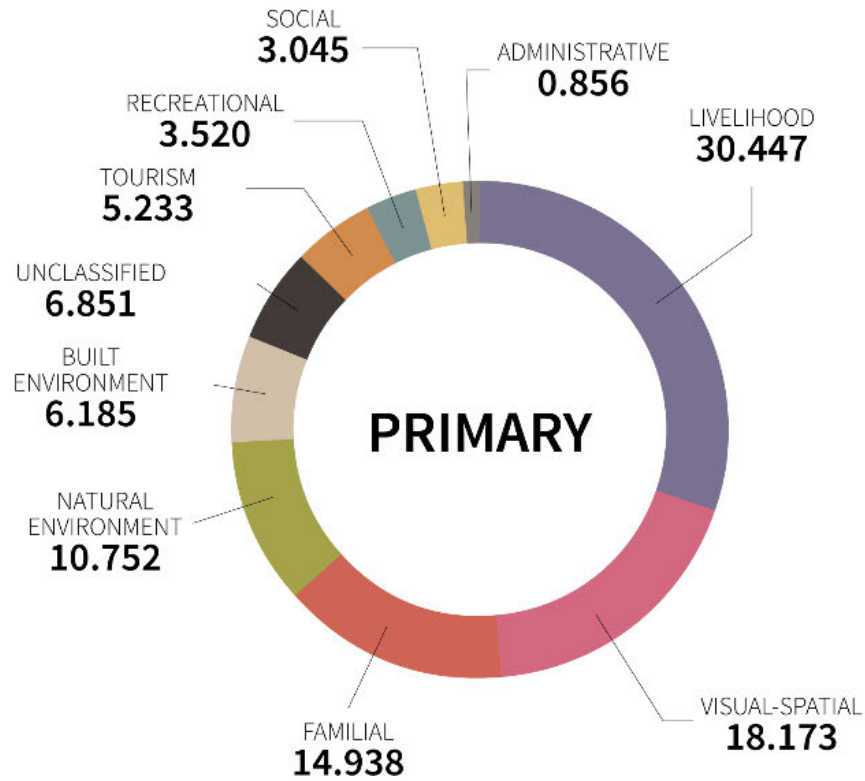


Fig. 78m. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) - Primary Group Category
(Visualisation by Nadal and Barroga, 2021)

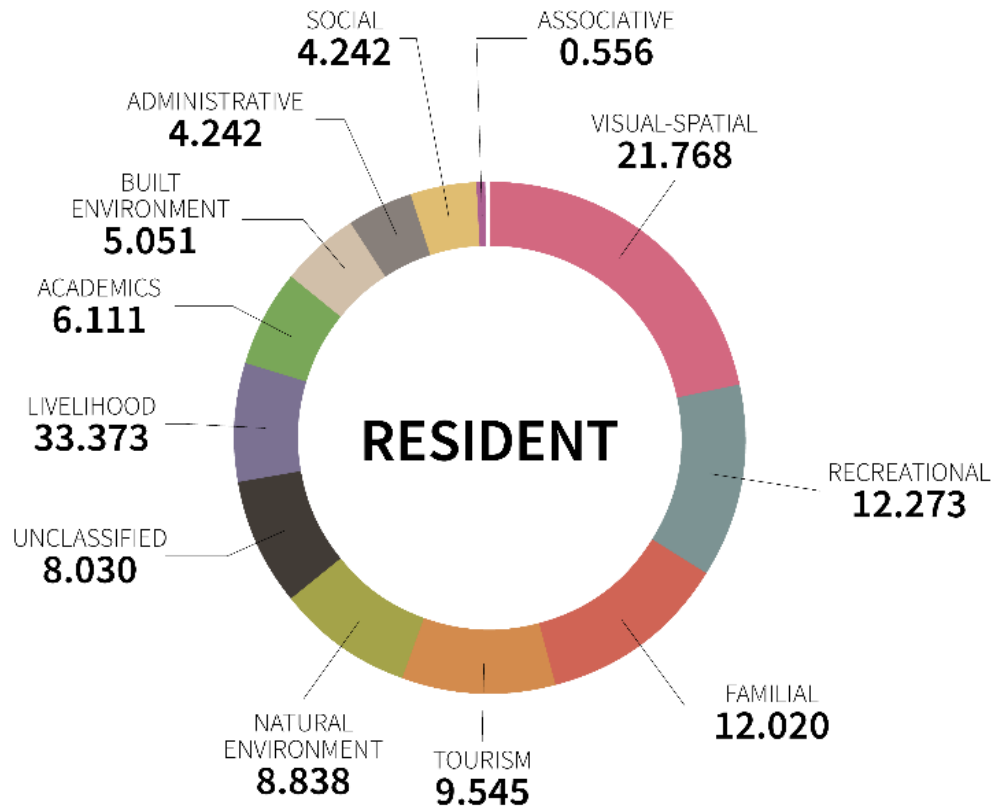


Fig. 78n. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) - Resident Group Category
(Visualisation by Nadal and Barroga, 2021a)

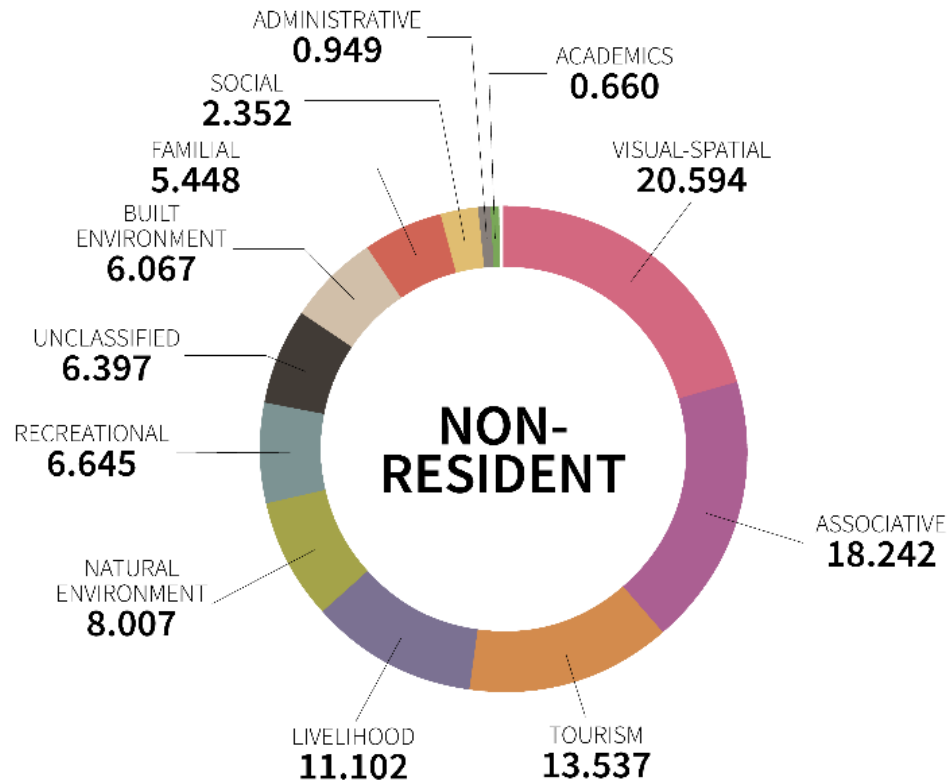


Fig. 78p. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) - Non-Resident Group Category (Visualisation by Nadal and Barroga, 2021a)

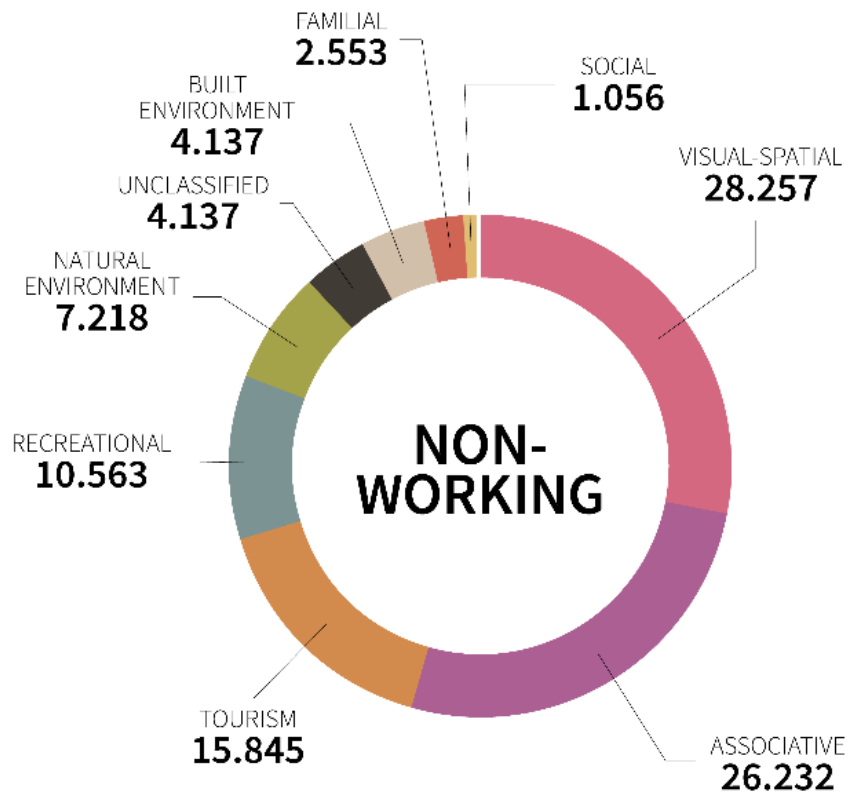


Fig. 78q. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) - Non-Working Group Category (Visualisation by Nadal and Barroga, 2021a)

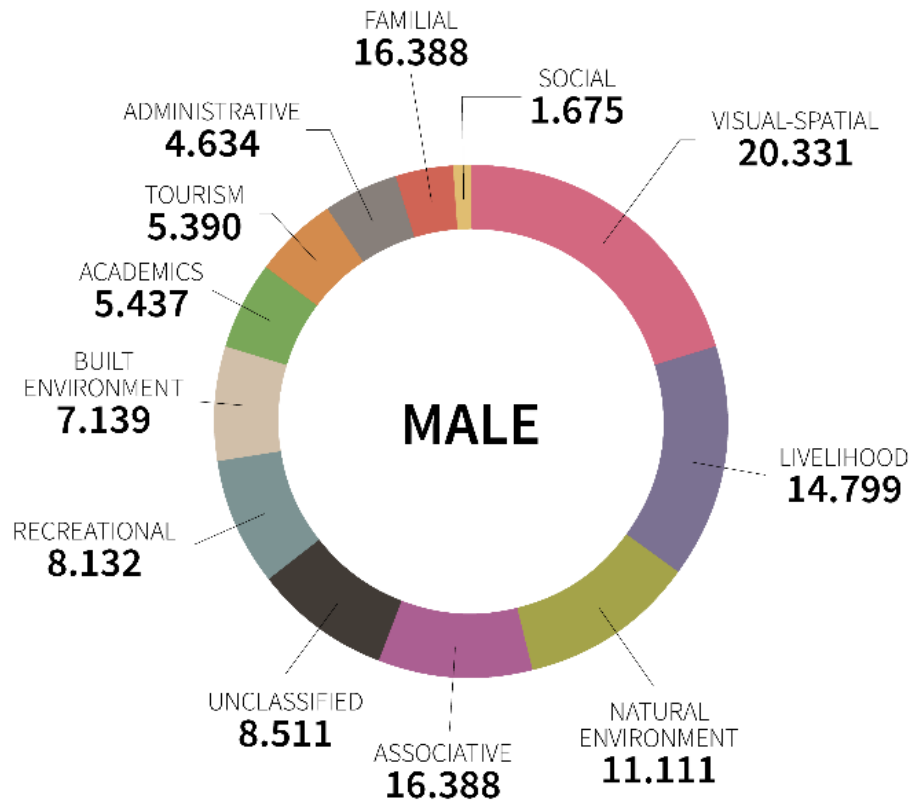


Fig. 78r. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) - Male Group Category
(Visualisation by Nadal and Barroga, 2021a)

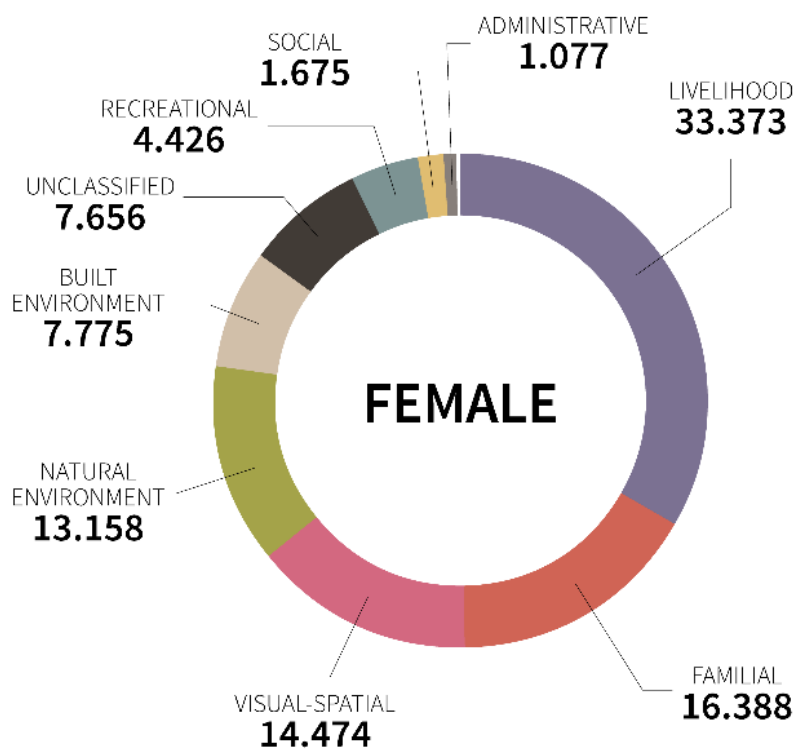


Fig. 78s. Landscape Word Clouds (LWCs) generated from the Landscape Walking Narratives (LWN) - Female Group Category
(Visualisation by Nadal and Barroga, 2021a)

MRP 01

- Interviewer** Recording number M-R-Pr-01 of the research project, The Peri-urban Landscape Phenomena of Cavite, Philippines. Interview is happening on 2019 February 9, at People's Park. Interviewer is Cathe Desiree Nadal. Interviewee is Reynaldo Tandoc from Amaceo, Cavite born on May 21, 1957. So to begin, among mga naiisip mong alala sa lugar na ito?
- Interviewee** Pwede tayo maglakad? Ang naaalala ko sa lugar na 'to, 'tong Cavite, yung kl'na. Yung ganda ng panahon, Kasi ang hobby ko kasi is gardening. Ang nagustuhan ko sa lugar na 'to talaga kapaligiran ng Ng isang rural area. Kasi lumaki ako sa bayan sa probinsya ng Nueva Ecija, taga Cuyapo ako. Kaya nung nagretire ako, bago pa man ako magretire, meron akong cating bahay sa amin dyan sa Cavite. Yun ang kwan sa pamilya ko. Kaya nung nandun ako, ito ang kwan ko, hobby ko kasi ay gardening. At ang nakita ko sa lugar ng Cavite, lalo na sa upland, ang upland Cavite kasi ay comprised of Silang, 'tong Indang, Mendez, Amaceo, so nakita ko yung lugar na 'to maganda sa gardening. Kaya bago ako nagretire naisip ko nang dito bumili ng lupa. So yun ang ang maalala ko sa lugar na 'to talaga yung kagandahan ng paligid.
- Interviewer** Kwentuhan niyo pa po ako tungkol sa kagandahan ng paligid ng Cavite.
- Interviewee** Sa kagandahan ng Cavite, dito kasi sa upland Cavite, maraming kwan dito, yung maraming mga puno. Na maka Ah Nakapaligid na pwede mong galawan na hindi ka ang kwan ko kasi, hindi ako ma mahilig sa siyudad, sa pamumuhay sa siyudad. So ang mas gusto ko babalik ako sa rural area na n'akran ko. At ang napili ko Cavite, lalo na sa parteng upland kasi malamig ang panahon, maganda ang klima, although ang kalaban din dito ay bagyo, pero habang ang sa, sa tungkol sa environment, presko ang hangin, yun bang hinci ka laging nagmamadali. At your own pace. Tapos ang kapaligiran mo nakakagawa ka ng isang magandang bagay lalo na sa gardening na nalilibang ka. Tapos malapit lang din raman ang Maynila kung may mga gustong bilhin, pwede kang bumaba. And then the same time, nagbabago na ang atmosphere dito sa Tagaytay, halos nandito na rin lahat. At madaali lang puntahan, hindi mo na kailangan pumunta pa sa traffic sa Metro Manila.
- Interviewer** Okay, patapos na po ang ating interview. May nais ka pa po bang ibahagi, sa parteng ito?
- Interviewee** Ang d'to kung siguro yung mga naglisip na lumipat na mga taga Maynila, magandang tumira dito sa parteng upland Cavite, kasi mararamdaman mo yung ganda ng panahon, yung atmosphere na nakapaligid dito.
- Interviewer** Okay, maraming salamat po. Interview ended at 11:11 am.
- Interviewee** Okay thank you.

MRP 01

- Interviewer** Recording number M-R-Pr-01 of the research project, The Peri-urban Landscape Phenomena of Cavite, Philippines. Interview is happening on 2019 February 9, at People's Park. Interviewer is Cathe Desiree Nadal. Interviewee is Reynaldo Tandoc from Amaceo Cavite born on May 21, 1957. So to begin, what memories do you remember from this place?
- Interviewee** We can walk? What I can remember about this place, Cavite is its climate. It has fair weather. This is because my hobby is gardening. What I liked about it is the surroundings of a rural area. This is also because I grew up in a town located in Nueva Ecija, I live in Cuyapo. This is why even before I retired, I already had a small house in Cavite. This is for my family. Every time I am in that house, I do my hobby - gardening. And what I saw in the uplands of Cavite, which is comprised of Silang, Indang, Mendez, and Amaceo - all these towns are good for gardening. This is why before I retired, I thought of buying a lot here. So that is what I can really remember about this place - the beauty of its surroundings.
- Interviewer** Tell me about the beauty of Cavite's surroundings.
- Interviewee** On Cavite's beauty, here in the uplands in particular, there are lots of, uhhh, lots of trees. uhhh, and spaces where you can move, uhm, I don't like cities, I don't like living in the city. I like to go back to the rural area where I grew up and chose to live in Cavite, especially in the upland because it is cold, good climate abounds, although typhoon is common, but fresh air is also everywhere and life here is slow. At your own pace. Also, you enjoy your surroundings because you can do gardening which is enjoyable. Also, Manila is near so if we want to buy things in Manila it is easy to go down to the city. And then at the same time, the atmosphere is changing here in Tagaytay, everything can be found here as well. There are establishments where you can buy these things, you do not need to go to experience traffic in Metro Manila.
- Interviewer** Okay, our interview is about to end. Would you want to share anything else at this part?
- Interviewee** What I am sure of, for those from Manila who would think of moving to Cavite, the better place to move to is the uplands of Cavite because it has a better atmosphere - the weather and climate are better here.
- Interviewer** Okay, thank you. Interviewee ended at 11:11 am
- Interviewee** Okay, thank you.

Fig. 79. Sample Image of the resulting text coding from the Landscape Walking Narratives and its translation -detailed content in Appendix 04: Meta-Analysis on the Landscape Walking Narratives (LWN) Strategies and Results creating the Landscape Word Clouds (LWC)

The coding with the corresponding word clustering for the LWCs suggested many possibilities for the LCS. First, the proposed systematisation for the LWC portion suggested the possibility of translating intangible attributes into quantifiable data for future planning decisions. The proposed clustering and procedures made it easier to rate and identify qualities of landscape that should be retained, recognised and improved should landscape proposals take shape in the planning discourse.

Next, LCS can be enriched with information from the landscape actors. Information gathered from first-hand walkers along places in Cavite suggests that these can generate viable information for the LCS. However, to create a more conclusive listing of words for clustering, repetition of the procedure to other types of landscape walkers or the same landscape walkers under the same category may be explored further to understand the commonalities of words from different combinations.

Lastly, walks synced with narratives are practical explorations for landscape data generation. Exploring this procedure opened possibilities for walking to move forward from just a process used in landscape analysis; instead, it became a vital component in narratives and word generation. It also opened new frontiers for walking as a procedure and a tool for creating landscape data objects for the LCS.

5.5.1. Place Perception of Cavite's Inhabitants

Another aspect joining the peri-urban narrative was the changing place-based paradigm of the Philippines' peri-urban. One considered prevalent was changing place imagery of Cavite's inhabitants. This new cultural model of landscape notions developed a hybrid of the cultural landscape that demands definition for us to seek proper solutions and measures to move forward. By exploring human actors' place preference and their placemaking strategies, we can predict and explain the emerging landscape typologies in the peri-urban and interpret the resulting landscape phenomena. Overall, the landscape context may provide relevant solutions for preparing sustainable planning policies in the peri-urban regions of the Philippines.

Moreover, the problems of the peri-urban are felt hidden at the edge where problems are imminent,

"Is this the countryside, the green belt - or rather the greed belt, where the farmers sell land rather than crops, where the developer takes the public resource of the city's hinterland and subdivides to create a private profit and a general cost? Certainly, here is the area where public powers are weakest - either absent or elastic - where the future costs of streets, sidewalks and sewers, schools, police and fire protection are unspoken. Here are the meek mulcted, the refugees thwarted." (Fellmann, Getis and Getis 1995, p.22)

As human actors migrate, cultural elements were brought from the rural hinterland and urban core to the peri-urban in a setting that integrates or transforms them. These identified actors do not only carry cultural elements and landscape values. In a reasonable discourse highlighted by Fellmann, Getis and Getis (1995, these actors are essential elements in landscape studies as they could bring various forms of cultural values, which were interpreted as mentifacts, artefacts and sociofacts. The actor's capacity to carry different cultural forms was an excellent concept to investigate as they become landscape features with perceptive capability that can form descriptions.

It was then hypothesised that the present inhabitants of Cavite bring their cultural interpretations through different forms of intangible and tangible landscape schemata to adapt to these new places. How can these connect them to geographically relevant landforms in the peri-urban area? How do they alter the landscape to feel a sense of belongingness to what was unfamiliar?

In the case of Cavite, it was evident through the perception clouds that involvement and interaction with the landscape could be explained through word associations. One narration of one of the participants revolved mostly on memories attached to landscape as the person interacts with it as a farmer. This narrative established the possible effect of exposure to landscape in classifying landscape perception.

Another perception cloud focused on family also explained the close association of landscape perception on social interactions. The participant also reiterated the attachment to the landscape as a place of familial interaction in the narrative.

Another perception cloud established a landscape character anchored on tourism. In this word cloud from a non-resident of Cavite, it was also established that those not directly interacting with Cavite see the region as highly tied up with tourism constructs. In this example, we saw the landscape as a place to visit for rest, another categorical function not sought by those residing within Cavite.

5.5.2. The Polarity of Opinions on the Peri-urban Landscape

Bringing the discussions back to Santa Maria (2001, as she argued on the polarity of urban and rural terms, especially in the context of culture, we see the landscape as one divided by rural and urban attributes. This division was felt tremendously in societies where rural culture had been connected to simplicity and unsophistication, contrasting with the presupposed dream world of the technological advances in urbanity.

Santa Maria (2001) again explained that the more present notions for cultural development had surpassed the polarity, whereas decisions and plans related to it must be made "favourable to the total environment" (p.80), where it meant culture and nature combined. Hereon, she explains that decisions and policies should be open to pluralism, multiculturalism, and cultural diversity yet also considerate of the natural environment in which these will be the situation. This exact situation was being felt in Cavite at this point when the research was done.

5.6. Landscape Character Cluster 05: Future Landscape Scenario Clusters from the Future Landscapes Scenario Workshop

The Future Landscape Scenario Workshop (FLSW) generated the following data objects for the LCS - the Future Landscape Scenario Clusters (FLSCs). The clusters were a catalogue of descriptions from the FLSW, including different activities for landscape data extraction from engaged action.

However, generating these clusters also encountered some logistical challenges. First, the selection of venue and participants for the FLSW encountered challenges concerning its size. Interaction as a component of the workshop design was not considered an issue during the workshop design process. Deciding spaces for the workshop became crucial as it projected movement and interaction within the space provided. Unfortunately, this problem was identified only during the workshop itself. Incorporating the movement and interaction requirements would have provided participants with spaces where engagement would be encouraged. It highlights the importance of venue size and ambience in preparing spaces for engaged action.

The venue size became a challenge as it was too large for a participation size of 15-20 participants. Although it was very generous to be given the conference hall as a venue for the FLSW by the local government office, this made the interaction of participants, facilitators, and moderators during the workshop very difficult. The venue was rearranged to solve this matter, and space usage was maintained to half its original size. It helped mobilise people into intimate and massive group clusters while generating more interactive spaces during the workshop proper.

The availability of facilities and support equipment for sketching was also an added challenge. It rendered the use of important *manila* papers, or large-sized yellow paper,

instead of whiteboards helpful to encourage the sharing of ideas of the participants during the FLSW.

Another challenge encountered was the lack of landscape-participant visual connection. The venue used for the FLSW had no windows to visually connect the participants to the outdoor views during the workshop duration. Being able to connect them during the workshop was assumed to be helpful in the thinking process. This challenge was only resolved with images and videos shown during the workshop. However, consideration of this aspect of the venue would be helpful only if the landscape units being asked from them during the workshop are accessible from where the workshop was happening.

From all the challenges raised, it was proven that the FLSW success is associated with the workshop design and participant-landscape interaction and settings. Moving forward, a communication framework that engages the participant with fellow participants and in the outdoor environment should be considered to enhance the data creation procedure further.

Although pressed with several challenges, the FLSW also had several contributions to the LCS. First, The FLSW supports design learning from the grassroots level – where design thinkers comprise not just the design professionals but also the community members – opening doors for learning and sharing ideas with its dwellers. Second, the FLSW generated different thematic ideas of Cavite's future - the clustering needed to foresee scenarios that may happen for Cavite's landscape. These ideas were bound by four major themes that emerged during the plenary session. The four themes, Historical, Heritage, Culture, and Evolution, developed further through the design thinking process supported by different communication-generated tools: meta cards, picture cards, and sketch concepts as the representation of their scenario ideas. Lastly, the FLSW provided a different data generation tool that uses interactive activities in creating the needed future scenario clusters for the LCS. These were communicated through a presentation and discussion activity as its culmination. During this time, participants interpreted their drawings and clustered ideas of the landscape as first-person users of the place.

Overall, the FLSC became a consolidated notion of the landscape that can enrich the LCS with possible management strategies should we want to resolve the landscape challenges that emerged through its morphogenesis.



Fig.80. The Four (4) Clusters of Texts, Images, and Sketches Becoming the Communication Device in this Future Landscape Scenario Design Thinking Workshop Session

Shown in the pages that follow were the FLSCs generated from the FLSW. The following images and texts were created from the thinking sessions and activities crafted for the

FLSW and were simulated to integrate the landscape components into clusters. The results became the LCC dedicated to showing the future perceptions of Cavite's spaces and may become the basis for management directions for the region.



Fig. 81a. Visual Simulation of the Future Landscape Scenario Cluster 01 - Heritage
(Visualisation by Nadal and Barroga, 2021b)

The Heritage FLSC

One of the FLSC of Cavite was envisioned to be more inclined to heritage, as interpreted by one of the workshop groups. The landscape, in their perspective, was associated with inherited places and place traditions – from the culturally relevant religious patterns that are church grounds to the schools' grounds, all relevant heritage spaces. It was also connected to critical ecological attributes from its archipelagic nature, with islands like Balut Island near Maragondon River considered part of the scheme. The future vision included notions of space centred on heritage tourism – where heritage was anchored on tourism development for the future. As heritage became associated with tourism, it became imperative that coastal heritage sites became beach destinations and areas reminiscent of valour and inherited practices become recognised by tourists as tourist sites in the Cavite region. In this case, the future of

the heritage landscape was very tourism centred. Heritage landscape was therefore considered as a magnet for tourism development in the future.

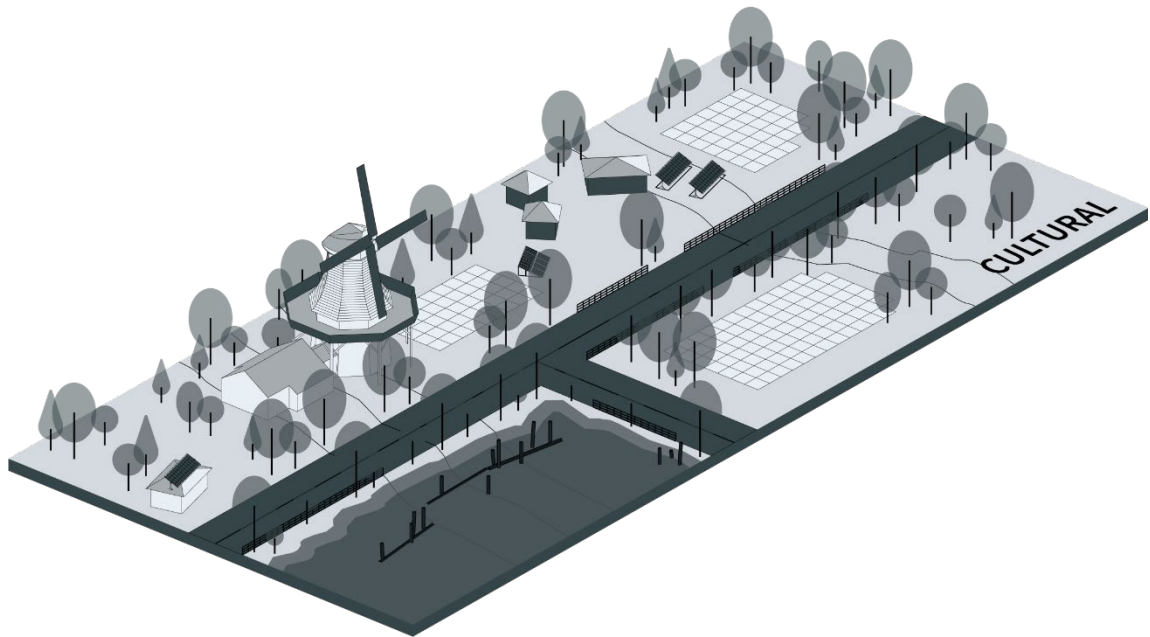


Fig. 81b. Visual Simulation of the Future Landscape Scenario Cluster 02 - Cultural
(Visualisation by Nadal and Barroga, 2021b)

The Cultural FLSC

The future of Cavite was also projected to centre around its cultural landscape that developed through its traditional industries. This FLSC included the conglomeration of old and new traditions of coastal and land-based farming origins. The idea of its close association with farming industries influences the notions of the landscape that could accommodate the changing industries with the viability of new technologies permeating the notions of space.

This vision included better transport infrastructure plans and a vision of improving the region's resources by introducing farm industries that adapt to new trends, whether crop advancement of the common produces like rice and pineapple. Also, in the context of Cavite, the cultural landscape was considered to be industry-centred as notions of culture are closely associated with farming industries and visions for labour reform that prioritises the needs of the farming industry and the population supported by this sector.

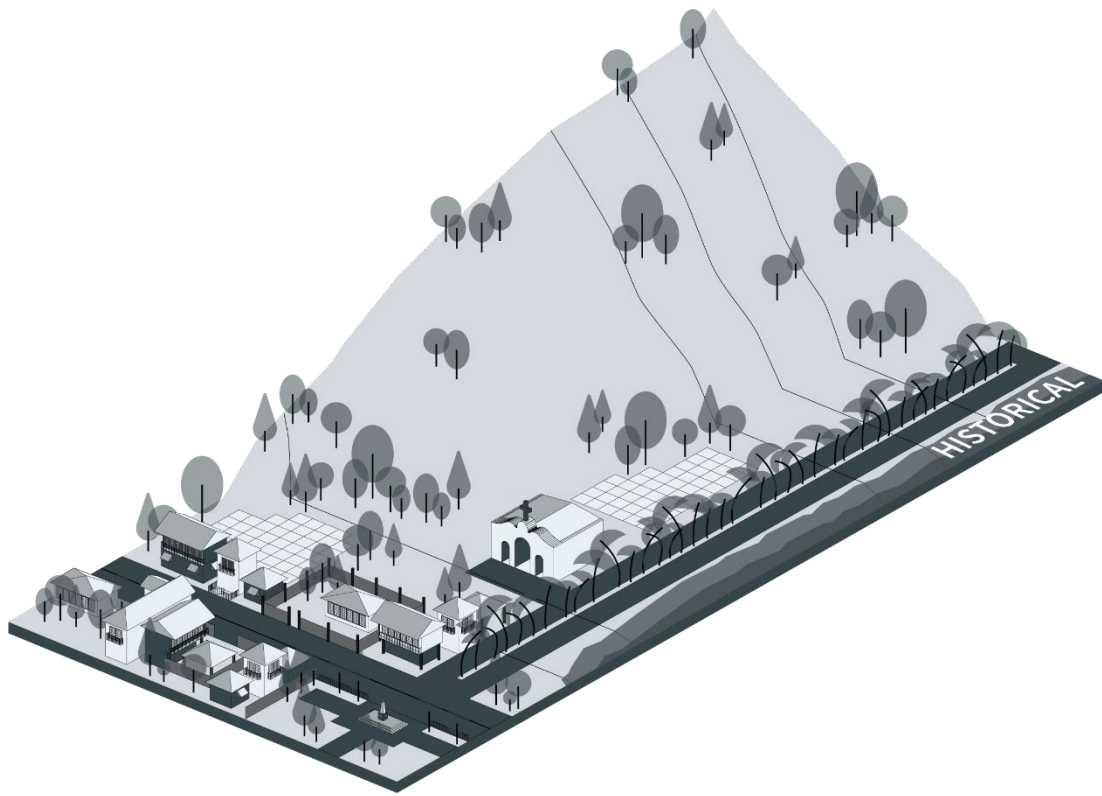


Fig. 81c. Visual Simulation of the Future Landscape Scenario Cluster 03 - Historical
(Visualisation by Nadal and Barroga, 2021b)

The Historical FLSC

The future of Cavite was also projected to centre on its historical landscape as FLSC focused on minimising development or limiting it by reviving the old notions of coastal development. With a group suggesting visions that prioritise the historical attributes of the landscape, development was suggested to focus on the following:

1. Reintroduce mangrove species to the coastal areas of Cavite as they were lost during the development of new transport corridors and built-up areas along the coast
2. Include the development of boulevard or esplanade development to refocus development strategies on the coast as the vital component of Cavite's history
3. Preserve the plaza and the design of the plaza as developed during the colonial wave of change

4. Preserve the farming fields in the uplands with overlooking views of Cavite's
landforms

The FLSC included natural and cultural attributes as essential aspects of this proposed future scenario.

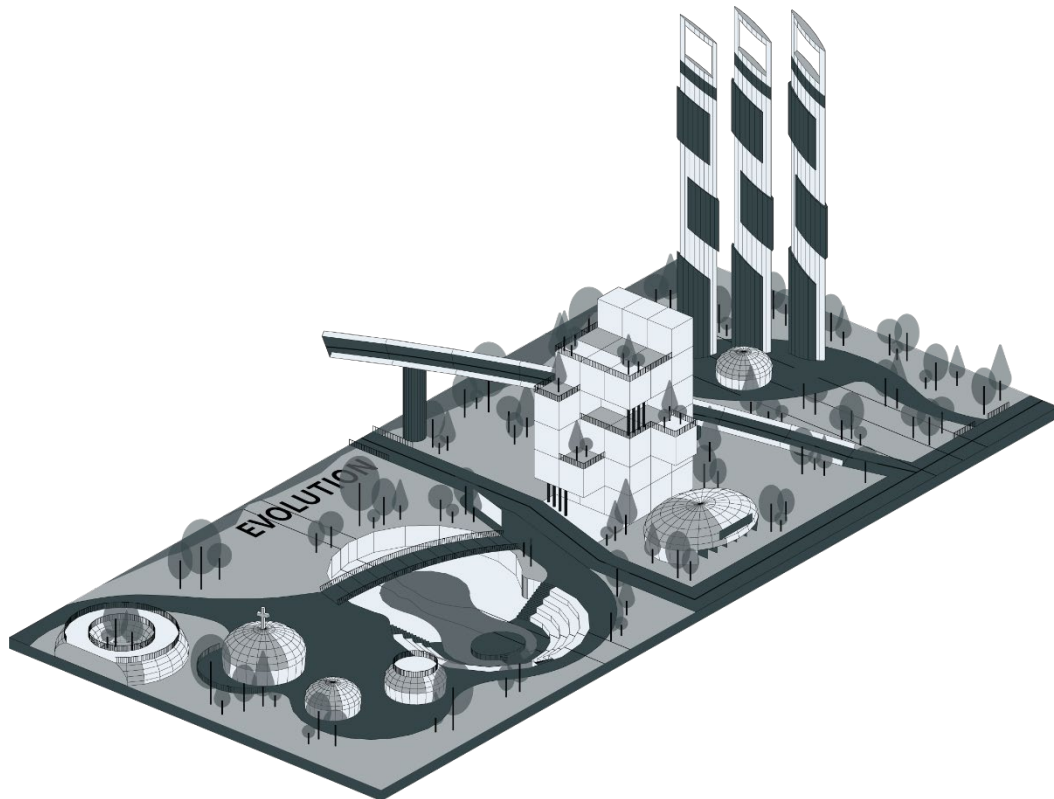


Fig. 81d. Visual Simulation of the Future Landscape Scenario Cluster 04 -
Evolution/Evolving
(Visualisation by Nadal and Barroga, 2021)

The Evolving/ Evolution FLSC

Another workshop group also projected the future of Cavite to centre on evolutionary landscapes – a landscape centred on the advancement of infrastructure and development of connectivity networks. This FLSC included notions of development towards places where development in Cavite can expand, thus adding visions of urban growth from Cavite towards the support regions nearby, with Bataan being considered. In this notion of a future that makes Cavite the new urban core with support services closely associated with growth towards the peri-urban area of Bataan, it was then suggested that future visions for the landscape must include connectivity corridors in the form of bridges. These interregional connectors will also

be readily available in nearby regions to support it as it moved forward towards progressive notions of places equated usually with urban development.

5.6.1. The Material Interpretations of Intangible Cultural Landscapes in the Peri-urban

Discussions on how the human-nature interaction was transformed into artefacts were brought into the peri-urban narrative as an essential tool to define the peri-urban landscape phenomena. Human actors interpreted the landscape through narratives and symbols in material or tangible forms. How do they value the character of the land that they came from as interpreted in the community landscape features? How do they value the distinct landform near the peri-urban areas as interpreted in their community open spaces? Discussions on literature that show the anthropogenic character as visualised in place attachments can also be seen in the acquired artefacts brought into the landscape schemata as essential in creating a detailed diagram of the phenomenon to be described.

5.7. The Challenges that Emerge from the Landscape Character Clusters (LCCs) created for Cavite's Landscape Character System (LCS)

The assumed multiplicity of landscape characters within Cavite had been influenced by Bunce's "urban escape" concept (1981). Bunce suggested a conscious desire to escape the perceived cityscape into an environment with quality open space and rural appeal, which usually extends to creating a rural-urban landscape in adjacent city areas. He considered this landscape dualism concept as a driving force of the movement to the city's fringe. The result was the movement of city dwellers to places with intrinsically countryside appeal, which maintained the conveniences found in the city. If the human actors are to choose places to live, these places should manifest the conveniences of the city while maintaining freedom from unwanted sensory attributes.

An example was removing the countryside's farming structures and the olfactory discomforts from farming activities. This rural-urban ideology has led to landscape dualism, a paradigm that expresses a division of landscape ideals: urban and countryside, culture and nature, man, and the environment. The dualism is expressed in the distinctly unique approaches for managing cultural and natural environments and the observed proliferation of themed town developments with manufactured and consumer-driven landscapes. These landscapes are synonymous with the views of the countryside yet are polished to appear city-like. Several examples expressing these are seen in new town developments found in Bacoar, Dasmarinas, Silang and Trece Martires in Cavite. As a result, the landscape is juxtaposed with two opposing forces, establishing the contention between two ideologies manifested as the peri-urban.

The landscape paradigm evident in the peri-urban region of Cavite stemmed from opposing aspects of nature and culture present in the area. While there was a consensus on the importance of the landscape in the context of Cavite,

there was disagreement as to why it was essential to go beyond the land-use plans in the region to properly move forward and bring into planning the importance of Cavite's landscape character. The lack of understanding of the patterns, processes and actions ascribed to the duality of the landscape continues to result in the continuous dichotomy of places in the regional and management narratives. This perceived gap in peri-urban landscape knowledge was rooted in a lack of agreement on the highly enriched concept of a "peri-urban landscape". The growing apprehension to understand it as a seamless interface is problematic from a design and planning perspective, as settlements spread into separated, multi-use and cluttered forms and patterns.

Furthermore, the inability to seek a proper understanding of the peri-urban landscape poses new interpretations of the landscape. It led to a fusion of multi-cultural notions of space and place. With the peri-urban process, landscapes were neither rural nor urban, nature, culture, or space. Ultimately, this unique category and the typologies should be recognised to subsist.

5.8. The Challenge of Finding Sustainable Initiatives for Cavite's Landscape

As more areas were rapidly being transformed in the peri-urban region of Cavite, far too little attention had been applied to solve governance hindsight on the landscape situation. The ill-definition of peri-urban landscapes was evident in development narratives where peri-urbanisation had not been considered relevant in regional profiling or regional governance. This situation was evident as a lack of any landscape character system in the region's Development and Physical Framework Plan or Socio-economic Profiles (Province of Cavite, n.d.; Cavite Provincial Planning and Development Office, 2013).

In a way, the critical determinant of landscape sustainability must understand its actors towards the landscape and its dynamics. Therefore, discussions on place attachment

of the dwellers and how they perceived themselves as part of Cavite's landscapes in the future were hypothesised as an essential tool for sustainable mapping actions for the landscape. What do these actors considered essential in the landscapes of Cavite? What attributes of the landscapes should remain, and what should change in the adaptation process?

5.9. The Challenge of Adapting the Landscape Character System Approach in Cavite

One of the challenges encountered was the documentation of viewpoints in Cavite, as the initial proposal to document views from centroid locations encountered several issues:

1. the legibility of landscape features within each photo taken at the centroid
2. The positioning of the camera in public spaces where movement is fast-paced and heavy traffic is frequent.
3. The provision for taking photos in public places where it is not allowed or where security concerns are relatively significant
4. Provision for taking photos where safety is also high-risk, i.e. Landfill sites and public spaces with high crime rates.

As a result, the sample photos to gather descriptive data for the visual dimension of the landscape character were limited to areas where centroids are found, namely,

1. on accessible open spaces
2. on open spaces that are accessible during the fieldwork schedule
3. on areas where centroids are not in the middle of roads or on top of buildings

Exclusion criteria in place were also considered because of the limitations:

1. Presence of Waterbody rendering inaccessibility to centre point
2. Presence of a Building at a centre point
3. Private property that cannot be accessed
4. Unsafe locations like landfill sites

One of the relevant contributions of the thesis was the adding of this localised procedure for evidence generation from multiple areas in landscape-based studies in the Philippines. The resulting data were not precisely the physical and tangible landscape attributes that the research was aiming for, yet reveal terminologies that tried to ascribe character descriptions to the landscapes of Cavite. Although the ascribed attributes rely primarily on what other authors observe, landscape character descriptors in the review could ground the peri-urban landscape phenomena into its FORM dimension that may serve as a backbone to the overall research process.

One weakness of this approach was the scoping pieces of evidence-based mainly on the research of authors assumed to be chosen through the applied search. The list was generated to answer the query search string guided by Boolean text operators. The weakness was the need to cross-reference the two-dimensional text extraction procedure with the social dimension – perhaps looking into the relevance of the landscape character units identified with the stakeholders that are part of the landscape. It was critical to check and map the phenomena and the landscape actors' ascribed meaning, hopefully categorising the landscape character units according to their meaning and functions. As a possible solution, other data informatics methodologies must support the evidence synthesis method to generate a more comprehensive definition and a valuation that reveals the patterns, processes, and placemaking attributes attached to the landscapes. A cross-examination and perhaps dialogues with the public may enhance the search string and funnel more findings to support the coding approach.

Some possible solutions to the gaps resulting from the written publications that see the landscape as a possible mirror of peri-urbanisation in the cultural and ecological

environment include more references to the search list. Also, developing the Boolean operator to reveal more relevant pieces of evidence may be done to scope more references.

Overall, the evidence synthesis can be a tool used for phenomena mapping but should be further supported by other devices to map all dimensions of the landscape to generate a more grounded and well-evidenced result. For the next chapter, we look into finding more meaning in the peri-urban landscape of Cavite by looking into its temporality – the morphogenesis being integral in creating a baseline analysis of the landscape phenomenon.

Chapter 6.

Conclusion, Reflections, and Recommendations

This chapter concludes with landscape scenarios and actions moving forward. It includes a section on the relevance of the Landscape Character System and its relevance in practice and research, dissemination and data lifecycle showing purposeful approaches to its application, a section on the scope of work done including limitations encountered, and impacts emphasising the importance of the classification and description mapping approach for Cavite and the regions of the Philippines, thus leading to recommended actions for integration towards a landscape-based Philippine planning framework.

Chapter 6 will delve mainly into the purpose of this research – from the new ideas it proposes to understand the landscape and its associated semantics, systematise the landscape attributes into a format for judgement and assessment and integrate the system into the regional planning framework of Cavite, Philippines. It also becomes the review of the Peri-urban Landscape Phenomena of Cavite, Philippines, where the landscape is in flux and accommodates new development spaces. This culminating chapter also includes the successes and failures that transpired during the research process while highlighting the contributions and opportunities it opened for future landscape research to commence. Lastly, Chapter 6 will recommend what can be done to the peri-urban landscape data proposed to provide sustainable actions for its future.

6.1. Relevance of the Thesis and its Original Contributions to Philippine Landscape Planning Frameworks

"Our wellbeing is shaped by the places where we live, learn, work and visit." (Place Standard tool Strategic Plan 2020-2023, The Scottish Government, 2020, p.5)

This peri-urban landscape research was designed to generate fresh insights into definition modelling in a country where landscape data is close to unavailable. Landscape descriptions, as presented in this thesis, proved this is possible - how integrating different data formats can be done using a complex mix of procedures presented as the LCS.

Understanding the links lost between cultural, natural, and place studies is critical in addressing the environmental planning silos in the country. Data taken from both the ecological and cultural spectrum of the environment are essential resources as these are receptacles of landscape attributes in the place of inquiry. Landscape dynamics from this thesis will move forward as a personal and communal narrative, leading conversations on landscape literacy as a critical and primary component in the sustainable management of peri-urban landscapes in Cavite.

Also, this thesis provided a valuable opportunity to advance landscape architectural studies in the Philippines. The ability to integrate the importance of the landscape through this research was a leap from the usual mediocrity towards landscapes in environmental planning procedures.

As the research gaps in this thesis may be answered, the research also became a relevant catalogue of landscape attributes for peri-urban landscape planning in the Philippines. It may advance the value given to landscape in predicting futures of areas in flux like the peri-urban. It can also develop a landscape planning model to ground

sustainable landscape management and development guidelines to the rural-urban interface.

Some of the resulting data sets considered as the original contributions of the thesis to landscape studies in the Philippines included:

1. The territorial adaptation of a Landscape character system in Cavite with a format that can be moulded into different maps for interpretations. Should this be considered in planning frameworks, it may become the first LCS to be adapted in the country.
2. An Evidence-based Landscape Descriptor Mapping (EBLDM) Procedure that produced Cavite's landscape character area descriptor typology (LCAr-DT)
3. A Landscape Morphogenetic Character Simulation (LMCS) tool that utilises the montage and the DPSIR and DESTEP framework to create landscape character area morphogenetic montage clusters (LCAr-MMCs)
4. A Future Landscape Scenario Workshop (FLSW) with Landscape Actors as the data source to extract the future landscape scenario clusters (FLSCs)
5. A Landscape Walking Narratives (LWN) Procedure that adapted the Derivé and Oral History techniques for gathering landscape word clouds (LWC)
6. Landscape data visualisation strategies that sync landscape data to be integrated into the planning framework for Cavite

Finally, it was essential to consider landscape from the macro to the micro-scale level to explore a better landscape character catalogue for the Philippines. Thus, the most relevant contribution of this study was the adaptation and localisation of a Landscape Character System for the peri-urban Philippine region of Cavite. This contribution to regional planning integrated the layers of landscape Information in Cavite as the proposed output. The landscape's characteristic layering followed a cataloguing procedure that enriched the landscape with texts, images, sketches, and narratives gathered across several years and layers of interaction with the landscape. Therefore, the research produced a comprehensive database of peri-urban landscape information

from the multi-dimensional data gathering strategies to reach confidence in the validity of attributes catalogued as the LCS. By doing so, Cavite's image, structure and future narratives through a comprehensive definition of Cavite's landscape character were showcased as a document that can be defined as its landscape manual. This strategy also juxtaposes the landscape as a mosaic of attributes critical in exploring possible future directions in a region which is highly vulnerable to the changes of peri-urban drivers of change.

6.1.1. The Peri-urban Landscape Speaks: How the Landscape is felt in Cavite's Peri-urban Narratives

Kroeber (1917) and Huxley (1955) explained culture as similar to anthropological sciences and became a collection of human activities. Culture, according to them, expresses objects that were "superorganic" (Kroeber, 1917) - culture may be combined as one despite coming from varied influences, and alternatively, it may be influenced without affecting the system. Also, culture may be expressed as products like artefacts, mentifact, and sociofacts which were material objects showing development or advancement. Also, Kroeber (1917) and Huxley (1955) also found it best to describe culture according to what moulded it – the stimuli that created it in the first place.

From this point of view, the landscape was the player in the nature-culture narrative - the landscape was then perceived as a carrier and receiver of the voluminous influences in an evolving environment. With its innate flexibility and vulnerability lies a landscape character that could be altered through time and expressed in new forms, patterns, and perceptions.

Santa Maria (2001) had been vocal on how the landscape has helped build up the narrative of cultural sites. From this perspective, she emphasised the role of the natural environment as a source of a culture's evolution,

“We build with the materials around us; we eat what is nearby or compatible with the area’s soil and weather. We regulate behavior through superstition, religion, political law, scientific guidance, emotions. And we renew our belief in ourselves by passing on the story of how we as a community have been coping with the natural environment, and with our attempts at coping.” (p.36)

The many identified landscape elements shown through the LCS were polygonal units, viewpoint images, and other clustering types. Location attributes and the topographic character of the region were also significant factors of development, and the LCS was a good reference that proved this. As Cavite became one of the primary destinations for trading and the source of forest and ocean-generated supplies, Cavite then provided various settlement options to the migrating population. It provided various landscape choices – the uplands, the riparian, and the coastal setting within Cavite (Medina, 1994. Cavite's landscape also became the natural setting as it has resources in the uplands and the riparian channels while having lowland coastal sites for the economic trade and agriculture on both land and sea.

From a geopolitical perspective, Cavite's location made it the most immediate place to relocate. It provided services deemed necessary for those migrating from Metro Manila and again highlighted in the catalogue of images presented in this aspect of Cavite's landscape.

During the pre-Spanish period, Cavite's location near the trading water of Manila Bay made it the most immediate choice for building settlements. It led to the development of several settlements in Cavite. During that time, the three dimensions of Cavite's landscape could be best described in the following terms:

- FORM: relatively unused land with organic patterns of trading settlements
- FUNCTION: a provider of natural resources from upland and coastal areas and the trading grounds for its coastal shores. It also functions as a good location for settlements to thrive because of its geographic location.

- **MEANING:** the landscapes of Cavite have been capacitated to include various conveniences to the lifestyle of the people. As a result, the areas have attracted more *balanghays* to move towards Manila through the access point of Cavite.

During the Spanish colonial period, two distinct landscape characteristics of Cavite flourished:

1. Its agricultural character is a result of the acculturation of the "hacienda" system.
2. Its "revolutionary" character came from how it became the settlement location of several revolutionary leaders during the wars that led to Philippine independence.

Landforms were influential in settlement growth throughout Cavite. The distinct landforms found within Cavite result in various forms of geopolitical boundaries. Aside from the boundaries it projects, the landforms also allow the growth of different forest species that some consider essential supplies in building construction. As Cavite was approximate to trading centres developing in the bay area of Manila, it became apparent that Cavite could be the best location for service facilities as its proximity became an asset for transporting building materials, especially during the period when galleon ship production was located near Manila (Medina, 1994). Providing this transport-driven industry with products they can use for construction also resulted in more job opportunities for the natives and the migrants of Cavite.

This highly relevant landscape setting resonated in the settlement preference and how prehistoric Cavite towns developed place-identifiers. These place-identifiers in the form of town names resonate with attributes from the landscape. Medina (1994 brought several examples, including place names relative to a landform, to a distinct fauna and flora.

Cavite's cultural landscape situation can also be expressed through the language of cultural properties. Compared to the other peri-urban regions around Metro Manila, Cavite contains many cultural properties listed in the Philippine Registry of Cultural Properties (National Commission for Culture and the Arts, 2017). The cultural properties are highly tangible, most of which are buildings and architectural structures considered essential images of the past by historical and cultural organisations recognised by the government. It is noted that landscape architectural works of the early '90s were also included in the registry, making some of the early recreational and subdivision development integral to the culturally- significant landscapes.

As early as the 1960s, the Philippines had been establishing protected areas under the Department of Environment and Natural Resources (DENR), making several protected areas in the peri-urban under the management of this government unit. However, forest reserves were still converted into urban agricultural plots and land that the secondary and tertiary service sectors need. In the tabulated protected areas sourced from various references, Cavite had one distinct protected landscape located at the western portion of the land – the Mount Palay-Palay Mataas na Gulod Protected Landscape protected under Proclamation No. 1315, c.2007. This portion of Cavite comprised 2.78% of the province's total land area, implying a partially small area under protection.

Peri-urban growth sprawled from the edges of Metropolitan Manila to the countryside, adversely changing the landscape's identity in Cavite. It was particularly alarming, yet it was not addressed at the landscape level at this point. Shown in the clustering was the adverse effect of the processes on the physical and intangible aspects of the landscape - one that had to be considered soon in planning at a regional scale.

6.1.2. The Purpose of the Landscape Character System in the Planning Framework of Cavite

As a culmination of the thesis, it was necessary to focus on why it was finally apt to localise the landscape character system approach. Established through Chapters 1 and

2 were weaknesses of Philippine planning intertwined with peri-urbanisation adapted in the landscape construct as a solution to landscape challenges in a country where the concept was stagnated in its developing phase. By opening to this possibility, it was critical to localise measures that can be used and that a critical understanding of what can be applied should also be part of the selection process.

In this case, the localisation of the landscape systematisation to integrate landscape in the context of urban development was explored and presented to see how measures may be included in an LCS, where measures may be recommended for development, or where measures may not fit in a developing country like the Philippines.

Through the LCS, solutions to the challenge of ascribing descriptive components in the contextual level of space and place were presented to grasp the unique attributes of the pilot study region of Cavite. In doing so, attributes were tested to be within a receptacle, in this case, the landscape, as it became the collective language – a valuable syntax in sustainability. Additionally, as a tool, the landscape can guide regional land management undertakings for future landscape judgments.

The LCS as a research method became helpful in landscape character assessments for several reasons. First, it showed the physical attributes of Cavite. The LCS could bring in the natural and cultural attributes taken from different dimensions of time and space, becoming Cavite's description syntax. The catalogue of information presented here gave Cavite what cultural and natural philosophers emphasised as culture-nature aspects of the land that can mirror actions that may be done towards it.

Second, The LCS could also result in landscape expressions that may mirror Cavite's landscape directions. With the Landscape Morphogenesis Clusters as an example of the many landscapes clustering that may result from the LCS, the LCS became collective evidence of evolutionary processes changing physiographic and cultural descriptions.

It then became the temporal qualities of the landscape, typologies of space being evident in text, image, and practices.

Third, the LCS was also a collection of intangible attributes – values of the landscape usually overlooked unless explored as easily as tangible entities that can express their perceptive influences.

This approach was considered exemplary in the inclusion of natural units in the characterisation and the inclusion of the cultural descriptors of place associations that can also recognise the cultural aspects of the landscape as essential entities in future planning directions.

The LCS became the spatial object with a complex set of landscape descriptions. This systematisation was the adapted approach that answered the landscape enquiries in Philippine planning. By becoming a collective solution to all the research questions presented, landscape characterisation became a powerful ethos toward sustainable directions for the Philippine landscapes.

As explained in the earlier chapters of this thesis, landscape and urbanism processes is unique in almost every country - practice, experience, and expertise are some of the many aspects that support this claim. Understanding how they interact using methodologies that can become evaluation tools is critical to providing valuable knowledge in practice-based or research investigations.

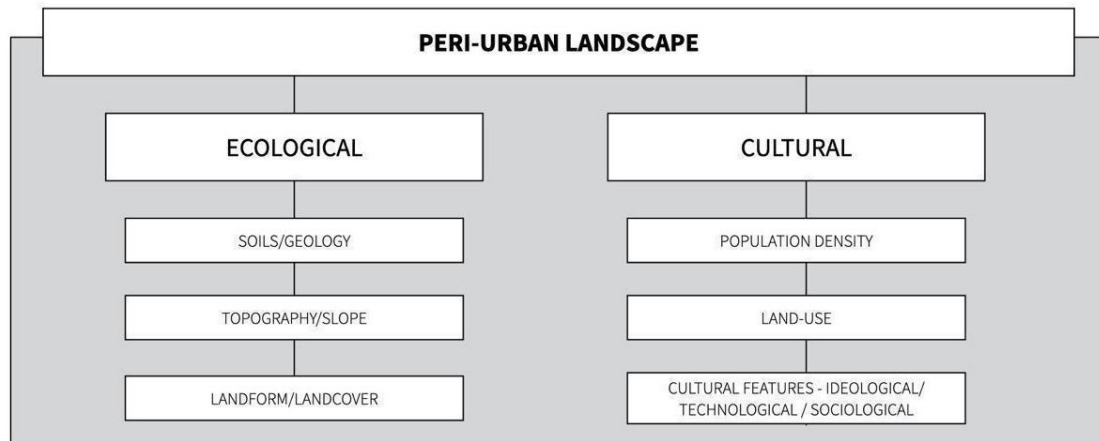


Fig. 82. The Peri-urban Landscape Attributes Framework for Cavite

The dynamic character of the peri-urban landscape attributes (Fig. 82) would not be understood if not for the creation of the LCS. Given the wide range of data available yet were not correlated into a functioning database, interactions of layers and units were not possible. The idea to also seek clarifications on how these layers overlap or where more gaps to solve may be seen will only be realised if these landscape description units (LDUs) were analysed at different scales and granularity. Also, presenting it here in this manner made comparative investigations with other countries with existing landscape characterisation models easier, if not less complicated. Discussing it in a language that was becoming globally acceptable with the ELCAI project (Wascher 2005) became one of the many research projects that tried to synchronise the approaches in each country to reach an understanding on where they are distinct and the same.

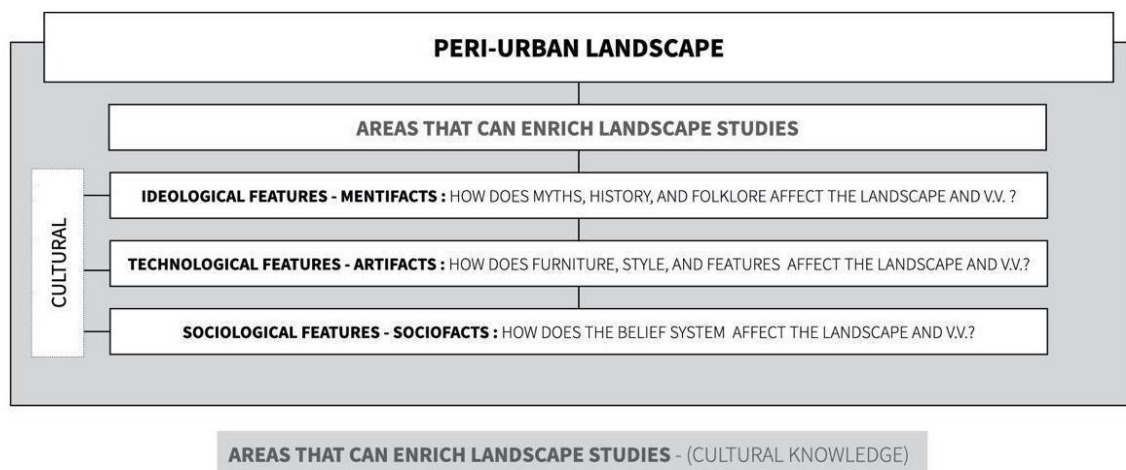


Fig. 83a. Areas that Can Enrich Landscape Studies – Cultural Knowledge

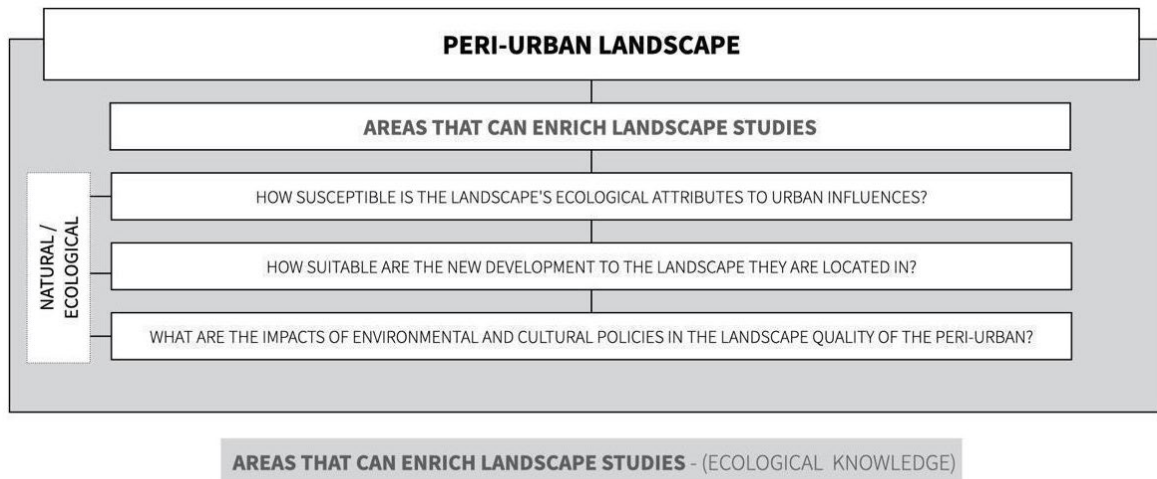


Fig. 83b. Areas that Can Enrich Landscape Studies – Ecological Knowledge

6.1.3. LCS as a Volumetric Landscape Data Catalogue for the Philippine Landscape Planning Framework

The LCS of Cavite contained significant landscape data volume from different dimensions of landscape data references. As a collection of landscape data, the LCS became a framework for visualising landscape information. The data set then programs the information into a decision support tool to process data into a valid format. It also became easily navigable, as the LCS became a common language where data can be fed to enrich information should additional attributes be added to the system. The data scripting also became possible references for nature and culture-based solutions, perhaps for disaster management plans and habitat preservation that could be proposed for a more sustainable regional plan in Cavite.

As an initial analysis of the volumetric data containing the peri-urban identity, it was possible to confirm that man's personal and community-level interaction with his environment could be the foundation of a successful peri-urban placemaking strategy. The attached symbols, signs, and codes to a culturally valued landscape were interpreted as foundations towards creating place image that was connected to its environment.

A second conclusion involved the complex interaction of quality places to the moulding of the peri-urban character. Understanding the ideal landscape considered quality areas also moulded more peri-urban areas similar to Cavite. Aside from the practicality of moving industrial spaces to the peri-urban, people also moved to the peri-urban because of the liveability and environmental sustainability potential. It resonated with the earlier concept of Howard's (1902) Garden City and Wright's (1932) Broadacre City, where the peri-urban is the counternarrative - a space of rural ideals blending with the urban as the blending of both characteristics brought back the importance of natural resources as connectors to the environment - primary geographic forms like the bay, rivers, and the mountain became prime components of land. These characteristics are also vital to attract people to the peri-urban and develop imagery attached to quality landscapes - landscapes where nature and culture are harmoniously combined.

Lastly, placemaking approaches identifiable at the neighbourhood level were revolutionary approaches implemented by placemaking movements worldwide. These approaches, once utilised in planning, can create a culturally sensitive strategy that may form the peri-urban character of the urban fringes of Metro Manila. The everyday landscapes of the community can prove to be a helpful attribute for consideration in creating culturally valued places.

6.1.4. Landscape Data Lifecycle Model as the Data Management and Dissemination Plan for the LCS

The practical devices of thesis application were shown in a landscape data lifecycle model -a 6-step data lifecycle plan that expands the research into long-term applications and different data formats. This model was adapted to culminate the thesis with a data management plan that included disseminating the proposal for adaptation of the LCS and data processing for possible use in different fields and studies. This data plan was proposed in a life cycle of activities to hopefully guide data integration toward the Philippine Landscape Planning Framework.

The first step of the Data Lifecycle of the LCS was discovery and planning. In this first step, landscape data underwent the discovery processes where activities were carried out to create data variables. Data collection was followed as the LCS, where landscape characteristics become data objects populated into a system framework for evaluation. It was then followed by data analysis, where landscape data became translated to a form that can be interpreted for practical applications. The following steps to continue this life cycle model were relatively external to the thesis, where publishing, sharing, migrating, preserving, and reusing data were all considered in data management.

The inclusion of the Data Lifecycle of the LCS as a conclusion to this research suggested the importance of the data flow processes in system planning. As shown in the diagram in Fig. 84, landscape data in this research were understood to undergo different formats as research objects that do not stagnate within the LCS but must transform into helpful information to become landscape character assessment materials for value judgment. Also, the different formats and processes of the landscape data must all undergo a long-term management plan that will hopefully be reused for further LCS improvement.

DATA LIFECYCLE

Adapted from DDI (Data Documentation Initiative) Research data lifecycle format) pp. 17-20 in Corti et. al., 2014, Managing and Sharing Research Data

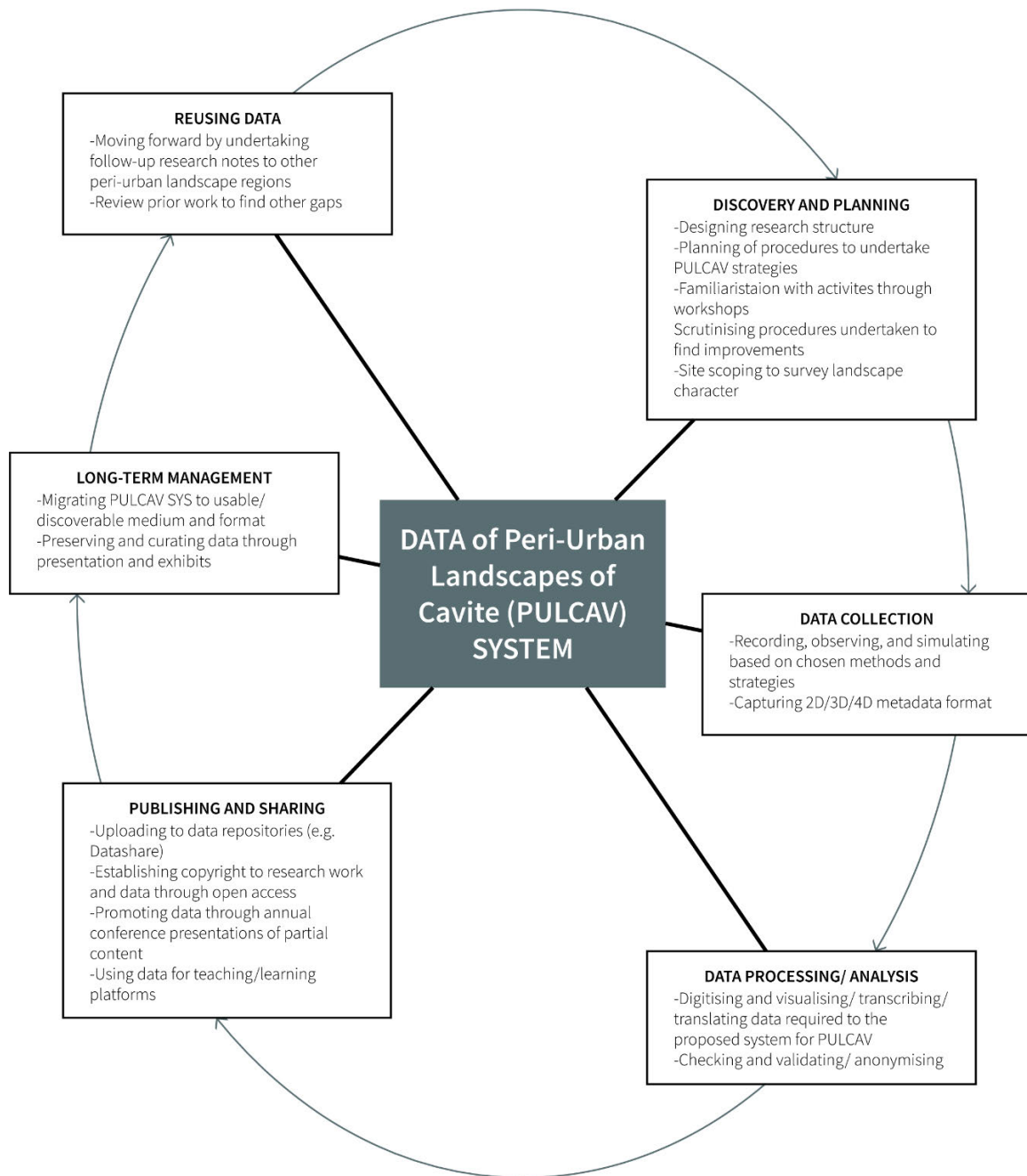


Fig. 84. Data Lifecycle for the Landscape Character System (LCS)

6.1.5. Dissemination of LCS in Different Engagement Formats

Further to the plan to bring the thesis towards practice, several dissemination plans were already delivered as part of the data life cycle plan. Information sharing, which fulfilled the 4th step in the life cycle plan, was explored for the LCS. To be able to achieve this, parts of the research were already presented in symposia, colloquiums, and conferences as research papers, posters, and recently as part of the keynote speech delivered at the 7th Philippine Association of Landscape Architects National Convention entitled NAMI: Productive Landscapes through Preservation, Protection, and Enhancement. The keynote speech was entitled, “Preserve, but How? Rethinking the Landscape Actors’ Role in Promoting Landscape Awareness in the Emerging Philippine *Desakota*”. As delivered in a keynote speech, the most recent application presented the results of the thesis to a group of landscape architects and professionals in the allied fields. In the keynote narrative, the LCS procedure was highlighted as one that should be considered in regional planning, a conversation that sparked realisation from landscape practitioners on how important landscape-based solutions are in safeguarding our landscape. Realisations on the role of landscape actors in defining quality landscapes also emerged in the discussions from participants. In this keynote presentation, word clouds were also explored to verify word associations of landscape practitioners towards the landscape. It confirmed how the landscape was closely associated with the term “nature”, yet queries emerged as to how, despite this connection, ecological systems still suffer from wrong planning decisions centred on urbanisation and economic gains. The speech ended with realisations from the participants regarding how landscape practitioners should consider more landscape-sensitive design approaches in the country.

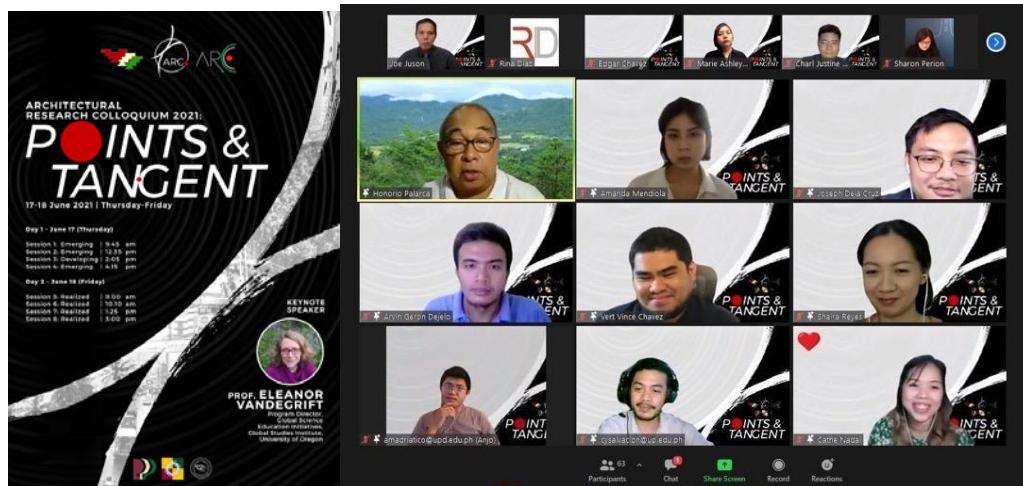


Fig. 86. Images taken from the Class presentation entitled, A [PLANE] of Landscape Inquiry: [POINTS] of Literary Encounters in Landscape Research held during the University of the Philippines College of Architecture - Architectural Research Colloquium 2021: Points and Tangents (UP College of Architecture, 2021)

The more recent application of the walking narratives was also in an academic thesis for the course, LArch 200: Landscape Architecture Thesis, in the same university. Trias and Nadal (2022) also took the methodologies of the LCS to explore the application of evidence synthesis techniques and the walking narratives in a digital, online format to be able to develop a hybridised landscape-based walking approach in gathering landscape perception attributes of people engaged in walks along a histo-cultural trail in the locale of Tondo in Manila. A full explanation of this research can be found at <https://haraya.upca.upd.edu.ph/2022/07/11/lens-of-the-present-pasts/>.

Since 2017, presentations in colloquiums and conferences have also been done, disseminating the landscape character system in different formats across the globe. Gathered from these venues are criticisms on how to improve the format or adapt other procedures to improve the one I have designed for the LCS.



Visioning the Peri-urban Landscapes' Future: A Social Constructivist Pedagogy in Phenomena Mapping through a Future Landscape Scenario Workshop

Cathe Desiree S. Nadal¹
c.d.s.nadal@ed.ac.uk

Abstract

The Future Landscape Scenario (FLS) Workshop is a landscape architectural research procedure applied in elucidating the Peri-urban Landscape Phenomena of Cavite, Philippines. It uses a participatory format and a pedagogical process that Downing and Swaffield regard as the Engaged Action Research technique - a pedagogical procedure that involves social engagement in landscape investigation and pedagogy for future management and policy directions. The FLS Workshop proposes to the landscape planning procedure the addition of participatory tools like reflective practice, shared actions and adventurous learning protocols and explores the application of social constructivist theories in answering a landscape research inquiry.

In the FLS workshop, social attributes were crucial components in elucidating future landscape scenarios. These consisted of the human components in a landscape, also known in this research as the landscape dwellers. They included a representation of different sectors - young leaders, planning members, non-government visionaries, community members, as well as landscape practitioners and researchers. The landscape dwellers then became the participants in the research process, thus providing a data informatics framework that is multilevel and highly participatory.

With the application of the FLS Workshop, the landscape dwellers strengthen the results by creating a more objective landscape research protocol - providing participants the ability to create a landscape catalogue of diverse landscape scenarios as an outcome of the workshop. As applied in elucidating the future landscape directions in Cavite, the FLS Workshop resulted in several peri-urban landscape syntax in the form of: (1) text objectives gathered from reflective practice as an initial workshop engagement of individuals living in Cavite (2) conceptual photo montage showing Cavite's landscape character gathered from shared perception of present Cavite, and (3) conceptual sketches of Cavite's futures from collaborative engagement and design. The resulting texts, images, and sketches are crucial as these will be used to move forward with a critical analysis of the directions that the landscapes of Cavite will undergo through peri-urbanisation. Also, the results will create a catalogue of landscape syntax - mobilising the landscape dwellers as direct participants and collaborators in understanding Cavite's peri-urban landscape future.

Keywords: Future Landscape Scenario Workshop, Social Constructivist Pedagogy, Phenomena Mapping, Peri-urban landscape, Engaged Action Research



Fig. 87a. Image from the paper presentation entitled, Visioning the Peri-urban Landscapes' Future: A Social Constructivist Pedagogy in Phenomena Mapping through a Future Landscape Scenario Workshop from the IFLA Asia-Pacific Congress held last 2019

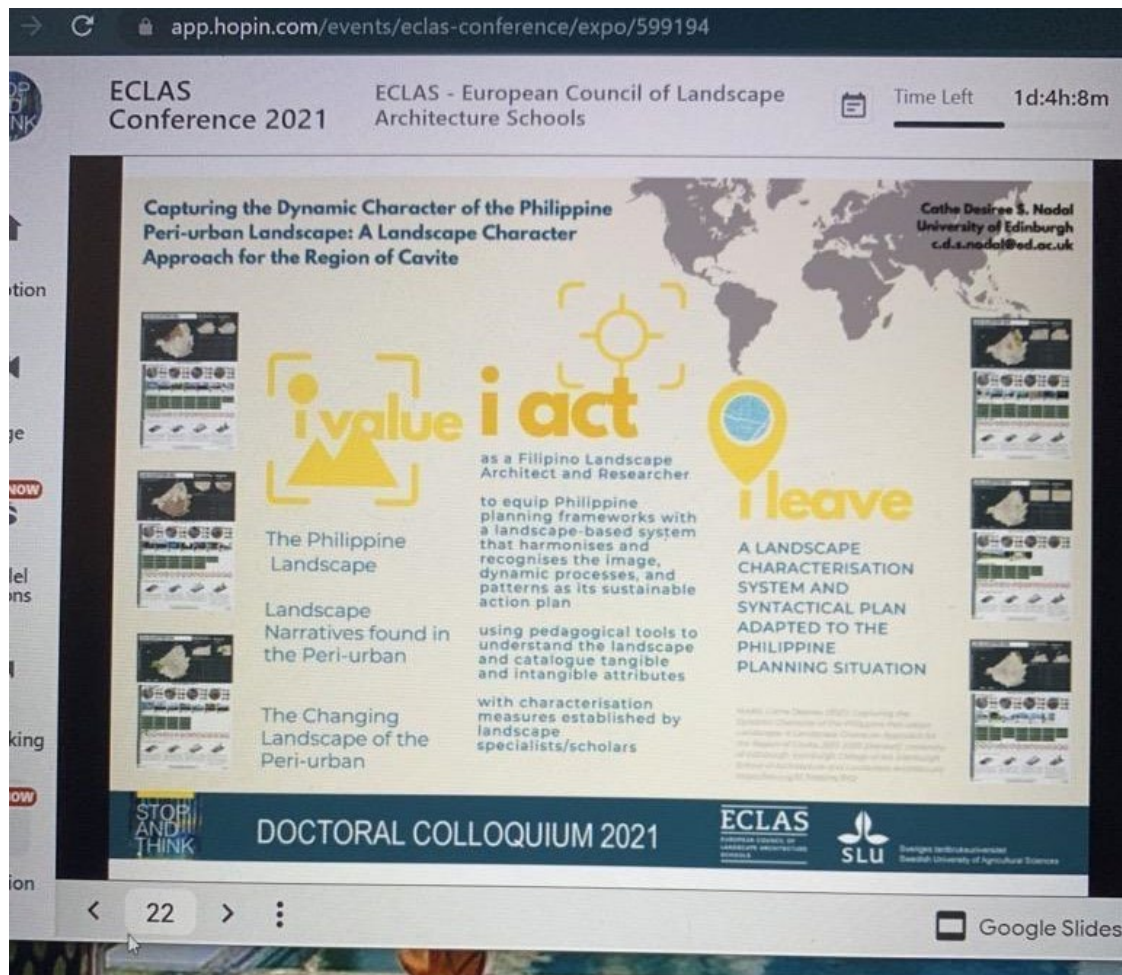


Fig. 87b. Image from the online poster presentation from the more recent Doctoral Colloquium of the ECLAS Conference 2021

Currently being crafted are digitalisation plans to explore the involvement of actors in identifying landscape units around the Philippines. Digitalisation plans included setting up peri-urban landscape channels on social media websites, including Youtube and Instagram, to present the data objects created for this thesis. Social media channels were the most sought-after tool to share everything in a format that can easily be understood. Hopefully, sharing all the landscape character units of varied types could make it valuable in research and practice and to those who live and experience the landscape in the region.

Publishing work was also planned to find national-level funding bodies that can accommodate poster exhibitions on Cavite. It was presently being explored in a different format - digital maps that can be shown in digital museums to explore understanding of a bigger market.

Soon, landscape character system projects and reports in the other peri-urban regions were being planned, moving the research and procedures outside the realm of the academy. This plan will continue with integration of the LCS in planning and standardisation committees in local government- perhaps to explore all the applications of the procedures on different scales while also equipping local government units with more landscape-responsive solutions.

Soon, tools was planned to be crafted for methodologies in the digital realms - allowing mapping and collaboratively syncing data in an open-source format as part of the plan. It will further the research by Trias and Nadal (2022) in creating data digitalisation toolkits that can empower the landscape actors in finding solutions to the many problems of landscape in the country.

At present, speaking engagements were also being considered with Philippine local government units to reach the adaptation of the LCS as a mapping tool for regional or national policy. Also, editorial engagements were beneficial as the landscape became a critical component in practice fields. Some of the more recent practical engagements included the technical consultant/editor for revising the Technical Education and Skills Development Authority (TESDA) modules in the country where landscape characteristics became important components for landscape maintenance. Another engagement included the editorial board role in Landscape Standardisation for Landscape Architects by the Philippines Association of Landscape Architects (PALA). Resulting of this engagement is the first of the country's Landscape Architecture Design Standards of the Philippines. Both editorial engagements brought landscape attributes as essential features in practice. Sustainable solutions where the landscape is recognised as its component will also be considered soon as the continuation of Luntiang Pook, an engaged-action workshop series headed by the National Commission with Culture and the Arts (NCCA) and the Philippines Association of Landscape Architects (PALA), in partnership with local communities. This grassroots approach is also being considered to extract landscape characteristics based on the knowledge of

community members who will be engaged in designing their communities through the workshop. All these engagements are part of the greater scheme of LCS application.

6.2. Scope of the Research and Limitations Encountered

Like all writings supporting this thesis, the goal for classification and identification was to utilise information to recommend further assessment and management of spaces for a harmonised future of man and nature in the Philippine setting. The thesis started with this premise, scoping information on the cultural and natural properties of landscape that remained and listing properties that were not safeguarded through integration in local plans. Last 2017, a comparative analysis of the Cultural and Natural Properties in the Peri-urban Regions of Manila was made to grasp the types of natural and cultural resources that exist in Bulacan, Laguna, Rizal, and Cavite (see Fig. 88 and Fig. 89). The four regions are the enveloping towns of Metropolitan Manila that are presently accommodating the sprawl of this growing HUC. This evaluation strengthened the need to look upon the region of Cavite as it is one of the regions highly populated with cultural and natural properties while still accommodating the urban change.

These earlier studies are presented here to reflect on how cultural and natural properties remain stagnated with the minimal value given to them in the urban plan: they exist but are again disregarded as landscape data that may be integrated into planning frameworks. For this to be interpreted into graphs was also a reason that grounded the dire need to find a solution to landscape data creation and extraction for planning. Seeing this in a format that would be useful for assessing and developing landscape actions, especially in the Philippines, became a significant result of this thesis.

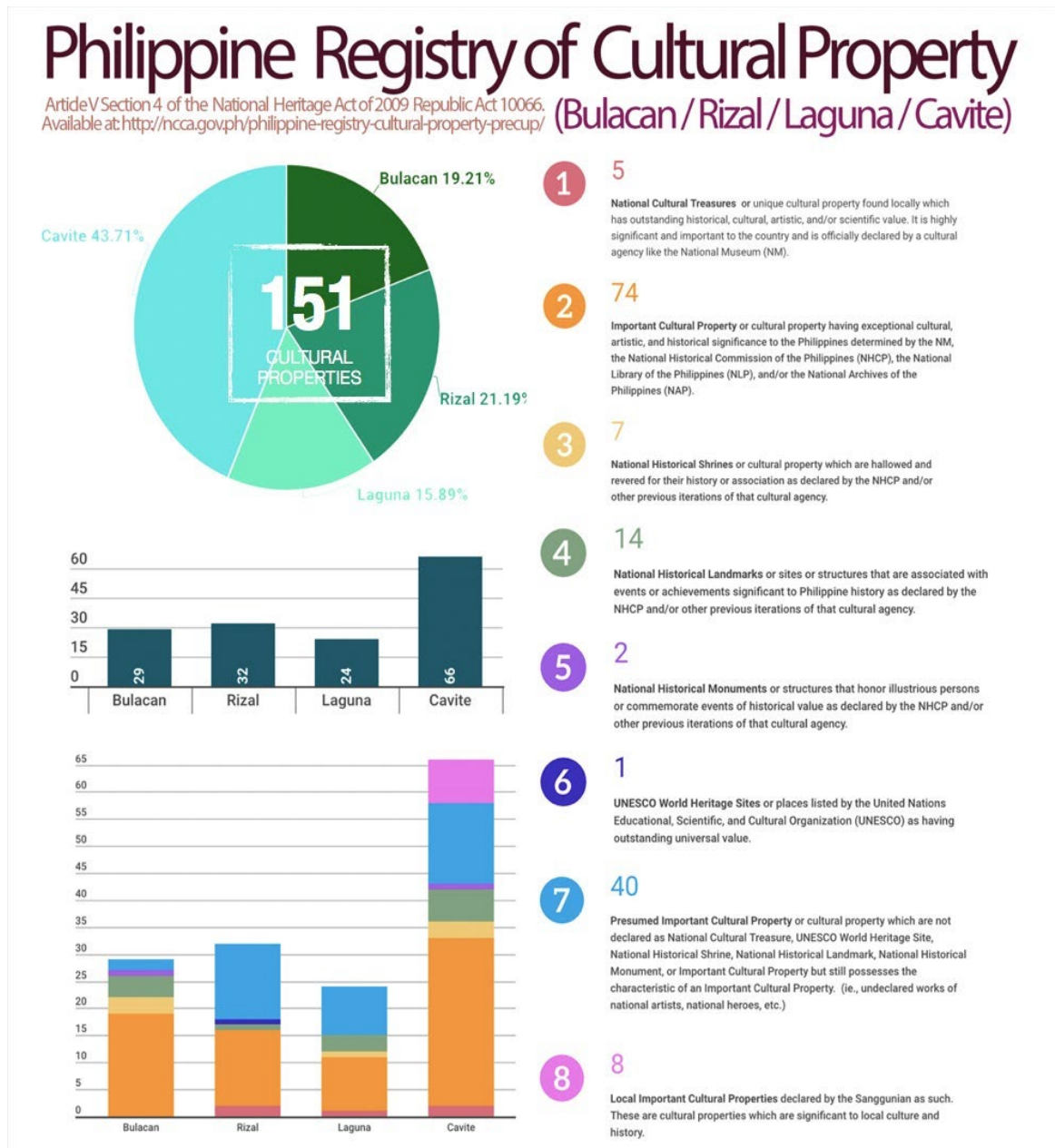


Fig. 88. Cultural Properties found at the Peri-urban Regions of Metropolitan Manila's Fringe (Nadal, 2017, as adapted from Article V Section 4 of the National Heritage Act of 2009 Republic Act 10066 in the National Commission for Culture and the Arts. Philippine Registry of Cultural Properties, 2017)

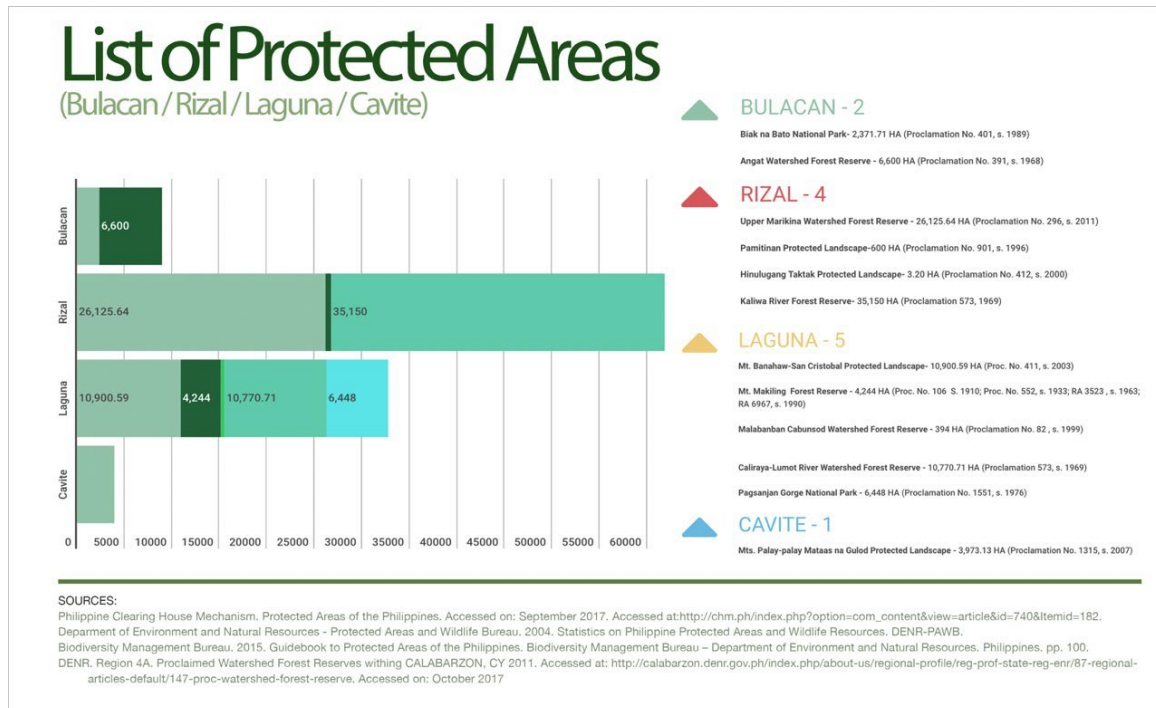


Fig. 89. Protected Areas found at the Peri-urban Regions of Metro Manila's Fringe (Nadal, 2017 as adapted from varied sources)

The scope of the research became very specific to the site of Cavite, a region in the Philippines, as studying this area can be done within the timeframe allotted for this thesis. Thus, research methods undertaken render results that are unique to the region. Landscapes have consistently been unique and complex. Although research procedures are expected to help bring new insights to Philippine landscape research and practice, the study remains landscape specific. The results are expected to render exceptional results only for Cavite.

Aside from being site-specific in scope, the research also encountered several delimiting challenges. The challenges brought by these limitations to the research plan led to the adjustment of data collection procedures and research timeline.

What became one of the limitations of the research is data availability. Philippine landscape data access and format were exceedingly limited. Available information was mostly outdated or only available in hardcopy format. Thus, research procedures were

recalibrated to fit this situation where data extraction and map making became necessary and were considered an activity of top priority.

The creation of base maps became part of the research to resolve the limitation of data. These maps are critical components of the landscape definition classification procedure, and their generation was considered essential. Base maps were created to be more accurate and being able to create them demanded the addition of another year for the research.

Additionally, biodiversity and ecosystem maps were not readily available at the scale used for this research. Key biodiversity areas (KBAs) in the Philippines are categorised in such a huge scale rendering inconclusive for analysis in Cavite alone. This particular reason was also one of the gaps being focused on some of the research papers in the University of the Philippines - Landscape Architecture Program to resolve this particular challenge in landscape studies - data is not available in a format useful for value judgment needed to manage our Philippine landscapes. This lack of data maps greatly impacted the research, with information also being cross-examined from references such as PhilGIS map files, QGIS software map plug-ins and Open Street Maps to resolve it. Also set in place were referencing based on field visits to scope the validity of maps from 2018 to early 2019. Visual scoping procedures such as photo documentation and overlay of different maps were also added.

Another limitation affecting the scope of the research is the landscape itself – as its natural attributes proved risky for research to commence at times. As the landscape posed as being dynamic, the research activities and data sets produced assumed site conditions before the onset of the natural disasters and health risks of 2020.

With Cavite being located near the active Taal Volcano, a portion of this study had to be changed limiting data gathering measures by a major volcanic eruption that began in early 2020 till present. The volcanic eruption of 2020 also changed the landscape character being studied. With the eruption driving change in Cavite's landscape, landscape data gathering had to change. Presented with an erupting volcano, actors' perception of Cavite was also assumed to have changed given this very vulnerable landscape situation. Access to the region also became limited due to the risky site conditions.

The on-site data collected last 2018 to early 2019 were those left for further analysis. The other data produced as research objects from 2020 onwards were already processed using remote information gathered from mapping tools generated through information taken from online references.

Aside from the erupting volcano, the global pandemic became one of the many challenges of the thesis. Further surveying of the users that should have been done as part of the review of results became impossible given the restrictions of town to any research activity. It added to the already limited data and collection procedures disallowed by logistical and pandemic restrictions. This part of the thesis was then recalibrated to conclude with data dissemination through webinars, and other formats since feedback from landscape actors was challenging to obtain with all these restrictions.

Overall, generating a comprehensive landscape database for Cavite required a more extensive data collection timeline aside from flexibility of activities. The landscape is very dynamic, with financial, time, and travel restrictions also proving to be delimiting factors that must be considered in the research plan. Contingencies should be in place should all these factors alter the research format to deliver valid results in the end still.

6.3. Impacts and Other Expected Outcomes of the Research

Cavite's current peri-urban situation resonated with a symptomatically more urban than countryside character, which is then assumed to be causing a struggle in protecting the cultural and natural environment of the region. This research brought to landscape research and practices an entire knowledge database on the landscape that is structured to become the reference in planning and landscape management of regions currently struggling to sustain their valuable landscape. Knowledge of the landscape can also help predict future situations.

It is time to harness the potential of landscape-based knowledge in enriching Philippine landscape studies with pioneering research measures that can make the landscape the tool to identify future planning possibilities in a rapidly changing region.

The landscape optimises our understanding of its dynamics and attributes, making it a reflection of a robust culture, place, and ecological quality that can mirror the character of regions like peri-urban Cavite. Thus, the thesis is an opportunity to bring the potential of Cavite's landscape into greater depths of descriptive explorations using rapidly developing techniques in landscape characterisation.

The dynamic peri-urban landscape character of Cavite in the Philippines is not just a narrative coming from a landscape character system of extraction and visualisation strategies producing data clusters, but rather a criticism of the existing landscape management and development silos. We have seen accounts from Healey (1983, 1997, 2007) and McHarg (1969) where strategic spatial and character plans were highlighted and showed evidence of the landscape's importance in sustaining the land. Studies of similar type may help integrating landscape data layers before employing a realistic planning strategy. The studies by Healey and McHarg and other planners also accounted for the value of integrating landscape governance and other aspects of landscape-responsive development schemes to create a sustainable environment-sensitive framework moving forward. In a way, solutions that resonate with a balance in the landscape should still be sought before regional spatial plans are finalised.

Moreover, with the landscape relative to space, people, and time, it is essential to know and understand the Philippine landscape in different dimensions to seek understanding not just of it but also of the pieces that distinguish it from the rest of the world. To work along the path of all landscape scholars who have established before this research, the need for landscape modelling into units that can be easily understood is just a step in the long process of landscape recognition in the country. The thesis is just one of the steps to be undertaken before establishing landscape as a vital component in planning. It is now critical to reflect on words by Riotte, Fabos and Zube (1975), who reiterated that landscape is not just a receptacle and a

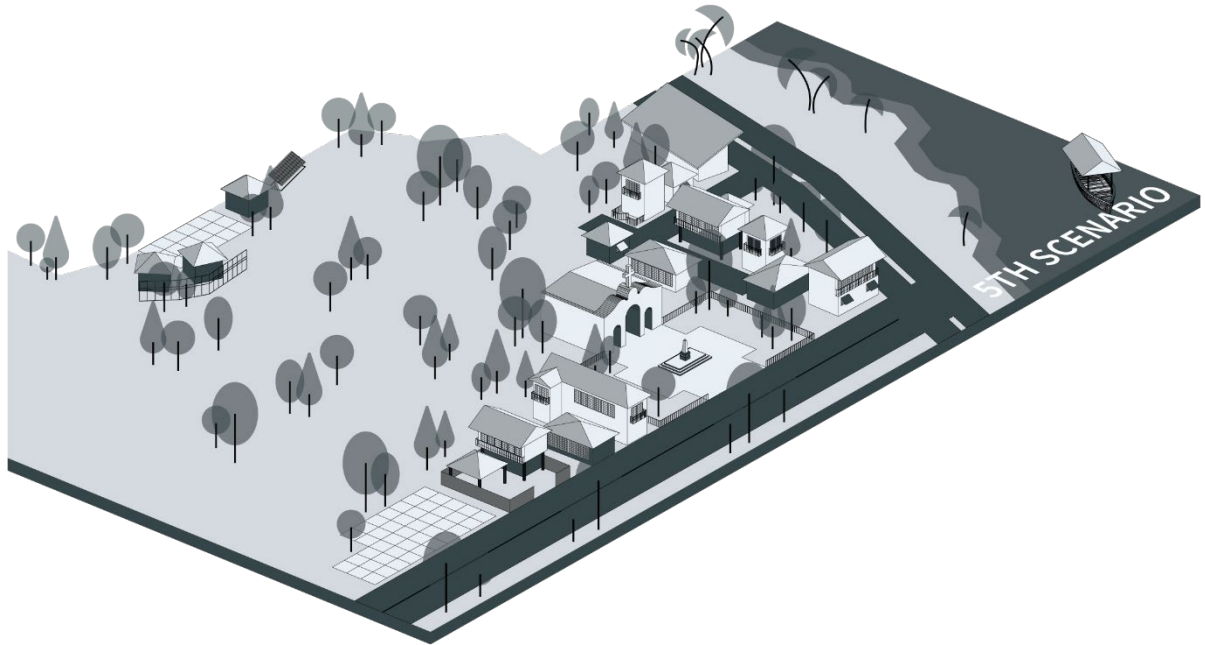
resource but also that it is a continuum that can be classified and identified to be able to establish what is available, where these are located, and how much of the landscape existing or not existing, should be manageable. In the end, the landscape character system is just a step to the many possibilities for the applicability of landscape as a concept in Philippine planning.

6.4. The Fifth Scenario: The Landscape

Scenario for Cavite's Sustainable Future

Understanding the peri-urban landscape depended on the people's openness to recognise its existence and ground their actions towards safeguarding these critical entities. Societies must set goals that harmonise landscape with the concepts and methods (Troughton, 1981). Thus, in this proposal, including the LCS and recognising its potential significantly contributed to the planning field. It became an approach that can harmonise the preservation and advancement of the Philippine landscape.

From this concept of landscape, a recommendation for Cavite's future suggests a Philippine landscape grounded in sustainable concepts. Fig. 90 is, therefore, the recommended fifth scenario that planners could consider for Cavite – a scenario that puts the resulting ideas from the FLSW clusters into one that includes the importance of health and wellness in present-day communities. It also integrated the narratives of healthy places into planning policies and economic strategies as an emerging tool for improving the quality of spaces in the peri-urban. This proposal was the recommended action for the landscape, suggesting that the grassroots approach to healthy placemaking is now at its peak at the global planning level. Eitler et al. (2013) supported this with guidelines for healthy placemaking, which included the following action plans: putting places first, recognising the economic value, empowering champions for health, energising shared spaces, making healthy choices easy, ensuring equitable access, mixing up components, embracing the unique character, promoting access to healthy food, and making it active (Eitler et al., 2013). Adopting these strategies may place leverage in areas devoid of social and personal benefits.



**Fig. 90. The Proposed Fifth Scenario: A Visual Simulation of the Sustainable and Healthy Landscape Scenario for Cavite
(Visualisation by Nadal and Barroga, 2021b)**

Another more assertive approach to placemaking in the peri-urban area explored the provision for community interaction to define "places". Communities currently struggle to connect with places as living environments face challenges from socio-political, economic and climate change (Hou et al., 2015). Despite this, communities were still impactful in creating places. Several examples were found in articles from "Now Urbanism: The Future City is Here" (Hou et al., 2015), which explores several community-centred urbanism approaches. One notable strategy used community codes that framed culturally sensitive place images for the city. The approach explored the use of vernacular community images, the introduction of community farming, and the re-establishment of public performances to promote a sense of place.

A similar approach was applied in a landscape-based community project in the Philippines called Luntiang Barangay (Nadal, 2015). It was a project exploring shifting the design ideology to the grassroots as design professionals become facilitators with the community, directly becoming designers of place visions to redevelop their community plots. The design, implementation and maintenance stages became the interface where attachments to the emerging community landscape are most felt

because of continuous "place" involvement. Capitalising on the community's imagination may eventually conceive a peri-urban image where the migrants become locals and the consumer-driven, while placeless environments become culturally valued landscapes.

As the landscape becomes intangible in most planning narratives, it has been consistently evident in many policies suggesting its importance as part of the broader discourse on place creation. Jones and Evans (2012, p.2318) brought this argument when they nestled the concept of place sensitivity in the narrative of urban policy rhetoric. They saw the sense of place as an integral component of the United Kingdom's Planning policies, putting the landscape as the integral component upon which placemaking could move forward with planning approaches for post-war reconstruction. They saw earlier narratives from the 1960s where the landscape became a repository that could suggest a sense of place. Further scanning of the literature up to the 2010 Planning Policies gave evidence of the growing place mechanisms in planning, making these tools integral to sustaining the cultural character of urban areas and communities.

6.5. Recommendations for Philippine Peri-urban Landscape Research

There are boundless possibilities in the LCS, with it being a robust and versatile system with landscape data that can be reused, clustered, divided, or combined. Highlighting in this section were several recommendations for LCS applications to improve planning for the Philippine landscape.

6.5.1. Adaptation of the Future Landscape Scenario Workshop in Regional Planning Formats

What can we do to incorporate workshops and co-design procedures in the design thinking process for peri-urban regions of the Philippines? In applying the FLS Workshop

to map the peri-urban landscape character of Cavite, the challenge of bringing in design thinkers from several sectors of the community became apparent. If such a procedure was to be integrated into the landscape planning process, it must then be incorporated through policies and learning environments that could develop the value of grassroots planning - its procedures and protocols. These co-design procedures proved their potential in generating knowledge that can find balance information from the nature-culture interface.

FLS Workshop was novel yet might be too adventurous in its learning format if controls and criteria were not in place. With most of the problems coming from participant and venue selection, it was apparent that criteria and learning protocols should be improved. How can engaged action research procedures be developed to remove the bias? Also, it became essential to look at the ideas of design professionals in the workshop process design. Where do we stop and incorporate the local/indigenous ideas? The approach opened up more possibilities to reframe the process design and select participants, facilitators, and moderators skilled in this research setting.

Weaknesses of the format included the development of networks in each group, as time constraints were also apparent. Key components of learning from the social constructivist theories (Applefield et al., 2000; Amineh and Asl, 2015) and that of those who study relationship networks (Argyle and Henderson, 1985; Amin, 2012) highlighted a slow progressive development of relationship networks in learning settings through an accumulation of pedagogical occurrences that makes people connect. In this case, workshop procedures that involve a long time to relate and develop networks should be considered as they could produce another set of landscape values like what was produced in this FLS Workshop application. Perhaps, a more precise idea of Cavite's landscape future may be produced if the participants could develop networks that can open up more spaces for them to share their notions of its landscape. Also, developing this idea may be explored to equip the results with knowledge from those trained in design thinking, especially since landscapes are also critical habitats that need proper

guidelines from those trained and knowledgeable about the natural and cultural environmental laws and guidelines.

To conclude this discourse, the FLS Workshop is a pedagogic process bound to be developed and whose results can prove endless. This method has proven that Cavite's landscape evolves as it adapts to the drivers of change. Nevertheless, Cavite's peri-urban landscape is still valued for its cultural hearths as it permeates the minds of those who live within its landscape.



Fig. 91. Participants of the FLS Workshop held last 13 March 2019, at the Provincial Capitol of Cavite, Philippines (Images taken by Nadal and Del Rosario, 2019)

Providing a landscape outlook to the present peri-urban studies in the Philippines is vital as it brings the essentiality of not just an environmental structure to direct planning into the discourse but also provides the landscape syntax that grounds any development plans that may occur in the peri-urban. It is vital to consider landscape-based syntactic measures for phenomena mapping to provide robustness in landscape descriptions. The data of these landscapes is critical, especially in developing Philippine landscape narratives, as they can assist in visualising better planning futures for the spaces between the rural and countryside.

Philippine peri-urban landscape (PUL) is susceptible to change as change is equated with population, a significant indicator of urbanisation. As the Philippine PUL becomes affected by the increasing demand for space of the growing number of dwellers, the landscape also becomes susceptible to problems caused by the lack of policies focused on maintaining the values associated with the cultural and natural environment. In the Philippines, region-wide silos in planning have already been recognised in geography, politics and agriculture, while a wide gap is still evident and must be addressed in landscape architecture in the country. Again, these peri-urban landscapes are almost unrecognisable entities of the spatial planning scene as they are emerging concepts that may be integrated if there are measures to consider these essential entities in planning.

In line with this proposed solution for the silos in planning, the inquirer saw evidence pointing towards creating a procedure for grounding future regional management plans in the peri-urban region of Cavite. The adjacency of Cavite to the highly urbanised city of Metropolitan Manila lends Cavite to the focus of inquiry. This particular adjacency to Manila prompts the possibility of the drivers of change to be in effect extensively in this region. In this case, drivers of change are assumed to be anchored on population growth, assuming the lack of information on this particular characteristic of space before the investigation. From here on, the silos of Cavite's landscapes are where landscape recognition can be the solution. The landscape has the potential to become the receptacle of solutions for sustainable solutions in future regional planning directives.

6.5.2. Adaptation of LCS Procedures in Philippine Planning Frameworks

The possibility of applying several research measures and technologies to reading and extracting tangible and intangible attributes of the landscape is impactful. It can bring new local landscape architectural practice options while bringing Cavite's landscape narrative into the global peri-urban landscape narratives. For instance, landscape

characterisation approaches may exist worldwide, although they have not yet been adopted in the Philippine planning scene. By proposing the adaptation of this procedure, the value of landscape forward in data science represents massive data sets, bringing together landscape information that will be easier to interpret and use for peri-urban landscape analyses.

In this proposed landscape characterisation plan, landscape data sets were catalogue of information fed into the proposed syntactic of landscape clusters. These clusters of landscape objects, tangible and intangible, were gathered into sets of subsystems to scope different landscape dimensions. As essential sets of research objects were integrated into the landscape character system, data clusters were created to demonstrate a unique landscape phenomenon affecting development in the region where planning silos is the most challenging –the Philippine peri-urban regions.

This thesis becomes a ground-breaking discovery for the Philippines as it suggests a multi-dimensional process in developing patterns of landscape descriptions from the one-dimensional written text, the two-dimensional images and maps, the three-dimensional immersive visits and engagement in narratives and finally, the four-dimensional morphogenesis in collaged montages and future scenario sketches. The catalogue is the landscape character system expressed by listing attributes taken from all dimensions of space and time.

Overall, the Peri-urban Landscape Phenomena of Cavite demonstrates the potential of landscape recognition in planning narratives found in a country where landscape research is minimal to none. It demonstrates the possibility of landscape recognition to readers with the emerging peri-urban situations mirrored as a landscape character catalogue. It is expressed in landscape clusters showing archipelagic landscape, saturated and consumed in different notions of space and place. The metaphors attached to the peri-urban landscape phenomena provide a meaningful discourse on how the landscape transforms and adapts in different eras of change. Additionally, it suggests a new method of seeing the physicality of the landscape as landscape cluster units. These cluster units will contain varying attachments of place

that influence future narratives, including notions from its landscape actors. The multi-dimensional strategic plan grounds the phenomena mapping with landscape characterisation as the tool and the Philippine landscape as the setting that can bring changes to the planning directions in the country. Finally, the landscape as a construct and the knowledge associated with it can be carried forward to express a landscape situation and move the position of the landscape towards a more sustainable future for peri-urban regions in the Philippines.

Cavite's landscape eventually became highly influenced by the existing regional planning frameworks. It adheres to adaptation measures to fulfil the regional planning goals (Province of Cavite, n.d.). With the clustering of data, this narrative becomes a story of growth with a syntax of data that can validate sustainable actions for the improvement of the regional goals and also as a tool that can bridge the gap in the culture-nature interface of regional development plans where the landscape is poorly included in the discourse. For adequate understanding to happen in the dimensions where the landscape is found, the landscape is then made to be useful not just as a setting where development will happen or as a visual object that expresses feelings but also as an object of the culture-nature interaction that is dynamic - it can be flexible, vulnerable, adaptable, or unalterable.

The landscape character system may be brought forward as it builds knowledge and a new language that can synthesise the information into a system of patterns and attribute clusters that expresses landscape characteristics. The landscape should be seen through possible mechanisms that foresee evolutionary processes that can sustain its growth or non-growth. In a way, knowledge is "... the more important, because it conditions and modifies the beliefs and attitudes" (Huxley, 1955, p.19).

6.6 Continuing the Discourse on Landscape Awareness for Philippine Planning Frameworks

"As we have seen, man has labo[u]red extensively to make the earth productive. As the primary tool-wielding animal, he has been governed by a second imperative as well - the need to make a mark of his own on the landscape where he is active and settled. The mark - this organi(s)ation of the space around him - may be a minor clearing in the forest, or it may be a massive conurbation spreading man's artefacts over thousands of miles. " (Salter, C., 1971, The Organi(s)ation of Space in Cultural Landscape. P.143)

As landscape characterisation slowly progressed as a solution to planning situations in Europe, the diffusion of the concept towards the Southeast Asian region was rather obtuse. The case I have focused on is the Southeast Asian region of the Philippines, which is arguably disadvantaged in landscape studies. Its situation is also confronted by bureaucratic challenges asserting further the need to look into landscape characterisation as the hypothesised solution for landscape recognition. Unfortunately, the landscape-based procedure is currently not explored as a solution in the silos of region-wide planning frameworks.

Regardless of the lack of a landscape character system to ground regional planning in the Philippines, the Philippines is not behind in developing land-based actions. A Comprehensive Urban Planning Framework (Housing and Land Use Regulatory Board, 2007) establishes different tiers and linkages for urban planning directions. However, the concerns involving the urban planning approach concerning the Philippines' landscape are rather dismal as operative procedures and guidelines putting it on the spatial platform have been argued to overly focus on zoning, housing, and economic-based land-use characterisation (Navarro, 2014). Also, the variety of layers in urban service responsibilities poses another challenge on what level of planning landscape should be considered ideal. Also, where this is already in place, planning for socio-

economic profiling used in the local level of urban development is deliberately focused on rather than clouting the ecological and cultural strata that must be important in planning narratives.

Our discussion will move back to peri-urbanisation from a global perspective to explain how its current landscape demanded immediate actions to be in place yet were again actions that could only be done should the LCS be recognised in the localised planning frameworks country.

Peri-urbanisation as a driver of change in the Philippines was closely connected to the global examples and processes of massive migration from the idyllic countryside to the busier urban areas that continue to be one of its many results. Many peri-urban scholars brought this ideology into the narrative (Webster, 2002; Webster et al., 2003; Webster and Muller, 2009; Piorr et al., 2011; Nilsson et al., 2013) a standard correlation between peri-urbanisation to changes in the fringe areas. This urban process created an almost similar growth of massive urban dwellings and recreational spaces on the outskirts of the urban core (see the full PLUREL Report, Piorr et al., 2011), and landscape character units manifested this through forms of montages, images, maps, and texts. An example that reinforced this situation was written by Troughton (1981) through his discussion of the urban sprawl phenomena that became historically relevant in the earlier planning narratives. Peri-urban scholars further reinforced the writings (Nilsson et al., 2013; Piorr et al., 2011; Webster and Muller, 2009; Webster et al., 2003; Webster, 2002) as similarities seem to be found in the influences of peri-urbanisation on land change. This situation is for further analysis in landscape research, where the silos now identified through the LCS should be brought forward for further assessment for policy and management creation.

Again, the peri-urban process was not new and had been in effect in the Philippines as the country transitions into different eras of urban land development. It affected the outskirts of Metropolitan Manila, also known as the National Capital Region (NCR), as it shifted land development towards global development aims. It was evidenced by the

decentralisation of urban services and the expansion of settlements in NCR's outskirt regions. In the latest analysis of the Population Growth Rate of the Philippines (Philippine Statistics Authority, 2016), rapid urbanisation has equated to the population growth rate of NCR's adjacent provinces: Cavite at 3.86%, Rizal at 3.50%, and Laguna at 2.89% (p.xxvi). These areas have the highest growth rate outside the NCR and are in the adjacent Region IV.



Fig. 92. Metro Manila and the Surrounding Peri-urban Regions

Expanding the urban ideals from NCR to the adjacent provinces of Region IV resonates with McGee's (1991) *desakota*: the Bahasa word *desa* means a city, and *Kota* means a town. This term collectively translates to the combination of varied urban and rural development (Webster & Muller, 2009). As a *desakota*, the provinces combine the

everyday conditions of Philippine rural-urban fringe settings with the sporadic mixture of industrial, agricultural, and residential land use. It is also argued to be a space with a diverse and ambiguous development zone (Ortega, 2014).

This peri-urban situation posed more challenges to the landscape as it existed as an irrelevant entity to spatial planning frameworks. One aspect being highlighted is the existence of a diaspora of planning strategies and nature and culture-based policies that have not been considered essential strategies to be integrated into planning frameworks. A particular case is the UNESCO's World Heritage List (World Heritage Convention, n.d.): a vital recognition systematisation of heritage sites around the world that, although it has pre-existing connections with landscapes within its text, does not imply that landscape must be integrated into action planning for the places found within the list. It is evident how landscape can become a receptacle of spatial categorisation, making it particularly useful in building evidence to manage and safeguard spaces. Examples of landscapes where this could be useful are natural parks like that in Tubbataha and Puerto-Princesa, rice terraces in the Philippine Cordilleras, the wildlife sanctuary in Mount Hamiguitan Range, the post-colonial historical city in Vigan, and several architectural baroque churches around the Philippines (World Heritage Convention, n.d.). However, suggesting landscape as an essential aspect in cultural heritage conservation directs it within the boundaries of this field of study. It becomes a challenge as landscape's polyvocality (landscape as a polyvocal entity adapted from Rapoport's theory, 1982, pp. 11-20) becomes muted in other related fields at the other end of the culture-nature spectrum of its semantics.

One particular concern is the resulting situation of the nature reserves in the Philippine countryside. One example would be the Makiling Forest Reserve. The Makiling Forest Reserve is in Laguna, a region also being affected by the diffusing influences of the HUC of Metro Manila. This forest reserve is safeguarded from urban utilisation through the Philippines Republic Act No. 6967 promulgated in 1990. Albeit the laws containing policies that control any form of development in the Makiling Forest Reserve area, the landscape considered as the Makiling Forest Reserve is not safeguarded from

converting its land cover into agroforests – a land use converts the forest cover into agricultural plot lands. This situation allows the conversion of the Makiling Forest Reserve into human-made development to become industry-driven land use (Combalicer et al., 2011).

Another protected landscape in the peri-urban region of Cavite is the Taal Volcano Protected Landscape. This landscape contains fundamental recreational and natural attributes, influencing tourism development to be centred in the municipality of Tagaytay, a town visually connected to the picturesque and unique landscape that the smallest volcano in the country has to offer the public.

As a result of the scenic view of the volcano lake, people's movement to Tagaytay boosted complementary tourist attractions forming various tourist spots like zoos, gardens, hotels, and resorts (Celis et al., 2013; Vista and Rosenberger, 2015). These tourism magnets add up to Tagaytay's already available cultural and natural magnets, respectively of religious and natural types (Vista and Rosenberger, 2015). It affects places as planning frameworks in the municipality are also driven by this tourism-driven change, with a surplus in tourism assets being the driver of land change – from the increase in land valuation to the shift in tourism-related livelihoods and land use. Evidence of this shift in tourism assets includes the increasing demand for more areas to be converted as weekend vacation sites in Tagaytay, with People's Park in the Sky as an example (Fig. 93).

Nevertheless, amidst these land use anchored mainly on natural landforms are risks that were not also foreseen in planning. Just last January 2020 and till today, the Taal Volcano has constantly been showing activity affecting not just ecological quality but also the perception of spaces in the city. It is another layer that can enrich the landscape data but is no longer explored for this research. There are aspects of the ecological environment that are again not considered nor integrated into policies that must safeguard people from natural risks.



Fig. 93. A view of the Taal Volcano Protected Landscape as seen from People's Park in the Sky, Calabuso North, Tagaytay, Cavite, Philippines taken last 2018

A good argument by Sta. Maria (2001) is the "place insensitivity" (pp.82-83) of planners in the Philippines that can then result in detachment to places of its communities. This weakness in the planning perspectives suggests that planners should also include in their narratives and solutions actions to inculcate historical values and integrate them simultaneously into future scenario plans to wit, "keeping structures that celebrate a neighbourhood's identity is important to the community's psychological stability and appreciation of self-worth" (Sta. Maria, 2001, p. 84). There are measures where historical pieces of evidence are seen throughout the region of Cavite yet are not used as core components in designing thematic villages and recreation points. This weakness in recognising landscape components is also one of the possible directions where the LCS can be helpful should these cultural databases be added to enrich the proposed system.

Creating the cultural protection policies as the next step makes the LCS the precursory solution for protecting landscape character in the Philippines. Several legal measures protect the Philippines' tangible and intangible properties but are again not explored

for integration to resound a common language. These policies can leverage landscape data and processes, especially in academia, industry, research, and design. Having these policies understood to sustain our landscapes will sustain landscapes from uncontrolled development.

In conclusion, the landscape challenge in planning frameworks must be resolved immediately. The thesis hopes that this proposal is used on the ground and be established as the solution to see this disparity in landscape actions for the Philippines. Again, the disconnect of landscape-based planning approaches in planning new settlements in Philippine peri-urban regions will continually be a problem without a landscape-integrated solution. The changing place-based paradigm in the Philippines' peri-urban area also grew to affect the inhabitants' place imagery and the culturally valued landscape character, and the change should be understood if not resolved immediately. This new criterion in the peri-urban regions of Metro Manila has developed a landscape hybrid that demands to be defined and understood by its users- both man and nature. It is high time to reconsider this proposal to understand the urbanisation process and put in the ground solutions that can shift planning into a more context-sensitive and environment-responsive approach. It then becomes essential that the landscape becomes a canvas that grounds sustainable actions.

Glossary and Definition of Terms

DESTEP	Demographic, Economic, Socio-cultural, Technological, Political Factors	Set of demographic, economic, socio-cultural, technological, and political factors. Terminology coined and adapted from the business sciences (Van der Voort, Schoorlemmer, and de Visser, 2012). Factors were used in the clustering of landscape characteristics from the Landscape Morphogenetic Character Simulation (LMCS).
DPSIR	Drivers, Pressures, State, Impacts and Responses	Set of drivers, pressures, state, impacts and response factors used in varied fields (Kristensen, 2004; Wascher, 2007; Gari et al., 2015; Kienast et al., 2015; Lewison, 2016). Factors were used in the clustering of landscape characteristics from the Landscape Morphogenetic Character Simulation (LMCS).
CLUP or CLUPs	Comprehensive Land Use Plan / Plans	A CLUP is a planning reference prepared by government units in Philippine locales, usually of provincial scale, to be able to give reason to the allocation of land and water resources. It suggests among other planning probabilities, housing and land uses in accordance with regional economic or social activities and goals (Housing and Land Use Regulatory Board, 2007).
EASW	European Awareness Scenario Workshop	The European Awareness Scenario Workshops (EASW) were initiatives stemming from the INNOVATION programme that explored new actions and social experiments to promote environment-responsive innovations in Europe (Cordis, 1997, Gnaiger and Schroffenegger, 2003).
EBLDM	Evidence-based Landscape Descriptor Mapping	Procedure designed for the Landscape Character System (LCS) used in gathering text descriptors from text as evidence of landscape character typology.
ELC or ELC 2000	European Landscape Convention of 2000	Convention that consolidated and promoted landscape in practice (Council of Europe, 2000)
FDI	Foreign Direct Investments	Investments or purchases by companies, shareholders, proprietors who are geolocated outside a country/location.
FLSC or FLSCs	Future Landscape Scenario Cluster or Clusters	Clustered landscape data that show the landscape scenarios gathered by the participants of the FLSW
FLSW	Future Landscape Scenario Workshop	Procedure designed for the Landscape Character System (LCS) as adapted from engaged action research formats (Deming and Swaffield, 2011) used in extracting future

		landscape scenario clusters (FLSC).
HDH	high density housing	Housing plans with large number of units per area
HUC	Highly Urbanised/urbanising Cities	Highly urbanised cities are cities in the Philippines with a minimum population of 200,000 inhabitants (as certified by the National Statistics Office in the Philippines), and with the latest annual income of at least P50,000,000.00 based on 1991 constant prices (as certified by the city treasurer per Section 452 of Republic Act 7160 in the Philippines).
LCA or LCAs	Landscape Character Assessment or Assessments	Methodology for identifying the patterns and individual combinations of features of land in a certain area or region. LCA begins with the first stage of characterisation followed by making judgments (Swanwick and Land Use Consultants, 2002, p.13; Worcestershire County Council, Accessed on 15 July 2022).
LCAp	Landscape Character Approach	Set of procedures designed to characterise the landscape into landscape data units as integrated in a system. This fulfils Stage 1 of the LCA ((Swanwick and Land Use Consultants, 2002, p.13)
LCAr or LCARS	Landscape Character Area / Areas	Regional scale clustering of landscape character units
LCAr-DT	Landscape Character Area Descriptor Typology or Types	Typology of landscape characteristics resulting from the application of Evidence-based Landscape Descriptor Mapping (EBLDM)
LCAr-MMC or LCAr-MMCs	Landscape Character Area Morphogenetic Montage Cluster / Clusters	Clusters created from the Landscape Morphogenetic Character Simulation (LMCS) as visualised into montages of images, maps and texts
LCArC-UG or LCArC-UGs	Landscape Character Area Cluster Unit Group / Groups	Component/s of the Landscape Character Area Map (LCArM) that are grouped according to similar culture-nature attributes forming a consolidated set of descriptors for the LCAr. Larger than the LCAr-U.
LCArM or LCArMs	Landscape Character Area Map / Maps	Maps coming from the clustering of polygons in QGIS and was created using a framework of culture-nature attributes
LCArC-U or LCArC-Us	Landscape Character Area Cluster Unit / Units	Component/s of the Landscape Character Area Map (LCArM) that are grouped according to similar culture-nature attributes forming a consolidated set of descriptors for the LCAr. Smaller than the LCAr-UG and contain descriptions observable from a smaller scale than LCAr-UG; LCAr-UGs are made up of LCAr-Us

LCC or LCCs	Landscape Character Cluster / Clusters	Approach used to handle landscape data in the Landscape Character System (LCS)
LCS	Landscape Character System	System of landscape characteristics grouped into a catalogue of different clustered attributes that can serve as basis for planning frameworks
LCU or LCUs	Landscape Character Unit / Units	Units of landscape characteristics / attributes
LDU or LDUs	Land Description Unit / Units	Sets of descriptions explaining a group of landscape characteristics / attributes
LMCS	Landscape Morphogenetic Character Simulation	Procedure designed for the Landscape Character System (LCS) to extract morphogenetic attributes of landscape
LWC or LWCs	Landscape Word Cloud / Clouds	Resulting word clusters identified from the Walking Narratives and clustered into groups to define landscape perceptive attributes.
LWN	Landscape Walking Narratives	Procedure designed for the Landscape Character System (LCS) that hybridised walking and oral history methods in extracting landscape perceptive attributes as visualised into Landscape Word Clouds
PDPFP 2011-2022	Provincial Development and Physical Framework Plan 2011-2020	Development framework of Cavite crafted as basis for planning and investment strategies of the region (Province of Cavite, n.d.)
PEBLDS	Pan European Biological and Landscape Diversity Strategy	Strategies implemented as solutions to the degradation of biological and landscape values in Europe (Council of Europe, 1996; Wascher, 2005; Jones-Walters, 2007; Jongman et al., 2011)
PICO Framework	Population, Intervention, Comparator, Outcome Framework	Framework used to structure the Evidence-based Landscape Descriptor Mapping query and captured the most important set of research papers required to answer the landscape-related question for the thesis
PNFPP 2001-2030	Philippines' National Framework for Physical Planning: 2001-2030	An integrated national land use policy agenda that may guide the allocation, utilisation, development and management of the country's physical resources in the Philippines. (National Economic Development Authority, 2002)
	Processing Zones (Free Trade Zones or FTZ, Special/ Manufacturing/Industrial/ Export Processing	Part of the wider range of processing zones or estates in the Philippines establishing supply areas for human capital. Processing zones are part of the global concept of industry-led estates generating foreign exchange and trade of service and investment mainly attracting overseas

	zones or EPZ, Business Processing Outsourcing or BPOs)	enterprise or foreign direct investors for technology and industry-led economic development. These areas follow certain localised policies on trade and labour relations that encourage easier and fast trade access to FDIs (Remedio, 1996; Wu, 2009)
PUL	Peri-urban Landscape	Landscape of peri-urban regions usually characterised by sprawl from urban regions. Landscape affected by the phenomenon of sprawl at the fringe of cities (see section 1.1.3)
SDG	Sustainable Development Goals	Set of goals crafted by the United Nations General Assembly to become the guide of efforts and policies towards a more sustainable 2030 (United Nations General Assembly, 2015)

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Main Text

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Appendices

Appendix 01: Landscape Character Area Full Metadata: Metadata Dashboard of Texts, Codes, Viewpoint Images and QGIS files

Appendix 02: Meta-Analysis of Varied References Showing the Landscape Character Area Morphogenetic Montage Clusters (LCAr-MMCs) of Peri-urban Cavite

Appendix 03: Landscape Character Area Descriptor Typology (LCAr-DT): Full Meta-Analysis of Text References used for LCAr-DT Mapping for Peri-urban Cavite's Landscape Character System

Appendix 04: Meta-Analysis on the Landscape Walking Narratives (LWN) Strategies and Results creating the Landscape Word Clouds (LWC)

Appendix 05: Metadata of the Future Landscape Scenario Workshop

All appendices can be accessed through <https://doi.org/10.7488/ds/3772>