

A Politico-Ecological Approach of Transitional Spaces in Social Ecological Systems

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I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

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Dedication

***I dedicate this work to Roman, Bram, Aura Karina,
Claudia, Manuel, Carlos Juan, Andres Miguel,
Camilo, Naomi and Lenny***

To my family and friends, who have supported me emotionally and financially during the difficult years. My sons, Carlos Juan and Andres Miguel, always giving me motivation and practical assistance. This thesis would not have been possible without your love, support and constant patience. To my ancestors Rodriguez, who struggled along with me every night to obtain this doctorate. To the memory of my father Carlos Lascoutx, my mother Clara Ruiz, my aunt Maria Rios, and my uncle Miguel Ruiz, who always encouraged me to carry on with my studies. To my friends, Daniela Bettiol, Armando Aranguren, Manelly Vera, Gabriel Pilonieta, Luis Vizcaya, Ismael Santos, Lastenia Narvaez, Cesar Diaz, Isaac Nahon, Johan Hamels, Luis Barnola, Ginette Sharp, who have shown their love, friendship and solidarity in many different ways. I really thank you all. Y siempre a Dios y la Virgen que nunca me abandonan.

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Abstract

As spatial properties that systems theoretically have, *Socio-Ecological Systems* are characterized by dynamism and mobility, therefore, are subject to changes in the space they occupy in the biosphere. In land ecosystems, these changes are understood as processes of evolution over time, or the result of extreme natural events, or transformation of the natural space induced by human activities.

These spatial changes produce effects on the land surface and groundwater of ecosystems colonized or penetrated by elements, individuals or populations belonging to other ecosystems. These are the so-called *Transitional Spaces* between ecosystems.

Throughout the continuous geographical space, these spatial transitions affect human and not human ecosystems in different ways. Given their ambiguous characteristics and their indefinite temporal location between urban, rural or natural spaces, transition spaces deserve to be investigated in order to know their properties and functions within the cartography that represents complex socio-ecological systems.

The research is conducted from a particular perspective of *Political Ecology*. For this I proceed to develop an epistemological exercise on the political ecology syntagma in order to approach its concept and object of study as a hybrid discipline between social sciences and natural sciences. Interdisciplinarity as a practice, a dialectic vision regarding anthropocentrism, environmental perception as a method for an ontology of human ecology, The ecosystem as a unit of spatial analysis. These would be some of the characteristics of my ecological-political perspective.

But what does transitional space mean for political ecology and what does it add to its theory? The question led me to seek the integral concept of ecosystem and to support myself in the General Systems Theory to analyze the notions of *boundary* and *external environment* as part of the classic concept of system. At that point, the notion of transitional spaces emerges implicit when recognizing the dynamic spatiality of other existing systems.

Since the research is not linear but interdisciplinary and convergent, a brief anthology of geographic and socio-spatial political thought is presented in order to connect the issue of transitional spaces with the point of view of the social sciences. Various socio-geographical, deterministic, anthropocentric, Darwinian, Marxist, modernist theories give an overview of the issues related to space and nature. With the emergence of *the spatial turn*, new concerns for political sociology, geography and environmental sciences are explained by the phenomenon of urban growth at the global level.

In the same way, I introduce the topic of ecological spaces, specifically the concept of *Ecotone*, the space of transition between diverse natural ecosystems. The use of the notion of ecotone is based precisely on the perspective of the concept of political ecology developed previously.

This, in turn, will allow me to introduce the FLACAM methodology into the research, which among its components has the virtue of identifying and analyzing the spatial phenomenon of physical and social *Interfaces*, that is, spaces of transition within human ecosystems. Several graphics and charts show the potential properties and functions of different kind of existing interfaces and ecotones. My proposal converges in using these concepts as planning tools for transitional spaces identified as Rurban Regions and metropolitan areas.

A final reflection on the need for spatial research on global urban expansion and the theoretical and pragmatic advantages of the concept of intermediate cities closes the main body of the investigation.

Keywords: *political ecology, transitional space, social ecological systems, system theory, boundary, ecosystem, human ecology, anthropocentrism, space, social space, interface, ecotone, socioecological space, intermediate cities*

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CHAPTER I

I. Introduction

A Political Ecology Approach to Transitional Spaces in Socio-Ecological Systems. The first thing one may wonder is how these 3 concepts, *political ecology*, *transitional space* and *social ecological systems*, converge in this research, how they do intertwine interdisciplinary, and how they lead, in this case, to a vision of the geographical, political and ecological space that seeks to offer theoretical tools to support the long run sustainability of our habitats.

Three interlocking aspects lie at the bottom of the research problem. The first aspect concerns the representation of space in the social sciences. What kind of space in what kind of social theory? (Simonsen, 1996). The second problem derives from the previous one. If we are to approach space in terms of political ecology, what are we to understand by political ecology? A third aspect to the research problem: Amid the plethora of ecological crisis variants, the aggressive urbanization process taking place on a global scale and the trend towards megacities, jeopardize democratic governance, social equity and environmental sustainability.

All these aspects provide a contextual scenario that justifies and explain the searching of meaning for space in political ecology theory.

Already in the introduction we find two proposed spatial concepts suitable for advancing political ecology theory: the notions of interface and ecotone, taken as examples of transitional spaces located between the boundaries of cities, rural lands and non-humanized natural environments

But how do we manage to connect these two notions with political ecology and urban expansion? Where can we find and use a common language that may represent the social human geographical space, and ecological space?

For that I have chosen to rely on system theory representation of boundary spaces, the interactions among systems borders and the resulting space between them.

Besides, the varied definitions of system - as an entity with spatial limits- and by extension the notion of complex systems, fit my narrative and theoretically explain the concepts of ecosystem and social ecological systems (SES)

Summarizing I can highlight my objectives in the following manner:

- a) Contrast diverse philosophical approaches to the notion of space in order to identify and characterize the bias of different world visions expressed in geographical, political and ecological theories, either based in anthropocentric or non-anthropocentric narratives.
- b) Propose an epistemological route to develop a bi-disciplinary concept of political ecology based in ecological theory and political theory, with a non- anthropocentric perspective.
- c) Find in systems' general theory those spatial concepts which can be applied in both social and natural systems, in order to establish a common language to analyze the problématique of space occupation and land use between human settlements and the non-human environment.
- d) Explore spatial notions and categories for a definition of social ecotone and eco-interface as social ecological spatial concepts.

What are the core contributions?

1. Nature and Space

The topic of nature as space. Though I do not presume of having discovered anything new; I demonstrated that there is a diffused and discretionary linguistic relationship between both concepts, nature and space; historically feeding different kind of human exceptionalism theories.

2. General System theory

The General Theory of Systems provides basic elements to understand and represent the inter-systemic space and the transitions on space. It represents a common language that facilitates the dialogue among researchers related to political ecology, and researches in socio-environmental areas.

3. Political Ecology

I propose a viable and coherent method to decipher the nature of the concept of political ecology through an epistemological exercise that seeks to specify its object and method of study as an discipline by itself.

4. Representation of Transitional Spaces

Theoretically, I demonstrate that the representation and characterization of transitional spaces - ecotones and interfaces- is not only possible but necessary in order to have a more precise sense of the urban occupation of space and its impact on agriculture and natural resources.

The graphics that accompany the texts give expression to the phenomena of urban expansion, allowing to visualize urban forms in a planning sustainable context.

What are the main conclusions?

1. Political ecology as a hybrid discipline is, however, an independent epistemological field of knowledge, with its own object and method of study. It is not a subsidiary of other disciplines. An interdisciplinary science by its very nature, it has the potential to offer anthropocentric and non-anthropocentric perspectives of reality, linking the natural and social sciences. I believe that the theoretical challenges ahead show a long way still to go for political ecology.

2. My inquiry about the concept of space, from the point of view of political ecology, emphasizes the importance of ecosystems as a spatial reference to address the environmental problems on peripheral urban areas, agricultural lands, and natural ecosystems. Within the concept of the spatial continuum, the notion of transitional spaces existing between human habitats and the rest of the biosphere are a key element of the ecosystemic dynamic, both human and non-human. The ecosystem should be considered the spatial unit for political ecology. The concept of transitional space (social ecotone, eco-interface) should be considered a method to characterize and determine the state of carrying capacity and resilience of ecosystems, either human or not.

3. Despite not having addressed in depth the issue of megacities, and their alternative, the intermediate cities, they both represent a key issue for the near future. Intermediate cities together with the concept of transition spaces (and its derivatives) are key elements to generate the necessary discussion on the sustainability and viability between both models of human settlements. In some way, the urban humanity risks its political, economic and social destiny, depending on the choices that will be made, and the existing ideas to build the arguments for sustainable cities.

I.1. A Short Story of the Research

During the 1980s and 1990s, I had the opportunity to live and work in the Venezuelan Andean coffee region, both as a farmer¹ and as an agrarian development agent for an NGO². These jobs helped me to gain an understanding of agroeconomics, environmental land management, soil and water protection, ecosystem services, and among other things, the processes of expansion of the agricultural frontier at the expense of forests, as well as the migration of the landless peasants towards cities. It was a first-hand rural experience on rural-urban dialectics.

The “urban side” of that dialectic dealt with the socio-economic and political consequences of the environmental damages caused by inappropriate development. One could witness the destruction of hydrological basins and other components of natural ecosystems that were supposed to feed towns and cities with ecological services. Consequently, the complex socio-economic circumstances of a petrostate and the loss of agricultural productivity added to the dependent capitalist dynamic of regional agricultural markets, accelerating a process that had begun 30 years earlier with a gradual migration of peasant farmers from remote places to bigger towns and cities.

¹ I was member of a small farming community located in the coffee region of *La Azulita*, some three hours’ drive away from the capital of Merida state, in the Andean mountains of Western Venezuela. At that time, the agricultural frontier was being expanded towards the pristine tropical humid jungle between 800 and 3,000 meters above sea level (Monasterio, 1986). Here, destruction of the forest cover and hydrographic basins led to the unprotected naked soil being washed away along with its fertility by the heavy local precipitation (2,500 mm).

² Founded in 1986 as a non-governmental organization, *La Era Agrícola* (The Agricultural Age) became well known nationally, thanks to its editorial program: *The Ecological Age* magazine. I was its CEO and editor. The proactive activities developed up to 2002 created a physical hub for local environmental groups. The Farmers Program was located at La Azulita, Merida state.

Ultimately, this redistribution of population increased the unevenness of the occupation of space in big metropolises, resulting in the slums or "misery belts" that exist in cities across the third world.

It was around that point in time that I began my research as an agrarian development graduate student. Though the notion of the urban-rural dialectics has long been studied from many diverse disciplinary perspectives and theories, I felt an increasing inquisitiveness to study the problems of the land from a spatial viewpoint that would go beyond social, economic, or political perspectives. Traditionally, in rural studies, spatiality is represented at the level of the rural landscape, and tends to express itself as a "land" problem: land property, rent of the land, land use value against land exchange value, landless farmers, land development, land reform, land culture, etc. But, intuitively, I was looking for deeper explanations of the human relationship with the environment: a conflicting spatial relation, as we humans tend toward territorial expansion and occupation of space on a global scale. What seemed novel to me was discovering a notion of human space as seen from a naturalistic and environmental perspective: a living, diverse space drawn by geographic contours, linked by ecological principles as missing elements of the agrarian equation.

It was in that milieu that I found the opportunity to "discover" two spatial notions that seemed associated to each other by a systemic isomorphism. On one hand is the ecological concept of ecotone; and on the other, we have the sociological notion of interface. These two analogous conceptions of spatial structure move beyond the idea of border, edge, or limit to become by their properties and functions sort of inter-systemic spatial connectors. Ecotones and interfaces are conceived, perceived, and lived thresholds through which energy moves from one system, or a part

of it, to penetrate the space of another system or systems. Active through time, ecotones and interfaces dynamics are expressed in advances and spatial retreats—either by progressive successions or violent changes—becoming de facto bridges that generate spatial metamorphoses over the functions and properties of the ecosystems involved.

By speculating on the spatial symbolism of systemically placing the countryside between the natural and urban spatial systems, I slowly began to develop a perspective of the historical process of formation of intermediate areas among agricultural landscapes, wilderness regions, and densely populated cities. Intuitively, one could foretell that those intermediate areas do represent, or form, a prediction of its own future conditions as spaces to which they will eventually trend towards, consolidating either as:

a) natural areas of increasing and/or decreasing spatial trends evolved and developed through ecological productivity by the generation of biomass in the ecosystems, and ecological succession changes.

b) human expanding areas, intervened and occupied according to diverse social and economic development models, impacting at different degrees those ecological systems closely related to the provision of basic natural resources to maintain human and non-human life, metropolitan regions, bioregions, or Earth itself.

c) areas of human habitat expansion, with an increasing number of metropolitan regions on a global scale gradually becoming larger in size and highly densely populated. This expansion of urban space takes place in dire social economic conditions, especially in third world cities.

Unfortunately, as we know, both capitalist and socialist development models have ignored the environmental variable for long time. The same can be said about space as a category of analysis. Following perhaps the positivist tradition, the dimensions involved in development theories and models—economic, cultural, social, and political—had a tendency to work independently, ignoring or even opposing views and development strategies presented as perspectives of environmental dimensions. Ignorance of the environmental variable linked to a wider notion of uneven development has been a feature of the post Second World War years.

After that period, a post-modern “ecological consciousness” slowly penetrated industrialized democracies, leaving the dark side of modernization to Third World countries. Between the decades of the 1970s and 1990s, industrial growth mostly meant accepting the negative consequences of the spatial relocation of economic neo-liberalism towards the global South. In Latin America, it meant the impoverishment of the population and the destruction and depletion of natural resources. “Economic growth without development,” was the phrase that summarized the advantages and profits for a minority elite vis-a-vis the great injustice towards the majority of a less-favored poorer class. We could add, from a present political ecology perspective, that those long periods of international neo-liberal interference could also be described as a deadly mix of an extractivist economic model, pushed by industrial investment and the absence of any social or environmental considerations towards the receiving countries of such a capitalist model.

The decades of the 1970s, 1980s, and 1990s were politically important for the state of the environment in Venezuela. Those years marked the beginning of the petrostate's decline, as social and economic democracy were failing the majority of the population. A gradually increased incidence of poverty and uneven social development were caused by a widening gap among social classes and increased regional development inequality. Nevertheless, political democracy was alive and well. For those who were active in the heterogeneous political environmental movement, there were many scopes and niches where participation was possible. In the Brundtland report of 1987, the notion of sustainable development emerged as a concept of multiple possible dimensions during the event of the United Nations Conference on Environment and Development of 1992³. As part of the Venezuelan environmental movement and related to my job as director of an ecological NGO, I had the opportunity to actively participate in the long process of the UNCED's prolonged action programs, and the philosophical and political discussions concerning the implications of the concept of sustainability.

In the struggle between the economic interests of the industrialized northern hemisphere and the impoverished global South, the extractivist capitalist model was used to confront the intrinsic relationship between development and environment. Even a quarter of a century later, most of the

³ UNCED-92: United Nations Conference on Environment and Development, celebrated in Rio de Janeiro, Brazil, in 1992. For 2 weeks, this initiative mobilized the economic interests of international corporations, which were always reluctant to open a political discussion about the social and ecological consequences of their development model. It also sensitized world public opinion to a critical view of the relationship between development models, poverty and environmental crisis.

proposals pushed through at the time by the United Nations development and environment programs remain stagnant⁴.

At the time, they represented a great political impulse for adopting the ideas of social ecological sustainability as a worldwide development alternative. Through these programs, some social, economic, and political principles together with global and local promises for political action were drawn up. The participation of Latin American environmental organizations, academics, and ecologically sensitized political groups produced strategic guidance, manifestos, and gave voice at the highest level to problems relating to the ecological and social crisis already visible⁵. This period of intense politicization of ecology pushed Latin American environmental and social organizations toward gaining a gradual understanding of the geopolitical and international economic implications of the environmental issues.

For most Latin American environmentalists, the question of poverty, which was understood as a problem of social injustice and economic inequality, had been closely linked to the imposition of uneven development models. Poverty was considered the first ecological problem to be solved,

⁴ Among the proposals and programs that emerged from UNCED-92 was *Agenda 21*, a world action plan divided up into 40 different chapters covering natural resources conservation, civil societies strategies, communication and education programs, political and economic initiatives. From there also emerged *The United Nations Millennium Development Declaration*, signed in September 2000, which committed nations to the goals of fighting poverty, hunger, disease, illiteracy, environmental degradation, and discrimination against women.

⁵ There were many contributions from third world countries to the UNCED-92. One of them was “Our Own Agenda,” a report elaborated from the 1989 Commission for Development and Environment of Latin America and the Caribbean as a diagnosis of the region, meant to fight poverty, fostering environmental conservation and aligned with development.

as it was described as a concomitant issue: both cause and effect of the increased social environmental crisis of the region. This was precisely the perspective that influenced the goals of my future research. Accepting the premise of an existing social ecological crisis, a better understanding of ecology leads to a better social political understanding of the *problématique* and its possible solutions.

As at that time, my previous studies on agrarian development had shown that there were shortcomings in understanding the complexity of the environment and development issues. The unanswered questions regarding the urban-rural dialectics, the transitions between nature and society, the link between ecology and social change, and the consequences and possibilities of adopting sustainability as a political paradigm led me to seek deeper knowledge on political and ecological grounds. I focused my master's studies in Political Science on approaching the idea of an epistemology for political ecology. I thought this path could lead to more formal and disciplinary explanations of this new hybrid science by giving theoretical foundations to the object and method of a discipline under construction.

After working for two years (2006-2008) in the Merida Urban Biosphere Reserve (UBR) Project⁶ under the guidance of a multidisciplinary team consisting of the University of Los Andes

⁶ The Urban Biosphere Reserve, UBR, is an initiative of the MAB program of UNESCO to adapt the concept of Biosphere Reserve to urban spaces under a sustainable development or urban planning perspective. The UBR Merida project was part of a joint initiative of Latin American universities in Colombia, Brazil, Argentina, Mexico and Venezuela. The Latin American Forum of Environmental Sciences played a decisive guiding role.

(Venezuela), the Latin American Forum for Environmental Sciences (FLACAM), and UNESCO's Biosphere Program, I acquired deeper spatial perspectives of the sustainable urban *problématique*. It was a big contextual shift, being transferred from a world of rural realities to the realities of urban possibilities. During that time, I participated in a two-year program on Sustainable Development at FLACAM's headquarters in La Plata and the University of Lanus, Argentina.

Both the UBR project and FLACAM's program reinforced the systemic idea I had of the urban-rural-natural continuum, and my drive towards a spatial notion of ecosystems. Among the conceptual tools developed during those experiences, I found the one that motivates my present PhD research: the identification, contextualization, and description of these specific intermediate spaces, the interfaces. I learned about spatial intermediation as political properties of territorial spaces. I widened my notion of public space as political territories of urban spaces. The idea of 'Rurban' territorial ecosystems emerged clearer as a means by which I could investigate this huge bioregional compound of cities, countryside and natural areas, and still make some sense of it.

As, holistically speaking, space is a continuum, these intermediate spatialities are not considered real breaks or interruptions on unknown spans of spatiality, but hinges that bind diverse forms of terrestrial life (including our own human activity), offering us an alternative interpretation of ecosystemic spatial diversity. Just as the interface is related to space in diverse dimensions—politically, socio-economically, geographically and ecologically—the ecotone becomes that living place of energy exchange among different ecosystems. Somehow, these transitional spatialities become a symbolic hint for a back-door approach to a spatial systemic notion of humanized

ecosystems: a new multidimensional and interconnecting paradigm between political ecology and space.

I.2. Background – Problématique

Three intertwined aspects form the problématique of the research. The first aspect concerns the representation of space in the social sciences. Given the different disciplinary perspectives that constitute the set of social sciences, it is easy to observe many diverse interpretations and representations of space and spatiality. Assuming the existence of diverse theories, concepts, and models of social space, the inherent question is: what kind of space (and social space) for what kind of social science? The second problem derives from the previous one, raising questions about space and spatiality in terms of political ecology, understood here as a social science. In the process of building their own theory, political ecologists have not insisted strongly enough on specific concepts of space that can respond on how the different dimensions of humanized ecosystems—the physical, biological, and social—are integrated within socio-ecological spatiality. I add a third aspect to the research problem: the expansion of urban habitat as global phenomenon provides a contextual element serving as a visualizing scenario for the deployment of spatial political ecology concepts. I briefly explore these three dimensions in order to set the premises and hypotheses guiding the research.

I.2.1. One and Many Spaces: spatial theories in the social sciences

Since the emergence of the Spatial Turn in academic research during the last decades of the 20th century, the concept of space has affected the social sciences in various ways (Hillier and Hanson, 2003). Spatial narratives have been developed in multiple disciplines and political science

has been no exception. Today's political vocabulary has been spatialized through concepts that seem to gain meaning and use—scientifically and metaphorically—in descriptions and explanations referred to the political, and questions of spatiality add new perspectives to a broad spectrum of political studies. The resurgence of space as an object of analysis seems to find its place across a wide range of social science studies. From the most diverse academic investigations, to governmental policy programs, to human development initiatives and private research, spatiality is at the forefront of today's humanities. A multiplicity of spatial interpretations seems to emerge from perspectives such as geography, political economy, sociology, cultural studies, and urban planning.

So, when referring to social sciences' spatiality, do we talk about one and the same space or many diverse spaces? What is the meaning of space, or social space, when it comes to conceptualizing, modeling, and operationalizing the term according to disciplinary lines? Why and when is it appropriate to incorporate spatial concepts in the analysis of social phenomena? How do we approach and work on these diffuse concepts of spatiality through dissimilar lenses? Are there strong enough conceptual bonds to generate a unified social theory of space? How should we deal with differences and similarities in the interpretation of socio-spatial events?

These are all open questions which this investigation uses as points of departure to develop its own concern: transitional spaces and spatiality within the theory of political ecology. Though relevant for the research, these questions show, nevertheless, that the spatial conceptions of postmodern thought maintain the same focus as the spatiality conceived by the enlightenment age and modernism, defining space, mainly, as a human construction, as a social product, as a reality

culturally perceived. But the questions above also show a wider concern for finding ways of integrating a broad selection of spatial theoretical perspectives, shaped by anthropocentric worldviews and values, along with a systemic ecocentric line of spatial research (or, at least, less anthropocentric) represented by ecological social sciences: environmental sociology, human ecology, social ecology, and political ecology.

Here certainly lies a deeper problem of spatial representation. On one hand there is human spatiality, perceived and represented by human understanding. On the other hand, there is a non-human space that requires a non-anthropocentric representation. A degree of anthropocentric determinism is certainly inevitable. Otherwise, how could humans perceive, understand, and convey the non-human sense of spatiality if not precisely by our own limited human understanding? Contemporary sociology has opened doors to the understanding of space as a multidimensional concept that is at the same time social, economic, political, and cultural. This trend was initiated by Lefebvre's work on spatiality. His three stages of representing space, the space perceived, the space conceived, and the space experienced (Lefebvre, 2013, p.69), offer numerous ways to explore the theoretical possibilities to construct and represent a "concrete abstraction" for a humanized ecosystemic space.

If the sociology of space studies the material and social constitution of spaces, then we need to insist on enhancing an environmental sociology of space as a middle ground towards an ecological sociology of space, where the balance between an anthropocentric representation of human spatiality may shift towards an ecocentric (ecosystemic) representation of human and nonhuman

spatiality. Therefore, new ontological and epistemological approaches of space are needed in order to integrate social science's spatial theory with the environment.

I.2.2. Searching for Spatial Concepts to Advance a Theory of Political Ecology

Two theoretical problems emerge in the *problématique* of researching spatiality in political ecology, putting in place two actual dimensions of enquiry. The first dimension points at the need for establishing an integrated, interdisciplinary, and consensual definition for Political Ecology. This entails mutual recognition between natural and social sciences and involves questioning the scope and limits of ecology—as biological and social science—within the framework of political ecology. It also implies a search for a common language among those social sciences (like geography, sociology, anthropology, etc.) that contribute to political ecology. This aspect of the problem is especially important for political science as it entails questioning the place of politics and the role of public policies within the realm of political ecology, and even more importantly the possibility of constructing a political theory based on an ecological approach.

But claiming a political ecology perspective means that the research goal should somehow reflect the object of study of political ecology. This relates the *problématique* to its epistemological grounds: it allows us to question political ecology about its own object of study and scientific method. Any given theoretical framework will depend not only on disciplinary lines of research but on worldviews and values. The philosophical and ethical crossroads reflect diverse approaches to nature's value, either from an ideal or realistic rational choice's perspective, depending on which

side of the instrumental rationality fence each researcher finds him/herself, and the degree of holistic-systemic thinking which he/she is ready to compromise in order to achieve pragmatic goals. In fact, the understanding of these problems is prior to the framing of the research question I present.

The second dimension of enquiry borders on the notions of spatiality and the concept of space in relation to political ecology. Once the concept of political ecology is presented and operational, questions about space can be made and enquiry methodologies can then be chosen. This second dimension relates to the main issue the research question addresses: the space as a category of analysis.

When accounting for the whole of Earth's biosphere, politico-ecological space can be considered as an absolute and continuous space. And yet, as a transversal category of analysis, space cannot be studied in isolation. The spatiality of political ecology is relational: it focuses on the spatial interactions among abiotic inanimate objects, geographical landscapes from diverse environments, living organisms, plants, animals, and human cultures. As human geography, space includes subcategories of analysis such as place, environment, landscape, region, and territory. Sociologically, it includes the concept of social space, which embeds notions such as the produced, perceived, and lived space, the conceived space, and the symbolic space. In a similar way, the research considers ecological spatial categories, such as ecosystem, life zone, habitat, niche, biotope, interfaces and ecotones, which would be eventually aggregated and fused to those previously mentioned, in order to create—as it has been pointed out—a framework of spatial categories and models for Political Ecology. The challenge involves integrating epistemological

concerns with questions of spatial representation in order to arrive at a satisfactory socio-ecological description and explanation of transitional spaces within humanized ecosystems as a valid concept for interpreting political ecology spatiality.

I.2.3. A Political Ecology to Deal with Urban Expansion

According to United Nations' World Urbanization Prospects (2014), 54 percent of the world's population was already residing in urban areas. By halfway through the 21st century, 66 percent of humanity will live in cities. This gigantic shift has taken place in the less developed regions of the planet. It has taken only six decades to invert the numbers from rural to urban habitats. In historic-spatial terms, the scale of these human agglomerations has never been experienced before.

As countries become urbanized, a greater part of the population within their national boundaries become concentrated in the metropolitan areas. Following systems theory logic, the more elements that are present in a given system, the more complex the interrelationships among the different elements of that system become (Bertalanffy, 1994). From this, it can be inferred that urban governance, understood as an urban system function, will also grow in complexity i.e. the higher the phenomenon of urbanization, the greater the city system vulnerability to the various variables that intervene. The greater the human agglomeration, the greater the threat to urban governance due to multiple social, economic, political, and environmental factors. And yet, as cities increase in size, more concepts from spatial analysis are required from political ecology to address the problems of global urbanization. Transitional space is one of those concepts that can illuminate the problématique related to the representation of complex bioregional systems, and,

therefore, shed new light on rural-urban linkages and the limits of growth and expansion of urban space.

I.3. Objectives

This investigation originated as an attempt to identify, typify, and conceptualize spatial interactions that occur in the transitional zones of urban and rural (Johnston, 2006) areas that border natural ecosystemic areas (Bazant, 2001). The research aims to provide a systemic perspective and a politico-ecological interpretation of the spatial dynamics taking place in border areas of human and non-human communities, within diverse types of ecosystems and geographical landscapes (Bédard, 2009). My purpose is to propose methods to observe, perceive, and compare the landscape based on notions of transitional space for a better understanding of sociopolitical effects caused by the spatial dynamics along the hybrid borders (human/non-human) of socioecological system's territories (Berkes & Folke, 1998; Binder, Hinkel et al. 2013; Escobar, 2008; Fall, 2005). These transitional areas—created by expansion and contraction of diverse ecosystems spatialities—will certainly have long-term impacts on the socioecological landscape, i.e. the socio-spatial equity and environmental quality of human spaces. In other words, these dynamic borders represent the vanguard, or prelude, of spatial models of human habitats, where democratic governance will be marked by the degree of ecological or environmental sustainability of these hybrid ecosystems, and by the properties of the set of elements and actors (human or not) who share a particular space system (Bozzano, 2000). Therefore, the theoretical implications for political ecology go beyond mere urban or rural bordering areas, and extend towards new and increasingly numerous spatial constructs, such as metropolitan regions and the megaregions of "cities without limits," (Fall, 2005) as well as

ecosystems located on binational transboundary regions. Hence, the need to identify, represent, and conceptualize those intermediate transitional spaces using system theory as a language adaptable to the requirements of an interdisciplinary study.

I.3.1. General Objective

The research aims at the interdisciplinary exploration of spatial concepts by amalgamating theories of geographical space, social space, and ecological space using a multidimensional concept of ecosystem as a theoretical framework. The research seeks to reinforce the notion of ecosystem as appropriate spatial unit to the study of political ecology, with the overall objective being to generate wider knowledge on the meaning of spatiality in political ecology's theory. The research promotes the observation of spatial interactions from the perspective of transitional spaces located between ecosystemic units, i.e. boundaries, borders, interfaces and ecotones, understood spatially as differentiated conceptual units. I intend to provide a better understanding of cities as ecological systems, the potential roles these concepts can play for sustainable urban spatial planning, and suggesting avenues to be explored by future research concerning the expansion of metropolitan territories and urban regions.

I.3.2. Specific Objectives

By supporting Political Ecology theoretical framework on a socioecological systems approach, I seek to link methodological tools obtained from general ecology yet based on rationale and

objectives derived from political theory in order to operationalize an interdisciplinary approach to the geographical and ecological transitional spaces, such as interfaces and ecotones, at different spatial scales. These objectives can be presented as follows:

a) Propose an epistemological route to developing a bi-disciplinary concept of political ecology based on ecological theory and political theory, with a non-anthropocentric perspective.

b) Find in systems' general theory those spatial concepts which can be applied in both social and natural systems, in order to establish a common language to analyse the problems caused by the occupation of space and land use between human settlements and the environment.

c) Integrate diverse theoretical approaches to the notion of space in order to characterize and conceptualize transitional and bordering spaces as methodological tools capable of establishing causal relationships within the spatial dynamics of expanded urban territories and bioregions.

d) Explore spatial notions and categories for a definition of social ecotone and eco-interface as socio-ecological spatial concepts.

I.4. Research Questions

I.4.1. The premises

The trend of expansive growth of urban space, generated by the capitalist mode of production, is determined by the economic logic of capital concentration and expansion of markets, which is dialectically opposed to rural pre-capitalist schemes. From there it can be interpreted that the urbanization of rural space is in fact a capitalisation of the countryside by the city, as well as the further expansion of capital to occupy and exploit natural areas. The expansive growth of the

industrial and service economy imposes unequal trade relationships to agriculture—in theory, the main economic activity of rural areas displaces the latter as a determining factor in the social and spatial organization of the rural population. The core-periphery spatial model, which translates into relationships of domination and dependency, expresses itself in the rural urban dialectic through the economic and social organization of urban-rural-natural space. The negative growth trend of rural and natural areas will accentuate the extent with which the process of urban expansion advances.

Besides the displacement of small and medium sized traditional farms by the sprawl of residential developer projects and industrial hubs in cities' outskirts, the arrival of corporate agribusiness occupying peripheral rural lands can be observed, and eventually will be incorporated into the capitalist logic of land exchange value. At a certain moment in time those peripheral lands, deprived of its rural original characteristics and yet not entirely urban, will become some sort of no-man's land, acquiring a particular status of transitional space. This example shows some of the multiple principles that characterize boundaries and transitional spaces in humanized ecosystems: the borders and spatial transitions are dynamic because they maintain a constant process of physical, biological, and social transformation; the normal ecosystem homeostatic processes are diminished, absent, or inexistent; their evolution (or mutation) serves both as a marker for measuring temporal and development stages of its functions within the bigger systems it connects; they represent a key theoretical hinge of the continuum geographical space.

The notion of transitional spaces enhances the understanding of the metropolitan and bioregional dynamic development that accompanies urban expansion. To reach a basic

conceptualization of such spaces my premises develop in four consecutive steps, as presented below:

Premise 1: Political ecology as a disciplinary synthesis of natural and social sciences is strongly bonded to spatiality through the concept of ecosystem. Therefore, space as a category can be studied as part of the object of political ecology.

Premise 2: Space as an object of study can be represented by concepts derived from systems' general theory and then applied to a non-anthropocentric inspired political ecology's theoretical framework. The choice in applying systemic spatial concepts (ecosystems, socioecological systems, etc.) in a given case is a dynamic decision that varies according to the particularities of a given spatial research and the space and place represented.

Premise 3: Considering the biosphere as the space of political ecology, and the ecosystems as spatial objects of its study, does not contradict the consideration of transitional spaces as synaptic elements within ecosystems, either natural or humanized. Transitional spaces can be represented, as expressed by premise 2, in various ways within the diverse political ecology theoretical framework.

Premise 4: The eco-interface and/or social ecotone, understood as transitional spaces that borders the edge of differentiated human or natural ecosystems, are terms likely to be conceptualized and developed. Based on the identification, description, and analysis of its spatial properties and functions, as well as by the nature of its interactions with other spatial areas, the interface and ecotone can provide methodological tools to contribute to the study of urban and rural territories by political ecology and substantiate sustainable land planning.

Derived from the ecological concept of ecotone, the notions of eco-interface or social ecotone can be adapted to the nature and dynamics of human spaces, referred to as border areas between two or more different habitats/niches in which diverse interacting human/biotic communities dynamically converge. The concept of eco-interface or social ecotone—as analogical derivation of the concept of ecotone—can be adopted by human ecology, social ecology, and political ecology to study urban and rural areas provided it relates to transitional zones serving as spaces where the information/energy exchange among human populations and their specific environment takes place in the form of social interactions. Thus, the core argument of the thesis can be formulated as follows:

The social ecotone and (or) the ecological interface are spatial concepts derived from the notion of transitional spaces directly linked to a sociology of space, human ecology, and ecosystemic theory, conforming to a particular theoretical framework within political ecology. As interdisciplinary concepts, its functions and properties can be described systemically with non-anthropocentric ecological approaches, and at the same time be represented socially through the diverse spatial dimensions that interact within the humanized ecosystems.

I.4.2. Research Questions

Due to the multiple disciplinary outlooks on spatiality, my research question moves between different areas of concern. Firstly, the research question shows a concern for exploring space from political ecology's theory, in which the whole research project is embedded. Theoretical frameworks for political ecology may vary according to different philosophical and disciplinary worldviews as proposed by Marxism, neoliberalism, anthropocentrism, ecocentrism, or ecosystemism principles.

Secondly, the research aims at pointing out differences within the conceptual understanding of space in social theory. Not only the ecological space, constrained by biological and geophysical variables. Neither is it the space of political economy. This research develops its spatial concepts by system's theory through an ecosystemic view of spatiality. The research's understanding of space is gained from a systemic stand: the ecosystem theory. The ecosystem is understood as the concrete space of political ecology; it is therefore a living view of space, in this case terrestrial ecosystems. But even from this systemic perspective, various gazes can offer their own interpretations of spatiality.

Thirdly, assuming the conceptual existence of a geographical spatial continuum, the research chooses to investigate the spatial transitions within humanized ecosystems by questioning the dynamics, forms, properties and functions of spatial interfaces and ecotones found within urban territories and bioregions. Therefore, the concept of transitional space becomes a premise for the subsequent analysis of interface and ecotone concepts,

In consequence, the relationship that seeks to be established between a theory of social space, and an operational concept of politico-ecological spatiality is expressed in this central research question: *What kind of spatial concept, within theories derived from political ecology, can explain the properties and functions of transitional spaces, borders, and boundaries within socioecological systems?*

I.5. Research Methods

I.5.1. Interdisciplinarity Approach

Interdisciplinarity, which is more than a type of research, is a research method that, based on various conceptual schemes, incorporates the results of various disciplines to the analysis of a phenomenon, and pursues through comparison and assessment the integration of these results. In a description of diverse types of disciplinary approaches proposed by Stember (1991, p.1-14), she affirms that “where integration of the contributions of several disciplines to a problem or issue is required, interdisciplinary integration brings interdependent parts of knowledge into harmonious relationships through strategies such as relating the part and the whole or the particular and the general.” I take the notion of interdisciplinarity to entail the action of integrating knowledges and methods from diverse disciplines, for the purpose of merging and synthesizing approaches, thereby producing new perspectives or solutions to a given phenomenon or problem.

The interdisciplinary phenomenon is twofold: an internal one, which has the essential characteristic of the general renewal of the system of sciences, accompanied by its progress and organization; and an external one, characterized by the increasingly extensive knowledge mobilization and the growing multiplicity of specialists. In his book, *Trends in Social Science Research*, Piaget argues that, "Interdisciplinary research can arise from two kinds of concerns—some from concerning structures or common mechanisms, and others from common methods, and they can both naturally intervene at once." Systemic theory as theoretical ground allows the conditions to perform research simultaneously from diverse disciplinary fields under the perspective of a common concept: the system. Ontologically, systemism defines the world as a system of systems. From an ecosystemic point of view, the commonalities between social and

natural sciences reflect on human ecology as a discipline of synthesis that incorporates methods from general ecology and social science. Interdisciplinarity as a method becomes a tool for political ecology at its task to integrate ecology and environmental sciences into the fields of social and political sciences. To deal with the hybrid nature and characteristics of political ecology, the interdisciplinary method integrates vocabularies, concepts, and premises—principles from biology, ecology, geography, sociology, philosophy, politics, and systemics. This is particularly convenient in dealing with phenomena related to spatiality, and for conceptualizing diverse notions of space.

I.5.2. System theory for approaching ecosystemic spatiality

According to the most general definition, every ecosystem has a traceable physical space in which its constituent elements and interactions are present and can be observed (Currie, 2010). In this respect, the boundaries of an ecosystem become a matter of importance in the analysis. As boundaries of human-dominated ecosystems do widen constantly, the nature of the physical space “produced” during the expansion—the new interface, is uncertain, as well as the new boundary—ecotone, created by the contraction of the neighboring ecosystem being interpenetrated. The methodological question is to determine where in the ecosystem's theory should we place the transitional space? Or how do we consider it according to the systemic theory? Thus, a special approach is required.

The perspective of the Ecosystem Multidimensional Concept (EMC) provides a method that moves from general definitions toward more refined perspectives of what, in each case, can be described as an ecosystem. Three dimensions are used to conceptualize an ecosystem: meaning,

model, and metaphor (Pickett and Cadenasso, 2002 b). The multidimensional analysis allows generalizing the method to other concepts in ecology (Pickett and Cadenasso, 2002 b). Therefore, it is transferable to the notion of an ecosystemic transitional space, either as an eco-interface or social ecotone.

After testing preliminary abstract definitions of transitional space, my work deals with building one or more models representing how the ecosystemic transitional spaces work within the systems it delimits. For modeling humanized ecosystems, the physical space is an increasingly important element with respect to the biotic/abiotic interactions which were prioritized in ecosystem studies in the past (Theodorson, 1974; Pickett and Cadenasso, 2002 b; Odum, 1972). The modeling dimension allows the establishment of the spatial “domain” of the ecosystem through methodological steps, therefore placing the spatial concerns at the center of the research. The third dimension of an ecosystem study searches for the metaphoric value of the concept, emphasizing the scientific and social importance of the place of the transition as a symbolic, yet a concrete, spatial feature.

I.5.3. Empirical Observation and Environmental Perception

My systemic-ecological field approach is based on the methodology of Environmental Perception, "understood as the process of acquiring knowledge through the senses and understanding of the environment by humans. It involves, therefore, not only the perception through sensations, but also cognition, prior or subsequently acquired by intelligence" (Castello,1995). Environmental perception as methodological framework favors inductive methods of theoretical construction taken from empirical observations. The method has been used

as a tool for identifying those values that confer qualities to the environment. The research identifies two methodological trends to this effect: the first is structuralist, which seeks to identify the components of the environmental structure; the second is phenomenological, where topological space attributes are also analysed through the sensations that it transmits to its users (Castello, 1995). These observations must be made at three empirical scales of action: the micro, medium, and macro scale. These scales are considered part of a continuum that ranges from the house, through the neighborhood, the city, the region, the nation's territory, and the global space. Among the techniques used are the so-called "urban walks" and implementation of mental maps techniques (Gehl and Svarre, 2013; Lynch, 1960), through which the elements that structure the city images, as well as the perceptions that people have of them are identified. Assuming a systemic-ecological approach, I perform a direct empirical observation of urban areas and rural peripheral landscapes, aiming to identify and describe potential sites of transitional spaces, in order to contrast and collate the nature of these places with the socio-ecological theoretical body that will be analysed in chapter 3 of the proposed thesis structure.

Expanding the notions of public space and public life, which include all built environment and the places in between (Gehl and Svarre, 2013), I will consider, tentatively, the physical and biological elements of the urban system, i.e., a river or a forest, as spaces belonging to the realm of public life. Therefore, with the help of urban maps to obtain descriptive data by observation, walking the city peripheries and tracking the fields into the urban lands I will represent theoretically a number of pre-determinate locations that may meet the criteria that define transitional spaces, interfaces, borderlands and ecotones within the urban-rural-natural continuum. These concrete-abstract locations will serve to test, compare, probe, or dismiss the theoretical

findings of the proposed concepts of social ecotone and or ecological interface, providing inputs to a spatial theory of political ecology.

I.5.4. FLACAM's Methodology:

Environmental Perception and Interface Identification

By applying environmental perception in searching for transitional spaces, my research method adopts concepts from general ecology, which are transferable and applicable to human ecology. That is the case of the concept of ecotone. As explained before, the ecotone marks the gradients or connection points between two ecosystems. For many, it is the most holistic and comprehensive explanation of ecology, since the ecotone delimits systems allowing its identification and individualization (Odum, 1972). In the case of humanized ecosystems, the research method implies an interdisciplinary dual use concept: of ecotone as an ecological concept, and interface as a human social concept. From the systemic point of view, both concepts reflect those spaces where the strongest exchanges of information and energy between systems take place. The interface concept, "as the phase between the phases," originates from both ecology and physics and represents a spatial element of utmost analytical and operational value for geography and environmental sciences, initially developed for the study of metropolitan areas. The methodology designed by FLACAM⁷ defines the interface as "the meeting point and overlapping of different systems,

⁷ FLACAM, *Foro Latino Americano de Ciencias Ambientales*. From a neatly urban perspective the *Latin American Forum of Environmental Sciences*, proposes two different types of Interfaces in order to understand city systems: a) the *Active* or *Social Interface* usually refers to areas and places related to the notion of public space, understood as sites of encounter and exchange: parks, bus terminal, theatres, markets, *etc.* and b) the *Passive* or *Physical Interface* refers to material urban structures or natural geographic accidents that by their very nature serve to unite or divide different areas of a city: rivers, channels, tunnels, bridges, highway, *etc.* (Pérez, J.1995, p.148).

through which can exist multiple interaction channels, capable of containing intense flows of matter, energy, and information" (Perez,1995, p.36).

I.5.5. Secondary Sources and Secondary Data Sources.

As an interdisciplinary investigation, the research includes several disciplinary areas which point to different secondary sources. The first of those disciplinary sources is related to political ecology and its subsidiary fields; the second is related to general aspects of spatiality from a social science point of view and emphasizing social theories about transitional spaces. Though most of my literature sources are in English, I rely a great deal of my secondary data on French speaking authors and Spanish speaking sources, mainly from Latin America.

I.6. Theoretical and Methodological Framework

“What kind of spatial concept, within theories derived from political ecology, can explain the properties and functions of transitional spaces, borders, and boundaries within socioecological systems? (Research Question)

I.6.1. Systemism’s Ontology and Social Systems

Systemism, as a worldview assumption about the nature of reality, provides the ontological framework of the research. The idea of system as a critical paradigm opposes scientific reductionism and methodological individualism, and its approach seems a more appropriate framework to undertake multidisciplinary research (Bunge, 2000, 2004). At the most basic level, a system can be defined as, “a set of interacting elements” (Bertalanffy, 1981). Systems Theory talks about dynamic interactions. The more complex a system is, the more properties the system

adds to its own performance or productivity. As a principle, a system's productivity is more than just the sum of its individual elements. According to Anatole Rapoport, "a system is a set of interrelated entities connected by behavior and history, in which elements and their relationships can be identified" (Fisher, 2010). Among scholars of systems theory, there is no single approach to the words structure and system. Of the many propositions and definitions, clearly, two split approaches emerge. For some, structure and system are similes: two terms meaning the same idea. For others, the structure is part of the systemic notion but not the system itself. From that point of view, structure and system are two different things.

The concept of social systems, as evolved originally from Parsons, implies interrelationships among individuals and groups in a continuous exchange of resources and products within a spatial range of its own environment (Parsons, 1974, 1991). The consideration of physical environment is a distinctive element of Parsons' social system. One of Parsons' theoretical and methodological contributions for understanding the functioning of social systems is the concept of interpenetration. It is defined as the overlapping boundary between any two systems in action. The interpenetration happens, theoretically, where a bordering "zone" of structured components or patterns is treated as common to both systems. Parsons describes the interdependencies of social systems using the concept of interpenetration, meaning that systems may enter or overlap partially into one another. Exchange processes between the systems can take place under the existence of zones of interpenetration. These notions of spatial intersect cross-linking between different systems of diverse nature are theoretical elements that build on analogical concepts related to the notion of transitional spaces. Hence, its inclusion here forms a building element for the particular ecosystemic theory that I intend to recreate (Parsons, 1974).

I.6.2. The ecosystemic approach

The research question shows the track for a systemic spatial theory fitted to work with human ecosystems. The humanized, or “coupled,” ecosystems refer to a particular field of system ecology and ecosystemic theory that does not study wildland or natural ecosystems exclusively, but explores new conceptual ecosystemic dimensions such as cities, rural lands, metropolitan areas, and all sorts of territories and landscapes where humans have impacted the previous natural organization of space (Odum, 1989). In 1935, Arthur Tansley defined the ecosystem as a biotic community associated with an abiotic physical environment in a determinate space. Since then, the concept has evolved and grown in complexity, and have been applied to different fields of human ecology and social environmental studies. Today, ecosystems are considered as functional higher-ranking units in which the emphasis is on the interactions between the biotic and abiotic elements of the system (Pickett and Cadenasso, 2002 b). The goal of ecology is to understand the functioning of ecosystems and try to establish patterns of interactions. The ecosystem is the unit that clusters different organisms and species forming a closely integrated community together with the physical environment it occupies; spatiality is inherent to its definition (Odum, 1972, 1989).

The ecosystem tends toward organization in order to achieve a temporarily stable equilibrium or reach the climax of its own evolution. In each element there is a degree of organization that indicates the state of its evolution. Space is one of those elements. The state of an ecosystem is the result of the changes undergone over time since the biotope was formed and started experiencing colonization by different species. Ecosystems are inherently dynamic. As an integral part of the biosphere, all ecosystems are connected spatially in a “spatial continuum.” From a political ecology analytic approach, the ecosystem—either natural or human, should be the basic spatial

unit of the spatial continuum. Considering the ecosystem as a spatial unit for scale measurement has huge implications for any political land planning policies concerning metropolitan or bioregional theories. Transitional spaces are a structural part of the system of ecosystems that make up that continuum.

I.6.3. The Human Ecosystem as an Organizing Concept for Political Ecology.

To navigate the flags of political ecology, I will adopt an ecosystemic approach to space as the most productive option to achieve holistic understanding of the theoretical complexities of social spatiality. Besides being a biological and physical science, ecology also studies the interactions among populations and communities with their physical environment, within the ecosystemic space. In that sense, it is considered a social science as well (Odum, 1972). Therefore, it forms a discipline of bonding and interplay between natural and social sciences.

Considering ecology as a social science is key for conceptualizing political ecology. It allows establishing a direct genealogy through one of the ecology's sub-disciplines: Human Ecology, the ecology of the human species population. The theory of human ecology (Hawley, 1999) includes the study of ecosystems—natural or built, and how they affect and are affected by human interaction. Political ecology would be, according to this lineage, a sub-discipline of social ecology which itself is derived from the broader field of human ecology. Ecology and human ecology uses the advantages of an ecosystemic approach to study the relationships of living beings among themselves and within their environment. In doing so it establishes a particular view of time and space. As an evolutionary process, the ecosystem, as well as the human ecosystem, passes through stages that successively advance creating nets of interactions that mutate accordingly. Therefore, the theory of ecological successions describes historically the development of social systems with

a particularly rich frame of interactions, usually missed by conventional analysis. Summarizing my position on the research question, I will distance myself from anthropocentric positions in order to describe and explain the properties and functions of transitional spaces within humanized ecosystems. Assuming human ecology and social ecology as the root theories of political ecology, I will approach spatiality, and the notion of transitional space, from the ecosystemic perspective of systemism—system theory as theoretical framework.

I.7. Literature Review

The literature review replicates the interdisciplinary logic involved in the main research question, subsidiary questions, and premises guiding the investigation. Basically, it questions the role of pivotal concepts of space and social space for political ecology theory, implying that the real search will be conducted through the notion of transitional spaces as a metaphor describing the dynamic boundaries of human ecosystems. From this question, three broad topics inherently emerge: a) Systemic and ecosystem theory as theoretical and methodological framework of the research; b) Political ecology, as an interdisciplinary theory and as a field of study providing the epistemological context to the research, and; c) Spatiality as an enveloping notion. Diverse disciplinary languages conceptualize space and transitional spaces in order to reach the main research task: building theoretical arguments for constructing spatial concepts suited to the object and method of political ecology.

I want to point out that my choice of authors follow my investigations in the different areas upon which the work is divided. They represent for me the vast repertoire of perspectives about

the topics of nature, space, politics, ecology, systems, and urban expansion. The wide choice of opinions and arguments regarding political ecology is well deliberated. I wanted to present here authors that reflect that diversity. Many authors, especially those coming from Spanish speaking countries maybe totally unknown to English speaking North America, but well known in Spain, Chile, Argentina, Bolivia, Peru, Brazil, Colombia, Venezuela, Central America, the Hispanic Caribbean, and Mexico. I believe this is an opportunity to get a grasp of them and go beyond the Anglosphere.

I want to point out two observations on the presentation of the bibliography:

1. The referred literature whose texts are in Spanish and French, has been translated into English through a free translation made by me, the author of the thesis.

2. Some of the titles in Spanish are called "Manuales," such as: "Manual de Ciencia Política." In English, this corresponds to collected works titled as "Handbook," for example, "The Political Ecology Handbook." It is simply a convention used by Spanish speaking publishers.

My literature review elaborates on the following topics:

I.7.1. System Theory, Social Systems, and Ecosystems

The decision to entrust the theoretical framework of the research to system theory and ecosystem theory naturally stems from the specific object of the investigation, i.e. the dynamic areas bordering the ecosystem. The primary definition of a system involves two spatial elements which are fundamental for my theoretical quest: the idea of the surrounding environment, and the notion of boundaries within the system itself (Cárdenas, 1978).

On the other hand, it is important to remember that The General Systems Theory (Bertalanffy, 1994) was originally proposed as a biological interpretation of the functions of the parts and the properties of the whole within the system, questioning the Cartesian linear logic and proposing instead the idea that the whole is more than the sum of its parts (Bertalanffy, 1994; Rotundo, 1973). Being applicable to biology, system theory took a straightforward route to ecology, adopting it for the study of natural systems. From this fusion has been developed the specific field of system ecology (Sutton, and Harmon, 1987; Odum, 1972).

On parallel grounds, system theory has served as theoretical scheme and cognitive mental map to visualize human society. Beyond the many criticisms of his work, Talcott Parsons is seen as the pioneer in the field (Parsons, 1974). His influence in North America has overpassed to Japan and Europe where many of his theories are being revisited. As I explained in the following chapter (Chapter II), my discussion of Parsons' social system is limited to the notion *of* interpenetration, as it describes a process analogically similar to the idea of transitional space (Parsons, 1991).

There are literally thousands of articles and books related to basic social systems theory and ecosystem theory. In my review, I have focused on literature related to systemic socio-ecological approaches that may offer clues on how to reconcile interdisciplinary concerns regarding the transitional spaces within human dominated ecosystems. In the available literature, some topics are highlighted due to their importance to my research object.

The need to integrate a common conceptual framework for socio-ecological research goes in hand with questioning the temporal scales by which that research should be conducted through socio-ecological long-term research (LTSER) methodologies (Collins, et al. 2010). The temporal scales are inherent to the concept of ecological successions as the process by which ecosystem spatiality varies.

The topic of ecosystem modeling not only involves understanding properties and functions of a system's constitutive elements, but also serving as the cognitive instrument of social ecological representation, suited for academic communication, environmental education, and sustainable planning (Bates, 1997; Currie, 2010; Machlis, Force and Burchjr, 1997). Finally, within the complexity of the human-dominated ecosystem, the question of culture rises as a multidimensional variable, which affects the social and ecological interactions. This transformation turns human ecosystems into "wicked problems" that reproduce their complexity systematically in time and space (Currie, 2010; Poe, Karma, Levin et al., 2014).

I.7.2. An approach to political ecology

This review explores basic approaches to the concept of political ecology, pointing at epistemological differences, showing their qualities and limitations according to their origin. The purpose behind this comparative exercise lies in contrasting political ecology's concepts within the "discourse community" of academics, as a preface to presenting a systemic notion by which the research develops. At present, the relationship between politics and ecology expresses itself empirically in a general awareness of how environmental impacts on earth's biosphere can affect the global human society (Odum, 1982, 1989; Orr, 1983; Pirages, 2004; Walker, B. 2006). But this relation does not have a unique theoretical basis for understanding the nature and dynamics of

these interactions between the natural world and human social phenomena (Esbjörn-Hargens, 2009). As a consequence of this theoretical disparity, the concept of political ecology which is indispensable for the establishment of new perspectives in political science still remains in a contested state (Ayala, 1999; Barry, 1999; Dobson, 1991), and the common use of the term generally relies on disciplinary bias rather than in a common multidisciplinary understanding (Dryzek, 1997; Eckersley, 1995; Goldman et al, 2011).

I.7.3. A Cornucopia of ecopolitical opinions

In my reading I have discovered numerous essays, research, and documents named and entitled “political ecology” (Glaesel-Frontani, 2005; Leff, 2006; Lemkow, 2002). Undoubtedly, the popularity of ecological topics, along with responding insurgent social movements that perceive that the ecological struggle has a profound political content, have brought about a daily use of the term (Dobson, 1991; Greenwood, 1973). However, when we dig into the content of ecological and environmental criticism and proposals in search of a precise definition of political ecology, it disperses in several ways (Walker, P. 2005, 2006, 2007). A description of the material on political ecology submerges us in a broad spectrum of topics and approximations, which to a large extent do not offer defining elements to mark the limits of the object and method of what is being proposed as a potential field of study. Thus, the initial question remains with respect to the nature of the so-called political ecology: Is it a sociopolitical movement? Is it a political ideology? Or is it an academic sub-field of geography (Bryant and Jarosz, 2004; Robbins, 2003, 2004; Zimmerer, 2003, 2010), human ecology (Harper, 2001; Hawley, 1999; Theodorson, 1974), urban ecology (Alberti, 2008; Swyngedouw and Heynen, 2006), development studies (Guimaraes, 1991; Mirovitskaya and Asher, 2001; Simon, 2008), sociology (Bates, 1997; Lemkow, 2002),

anthropology (Biersack and Greenberg, 2006; Escobar, A. 1999), political science (Biro, 2002; Carter, 1999; Deutsch, 1977; Dobson, 1997; Nygren and Rikoon, 2009; Paulson et al, 2003; Rangan and Kull, 2009), political economy (Newell & Paterson, 2010; O'Connor, 1998; Peterson, 2010), philosophy (Bookchin, 1990; Guattari, 2008; Holmes Rolston, 1989; Maahner y Bunge, 2000; Naess, 1990; Whiteside, 2002), or International Relations? (Paterson, 2001)

A good part of the material reviewed touches on descriptions of ecological problems caused by the system of capitalist production (Biersack and Greenberg, J 2006; O'Connor, 1998). The irrationality of the production of a high-energy consumption model—typical of western capitalist societies, which causes the progressive destruction of land and sea ecosystems—can be identified in them (Des Jardins, 2001; Dryzek, 1997; Kuehls, 1996; Leff, 2001). This was precisely when other research appeared associating political ecology with the field of ecological economy and facing the problem towards an eco-development and sustainable development path (Gabaldón, 2006; Guimaraes, 1991). Parallel to the above, other lines of research arose sustaining the dominant economic rationality with a more profound criticism, based on development models that pursue ideal human progress from a materialistic point of view. In these texts, responsibilities for the ecological crisis are shared equally among capitalist economies and communist economies (Humphrey, 2001; Huxley, 1965; Jarosz, 2004; List, 1993; Paterson, 2001). It is described as more profound because it questioned the eligibility of ideas related to the political economy considered until then universal, such as development and progress. From these discussions, a proposal appeared of a Marxist based socialist political ecology and others based on anarchism that approach the ecological problem from the dialectics of authority. From third world countries came

the subject of poverty, indigenous cultures, and north-south relations as elements of the ecopolitical discourse (Cardozo, 1998; Gudynas & Evia, 1993; Guimaraes, 1991; Leff, 2004).

Another group of researchers and thinkers approached political ecology from the differences in existing ideologies and doctrines and questioned the soundness of parties and other forms of political involvement (Biro, A. 2005). This conglomeration of research and reflections are a part of an environmental perspective of political ecology. One way or another, anthropocentric positions are maintained in which the appropriate technology and sustainability of development mark the path to be followed (Barry, 1999; Clark, 2001). In any case, it would be a matter of including in the western models and political systems—corrective environmental techniques and ecological policies adapted to the realities of the social system.

However, there is another area of research in political ecology which bases its interest in looking for alternatives to the timely controversy between individualism and holism, in search of less anthropocentric approaches (Shrader-Frechette, 1996; Simhony, 1991). I intend to find connections beyond the individualist and holist approaches to social sciences and systemic perspectives that propose ecocentric or biocentric understanding of reality (Bunge, 2000; Eckersley, 1995; Hayward, 1998; Humphrey, 2001; Guerra, 2001). We also find the positions of deep ecology that pursue a new spiritual encounter with nature from a cosmic, transcendent, and utopian point of view (Naess, 1984). This is a contribution of a profound philosophical and ethical nature, which favors an encounter with “worldviews” between east and west, industrial and traditional societies (Whiteside, 2002).

In a parallel context, we have legal and ethical thoughts on animal rights, the rights of nature, the non-human world, and the rights of future generations. We can also include here the eco-feminist thesis (Conley, 1997), that adopts key concepts such as domination and hierarchy, to explain mankind's self-destructive deviations. All of these transcend the plane of domination and hierarchy among humans to present the need to establish an ethical relationship with nature. Though the research will tangentially touch these topics and areas, they are beyond the limits of my present enquiry.

Another group of researchers follow a line of research within systemic ecology and studies of human social systems (Deutsch, 1977; Gual & Norgaard, 2008), what many consider an ecosystemic approach (Odum, 1982), with the intention of deriving unifying ideas for politics and ecology. I believe this study belongs to this latter group.

I.7.4. In search of Political Ecology's Spatiality

The theoretical framework constructed for this research implies that political science and ecology, together with geography and ecological economics, working as interdependent disciplines, give shape to political ecology's ontology and epistemology.

The resulting multidisciplinary approach to the notion of space adds to the possibilities of alternative models, methods, and consequent spatial conceptualizations. But, how do we track space from a politico-ecological point of view? This has been, so far, the question guiding part of my literature review. The review aims at marking differences and similarities within the conceptual

understanding of space in social theory in order to approach political ecology's spatiality. As the spatial approach is proposed from a systemic perspective, the notion of ecosystem appears preliminarily to embed ecological spatiality. Therefore, the ecosystem is understood as the concrete space of political ecology, the space where interactions take place; it is a spatial view of life, and a living view of space, the Earth space.

From this systemic perspective, various views can offer their own interpretation of spatiality. Here, the chosen view is political ecology, understood as a subdiscipline of human ecology. Therefore, the location of that space is the human space, the human ecosystems: urban, rural, and other humanized spaces. The resurgence of space as a category of analysis has emerged from diverse sources and have uneven impacts in present social thought. In the wake of the 1960s to 1980s, the emergence of the so-called spatial turn reflects contributions from philosophy, sociology, geography, and other humanities (Simonsen, 1996; Warf and Arias, 2009; Zieleniec, 2007). The investigation follows seminal theories in social spatial thinking from a group of scholars which have set guiding lines in the voids in space research. In order to advance in this direction, I contrast diverse approaches to space as conceptual categories from both social theory and human ecology. At this point takes place the comparative analysis between space understood by the theoretical constructs of Marxist (neo), post-modernist, and post-structuralist perspectives, and the spatial notion proposed by this research on political ecology. Following up the theoretical development and evolution of social space's concepts, sociologists, philosophers, geographers, economists, and political scientists leave their original footprint on spatial theory through concepts such as the production of social space (Lefebvre, 2013a, 2013b), space-time compression (Harvey, 1990), heterotopia (Foucault, 1986; Johnson, P., 2006), habitus (Bourdieu, 2002, 2012) and Third

Space (Soja, 1989, 1996). I will explore how academic research has assimilated the spatial concepts at different perspectives (Butler, 2012; Brenner, 2009; Dehaene & De Cauter, 2008). I will examine the possibilities of adopting, adapting, and integrating some of their premises, hypotheses, arguments, and conclusions into the theoretical body of an ecopolitical spatiality (Kareiva, 1994). The whole comparative exercise implies a concordance between the theory embedding political ecology and the process of observation and analysis guided by spatial theory.

Academics have opened up new perspectives on the importance of space for social sciences. This has allowed scholars to incorporate spatial explanations into multiple social phenomena by a diversity of disciplinary focuses. The political has been no exception (Goodchild and Janelle, 2010; Logan, 2012; Muir, 1994). But the relationship between space and politics has been shaped long before by an overlap between political philosophy and geography. Social Darwinism, geographical determinism, and doctrinaire geopolitics are just contemporary examples of those disciplinary interactions.

As an undisputed leading object of geographical studies, the concept of space has given this discipline a vanguard position in socio-spatial theory, turning it into a necessary source for the research of social space's practice (Curry, 1996; Goodchild and Janelle, 2010; Sack, 1980; Santos, 2009). Today's political science lexicon has been spatialized by geographical notions derived from these various disciplinary sources: territory, frontier, border, region (Klauser, 2012; Murphy, 2012; Raffestin, 2012; Rumford, 2006; Sack, 1983); area, zoning, scale, land planning, urban planning, (Escobar, 2008; Fall, 2005; Kuehls, 1996); social space, public space, private space, and at the international scale (Biersack and Greenberg, 2006; Cardozo Da Silva, E. 1998; Durant, 2004;

Engel-Di Mauro, 2009; Paterson, 2001) are notions that seem to gain conceptual meaning and use in descriptions and explanations referred to the political. I will briefly describe some early geopolitical thinkers, such as Humboldt, Ritter, Ratzel, Kjellén, Vogel, Henning, Vidal de La Blanche, Sample and Spencer, contrasting some of their ideas submerged in social Darwinism, establishing connections with the contemporary discourse of urban expansion and extracting from them the holistic values that can be found. I will critically relate the above writers to the political geography involvement with particular concepts of anthropocentrism, environmental determinism, and possibilism contrasting with environmental determinism, climatic and geographical determinism, and cultural determinism.

In a more recent context, I acknowledge some geographers' epistemological claims to a partnership with biology over the birth of ecology as science, as well as an ascension over human ecology as a geographic discipline. Even more, following this line of thought, geography understands and assumes political ecology as a subdiscipline of its own field (Steinberg, 1997). Beyond any scholarly dispute about those claims, the reality of academic research shows a great deal of work—the production of thousands of articles and essays done in the name of human ecology and political ecology from perspectives of geographical knowledge. Therefore, it can be presumed that socio-spatial research conducted by geographers in terms of human ecology and political ecology would have a stronger geographical influence in their approach.

I.7.5. Social and Political Theory of Space

The plasticity of the idea of space echoes philosophers, physicists, and mathematicians' notions, either as an abstract idea or a concrete place. Is there one absolute space or are there many

relational spaces? Is there a time/space unity? Is it a substance or an essence? Is it tangible or intangible? Has it form or is it shapeless? Is it a void or a mere receptacle? Or is it a place or a context discernible by its relationship with things (Einstein, 1947; Jammer, 1993). Limiting the enquiry to “Western Thought,” I race through a brief chronology of space scopes: Plato’s *Timaeus* opposing Aristotle’s *Physics*, Roman, medieval, renaissance spatial thought (Lucretius, 1947), the Enlightenment of Descartes, followed by the controversy between Newton and Leibniz and the jump towards Kantian notions of space. Hegel, from whom can be derived influences into the spatial notions of Marxist thinkers and modern and post-modern controversies along with Heidegger, Lefebvre, Foucault, Bourdieu, Deleuze and Guattari (2008), thereby setting the spatial issues in present context (Entrikin, 1991; Featherstone and Painter, 2013).

I have chosen to focus on Lefebvre’s work for various reasons. One obviously has to do with his particular understanding of space. Among his books and essays, the *production of space* (2011) highlights the concept of social space where three instances interrelate: spatial practices, representations of space, and the spaces of representation corresponding each of them to the unfolding processes of perceived spaces, conceived spaces, and lived spaces. Lefebvre expands his spatial philosophy towards a theory of everyday life combined with a geographical and sociological interest for exploring the multidimensional aspects of rurality, urban life, and modernity. All of them represent transferable scenarios to political ecology spatiality. A wide scope of studies about Lefebvrian space facilitates the understanding of his theoretical achievements (Butler, 2012; Brenner, 2009; Elden et al., 2006; Merrifield, 2006).

A second group of spatial reviews concerns the core task of the research itself, that is, an approach to political ecology's spatiality (Zimmerer, 1996) by analyzing the notions of spatial transitions (Botkin, 1990; Guyot, 2011; Helming, 2007; Jones, 2009). Following the systemic approach of the ecosystem (Jones, 2010; Picket and Cadenasso, 2002; Santos, 1992), I explore and compare the geographical notion of the spatial continuum along urban, rural, and natural areas in order to justify the political ecological approach to transitional areas. By identifying peripheries (Bazant, 2001; Allen and Lacabana, 2003; McGregor et al., 2006), and characterizing interfaces and ecotones, (Yarrow and Salthe, 2008) I intend to describe the dynamics of human settlements growth, both urban and rural, and their different interactions with ecosystems. It proposes a geographical tour from within the most humanized space—the city, moving towards its rural and natural peripheries (Andermatt

Conley, 2012; Amin, 2002). Considering at the same time the territorial organization of social, economic, and political instances, the environmental continuum forms the spatial theoretical frame in which to contrast conceptual terminology (Bellet and Llop, n/d; Bozzano, 2000; Camargo, 2005). I intend to highlight mainstream concepts of urban space, presenting my own critique in order to add arguments towards the conceptualization of a political ecological space.

A systemic and ecosystemic approach will confront the notion of city from diverse cultural, social, economic, and political theories, proposing new elements to consider in metropolitan and regional planning (Andermatt Conley, 1997; Brenner, 2004; Brugmann, 2009; Marzluff, 2008; Rydin, 2010; Swyngedouw and Heynen, 2003).

I.7.6. Theories and Definitions of Political Ecology

In the course of my research, I have found numerous journal articles and books under the banner of political ecology. Undoubtedly, the increasing popularity of ecological political topics is related to the growing awareness of global environmental problems originating from a myriad of intertwined causes and effects provoked by human agency. In a broad view, we can highlight three instances in which the notion of political ecology can be described and explained. In the first instance, we find the natural and physical sciences, where biology and geography form a cradle where the first ecological thinking was born. As it is known, the evolution of biology into the new ecological science took place during the second half of the 19th century up to the 20th century (Kormondy, E., 1969; Odom, E., 1972; Deléage, J-P., 1991; Benjamin-Golley, 1993). We can roughly locate in time a second instance of political ecology development as a social movement after each of the two world wars. The causes of this new interest in preserving the natural world against its extinction are many, interrelated, and therefore complex. It could be pointed out that some interconnected triggers have made political ecology a science of our time. One of them has to do with the consequences of the huge destruction caused by the two world wars. One consequence of it was the decolonization process that took place in Asia and Africa. Meanwhile, extractivist economies increased their activities in the third world, equipped with advanced information technology and communication networks. The acceleration of industrialization processes occurred both in western capitalist societies and in the Soviet bloc and communist China. The gradual globalization of markets transformed, and even defined, the modes of capitalist production up to the present. A century after the beginning of the world wars marks the long dawn of transnational corporations' oligopolies. The rise of global consumer society conversely impacts the nature of sovereign states. Borders blur and frontiers yield before trade. Talk about population growth is an academic taboo that triggers alarms. Poverty, human

rights violations, racial and gender injustice go global as well. The fear of a world nuclear war amalgamates citizens' consciousness. All these events, situations, and actors that I note are intended to draw a very general context that pushed forward to look for new explanations about the world and new alternatives to organize our societies under different paradigms. Ecology emerges then as the paradigm of interconnection of all things. The care for the planet, the environment, the ecosystem, is then a self-preserving idea. Ecological sustainability becomes part of the social, economic, and political paradigm of democratic ideas.

I will present ideas of some known authors, particularly regarding their understanding of political ecology. It is remarkable to witness the diversity of the criteria and objectives they pursue, along with social movements that perceive the ecological struggle with a profound political content. However, when we dig into the content of ecological and environmental criticism and proposals in search of a precise definition of political ecology, it disperses in several ways. A description of the material on political ecology submerges us in a broad spectrum of topics and approximations, which to a large extent, do not offer defining elements to mark the limits of the purpose and method of what is being proposed as a potential scientific field of study. Thus, the initial question remains with respect to the nature of so-called political ecology: is it a sociopolitical movement, a political doctrine, or did it derive from political science? A good part of the material reviewed concentrates on a description of ecological problems caused by the capitalist production system. The irrationality of the production of a high-energy consumption model—typical of western capitalist societies, which causes the progressive destruction of land and sea ecosystems—can be identified in them. This prompted further research, associating political ecology with the field of ecological economics and directing the problem towards an eco-

development and sustainable development path. In parallel to the above, other lines of research arose sustaining the dominant economic rationality with a more profound criticism, based on development models that pursue ideal human progress from a materialistic point of view. In these texts, responsibilities for the ecological crisis are shared equally among capitalist economies and the extinct Marxist economies. These are considered more profound because they questioned the eligibility of ideas related to the political economy considered until then universal, such as development and progress. From these discussions, a proposal of a Marxist-based socialist political ecology appeared and others based on anarchism that approach the ecological problem from the dialectics of authority. From third world countries came the subject of poverty, indigenous cultures, and North-South relationship as elements of the ecopolitical discourse. Another group of researchers approached political ecology from the differences in existing ideologies and doctrines and questioned the soundness of parties and other forms of political involvement. This conglomeration of research and reflections are a part of an environmental perspective of political ecology. In one way or another, anthropocentric positions are maintained in which the appropriate technology and sustainability of development mark the path to be followed. In any case, it would be a matter of including in the western models and political systems—the state corrective environmental techniques and ecological policies adapted to the realities of the social system.

However, there is another area of research in political ecology commonly known as ecologism, the main description of which is the biocentric perspective of its analysis of reality. This is where Darwinian based neobiologists' theses that lead the discussions towards the criticism of modernity as a system can be found. It is here that we identify the base of a classic geopolitics marked by determinist theses, close to an ecofascist notion of the social system. We also find the positions of

profound ecology that pursue a new spiritual encounter with nature from a cosmic, transcendent and utopian point of view. This is a contribution of a profound philosophical, even religious nature, that favors an encounter with world views between the East and West, industrial and traditional societies (Esbjorn-Hargens & Zimmerman, 2009).

Other groups identify themselves with systemic ecology and studies human social systems from an ecosystemic approach, with the intention of deriving unifying ideas for politics and ecology. Our research keeps close to this latter group.

I.7.7. Industrial society perspectives on political ecology

The original intention of this work, an approximation of the idea of political ecology, arises, as we stated, from the hypothesis that suggests the possibility of identifying and building principles and fundamentals from a theoretical body to serve as a foundation for a hybrid discipline between political science and general ecology. Obviously, political ecology finds itself in a foundational moment of its history, as was pointed out by the researchers that were consulted. It is a time with a wealth of ideas, approaches, and proposals. Now we will look at the observations of authors that were consulted.

As was stated by Jean Paul Deléage in his History of Ecology (1993), the role of Ernst Haeckel in the development of ecology is more important than is usually mentioned by historians. As a biologist and zoology professor of the University of Jena, in Germany, he is known as a spreader of Darwin's ideas in Europe. Haeckel is a fervent follower of monist ideas based on a holistic view

of the universe. He believes that nature should serve as a model for human societies and argued in favor of a political reform based on scientific knowledge of the relationship of respect between man and nature. Thus, as was mentioned earlier by Deléage (76), Haeckel was not only the scientist and philosopher who managed to reestablish the union between the world of man and the natural world, but he was also the scientist that first set the theoretical foundation for conservationism.

There have been many contributions from the beginning of ecopolitical thought to the century of ecological research. However, it is necessary to jump in time to the near past, the 1970s, which according to environmental historians, marks the period of modern ecology. This is where the work of André Gorz is worthy of special mention as one of the pioneers of political ecology and more specifically, ecosocialism. His arguments have been adopted, and in good measure, into leftist green thought, especially anarchists, who were the first to give ecologism a utopian perspective. During the 1970s, Gorz became known as an essayist, thanks to the publication of his two “Ecologies,” the contents of which essentially compiled or summarized the informative work that he had been carrying out as a journalist in *Les Temps Modernes* or in *Le Nouvel Observateur*. Gorz, along with others, such as Illich, Barry Commoner, and E. Schumacher, opened up a new path, from the Marxist point of view, that other outstanding ecologists such as Bahro or Bookchin would later take, who on many occasions though, were contrary to Gorz’s position. What is novel about Gorz’s thought is the convergence of leftists and free socialists with the new ideological elements of ecologism. In his essays, Gorz reflects the imminence of an ecological crisis evidenced in energy, industrial and population levels. Thus, criticism of the industrial model and economic thought form the base from which Gorz performs his analysis. It is a criticism of the idea of development expressed in a rejection of consumer habits, production, and technique. At the same

time, it is a proposal centered on scientific precaution, duration, reparability, and public nature of production and equity in the use of natural resources.

Gorz developed essential topics of political ecology during the 1960s and 1970s. However, he always used the categories of the Marxist approach. In one of his essays, “Political Economy and Ecology: Marx and Illich” (Ecologia y Libertad, 1979), Gorz made an analogy between the purpose of political economy with respect to its expression in the social division of work and the ecological position in relation to economic activity. From there, Gorz demonstrated the difference between the consideration of ecology as a neutral field of study, serving the productive economic system, what he called technofascism, and ecologism as a political option for harmonious living and solidarity. Although Gorz does not define political ecology within a precise category of science, his contribution consisted of an attempt to modernize the socialist thesis, by purifying the productivist dogma from the consumer society analysis. The bias of his Marxist formation can be evidenced in his particular anthropocentric ecological approach permeated by a realist social theory, directed towards action. In this sense, he is considered one of the founders of ecosocialism.

Within the scope of an ecological debate from the left, the theme of development models, faced with the idea of sustainability, presents an economic consideration of political ecology in which a Marxist analysis becomes elucidating. This is the case in the essay by the German philosopher, Hans Magnus Enzensberger (1973), entitled “For a Critique of Political Ecology.” In it, the author presents a well-informed analysis that compares certain political arguments from the traditional left in relation to the realities of the ecological problem. Its first task was to denounce the theory that only blames the capitalist system for the ecological catastrophe. Enzensberger doubted the

success of a mechanical implantation of socialism as an undisputable solution for confronting the environmental crisis. To this end, Enzensberger declared:

To infer this answer from the premises of a Marxist theory is not like playing into someone's hands. The matter derives exclusively from knowing if in this manner we could come up with something more than an abstract phrase, alien to any political practice, and which would permit the sustainer to abstain from analyzing a specific situation. (Enzensberger, 1973, p.56).

The author answered his own question: what do we understand by capitalism? But Enzensberger's answer is also an accusation of an intransigent ideological power that attempts to limit free thought:

If we understand capitalism as a system distinguished by the private property of the production media, its consequence will be the following: The ecological problem (as all the series of problematic situations of which "capitalism is to blame") will be cleared by nationalizing the production media. Consequently, in the Soviet Union, for example, environmental problems should not exist. (Enzensberger, 1973, p.57)

Enzensberger presents us with a quote by Rossana Rossanda (1973) in which capitalism is defined as a global manner of social production, in which the destiny of ownership of the media is not a determining element of nature. For Enzensberger, this consideration of capitalism would allow us to handle a Marxist approach to ecology. The author reasons that:

For the first time, the meaning of capitalism understood as a manner of production and not as a simple relationship of property, places us in a situation of confronting the ecological problem from a Marxist point of view. Seen from this angle, the categories of exchange value and the value of use take on an extraordinary significance. The interference of the metabolism between man and nature then appears more precise than when it was

taken as a derivative of the capitalist production of merchandise (Enzensberger, 1973, p.60).

Another important path singled out in Enzensberger's essay is his appeal to research the production mode as a necessary task for a proper social determination of the ecological problem. For Enzensberger, phases of the capitalist production mode can be represented by the path between accumulation, wherein the exploitation of people becomes more serious, and the subsequent state of expansion of the productive forces, which entails a growth of the destructive power of the system, in which exploitation of nature by people becomes greater and a real threat to the destiny of people's "vital natural bases" arises. Enzensberger adds:

As a consequence, the fact arises that a situation of lack of a social origin appears as if engendered by natural forces. This return to a state of general scarcity becomes the nucleus of the so-called "ecological crisis." However, this does not mean a pure and simple regression to a *historica preteritas* situation and condition, since lack does not suppress abundance. Both exist simultaneously. Their contradiction constantly becomes more acute and adopts forms that become more and more delirious. (Enzensberger, 1973, p.83)

Obviously, much of Enzenberger's zeal in referring to the supposed exaggeration of the magnitude of the ecological crisis was surpassed three decades later by overwhelming facts. A similar case occurred with his consideration of political ecology as a field of study, to which he denied the rank of a science:

Human ecology is above all a hybrid field of study forced to use categories and methods from social science and natural science without receiving any explanation about the theoretical difficulties that this entails. In a certain way it tends to absorb the new fields of study and submerge them in one or the other science depending on the purpose of the

research. This is a tendency devoid of any scientific base and which only answers to the urgency of the objective. (Enzensberger, 1973, p.8)

It is worthy of note that it is precisely the multi-disciplinary and inter-disciplinary nature of human ecology that caused the author's rejection and which, in any case, reflects the rigidity of the scientific point of view of a social research sector in the 1970s. Also note that there is no clear distinction between the use of the terms "human ecology" and "political ecology," he assumed them to be equivalent.

The American social theorist, James O'Connor, is another philosopher who approaches ecological matters from a socialist perspective. In his book *Natural Causes, Essays of a Marxist Ecologist* (1998), O'Connor develops a critical analysis of what he calls traditional socialism, with which he compares his construction of an ecosocialist theory:

Ecosocialism is a theoretical criticism of the ways with which capitalist production relationship influence productive forces (defined as earth, energy, raw materials, technology, machinery, special abilities, organization of work and other production media and objects, and also housing, transport and other reproduction or consumer media and objects). Besides, ecosocialism is a practical criticism of these productive and reproductive forces defined in terms of movements / social struggles to modify or abolish these forces based on other technological options, work relations, transport modes, organization for rearing children, and others (O'Connor, 1998, p.386).

O'Connor explains that ecosocialism is not strictly a normative position, but rather a positive analysis of social and economic conditions, as they subordinate the value of change from the value of use and production in favour of the benefits of production on behalf of needs:

Use the term ‘ecological socialism’ to distinguish theories and movements that attempt to subordinate the value of change from the value of use, and concrete work from abstract work. That is to say, to organize production in favour of needs (including the needs for personal development of the workers), not the profit. Thus defined, ecosocialism analyzes the problems as much as, the capitalist labour process, as the structure of value and use and the needs (consumption). In this sense, it attempts to place traditional socialism at the level of its own critical ideals (O’Connor, 1998, p.385).

Alain Lipietz, in his essay, *What is Political Ecology?* (2002), allows us to note that environmental practices and social and political movements occurred in time before attempts were made to form a field of study. According to the author, when political ecology highlights imbalances caused by human activity, it questions modern ways and develops a critical analysis of the manner in which our industrial societies function, inviting us to place the content of the analysis at the center of politics. Ecology is “an immense supply of new contents, or rather, a great call to deal with the content. It sets objectives, redefines means and strategies, things that seemed to have disappeared from ‘politics’, reduces competition for power among men and interchangeable and alternating parties” (Lipietz, 2002, p.7). In the process of building a future ecological society, political ecology attempts to redefine a moral path for the 21st century, superimposing values above a societal model. The matter of values, affirms Lipietz, is independent of technical change and comes before its application. Lipietz bases himself on the deliberation that a human being is a social and political animal. The particular nature of human societies is what determines their political character, which results in the main form of evolution of the human species being social and economic evolution.

Lipietz defines scientific or natural ecology as “the science of a triangular relationship among individuals of the same species, organized activity of this species, and the environment of this activity” (Lipietz, 2002, p.14). Although the definition is erroneous, since general ecology studies relationships of living beings among themselves and with their environment, however, it is true as a definition of the ecology of a particular species observed from the branch of self-ecology. What is important to emphasize is that Lipietz assumes that political ecology bases itself on two sides of the triangle that forms scientific ecology. That is to say, on social activity and its effect on the environment and the influence of the environment on humans.

Political ecology is the ecology of a particular species: the human species, a social and political species. However, it is also a social movement to transform the truly existing ecology of our human species. Thus, it is politics, but it is also ethics: a moral aspiration towards more harmony, more autonomy, solidarity, responsibility. (...) Political ecology is a social science, ecological politics is first and foremost, social politics. (Lipietz, 2002 p.9)

Lipietz assigns a practical sense to political ecology, which defines itself by its ecological actions that favour environmental defence. Thus, “ecology spontaneously becomes politics, rejecting ‘unsustainable’ economic development models,” in search of answers to sustainable development (Lipietz, 2002, p.19). Political ecology is also a “human science, or rather, a federative approximation of numerous human sciences, and a social and political movement, acting on the social problems that this human science deals with.” However, Lipietz appears not to give much importance to precision in the use of the terms of this meaning, since he gives undifferentiated use to political ecology and ecological politics.

A precise and formal definition of political ecology was offered by Jose Luis Serrano Moreno, a Professor of the Universidad de Granada, Spain, in his essay “Premises for an Ecopolitical Theory of the State” (1998), in which he approaches the meaning from a juridical-political point of view:

In one of its possible meanings, the term Ecology implies a certain model of the juridical-political system. This model will be characterized by combining the three points of view mentioned before, that is, by coming from a pluralistic, relativistic, and conflictual doctrine that admits the central laws of thermodynamics and the general theory of systems, read in an ecological key. On the epistemological level, the model of a political-legal system for Political Ecology is characterized by being appropriated for dealing with the asymmetry of ecosystems, the coevolution of systems and their natural environments, and the existence of temporal limitations. To put it briefly, the model for a Political Ecology legal system will be characterized at the epistemological level by being a system of minimum power, self-limited, and therefore, adequate to lasting. (Serrano-Moreno, 1998, p. 160)

Manuel Castells is another contemporary philosopher who dedicates his attention to the topic of ecology. In his monumental three-volume work, *The Era of Information*, Castells dedicated himself to describing the characteristics of social movements with an ecological tendency by constructing a typology. Although Castells did not attempt to offer a formal definition of political ecology, his descriptions of green movements are very purposeful for our research:

Collective action, politics, and speeches grouped together under the name of ecologism are so varied that the idea of a movement becomes questionable. Notwithstanding, I believe that this diversity of theories and practices is precisely what distinguishes ecologism as a new form of decentralized movement, with multiple forms, articulated in a network and omnipresent. (Castells, 1997, Vol. 2, p.137)

The distinction between environmentalism and ecologism made by Castells is convenient. It appears to be influenced by the thoughts of Murray Bookchin, though the former is synonymous with anthropocentrism, while the latter presents the biocentric view. In this sense, Castells remarks:

By environmentalism I refer to all forms of collective behavior that, in their discourse and practice, attempt to correct the forms of destructive relationships between human action and the natural surroundings, in contrast with dominant structural and institutional logic. In my sociological interpretation I understand ecology as a series of beliefs, theories, and projects that consider humanity a component of a broader ecosystem and want to maintain the balance of the system in a dynamic and evolutive perspective. In my opinion, environmentalism is ecology put into practice, and ecology is environmentalism in theory, but ... I will restrict the use of the term ecology to the explicit and conscious manifestations of this holistic and evolutionary perspective. (Castells, 1997, Vol. 2, p.137)

We found another specific definition in an article by Jacques Robin, founder of *Transversals Science Culture*, published in the magazine of the same institute, entitled *Political Ecology and the XXI Century* (2002). There, Robin emphasized on the relationship that exists between a sense of responsibility toward nature and relationships with third parties, directly linked to our individual and social behaviours. This reality led him to a re-examination of the meanings of dominion and hierarchy among individuals, sexes, races and ages, where the relationship between political ecology and philosophical and ethical questions are expressed.

Political ecology attempts to transfer the multiple aspects and realities that make up the term ecology, to the political field.... The term ecology, generalized in the last decades of the XIX Century, adopted the most satisfactory sense of organization of our Earth home, in its relationships with the nature that surrounds it. What is exceptional about ecology is that it had been a science but has evolved to be a political and ethical matter of greater

importance.... Coevolution between daily activities of human societies and the biosphere is presented as a pressing need. However, scientific ecology leans more and more towards a general social and political matter and a revolution of minds. (Robin, 2002, p.)

I.7.8. Latin American Perspectives on Political Ecology.

Henrique Meier, a researcher in environmental law and former Venezuela Minister of the Environment, in his *Introduction to Political Ecology* (1978), evidences the time that has passed and the evolution of reflexive thought in relation to ecological matters. Meier, as well as other authors, does not distinguish between human ecology and political ecology, but makes equivalent use of both meanings. After introducing the ecological terms “inhabitants” and ‘community,” Meier considers the differences that separate man from other animals, underlining their evolutionary load, understood as reasoning power and awareness of self. The description of Homo-Faber, the “political being” that interacts as a living being with his environment, at the same time that he is interacting culturally with the rest of the individuals of his species, that establishes a transfer of the ecological term “inhabitants” to the context of political ecology. He affirms that human-nature relationships occur in a social-historical context. Thus, society is the consubstantiality between people and nature. In this manner, the author defines the purpose of political ecology as an “extremely new branch of knowledge that still cannot attempt to acquire the characteristic of a science. A study of the impact or influence of various social forms over nature” (Meier, 1978, p.13).

In his book *Ecopolitics of Development in the Third World*, (1991) Roberto Guimaraes, dedicated a chapter to considering the relationships between political science and ecology. Upon questioning Guimaraes in this respect he opined that:

In order to adequately understand the internal function of ecosocial systems—how they interact, strengthen, maintain, and transform one another, the natural and human systems are crucial for exploring the political dimensions of these relations. We are constantly reminded that humanity is on the border of a serious environmental crisis. What does this term mean? Is the environmental crisis determined by the pollution in the air we breathe, the food we eat, or the water we drink? Or is it related to other structural elements of human evolution? What difference is there for a political scientist or public administrator in understanding the essence of present ecological realities? Can information about social relationships and political systems be obtained by exploring interconnections between human activities and nature? Lastly, can a space be created for developing new fields of social science that would be capable of incorporating integrated studies of the knowledge of natural and social sciences with a multidisciplinary approach? (Guimaraes, 1991, p. 11).

The questions presented to us by Guimaraes are the first obstacle on the path towards an approximate definition of ecopolitics and were broached by the youth of ecological science themselves. As a new science, ecology is still in a developing stage, in spite of having consolidated certain guiding principles of its purpose and study method. In this sense, the scientific knowledge capable of discovering the nature and dynamics of the interactions that make up the vital network of land biosphere, is still scarce. Thus, the identification and analysis of human-nature interactions and their impact in time, still maintain a halo of ambiguity.

In spite of the fact that this affirmation may sound relative when we analyse the environmental history of past societies, it is confirmed by taking into consideration present uncertainties posed

by the ecological impacts of industrial and technological development and population growth that characterized the end of the 20th century. Notwithstanding, beyond the identification and analysis of human-nature interactions, the idea of human ecology and the elements of ecopolitics direct us equally to the subject-area of interactions among human beings, which belong to the field of social science with environmental systems as the setting, whether natural or anthropogenic. With this frame of reference of a conceptual search for the ecopolitical term, we quote Roberto Guimaraes again:

It is generally accepted that the area of concern of ecopolitics—understood as a study of political systems from an ecological perspective—has a sound base. However, its development has been erratic. Various attempts to apply an ecological approach to social science have been made, but in most of these cases the studies have remained isolated. Very useful studies also exist in specific areas and problems, but the truth is that environmental problems have been perceived in fragments... There is an urgent need to study ecopolitics comprehensively, with an understanding of the fields of human ecology, political science, and public administration. (Guimaraes, 1991:13)

One of the founding fathers of the theology of liberation, the Brazilian theologian Leonardo Boff studied this subject in depth in his book, *Ecología, Grito de La Tierra, grito de los pobres* (Ecology, Cry of the Earth, Cry of the Poor. 1996), in which he gives his interpretation of political ecology:

Ecopolitics attempts to work with sustained development strategies that will guarantee a balance of ecosystems, including a labour system and, at the same time, one with a sense of solidarity towards future generations. They have a right to a fair, just, and involved society, with a healthy environment. However, there are limits. Generally, in the tautness between development and conservation of the environment, a decision favours deterioration of the

environment for development. The increasing and linear development model is not being questioned radically. It is still the ideal-type for society. (Boff, 1996, p.18)

Chilean political scientist and sociologist, Fernando Mires, is one of the Latin American essayists who has dedicated himself to the study of ecology as a sociological and political topic. Prominent among his publications is *The Discourse of Nature: Political Ecology in Latin America* and *The Revolution no one Dreamed of or the other Post Modernism* (1996), which we will describe briefly. In a chapter dedicated to ecological revolution, Mires approaches the impacts that generate the ecological crisis of the established order with precision:

Ecology, as a political practice, subverts essential principles of modern rationalism. Possibly we are taking part in one of the most revolutionary processes that the history of humanity has ever known. Thanks to the services rendered by ecology, we may be able to perform a sort of three-dimensional discussion. In the first place, a civilizing order: modernization itself. In the second place, a social and economic order: industrialism, predominantly the capitalist form (since the socialist form questions itself and does so very radically). In the third place, ourselves. There is no global revolution without subversion of the individual, and vice versa. In the past, revolutionary projects reduced questioning to just an external relationship. The person who achieves his potential by appealing to the resource of ecology, internalizes and externalizes problems at the same time. Because it is not only a system outside our consciousness that can be held responsible for the extermination of our planet. It is also we, ourselves. (Mires, 1996, p.97)

A similar position, proposing a critical view of modern ways, was offered by a Venezuelan, Joel Sangronis Padron, a Professor of the Universidad Nacional Experimental Rafael Maria Baralt, in Venezuela. His article, "Ecology and Modern Ways" (2005), published on the web page ecoportal.net, reveals one of the main characteristics of the ecological discourse. The

denouncement of the myth of progress promoted for the technical and instrumental reason of modernity. Sangronis argues in relation to the contradictions of materialistic reasoning, which finds its own contradictions with the promise of a future that it, itself, is denied in the praxis of its destructive logic.

Ecological and postmodern discourses close in on the proposal of abandoning reductionist thought, a symbol of modern ways, by questioning the dehumanizing and commercial logic of capitalism. Ecological thought, which serves as a basis for present questioning of the legitimacy of the myth of progress and eternal linear development, and therefore, of the liberal-capitalist model, rises in the horizon as one of the main weapons with which to fight the present ideological battle between the agonizing side of modernity and the new civilizational model that is to be born as an indispensable requirement for the survival of the human species.

Hector Alimonda, Coordinator of the Political Ecology Work Group of the Latin American Social Sciences Council, CLACSO, compiled a group of international essayists from Argentina, Chile, Uruguay, Brazil, Mexico, United States, England, and France in a book called *Political Ecology, Nature, Society and Utopia* (2002). There, Alimonda presented a global view of western and Latin American ecopolitical thought, in which from the beginning, mention was made about all significant environmental matters to the political sphere. Theoretical and practical consequences derive from the central role held by politics in society-nature relationships that lead to different positioning for the analysis of a social reality, at the same time permitting the use of different disciplinary approaches. Assuming the particularity of the ecology of the human species and its relationship with nature, these are mediatized by forms of social organization, and kept in

political mechanisms to establish their consensus and reproduction. Alimonda echoes the implicit fear of a political consideration of ecology that would direct it towards deterministic and biological interpretations of a reactionary type:

To attempt re-establishing politics from a place that supposes a significant articulation of validity with scientific enunciations (in this case scientific ecology) brings with it the danger of reintroducing autocratic mechanisms of enunciation. Politics, supposedly based on scientific certainties, brings with it the risk of dogma and the crystallization of its truths. (Alimonda, 2002, p.8)

Thus, there is a need to incorporate a reflection of democracy and of environmental justice as an extension and complement to human rights and citizenship. For Alimonda and the group of researchers that follow him, the construction of a Latin American political ecology is an urgent and unpostponable task that already has its requirements assigned:

A rigorous, yet flexible conceptual explanation, based on a critical theoretical reference. A dilated accumulation of information of the nature and history of the continent, particularly of the relationship between both, and of contemporary events on a planetary scale. It is a reflexive work of the various ways in which dominant powers of different periods conceived and carried out their strategies of appropriation of Latin American nature and a balance of their environmental effects and social consequences. A permanent dialogue with territories of scientific and technological knowledge, specialized in domains external to social science. A rereading of classics of social and political thought of the continent, from new points of view. (Alimonda, 2002, p.12)

At this point I summarize some elements from Enrique Leff's political ecology work, which from my point of view, is one of most profound, conceptually clearest and comprehensive research efforts made in Latin America to define the scope of political ecology. The author certainly has

the necessary background to undertake this task. Leff has been coordinator and feature writer of a series of editorial works that compile a broad spectrum of sociological essays that dealt on the topic of environmental science: *Social Science and Environmental Training* (1994), *Environmental Complexity* (2000), *Problems of Knowledge and the Environmental Perspective of Development* (2000), besides a book he solely authored, *Environmental Knowledge* (1998). In addition is his work as a university professor and as an advisor of the United Nations Environment Program, UNEP, as one of the most conscientious researchers dedicated to the theoretical reflection of an epistemology of environmental knowledge. From his reflections one can perceive the influence of the well-known “green thinkers” from the United States school, who in the 1960s and 1970s proposed a definite rupture from the industrial productive model, as in the case of Murray Bookchin and his social ecology. Equally contrasting is his knowledge of Marxist categories, which he confronts with a new rationality. As a Latin American he has the ability to portray the view from the third world periphery, that social ecologists from Europe and the United States are not always capable of internalizing. However, the problems of knowledge that Leff tackles are all-encompassing, in that the non-construing of scientific paradigms of modern times is to be approached from the diversity of dialogues of traditional, aboriginal, and rural cognizance.

Leff has written about a vast number of environmental topics related to the problem of scientific knowledge. Therefore, reading about his opinion of political ecology takes on a double meaning: that of a sociologist and an epistemologist. Upon referring to the phenomenon of the abrupt emergency of political ecology as a category of knowledge, Leff reiterates the position of other researchers that place it in a foundational moment of its theoretical-practical field. Leff advises that it is not enough to place it in the field of science. Beginning with the deconstruction

of an unequivocal and fragmentary science, the field of political ecology should be construed with new principles and views that will give it an identity of its own. Political ecology transcends environmental politics, since it is not only concerned with conflicts of ecological distribution, but also goes deeper into the dynamics of relationship of power among people and with the world as a whole:

Political ecology builds its field of study and action in the crossroad and countercurrent to various social disciplines, thoughts, ethics, behaviors and movements. It is there that environmental and ecological branches of new disciplines: ecological economics, environmental law, political sociology, anthropology of cultural-nature relationship, political ethics, collide, flow and intermingle. (Leff, 2004)

Leff explains that the field of political ecology transcends the territory of ecological economy and the ideas of re-evaluation of nature. However, he acknowledges that it is still far from forming a new paradigm. He only grants it the exploratory nature of a new science trying to find a place for itself:

Political ecology is a field that still does not have a name of its own. For this reason, it is designated with metaphorical loans of meanings and terms from other areas of concern to name a few of the conflicts derived from an unequal distribution and appropriation strategies of ecological resources, natural resources, and environmental services. (Leff, 2004)

For Leff, political ecology represents an environment for reconstructing cultural identities, beginning with the defense of natural resources, which implies free thinking allied with the excluded majorities. As fundamental actors, people of the research, action, and participation process represent their own priority objective of ecopolitical practice. Leff differentiates ecological

relationships seen from biological ecology to those seen from political ecology, denying a political sense to the former as a manner of conjuring a biologist temptation:

Relationships between living beings and nature, trophic chains, territorialities of species, including depredatory relationships and domination, are not by any means politics. If politics were taken to the territory of ecology it would be in response to the fact that the organization of the ecosystem of nature had been denied and externalized from the field of economy and social science. Relationships of power emerge and are shaped in the symbolic order and wishes of human beings, a radical difference from other living beings that are the purpose of ecology. (Leff, 2004)

Upon entering the area of the epistemology of political ecology, Leff defines it as the politics of re-appropriation of nature. However, it should not be understood as a linear discourse, or as a strategy of political action, but as a body of knowledge wanting to take over and build worldwide theoretical-political values and opinions of a symbolic order. It pursues the formation of foundations with a new rationality capable of unifying the world of nature with the world of culture, from a prospective view of the possible:

Political ecology is politics of the difference of diversification of the senses: beyond politics for the conservation of biodiversity, which would be re-codified and revalued, as a universal ethics or for the world equivalent of the market. It is a transformation of unitarian logic towards the diversification of sustainable projects and ecodevelopment. This politics is a revolution that opens civilizing senses, not because they would be a revolution of nature or of scientific-technological knowledge (biotechnological). But instead, because it would be a revolution of a symbolic order, which implies placing the deconstructionist spirit of postmodern thought at the service of politics of the difference, to propose the “abolitionist imagination” as a principle of liberty and sustainability. (Leff, 2004)

Thus, the notion of political ecology proposed by Enrique Leff transcends the scope of conflicts of power in relation to the appropriation of nature, and invites readers to rethink politics from a view alternative to the relationships of nature, culture, and technology, based on a new political ethics that questions about the meaning of life (Leff, PNUMA, 2002).

We could arrive at the conclusion that if political ecology is a science, its purpose and methods still have to be defined. If political ecology is going to become an organized doctrinal body, it will need principles to govern it, programs of action, and organizational models to define it. If by political ecology we are going to describe the heterogeneous characteristics of a vast conglomerate of social sectors, from indigenous movements and feminist groups to popular organizations and environmentalist NGOs, we will require analysis methodologies different from those used until now to measure the action of the state and political class. For the researcher attached to the field of political science, all of this implies a re-reading of the ideas that have sustained the philosophical systems that teach us the history of political ideas. This implies adopting methodological approaches capable of reinterpreting the realities that will determine the existence and survival of human societies in future centuries. It also implies identifying old and new scales of values capable of mobilizing societies in the scenario of a global crisis. Lastly, it implies questioning the anthropocentric paradigm that will confront humanity with itself, separating the destiny of people from the nature that feeds us.

1.8. A Convergent Interdisciplinary Research System

With the help of geometric figures and colors, the above chart (Fig. 1) represents the various disciplines primarily involved in research and that will be integrated to build a wide idea and particular notion of the *transitional space*.

In the upper left corner, we see that Systems Theory (Blue) gives us an initial guideline for this approach to space. Understanding the notion of a system as an entity with spatial limits. The notion of system thus entails the existence of a systemic edge or boundary and therefore the notion of an inter-systemic transitional space.

Figure 1. Outline of a Convergent Interdisciplinary Research

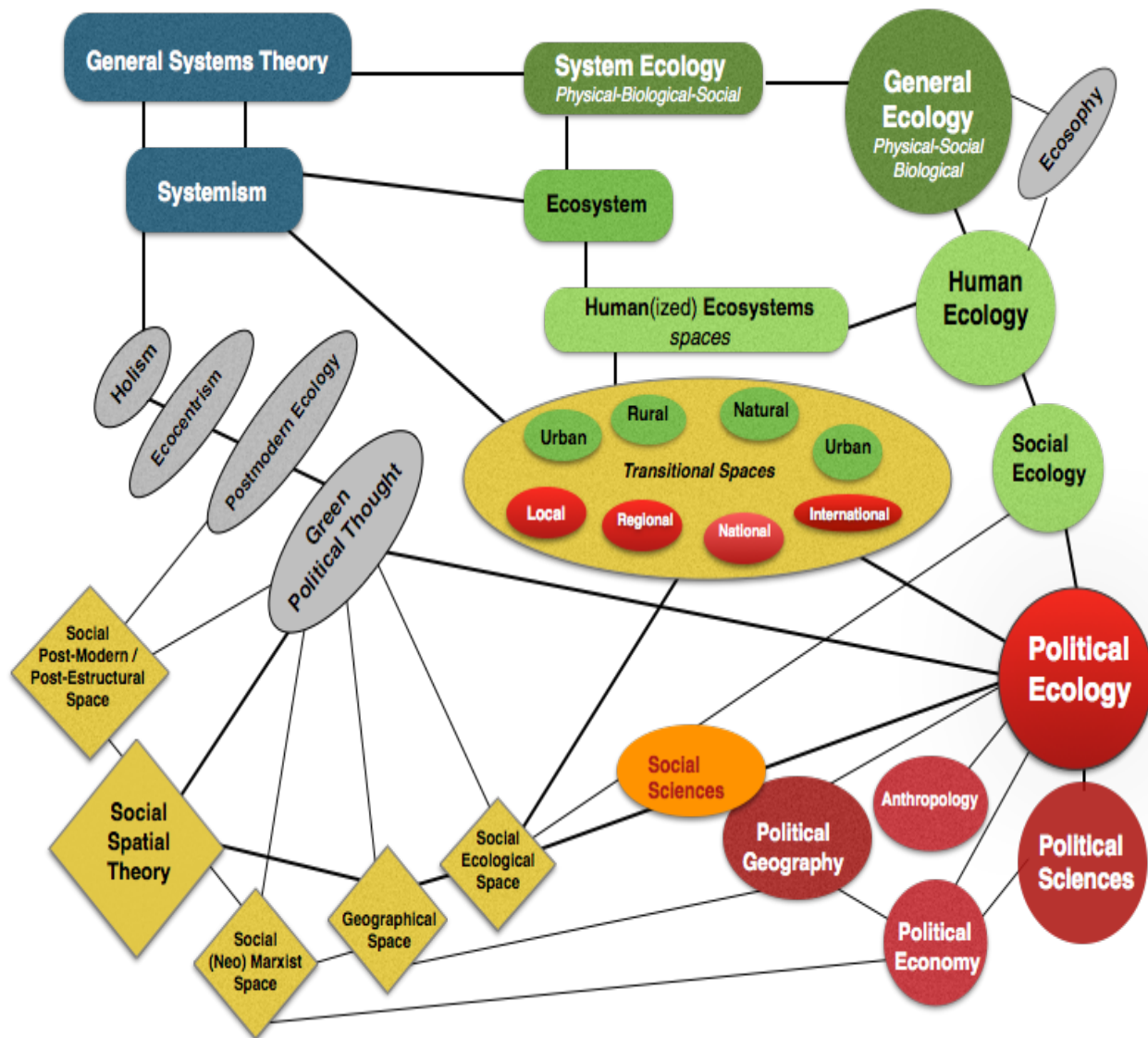


Fig.1- Theoretical Framework of the Thesis

An interdisciplinary diagram of the areas and elements of the investigation showing how they interconnect, creating a convergent research system whose function is to inquire about the issue of transitional spaces (Lascoutx).

This allows us to connect theoretically with the spatial referents of systemic ecology, and in particular the concept of ecosystem (Green). The recognition of complex ecosystems, spatially

integrated by communities of different species (human and non-human), leads us from a general ecology to a particular vision of human ecology that in turn leads to social (human) ecology.

From this point on we move from the field of natural sciences to enter the diffuse dimension of the social sciences, particularly the field of political science (Red). This sort of metamorphosis of the analytical point of view, that is, the diverse perspectives of spatial analysis that emerge from an interdisciplinary, non-linear framework, will confront us with the concept of political ecology. This hybrid concept requires an epistemology that supports it within the inherent logic of research related to transition spaces between ecosystems.

Following the flow of the graph, this would mean exploring a concept of political ecology as a resulting evolution of human ecology. But it would also mean the possibility of "reading" the graph in the opposite direction, that is, from the philosophy of ecological thought, ecosophy, holism, etc. (Grey), which are impregnated with a quasi-symbiotic relationship between the concept of nature and the concept of geographical and ecological space.

This in turn leads us to take into account, even briefly, the different concepts of space used from different perspectives of the social sciences (Yellow). And it is through spatial social theory and political geography, among other disciplines, that we find another connection to political ecology.

At the center of the graph there is an oval (yellow) that represents the scope of boundaries between ecosystems, and the transitions between geographical spaces: urban, rural, natural; local, regional, national, international. It will be noticed that only some do touch the central oval: a) systems theory, b) social-ecological systems, c) socio-ecological spaces, and d) political ecology. They represent the interdisciplinary points of contact with the object of study, in this case, a Politico-Ecological Approach of Transitional Spaces in Social Ecological Systems.

I.9. Outline of Chapters

As part of the broad theoretical possibilities of political ecology, this research aims to relate spatial concepts from diverse disciplines in order to outline a conceptual framework in which the notion of transitional space can play a fundamental role in the structure and management of social ecological systems of cities, metropolitan areas, and bioregions. I will explain why transitional spaces may become key elements of preservation for urban peripheral ecosystem services amid the governance challenge posed by relentless urban growth. The notion of transitional space can be used to establish a concrete argument for bioregional planning policies advocating for socio-spatial justice. With the overall purpose of strengthening Political Ecology's theoretical tools, the research seeks to introduce two notions of transitional spaces: Social Ecotones and Eco-interfaces. By advocating for the properties and potential functions of these spatial subsystems—preserving natural ecosystems and low-impact agricultural lands bordering diverse urban peripheries—this research endorses the goal of protecting Earth's habitable spaces, for both human and non-human life.

From the widest possible perspective, the underlying theme that provides a sense of the spirit of this research is the notion of *habitat*⁸. Through general inductive reasoning, the universal notion of *habitat* refers to the place where life exist, that is, where physical conditions are suitable for the existence of life of any kind: organisms, individuals, species, or communities, be it plants or animals. Using the notion of *habitat* as a ‘generative’ concept, we can identify spatial elements from which to build a theoretical framework for the research. It opens a scope of spatial notions that allow us to relate spatial concepts from diverse disciplinary fields and different categories. Since the 19th century, biologists have understood the notion of *habitat* as a precondition for the existence and development of all living creatures (Haeckel). The drive behind habitat preservation is a notion that largely synthesizes one of humanity’s many social and ecological concerns in the 21st century. The notion of habitat—understood as settlement—allows me to move my arguments from general ecology to social theory through parallelism with cities, metropolises, and urban ecosystems.

Chapter two shows a second parallelism present in political theory: the analogy between the idea of nature and the notion of space. A brief historical recount of these two concepts provides a theoretical framework for Political Ecology as it shifts on how dialectics of power express

⁸ Two concepts that are related are "Habitat" and "Ecological Niche". Eugene Odum (1972) exemplifies them simply and clearly. Habitat is the site, place or location that the organism occupies within the ecosystem. "*It's where you go to look for that organism,*" says Odum, comparatively referring to Habitat as an individual's "home address." The Ecological Niche represents, for its part, “the profession” of the individual, that is, the set of functions performed by this organism within the ecosystem; that is, what it does, how it transforms energy, how it behaves and reacts to its physical and biotic environment, transforming it, and how it is "coerced" by other species that share that Habitat.

themselves over anthropocentric notions of space and nature. The origin of this particular man-centred worldview is an ancient and multicultural belief. This chapter demonstrates the reiterative existence of overviewed theoretical ideas, deposited like fine layers of pseudo-scientific prejudices to the building of the anthropocentric discourse, together it all is derivatives (Geocentrism, Ethnocentrism, Eurocentrism, Androcentrism, Technocentrism, etc.). This chapter supports my argument about how anthropocentric rationality limits our capacity to perceive the deeper reality of the ecosystemic space, our relation with nature, and the consideration of the biosphere as our endangered habitat.

Let us not forget that the history of political philosophy and political thought being debated here focuses solely on the roots of Western civilization and its own evolution: the *Cosmocentrism*⁹ of the Greeks, *Theocentrism* or *Deus-centrism* of Middle Ages Christianity, the *Humanism* of the enlightenment (later turned into rational anthropocentrism), *Materialist Individualism* and *Historical Materialism* as products of modernity and nihilist post-modernity. While a human-centred vision of the world has not been exclusive to Western thought, it is important to keep in mind that the belief in a man-centred universe is not common to all cultures, nor expressed in the same way throughout historical time and diverse geographical spaces. My arguments regarding

⁹ “*Cosmocentrism, at its core, makes the universe a priority in a worldview, perhaps along with other priorities. Teleological cosmocentrism suggests that the universe has intrinsic directionality or perhaps an ultimate ‘purpose’.* Pantheism goes further by ascribing a kind of spirit or divinity to the universe, essentially equating it with many notions of God”. (Lupisella, M. (2010) *Cosmocentrism and the Active Search for. for Extraterrestrial Intelligence*. NASA Astrobiology Science Conference 2010. <https://www.academia.edu/4269813/>

anthropocentrism and its alternatives (i.e., *Ecocentrism*, *Biocentrism* and *Systemism*), therefore, correspond mainly to Western philosophy. In this respect, they are referential and limited to some examples of how Western thought and political ideologies have used nature and space (neo-Darwinian biology, geopolitics, and geographic determinism) for the benefit of their particular ideas of power, progress, and development: political philosophy paradigms based mainly on a single argument—humans as beings alien to nature.

As I stated ahead in **Chapter 2**, the scientific and philosophical positions of social scientists regarding anthropocentrism is a dividing line between two different conceptions of life. These two separated worldviews, which point to different objectives and aims, will most certainly reach different conclusions about most of the research done under the banner of Political Ecology. But how can we understand this research as a political ecology investigation? In which manner does Political Ecology manifest itself when studying spatial transitions and express its spatial *problématique*? How can we look at the subject of space and its transitions within the hybrid lenses of political ecology? There are multiple contexts for, as well as concepts of, political ecology. No single definition satisfies all researchers as each use a political ecology framework from the perspectives of their own disciplines. There is no common grand theory about its objectives and method of study. There is no unanimous opinion about its theoretical frameworks.

To address these questions, **Chapter three** will develop an explanation of my particular understanding of political ecology. Through an epistemological exercise dissecting its two conceptual elements (the political and the ecological), I will highlight the discipline's basic political rationale as a social science, while at the same time cross-pollinating the theoretical

principles of systemic ecology with an interdisciplinary view of social ecological space as a politico-ecological issue. It is the fusion of these two perspectives into a single discipline (i.e., political ecology) that offers innovative possibilities to transcend univocal interpretations of human habitats. Its interdisciplinarity allows us to relate biological, physical, and social dimensions with an ambiguous notion of space that nevertheless becomes a structural concept for socio-ecological systems.

We must be aware that Political Ecology is a discipline responding to the needs of the historical time in which we live. This is exemplified by Thomas Kuhn when he affirms that each scientific paradigm appears when the conditions that produced the reigning paradigm disappear and new conditions emerge, demanding a change of perspective vis-à-vis reality (Kuhn, 1982). In a certain way, we have arrived at political ecology through the particular transformations of each of its two disciplines. These paradigmatic metamorphoses have impacted *the political*, encouraging its theory to open up to ground-breaking topics and expanding the study of the State and power to new frontiers and perspectives. Similarly, ecological sciences have evolved in their objectives and methods.

As the XXI Century advances, an increasing number of environmental and ecological problems show profound social, economic, and political consequences that come from unequal and unsustainable spatial relationships between biophysical systems and human systems. In this sense, traditional scientific disciplines are limited to understanding the problems that arise when confronting complex systems such as those posed by spatiality in SES. In this sense, we can affirm that political ecology is an offspring of the interdisciplinary sciences. Understood as the integration

of perspectives and methods that cross the classical boundaries between different scientific disciplines, interdisciplinarity aims to share a common research approach as the preliminary step in exploring a research topic. The difference between interdisciplinary research and multidisciplinary or transdisciplinary research lies mainly in the way the research problem is conceived based on common characteristics shared by the integrated disciplines. That is to say, interdisciplinary research implies an integration of different approaches before delimiting the problem that will be investigated (García, 2006. p.32). This description fits political ecology well.

As a starting point, and to make my position on Political Ecology clearer, **Chapter 3** will introduce some basic rationales for the political consideration of ecology as a social science. I will share extensive research of Political Ecology definitions in order to illustrate the above-mentioned diversity of conceptions. I make this argument about the political impact of ecological problems in order to advance a concept of Political Ecology from an epistemological perspective. This follows the guidelines of Eugene Odum's systemic ecology, which allows me to visualize the concept of the ecosystem from the perspective of system theory, using space as a fundamental element to consider in the interactions between human and environment.

Consequently, by correlating humans with natural habitat ecosystems, **Chapter Four** explores the capabilities of system theory in finding possibilities for using a common spatial language between ecology and political science, as we search for common ground for approaching spatiality through systemic reasoning. Given the different topics involved in this research, I chose a systemic approach to space as the most productive option to achieve an integral understanding of the politico-ecological complexities of social spatiality. The aim of this is to develop a research guided

by systemic thinking, targeting the notion of spatial transitions within an interdisciplinary context of intertwined natural and social sciences at the same time and fitted for a non-anthropocentric Political Ecology.

As I will explain later on in more detail, a system is defined as an entity with spatial limits. There is a space inside and outside of the system. There is also another element that will be highlighted in terms of its spatial characteristics: *the border space* within every system, which will prove fundamental for this research. Theoretically, if each system has a border, neighboring systems share borders too. My argument is that the common border does not exist as such, as each system interacts with its inner border in different ways, especially if the systems are of different nature. Interfaces and ecotones do separate what seems to be a unique border. Nevertheless, systems overlap in "space" on many different ways. Those spaces in between systems' borders have particular characteristics as "transitions" of a spatial continuum. This merge is what Parsons and Luhmann named *interpenetration*. Systemically, it could be considered as a new subsystem capable of separating or linking neighbouring systems or "environments."

Chapter Four briefly explores the concept of complex systems in order to create a link with the concept of Social Ecological Systems (SES). The ideas developed about SES are relatively new in academia, but it is a key concept for this research. Although the notion of space is inherent in SES definition, the question of boundaries between the ecosystems involved is a debated topic. The function of borders is subject to interpretations about the intrinsic value of nature, especially when it is confronted by a philosophy of utilitarianism guided by anthropocentric paradigms. The

idea of transitional spaces has gained clarity thanks to the concepts of “border” and “environment” discovered as principles of *complex system theory*.

By understanding human habitat as an analogical extension of the original ecological concept, **Chapter Five** finds the notion of human settlements as involving cultural elements where the idea of social space and geographical space is implicit. The presence of SES implies a clash of systems of different natures over a space. Beyond the inner complexity of biological and geochemical interactions within natural ecosystems, we find the complex cultural diversity of human ecosystems such as metropolitan areas and rural land. In the same way, the renewed and highlighted importance of transitional spaces, interfaces, and ecotones is developed in more detail. These characterization of properties and functions of transitional spaces may help identifying the spatial gaps within the theory of SES.

Systems are represented theoretically in this research by a classical typology of natural ecosystems, agroecosystems, and urban ecosystems. Beyond the borders of each of these systems, barriers or connections exist that unify a disparate continuum of spatial systems. The *interfaces* among human systems and *ecotones* between biological systems are directly related to the concept of social ecological systems. As they will later on be described in more detail, *Social Ecological Systems* (SES) are complex and dynamic systems formed by biological and social elements generally located in the spaces between these three classical systems (i.e., spatial transitions). This research aims to identify the spatial deficits in the structures of socio-ecological systems by observing and analyzing the notion of interface and ecotone from the systemic concepts of border and environment.

Chapter Six offers a concrete perspective of habitat understood as environment, or a set of geographical factors related to places of human settlements considered at different scales—from dwellings and villages to towns and cities to extended metropolises—and occupying areas delimited by human social interactions. Human ecology, cultural ecology, and social ecology have given way to renewed approaches to understanding human environments and the relationships between space, nature, and culture. From there, we can identify and relay an extensive spatial vocabulary: landscape, territory, region, border, urban, rural, natural, area, zoning, etc., shared by social, economic, and political realms. All of these spatial concepts are related to specific dimensions of political fact.

The notion of alternative concept of urban territory has been widely accepted since the creation of the *Global Cities* concept (Saskia Sassen, 2000) and the *Global City Region* concept (Allan Scott), where the city as such encompasses much more than its physical urban space, spreading through a systemic network occupying extensive spaces.

For its part, the *territory in socio-ecological systems* (TSES) is equally identifiable by its interactions between populated centers and rural areas of various sizes, which orbit around one or more central cities linked by communication and transport systems. In the case of territory in socio-ecological systems, however, the network emphasizes ecopolitical relationships connected through a spatial continuum. The socio-ecological spatial continuum impacts the relationships between actors and the elements that make up the systemic network, and are expressed through urban ecosystems, agroecosystems, natural ecosystems, biological corridors, and protected areas in the

TSES's green infrastructure. The concept of Intermediate Cities is advanced as a concrete alternative when facing megacities prospects. Intermediate cities would be responsible for mitigating territorial fragmentation and preserving spaces for the provision of environmental services.

Summarizing among the several final **Conclusions**, considering humankind as a component of ecosystems, and therefore as an integral part of the concept of nature, what Political Ecology does is to propose an analogy of the idea of “*primus inter pares*” loosely translated as, *human primacy within the biosphere indispensable life diversity*. No more, no less. The idea of the Anthropocene is based on that human primacy, which will ultimately seal the fate for a habitable and sustainable planet, or extinction as man's destiny. This statement, which may form a premise for Political Ecology, gives rise to a reassessment of the concept of Socio-Ecological Systems and the understanding of socio-environmental conflicts from a renewed spatial perspective of territory.

Although socio-environmental conflicts can be generated by an infinity of causes related to the use of natural resources, ecological impacts derived from unsustainable projects, or changes in land use affecting certain communities, *space*, as a theoretical element of any territorial system, will always be present.

CHAPTER II

Political Theory of Nature and Space

“A human being is part of the whole, called by us ‘universe’; a part limited in time and space. He experiences himself, his thoughts and feelings, as something separated from the rest—a kind of optical delusion of his consciousness.” Albert Einstein¹⁰

II.1. Introduction

In this chapter, I will explore how the idea of nature intertwines with notions of space, and how human-centered cosmovisions have been conceptualized by philosophy and social theory. My concern is to find out how much the Western modern idea of anthropocentrism owes to our flawed understanding of the nature of space within Nature. I will briefly approach those mainstream ideas I believe somehow represent an evolution of ancient human centered cosmovision which initiated a trend that eventually led us to the great divide with our natural environment: from classical Greek philosophy, to the European Enlightenment; modern anthropologists, historians, geographers and political scientists from the XIX and XX centuries. All of them represent a Western perspective on the world (Meyer, 1999).

I would agree that the choices I made in this Chapter Two are not representative of the large numbers of authors who have related the questions of nature to the idea of space. I would agree there is a conscious bias in the choice of Plato and Aristotle, who somehow start a controversy between the metaphysical and the materialist's points of view, between the abstractions of The

¹⁰ Albert Einstein as quoted by Nick Herbert (1985) in *Quantum Reality: Beyond the New Physics*. Anchor Books Edition, USA. p.250

Idea and the concreteness of the physical world. Two stands that stand firm through the ages. Similar reasons made me chose Hegel. A large number of disciples and followers have passed through him who, one way or the other got influenced by his views on the natural spaces and inhabitants when formulating his Eurocentric arguments. As an example, we will read Montesquieu's supporting Hegel's opinions. The same considerations made me choose as an example those theses of geographical determinism that distorted some of Darwin's iconic ideas, producing a biased version of organic theories, thus creating an atmosphere of rejection and stigmatization over other theories that seek explanations in nature. Same goes for Giddens as a representative of present modernism and the relationship on anthropocentric rationale. Furthermore, I open diverse reasoning and arguments, most of them from the field of non-anthropocentrism, which will help me to sustain my own views regarding ecocentrism, biocentrism, and systemism. Those descriptions account for the biophysical realities that influence, affect, or determine human societies. Incorporating those biospheric realities into social science is the job of political ecology. The narrow gaze of anthropocentrism is one of the obstacles to overcome.

My intention with this review is to offer a glimpse on how topics of space and Nature concur with subjective philosophical interpretations of geographic phenomena. Individual or societal values are implicit in particular views of geographic space when understood as an alien environment to humans. It becomes an open question how culture shapes certain societies into a 'cultural anthropocentrism' that distance them from Nature. Meanwhile, other societies favour a 'spatial conjunction,' inducing humans to seeing themselves as part of a broader environmental system where the idea of externality takes on another dimension of understanding. The reader can

foresee how the concept of socioecological systems points towards that direction. My expectation is that this approach will help us to perceive and identify any spatial bias affecting the development of a non-anthropocentric theory of political ecology.

II.2. The idea of Nature and the Question of Space

Nature as Context

What is this natural world, this nature we are referring to? From the perspective of political philosophy, *Nature* has been represented and defined in many ways. For early philosophy the meaning of nature was related to the very essence of the being, of the self (the soul or spirit that animates the living), or defined through the characteristics, inner structures, properties and functions of things (the unanimated things which exist). Nature was then related to the essence, the movement and the potency.

For its part, the biological perspective of the natural world has proved to change dramatically from the medieval and renaissance theological constructions where nature represented the creation of God, to the enlightened vision of modernity where the natural world is seen as a mechanical machine, either moved by will of God or obeying its very own laws, but always as something static, instrumental, and surrounded by an utilitarian aura. It wasn't be until Darwin's evolutionary theory that a concept of nature in movement and constant change emerged, allowing the possibility of understanding natural science in a different way. The idea of nature, understood as the biophysical world surrounding human beings, is a well-accepted statement as long as the question about place and role of humans within that nature stays away from the discussion.

I shall go through a brief recount of the main human views regarding the idea of nature, establishing a certain parallelism with the notion of Earthly space, considering it also as a

biospheric place which humans and non-humans inhabit. Thus, both nature and terrestrial space are configured in a certain way as a whole where the existence of man unfolds.

Of course, all these thoughts come to an end: our ideas about Nature are just representations that we humans construct in order to have codes to transmit our perceptions of reality. The process of nature's knowledge construction is by definition a social construction. It has always changed according to the culture and the knowledge we humans have acquired through history.

Similarly, the idea of nature intertwined with the notion of space can be found at any epoch where political or philosophical ideas show relationship with geographic explorations, the territory of a State, or colonial expansion as factors to be considered in political analysis. These representations of nature show diverse forms and values, usually involving different disciplinary angles and alternative approaches to the human-nature relationship.

All major works of political philosophy developed since antiquity, middle ages, enlightenment, until modernity and post-modernity, pursue the intention of deciphering nature and therefore human nature's place in the world. But what is that nature which philosophers talk of? Is it the same nature of the botanists, psychologists, or artists? Is it the nature of geographers or astronomers usually treated in tandem with topics related to space? I believe it is important to recognize that we, humans, do not have definitive answers to this question. I shall approach the idea of nature from the pristine lights of ancient thinkers who initiated the controversy about the nature of man and influenced the ideas for centuries to come.

We can argue that man's relationship with nature has always been present in religious, mythological, and philosophical canonical texts since the very beginning of historical times. We

can also trace the process of building the epistemological bridge between natural sciences and human sciences to as far back as the Greek classical philosophy, particularly Plato, Epicurus, and Aristotle, whose concepts of nature have influenced—directly or incidentally—a vision of the world for centuries.

One of the most peculiar aspects of the ancient concepts of nature is the low accuracy and the wide spectrum of its different meanings, either from philosophical, scientific, or cultural standpoints. However, as we know, many classical Greek philosophers succeeded in producing a set of ideas about the *self* and its *essence*, about *movement*, *space* and *time*, about *matter* and *spirit*—all of them somehow related to the notion of nature that generated a body of knowledge so vast and profound that impacted for centuries the post-Hellenic civilizations making its mark in Rome, Byzantium, the Arab Caliphates, medieval times, renaissance and enlightened Europe, its influence reaching today's Western culture.

Plato is recognized as one of the first Greek philosophers who initiated this inquiry about the place of man in the universe. In his dialogue *Timaeus*, he described the creation of the world, and the laws that govern men, nature, and the universe.

"The truth is that the image, different from the substance in which it is born, a changing representation of a superior being, must be produced by the same thing within something else, from which in a certain way It takes existence, or not to be absolutely nothing ... Being, space and generation are three different principles that predate the formation of the world " (...)
"The contour of the universe by enveloping all kinds of beings and by nature tending to its spherical shape to concentrate on itself, compresses all bodies and does not allow any space to remain empty." (Plato, 1977. p.42-62)

We clearly find here a theological vision of the universe where a higher being, a Father and Creator, generates the world and its elements. Platonic idea about the reality of the world of ideas

as uncovered has primacy over the illusion of the material world. His worldview on space as a support for creation stands out.

"Matter sometimes appears as an undetermined substance, crossed by these [geometric] forms, sometimes as mere space [...] in this way, cosmogony still leaves in the shadows the ancient problem of how to relate to the eternal world of ideas with the mutables of time and space". (Plato, 1977. p.42-62)

One aspect that should be noted is that through Timaeus, Plato affirms that an elemental understanding of space can be reached through reason and without the need for perception of the sensible world.

As part of his writings on Physics, Aristotle's concept of nature has proven to be a challenging one for several reasons. I have selected some fragments from his classical texts searching for arguments that could be adapted to politico-ecological notions of nature, human nature and space.

One aspect of the difficulty of defining nature is the complexity of reality itself and the difficulty of drawing its boundaries: Nature means (1) *The genesis of growing things...* (2) *That immanent part of a growing thing, from which its growth first proceeds.* (3) *The source from which the primary movement in each natural object is present in it by virtue of its own essence* (Aristotle, 2003, p.329). As had been said, philosophy at the time did not draw a precise line with science. We can see how Aristotle's definition of nature struggles between biological and metaphysical explanations, and then returning to physical descriptions of matter:

Nature means the primary material of which any natural object consists or out of which it is made, which is relatively unshaped and cannot be changed from its own potency, for e.g. bronze is said to be the nature of a statue and of bronze utensils (...) For it is in this way that people call the elements of natural objects by their nature, some naming fire, others earth, others air, others water. (Aristotle, 2003, p.329)

The word *Essence* is sometimes used as a simile, a synonym of nature; sometimes as a property of the “thing” that nature is: *“By an extension of meaning from this sense of 'nature' every essence in general has come to be called a 'nature,' because the nature of a thing is some kind of essence.”* (Aristotle, 2003, p.329). But Aristotle also knew and talked about the natural reality that was allowed in our senses. Facing the palpable matter underlies its essence, and that essence is made up of the elements that constitute it, whether animated or not, and all these elements share the principle of movement, either as transformers or generators, whether in potency or in action:

“From what has been said, then, it is plain that nature in the primary and strict sense is the essence of things which have in themselves, as such, a source of movement; for the matter is called the nature because it is qualified to receive this, and processes of becoming and growing are called nature because they are movements proceeding from this. And nature in this sense is the source of the movement of natural objects, being present in them somehow, either potentially or in complete reality.” (Aristotle, 2003, p.329)

Regard space, Aristotle shows different examples of spatial analysis. The objects of research swing from world of ideas to the physical phenomenon: *“According to Aristotle, space enters the investigation of empirical science, which broke out from philosophy; On one side, cosmogony disappeared and cosmology was formed (...) guided in the observations of the stars, their cyclical movements and rotations, and mathematical models also represent the circular orbits that are expanding from arithmetic to geometric shapes and not only as theoretical forms.”* (Velez Rodriguez, 2017). In other words, the concept of nature has been allowed to question itself, reflecting on its own questioning, as a whole: what is the nature of nature? Or as a bias: what is the nature of a statue? What is the nature of a tree? What is the nature of men...? and the nature of women as opposed to men...?

From Aristotle's description of Nature, we see how, since those early times of ancient philosophy, the word *nature* can be defined by an inherent double sense it acquired and still maintains today. A first meaning to the word *nature* can be understood as an essence, an inner potency by which the thing or being is able to express itself as part of sensible reality. Its immanence would be the subtle way of expressing itself. As an inner self still, its movement is in quietness. Perhaps it may be the case that we do not see, feel or understand its essence, but we sense the thing or being strong enough to recognize its existence. Therefore, one could say that everything and every being has an inner soul or spirit that sustains or expresses the idea of its nature. The fact that we may or may not connect to its *nature* represents a different problem—a different issue. If we are not able to sense or understand the *nature* of specific things or beings it can only mean two things: either we are ignorant and senseless to this *nature* in particular, or it is an unknown fact, a mystery that needs to be solved.

A second meaning of the word *nature* (from Greek *physis*) is the reality as a whole, with all the elements, things and beings that composed it. This meaning would represent the form, the shape of things or beings animated by its inner soul, the potency expressed in movement and action. This nature is or can be at the same time acknowledgeable and unknown. It is acknowledged when it stands at the range of our senses: animals, plants, rivers, mountains, sky and of course, fellow humans. But it is unknown when our senses cannot reach this *nature*, even with the use of whatever cybernetic devices built as human extensions to measure whatever phenomena of the known universe, either a Subatomic Particle Accelerator or a powerful space telescope. Therefore, the case is that we do not sense or acknowledge beyond certain limits of micro cosmos or macro cosmos. *Cosmos*, as Carl Sagan defined it is *all that is or ever was or ever*

will be (1985, p.1). It is the infinite universe, where the notion of an eternal time-space matter gives a sense of vertigo, leaving reason impotent.

Leaning on the controversies of theocentrism and its heir, anthropocentrism, we arrive on the third stage of our nature's questioning: the gender issue, or namely, the approaches that define the male/female dualism as a question of different natures. Curiously enough, anthropocentrism has managed to link itself mostly with the male element of our species, taking for granted that male physiology has no consequences for experiencing and describing reality. So, anthropocentrism, understood as a distorted view of human relationship with nature, has developed a radical variation of itself becoming, in fact, Androcentrism. Mellor (1997, p.25) describes androcentrism as a, "masculine centrality that reflects the male domination over women and nature." Explaining that the concept is widely used by eco-feminist theorists. In her essay, *Do Women Have a Distinct Nature?* Nancy Holstrom questions what exactly a nature or an essence is. When are similarities between things sufficient to form a common nature? And when do differences form different natures? She turns to Biology as the methodology to elucidate the problem. She states that nature or essence should be understood as an underlying structure that generates laws. Nature in this sense often plays a crucial explanatory role in explaining the differences that might determine the respective social roles of men and women. And although she concedes that psychological sex differences are significant, she concludes that those differences are socially constructed: there are essentially no differences as a species in the traditional sense of nature. But then again, if it is socially constructed then it is not the real nature, but a constructed one, a tiny piece of nature—as an idea belonging to the cultural production of the human species (Holstrom, 2000, p. 289-290).

II.3. The Influx of Geography as Political Philosophy

II.3.1. The Political Consideration of Geographical Space

This section aims to make a first approach to the consideration of space as an element present in various theories linked to philosophy and political science, particularly from the nineteenth century onwards. Its first purpose is to establish a kind of chronological sketch that shows the evolution of spatial concepts commonly used in contemporary social sciences, but which have their origin—or in any case its deepest significance—in geographical spatiality. This section's second aspect seeks to transfer and adapt these original geographical elements, present in various philosophical and political theories, towards a spatial consideration of political ecology. The specific interest in the question of space is explained by our desire to accumulate theoretical inputs that can be developed, as a foundation of ecology as an object of political science, within the broader framework of the conclusions of this doctoral thesis.

In the tentative search for a criterion that allows us to trace this chronology of spatial thought, I will make a brief historical journey based on the approach offered by political geography, a discipline that for the purposes of our research is found theoretically halfway between political science, as the basis of the analysis, and political ecology, as object of the analysis. This brief interdisciplinary tour will show that the notion of space has been inherently present in the work of philosophers and social scientists as a subjective-objective element embedded in their world vision, even if it is not always meant, or treated, as a category for scientific analysis. At this level, nature can mean many things, depending on each perspective considered: Cosmos, Earth space, ecumene; more precisely, in anthropocentric terms, all that exists and are different from human.

This human-centered notion of spatiality allows for an overview of diverse conceptions of space from the perspective of natural sciences' disciplines, such as geography, biology, ecology, or anthropology; and to establish wider meanings for related concepts, such as land, territory, landscape, climate, natural resources, vital space, environment, habitat, along with the philosophical and ideological discourses, flawed or real, based on geographical knowledge. While this exercise may at times seem to offer a very superficial understanding of spatiality for today's readers, it will nonetheless reveal the deep insights some authors have about nature, as well as showcase the cultural biases of others. At the same time, my hope is that it will cause us to reflect on the stigmas imprisoning to this day contested ideas that need to be freed from distorted doctrinaire philosophies.

II.3.2. The Geographic Spirit Interprets the World

In the eighteenth century, the converging trend of geographical exploration within the new political environment, a product of the American and French Revolutions, combined with the definitive separation between science and philosophy in what could be described as the final crisis of the enlightenment, and the emergence of Romanticism and German Idealism in sciences, philosophy, arts, considered as the initial essence of modernism. Romanticism represents an uprising against the classical rationalism of Descartes and Kant. It supposes the importance of feeling over rationality and technology. The idea of human spirit is the motor that drives this new sense of life. The spirit is fully realized through the phenomena of the external world that impact on it (Miranda- Geo Crítica).

During the eighteenth century, two figures gave a twist to the prevailing positivism by their approach to nature understood as geographical space. Alexander Von Humboldt, together with

Carl Ritter, conducted long explorations of South America and Africa, respectively. Their method proclaimed the unity of man and nature. Influenced by Rousseau's ideas, they adapted the idealized philosophical notion of *state of nature*, transforming it into a quest for scientific knowledge, research led by direct observation, and the opening of the senses, as well as one's reason, to the sensible world.

Humboldt is the perfect embodiment of those circumstances and ideas, sharing with romanticism the importance of feeling towards the sensible world. His two most important works, *Travel to the Equinoctial Regions of the New Continent* (written together with the French naturalist Aimé Bonpland, and published in 1807), and *Kosmos* (1845-1847), perhaps his most important work, both deal with space —sidereal and geographical— and its peculiarities. His ideas go beyond the rational consideration of nature as a means of providing for the necessities of life, but also as a relationship between the forces of nature and the intimate feeling of mutual dependence with the human.

Ritter's ideas are in tune with Humboldt with respect to the influence of geography over the life of people. The objective of *Erkunde*, the new discipline, was to study the relationship of humans with nature within all different geographic scenarios created by historical connections between man and Earth. Ritter sees this connection as a historian and ethnologist which delimits his geographical views towards a humankind, anthropocentric discipline.

II.3.3. The Geographical Foundations of Hegel's Universal History

An example of a geographical interpretation of the world can be found in Georg Friedrich Wilhelm Hegel, perhaps the highest exponent of German Idealism. The transcendence of Hegel's

early philosophical work is an indisputable fact for Western political philosophy. His later influence on the ideologists of fascism, like Giovanni Gentile, is recognized thanks to Hegel's central concept of reason: a particular vision of an omnipresent state founded on reason, which combines the total reality of the human spirit as a moral idea; an ethical spirit which encompasses all of the free men's nation, who in turn delegate in that state all their will in order to be guided towards a privileged historical destiny.

Similarly, Hegel's many conceptual contributions (reason and liberty, his idea of history, phenomenology, dialectical idealism, alienation, and the abstract-concrete distinction) will have a definitive influence on the work of Marx and Engels; and later, on the formation of a Hegelian Left developed by a myriad of successive generations of Marxist philosophers. Hegel's influence will also reach, to Henri Lefebvre more than a century later. It is not the purpose of this work to elaborate on the philosophical bases present in Hegel's work that may have served to underpin the colonialist policies of European expansionism or to nourish the doctrines of communism or fascism. My interest is limited to a recognition of a Hegelian spatiality, and the question mark that it places on all political philosophy of Hegelian origin, when it faces the diversity of realities of the geographical space, and it is confronted, in modern terms, with the ecological concept of environment.

Although throughout the interpretive tradition of Hegel's philosophical work it has been his political thinking which has generated the most controversy, little is known about Hegel's geographical line of thought, or perhaps it is better to say that little has been said about Hegel's geographical ideas and how those ideas could have fitted into his philosophy. Towards the end of

his life (1828-1830), Hegel dictated a series of lectures to his students from the University of Berlin. Those lectures were compiled into what many consider his later major work: *Lessons on the Philosophy of Universal History*. In the second chapter of these *Lessons*, entitled *The Connection of Nature or the Geographical Foundations of Universal History*, Hegel presents his particular view of history, through the interpretation of the facts of nature, expressed here as geographic factors that influence or determine the future of people. This chapter may be a revelation to those who inquire into the possible interrelationships between notions of geographic space and political and philosophical conceptions that have in turn resulted in geopolitical theories and doctrines.

The first section of this chapter, “General Characters,” serves as an initial basis for broadly characterizing the geographical scope that will serve as the natural setting for the evolution of the human spirit and the drama of history. Hegel then traverses the different continents, describing the climatic and topographical characteristics of geographic space, relating these factors to the degree of civilization and modes of government of the various societies that inhabit the different regions of the planet. Thus, among the different ways Hegel recognizes history, let us see how the philosophical spirit, endowed with a concrete and absolutely present universal vision, confronts the sensitive realities of nature:

We start from the general assumption that universal history represents the idea of the spirit, as revealed in reality as a series of external forms. The degree of the spirit in which he has self-consciousness appears in universal history as the spirit existing of a people, as a present people. That is why this degree is placed in time and space, acquires the characteristics of natural existence. These particular spirits, which we have to consider simultaneously and successively, are particular thanks to its determined principle; and to every people of universal history a principle is attached. (Hegel, 1974 B, p. 161)

Doctrinally, Hegel departs from the supposed existence of a governing principle that determines the destiny of each nation (people), which must be accepted as an indisputable premise to assimilate the rest of the propositions. Hegel's anthropocentrism is evident in his consideration of natural existence as a phenomenon dependent on human evolution. Without explaining how or why, the idea of this spiritual principle guides universal history. On the basis of his particular logic¹¹, Hegel describes the mechanisms of selection that act on this enigmatic principle that governs the dynamics of people, without the genesis of the principle being clear. It seems that Hegel constructs a personal cosmology whose foundation is closer to dogma than to the verification by means of reason he claims to defend. We are given the impression that Hegel finds it difficult to hide his discomfort at the presence of external, natural, or *sensitive forms*, as he would

¹¹ "It is paradoxical for us to describe the manifestations of nature as abstract, whereas the absolute idea would be concrete. It is not strange, however, to know that we refer to the author of the phrase "the rational is real" and vice versa: "This natural aspect makes us penetrate the geographical sphere, which contains what belongs to the stage of nature. In the natural existence are contained together the two aspects of this sphere: on the one hand the natural will of the people, or of the subjective way of being of the people, but this, on the other hand, is presented as a particular external nature: Man, because he is a being that is not free, but natural, is a sentient being, it divides into two aspects: the subjective and the external nature. This is the geographical aspect which, according to the immediate representation, belongs to the external nature. Therefore, what we have to consider are natural differences, which must first be estimated as particular possibilities, from which the spirit is detached and thus offer the geographical basis. We do not propose to know the ground as an external place, but the natural type of the locality, which corresponds exactly to the type and character of the people, the son of such soil. This character is precisely the way in which the peoples appear in the universal history and occupy a position in her. The connection of nature with the character of men seems contrary to human freedom. Let us call it the sensitive part, and one might think that man carries truth in himself and independently of nature. Neither should we admit a relation of dependence, in such a way that the character of the peoples was formed by the natural conditions of the soil. We should not think of the spirit as something abstract, which later received its content from nature. Those who in history appear, are particular, determined spirits. The speculative idea shows how the particular is contained in the universal, without the latter being obscured by this. From the moment that people are spirits with a particular form, their way of being is a spiritual determination, but corresponds, moreover, to the way of being of nature. What is in itself exists naturally; so the child is a man in himself, and as a child he is a natural man, who only has the dispositions to be, in and of himself, a free man." (Hegel, 1974 B, pp. 162-165)

refer to it. In a world of abstraction and concrete, physical reality tends to subordinate its notion to the spirit.

Reading Hegel's *Geographical Basis of World History* from an ecological perspective turns out to be a contentious exercise. It is not in agreement *per se* with Hegel's definition of what being a free man means, and the essential difference is on the man who is not free but "natural." Of course, from a particular point of view, the "natural man" is not entirely free; he is subject to the forces of nature and his existence requires an incessant struggle for survival. Culture in this sense "frees" man from this imperative dependence that nature exerts on him, thereby paving the way for the development of his deepest and most enriching potentialities.

On the other hand, what does freedom mean to the Hegelian man, the civilized people? What purpose does freedom serve in surrendering all its will to the omnipresent state? After carrying out this ritual of surrender, of detachment from one's own will towards a theoretically shared design of the state, what remains of man's freedom besides discipline and subjection to a notion of common good, administered by a minority of specific spirits, predestined towards authority by grace of that enigmatic principle? Finally, what essential, transcendental difference distinguishes the "natural man" from the civilized being in his connection with nature, or rather, under the influence of nature over them?¹² Hegel begins by dealing with the subject of "the influence of

¹² "(...) This consideration seems to coincide with what is said of the influence of climate on circumstances. It is a general and common belief that the particular spirit of a people coincides with the climate of the nation; and the necessity of the connection between the spiritual and the natural principle, we must not stick to the general common place, which attributes to the climate effects and particular influences (...) It has, however, an influence on the climate, since neither the hot nor the cold zone is a fertilized soil for the freedom of men, so that important peoples in the universal history will develop. In his first awakening, man is immediate natural consciousness, in relation to nature. Therefore, a relationship between the two

climate on circumstances” by first disregarding any vulgar knowledge that sees connections between the human spirit and nature. But then, Hegel seems to yield to direct geographical observation:

It has, however, an influence on the climate, since neither the hot nor the cold zone is a fertilized soil for the freedom of men, so that important people in the universal history will develop. In his first awakening, man is immediately naturally consciousness, in relation to nature. Therefore, a relationship between the two necessarily occurs. All evolution is a reflection of the spirit on itself and against nature; it is a particularization of the spiritual itself, in front of its immediacy, which is precisely nature. (Hegel, 1974 B, p. 167)

Hegel's text's ambiguities seem to follow his slippery line of thought. The realization that sensible observations show the influence of geography on nations' “native people” seems undeniable. Yet, Hegel is well on guard against any evidence that may single him out as a spirit susceptible to sensible knowledge. Hence, after denying the vulgar influence of the climate, Hegel moves to the other extreme of his dialectic in order to explain to us philosophically what every peasant has always known. We see, therefore, that his dialectical synthesis takes him farther than could be expected from his first thesis, which warned us of the dangers that *the spirit* might suffer from being influenced by a good downpour. Now, swift and fast, the man of absolute reason not only defends climatic influence but presents it to us as a determining factor of our historical destiny, to the point of requiring the northern four seasons to reach a position at the right hand of Odin and his Valkyries.¹³

necessarily occurs. All evolution is a reflection of the spirit on itself and against nature; is a particularization of the spiritual itself, in front of this its immediacy, which is precisely nature " (Hegel, 1974 B, p.166)

¹³ “Man needs nature for his purposes: but when nature is too powerful, it is not offered to man as a means. That's why the hot and cold areas are not the theater of history. These extreme regions

After these reflections, Hegel goes on to address his true object of geopolitical analysis: the “New World,” which he divides into the north and south, and the “Old World,” which comprises of Africa, Asia, and Europe. It is not the purpose of this paper to show the index of geographical errors and biological falsities in the description provided by Hegel who at the time was the Rector of the University of Berlin.

The influence played by Montesquieu’s typology of political systems on Hegel is well known. It may be useful to consider this influence exercised on Hegel’s thinking as regards the geographical conception of historical development with even metaphysical consequences¹⁴. Let us read from some of Montesquieu’s geographical reflections contained in *The Spirit of the Laws*, which surely served at its time as a doctrinaire guide to many philosophy professors of the time, Hegel included. Montesquieu says:

Africa itself is the characteristic part of this continent. We begin by considering this continent because we usually put it aside, so to speak. It has no historical interest of its own, but that of the men who live there in barbarism and savagery, without providing any ingredient to civilization.... Black represents the natural man in all his barbarity and violence; to understand this, we must forget all European representations. We must forget God and the moral law ... we must ignore all respect and morality, all feeling. Everything matters little in

are excluded from the free spirit, from this point of view. (...) This is, in general, the temperate zone which the theater has to offer for the drama of universal history; and within the temperate zone, the northern part is the most adequate" (Hegel, 1974 B, p. 166)

¹⁴ Writes Montesquieu, “We cannot be convinced that God, who is a very wise man, has put a soul, and above all a good soul, in such a black body ... It is impossible for us to suppose that they are men; we knew, we could begin to believe that we ourselves are not Christians”. (Montesquieu, 2002, Book XVII, p. 409-410)

the present man, in whose character nothing is found that sounds human.... If, then, in Africa, man is worthless, it is explained that slavery is the fundamental legal relationship. The only essential connection that blacks have had and still have with Europeans is that of slavery. In those, blacks do not see anything inappropriate. It is not to be wondered that in the towns which are situated in warm areas, because of their laxity, they have been slaves almost always, or that the inhabitants of cold countries have been kept free. It is a consequence derived from natural cause. (Montesquieu, 2002, Book XVII, p. 180-182)

This fact is highlighted by Norberto Bobbio (1976, p. 147-152) in his research on *The Theory of Forms of Government in the History of Political Thought*, where Bobbio cites a colleague of his, P. Rossi, Sansoni, who in his research of Universal History and Geography in Hegel, maintains that "the affirmation of the geographical basis of the historical process ... forms one of the doctrinal bastions of the Hegelian philosophy of history." Bobbio suggests correctly that Hegel, through his philosophical system, manages to combine the historical conception of the forms of government (Giambattista Vico) with the geographical and spatial conception that predominates in the work of Montesquieu. But what in Montesquieu is only an intuition, in Hegel, under the guidelines of the geographer Carl Ritter, author of a geography research, "*related to the nature and history of man*," published in 1817, becomes a true theory. In *Lessons on the Philosophy of Universal History*, which represents the last phase of the evolution of his thought, Hegel dedicates an introductory chapter to "the geographical basis of the history of the world," in which he explains that the history of the world has gone through three phases, characterized by three different types of settlements: the high plateau with its large steppes and plains, which is the typical landscape of Central Asia, where the nomadic nations (mainly shepherds) were born; the river plain, which differentiates the Indus lands from the Ganges, the Tigris and the Euphrates, to the Nile, where "the fertile land spontaneously brings with it the passage of agriculture;" and finally the coastal area, in which

develop man's attitudes to trade, and new reasons for wealth are formed at the same time as new conditions of civil progress.

For Bobbio, Hegel's descriptions and geographical interpretations were provided through rigorous and imaginative language. From our point of view, we can accept the presence of an imaginative language without problems. But with regards to Hegel's geographical vision, it may be anything but rigorous. However, it would be unfair on our part to criticize the limited geographical domain of Hegel, who ventured into a discipline alien to him, and did so within the framework of a geography of romantic age and limited scope. What we could really argue without much difficulty is that the Hegelian description of the human geography of Spanish America, and especially of Africa, is written in a decidedly racist language, heavily imbued with a colonialist ideology and with his philosophical "self-consciousness" of a superior spirit¹⁵. Hegel affirms that a nation is the protagonist of universal history, that in the becoming of the self-consciousness of "the spirit of the world" that develops in an era, that nation is entrusted with the leadership of world history. That a People have an absolute right to champion the evolution of the spirit of the

¹⁵ An example of Hegel's ideas about the inferiority of non-European men: "[In] the new world (...) the conquest of the country marked the ruin of their culture, of which we keep news, but are reduced to letting us know that it was a natural culture, which was to perish as soon as the spirit will come closer to it, America has always revealed itself and continues to reveal itself powerless as well as spiritually, since the disembarkation of Europeans, the Indians have perished at the breath of European activity. Equality is inferior to that of men ... The fauna has lions, tigers, crocodiles, *etc.*, but these beasts, although they have a remarkable resemblance to the forms of the old world, are, however, in all senses smaller, weaker, more impotent (...) They claim that edible animals are not as nutritious in the new world as those of the old (...) These people of weak culture perish when they come into contact with peoples of higher and more intense culture ... Some customs have undoubtedly adopted the indigenous in contact with Europeans; among others the drinking of brandy that has brought about destructive consequences in them.... A long time has to elapse before the Europeans ignite in the soul of the natives a feeling of self-esteem. We have seen them in Europe, to walk without spirit and with almost no capacity for education. The inferiority of these individuals manifests itself in everything, even in stature. (Hegel, 1974, p.170-172)

world. Before him, the spirits of other nations are absent from law. If we could ask Hegel why other nations do not have the right to share the spirit of the world, and also be protagonists of universal history, it seems that the geographical argument expressed through the sensible world would be the answer.

For the purposes of my research, it is of secondary importance if a flaw in Hegel's logic led to flawed philosophical conclusions, or if the scarce geographical data led to a flawed logic. In any case, what I want to highlight is the presence of an awakening spatiality, derived from or supporting philosophical theories which in turn result in political doctrines. This strengthens my research premise, which is conducive to following the trail of spatial thought and a more careful consideration of the influence of geographical and environmental factors on theories of political thought. This geographical vision fits with his doctrine of the national state. From the current perspective, we could say that these texts by Hegel show a contradiction in his pure idealism and, conversely, form an ideological leaven of positivist doctrines, which together with misinterpretations of Darwin's evolutionary theory helped to shape the so-called "geographic determinism" and development of a doctrinaire discipline of geopolitics.

II.3.4. Historical context of a spatial awakening

From the classical Greek philosophers, to the great minds of The Enlightenment, until modern and contemporary thinkers, the idea of nature and the question of space have been, and still are, contested concepts on the discussion table of philosophical and political theories. Mathematical abstraction or philosophical essence, absolute or relative, objective or subjective, the idea of Space arrived at the twentieth century as a handicapped concept overshadowed by the hegemony of Time

and historicism. This assessment regarding the unequal preponderance of time over space eventually becomes a conscious reality among scholars and researchers from the late nineteenth century, giving rise during the following century to an extended and growing movement that permeated an entirely new spectrum of disciplines related to spatiality. As we shall see in Chapter Five, this will be known as the “spatial turn” which gained momentum during the 1960s, when the theories of Henri Lefebvre opened up new perspectives on space research, namely on social space. There are several historical approaches that could explain what may be considered as a spatial awakening that precedes the spatial turn. This spatial dawn begins with the European Renaissance and ends approximately at the Second World War. During this long and varied period, the revival of space as a subject of research manifested itself gradually in diverse and uneven world scenarios. Those manifestations expressed the dialectics of an expansive acceleration of capitalism leading to an uneven early globalization process.

Three previous historical processes could be considered as major triggers for the early spatial revival. Though I do not intend to elaborate deeper on those processes, I want to keep them in mind as a general context that shows the fragmented lines of developing spatialities that can be traced over time in those societies making their way to modernity and post-modernity. These processes are, perhaps, paradigmatic icons that will transform the ways space is imagined, perceived, represented and lived. The first, of course, is the discovery and conquest of the Americas by Europeans, which opened an age of geographical exploration of a world unknown until then by the “old” continents. Beyond the “discovery” of a new world, there was, in fact, a discovery of space. The world was finally understood to be a globe and the perception of spatiality,

from sky to Earth, had changed for ever. The rise of cartography as a representation of geographical space is a first step in constructing a new spatial discourse.

In another context, the first Industrial Revolution, closely linked to the Age of Enlightenment, marks a turning point in history, modifying and influencing all aspects of daily life in one way or another. European science and technology supported increased manufactured production, means of transport for world trade and the military capacity allowing the second age of exploration, conquest and colonial dominium of Africa, Asia, Oceania and the Americas. Beyond the territories of sovereign states are the world territories or domain at reach, thanks to modern technology.

After the eighteenth century, continued European expansion and the movement from merchant to industrial capitalism required the support of philosophical arguments to justify these nations' colonial policies. Geographical space served as a measure of civilization. Geographical latitudes determined not only spatial distances, but the hierarchical position of aboriginal cultures *vis-a-vis* European society. A reverse trend seemed to occur from the pragmatic realities of climate, landscape, and natural resources. There seemed to be a need for constructing an imaginative representation of the world that may justify the central position of the civilized man in the cosmos.

The encounter between biology's evolutionary theories, history, geographical exploration, and political philosophy creates the conditions for the foundation of a science centered on the study of man: Anthropology. Originally a natural science, it was quickly diversified according to the multiple facets of human life, where culture appears to be the distinctive element of our species. By the beginning of the twentieth century, anthropology was not just seen as an integrative

discipline that links human studies from natural and social sciences perspectives, but also as the science that deepens the great divide between nature and culture, highlighting the distinctive place of homo sapiens on Earth. My intention with this review is to offer a glimpse of how these topics intertwine, sometimes showing a very anthropocentric view of space, understood as an external environment, sometimes favoring a spatial conjunction where humans are part of that environment and the idea of externality takes on another dimension of understanding.

II.3.5. The Doctrinaire Space:

Social Darwinism, Geographic Determinism and Anthropocentrism

From the perspective of this research, and the unfolding of spatial theories related to the place of humans in nature, the publishing of *On the Origin of the Species* by Charles Darwin (together with the evolutionary theories of Alfred Wallace and Ernst Haeckel) becomes a landmark from where to merge biological discoveries with geographical facts, giving way to the development of early ecology, where the spatial is an inherent element. The work of Darwin (1809-1882) will allow us to synthesize a genetic perspective of living beings with a causal explanation of the interactions between them. The novelty of Darwin's method lies in the ability to recognize the historical evolution of species, not only through their form and function, but also because of their relation to the space they occupy.

These merges of certain aspects of evolutionary theory and geo-ecological knowledge gave way to the development of diverse schools of thought in anthropology, political geography, and geopolitics. It also resulted in a clash of confronted paradigms from the positivist disciplines overlapping multiple social sciences: history, jurisprudence, philology, and sociology. Gradually,

the spatial became an inherent element of conflicted political philosophy trends that emerged within the industrial revolution and European colonialism of the nineteenth and twentieth centuries. The encounter between biology's evolutionary theories, geographical exploration, and political philosophy created the conditions for the foundation of a science centered in the study of man. By the beginning of the twentieth century, anthropology could be seen as an integrative discipline that links human studies from natural and social sciences perspectives, but also as the science that deepens the great divide between nature and culture, highlighting the distinctive place of *homo sapiens* in the cosmos.

As many authors have observed, since the eighteenth century there has been a shift from the theological standpoint of the philosophy of the Middle Ages where all search and explanations are rooted in the idea of God, to a new kind of centrism: anthropocentrism. Not religion, but science guided by human reasoning, will support the transit from the enlightenment to modernity having man in the central position "as the measure of all things." These topics and dialectical confrontations between culture and nature, the sensible world and the intelligible world, natural and social sciences, philosophy and geography, *etc.*, will have a direct link to spatiality and to the interpretation we humans may give to the reality of space and its human connotations.

Darwinian Territorial Biology

Inspired by Darwinism, the English biologist, sociologist, anthropologist and philosopher Herbert Spencer (1820-1903) developed evolutionary ideas based on his conviction about the similarities between biotic communities and human societies. Spencer's analogies led him to compare political, economic, transport, *etc.* activities with the regulatory systems of living

organisms. From this reading, Spencer deduces the universality of the postulate of "survival of the fittest."

The German geographer Friedrich Ratzel (1844-1904), founder of human geography and author of *Anthropogeography* (1882-1891) and *Political Geography* (1897), draws these analogies to a comparison between the political functions of the state and the behavior of living organisms. Taking central elements from Ritter's organic conception of the state, Ratzel transformed the metaphoric concept of the living space, *Der Lebensraum*, and constructed his theory of vital space, whereby a state can justify its aggressions against neighboring territories, even at the cost of another nation's existence. Understood as the manifestation of its life force, *die lebenskraft*, its "instinct for survival," conquest is justified as a biological necessity for a state's growth.

The specific case of Hegel's philosophy has allowed us to identify those geographical conceptualizations that derived in turn from a characterization of the state as a "spatial organism," or as a "living being." From this arises a good part of the alleged causal relationships that originate in reason to the geographical location of the territory where each nation and each town is based.

As pointed out earlier, the genesis of these naturalist currents, influenced by Darwin's evolutionary theory, is found in the works of Ratzel, Kjellen, Vogel, Henning, and many other authors, from which emerges the disciplines of Political Geography and Geopolitics. These in turn were constituted into the body of positivist doctrines, marked by "geographic determinism," which would serve as a scientific basis to justify the relationships of domination and dependence between civilized people and "barbarian people."

Geopolitics as a science that studies the influence of geographic factors on the life and evolution of states, has its roots in nineteenth century Pan-Germanism. Geopolitics seeks to reach conclusions of a political nature, through the study of the geographical determinants of man. Its basic principles can be summarized as follows: (a) individual persons do not exist, (b) the notion of people is a myth, (c) what really exists is nations, (d) the nation wholly identifies itself with the state, e) without the state, the nation can do nothing. But as the state is power, the concept of man is reduced to nation, state, power. The world is a struggle of powers, a configuration of nations competing with each other in an uninterrupted struggle, because competition and struggle are the essence of power. For Friedrich Ratzel, human society is a spatial-type organism:

The individuals that compose it are largely autonomous and move freely ... Social cohesion is manifested in the customs that individuals or social groups acquire through the shared experience in the same terrestrial environment. In the most developed societies, habitat is disaggregated and the surveillance of the territory rests with the State. Society is, therefore, the intermediate element through which the state joins the soil, which means that the organization of a society depends closely the nature of its soil and its location on the surface of the earth ... Knowledge of the distribution of human groups on the surface of the earth is therefore fundamental ... these distributions are the result of the struggle for space, that is to say, territorial expansion or migration ... As people adapt to their environment, the influence of the environment on individuals and societies can be studied by analyzing the geographical conditions. (Obadia, 1991. p.111)

This conception was then systematized by the American Ellen Churchill Semple (1863-1932), who developed the well-known formula of "geographic determinism" or "environmental determinism." Churchill Semple reduced her interpretation of history to two major factors: 1. Man, considered in terms of his genetic-racial load; 2. Nature, as a habitat or physical environment, which will be decisive in its influence. As historical evidence shows, the foundations of these

theories were empirically inconsistent, not only because of the parallel existence of multiple spaces in addition to the "homeland," but also because of the elementary confusion between geographical factors and location factors of geographical area (Obadia, 1991, p. 53).

The influence of Darwinism has been noticeable in the development of other geographical currents. From the general postulates of the German ecologist Ernst Haeckel (1834-1919), who maintains the existence of a parallelism between the individual development of organisms and the evolution of living beings as a whole, arises the thesis of the French geographer Paul Vidal de la Blanche (1845-1918), as a combination of Darwinian hypotheses and the central postulates of the German school of geography. Vidal de la Blanche starts from a total view of the earth as a living organism, which is expressed through the particularities of each geographical entity that constitute the regions. Similarly, Vidal de la Blanche transforms the ecological notion of the "natural environment" into "geographical environment," introducing the concomitant relationship between the action of man on his environment and vice versa. The influence of Vidal de la Blanche in French geography is evidenced by the presence of non-geographic elements for the selection of those objects of study that can explain spatial realities. This selection is made through pseudo-generalizations intended to establish similarity and spatial differences interactions. Once the structures and mechanisms are analysed, we return to deciphering the concrete, based on the facts observed.

Vidal de la Blanche's Possibilism is made inconsistent by its dependence on pre-determined analogies that do not illustrate much with respect to the mechanisms of the action exerted by man on his environment or vice versa (Obadía, 1991, p. 54-56). In my view, the primordial vision of

Vidal de la Blanche maintains its integrity, since it seems to ground the postulates of some currents of modern ecological thought which hold to the holistic concept of Gaia, the living earth, based on the biocentric paradigm which defines the philosophical position of Deep Ecology.

II.3.6. Historical and Geographical Backgrounds **in 20th century Political Theory**

By referencing these methodological premises, this study will also look briefly at the experience of the *Annales School of Thought* and Braudel's geographic perspectives, to tangentially support its point of view:

If the new history needs to be, as I think, a reconstruction of the past captured fully and in all its complexity, you will need to incorporate in its pictures and explanations the rich and entire work of social sciences, its neighbors. Therefore, the historian will certainly be a historian, but at a time also an economist, sociologist, anthropologist and even geographer. In this imperialist social scope (in the broad sense of the word), we will not be surprised if the historian finds before him insurmountable difficulties constituting the reality of human life, both in the present as in the past, needed to be captured in different workshops, by particular sciences and addressed, in short, simultaneously on multiple sides. No intelligence can capture today's social reality in all its full wholeness. (Braudel, 2005, p.)

With these words, Braudel begins the preface of the first Spanish edition of *The Mediterranean*. Looking at reality from the perspective of geography, distanced from geographical determinism and going beyond geopolitical insights, Braudel was testing—without labelling—a human ecology approach to history. The first reason for transferring Braudel's ideas into an ecological perspective is provided by his proposal about time units (Clark, 2006, pp. 182-

183). First, the short time-term where the events of traditional history accounts occur. This is the time of generations before and after our own, of individual history, where fresh memory and immediate foresights take place. Secondly, Braudel develops the notion of time-*conjunctures*, a broader span where societies recycle themselves through waves of change, and where ideas evolve, institutions are transformed, the economy flows, and cities receive new skins. Finally, there is the long timespan—or *la histoire de la longue durée*—where time moves slowly and imperceptibly, almost inert to human eyes, but nevertheless transforming the landscape on massive bio-geo-chemical atmospheric cycles, shaping humans' surrounding environment and Earth itself.

Braudel's perception of time also represents his intuition of nature as a subject of study for human science. By conceiving of these time structures, he is able to describe and explain how culture flourishes, and how that gives purpose and meaning to the development of diverse societies. Braudel's definition of a mountain as almost a character in the human saga (Braudel, 2005, p. 35) is particularly inspiring. His description goes beyond utilitarian geography or positivist classificatory purposes. By telling the tale of the Mediterranean mountains or considering climate changes since the 16th century (Braudel, 2005, p. 353), Braudel knits a net of natural interconnections where civilizations have stood since long ago. He connects the exploits of a silver mine, the agriculture of pepper, the density of a forest, or the shape of a coastline with human migration patterns, war-skilled vessels, a certain aspect of architecture, or the development of codes and laws. By scanning the influence of the environment, he creates an enormous puzzle, a crossword of causes and effects composed by hundreds of small occurrences, usually unseen by traditional research methods but rich in the consequences of historic shape.

II.3.7. Biological and Geographical Factors

Forgotten to some extent by the French scientific community, but a man who was considered one of the pioneers of European political science, Maurice Duverger's work stood out in the field of public law. But above all, his studies of comparative politics of electoral systems, his typology on political parties and the creation of formulas to measure electoral processes, led to the development of the so-called "Duverger Laws." Being a promoter of political sociology as a distinctive discipline, Duverger maintains an ambivalent vision of the political fact, like the two heads of Janus: one face represents the struggle for power itself, for the benefit of those who hold it; the other represents the desire to build a social order based on the common good. "The general exposition of political sociology attempted here will naturally be organized around the central idea that power is double-faced: both oppressive and integrative" (Duverger, 1970). p. 24).

Though not his most renowned idea, Duverger raises the importance of biological, demographic, and geographical factors that eventually translate into forms of politics, which in turn will result in socio-geographic and geopolitical interpretations of the elements of the state in *Introduction to Politics* (1964) and *Political Sociology* (1968): "The forms of political conflict, as well as the very existence of the antagonisms that form it, depend on a series of elements that we can enumerate: biological, psychological, demographic, geographical, socioeconomic, and cultural. For Duverger, the consideration of political space marks a change of dimension for political science. This change of perspective becomes evident in the imbalances created between traditional political structures and new regional realities at the local level, the state, and international level (Duverger, 1968, p. 46-52):

If we study the forms of political struggle and not the origin of antagonisms, we do not change the observed object but only displace the point of view. (...) In describing (...) here the factors of antagonism we have treated in sum of the relationships between politics and other aspects of social life, but if we move the point of observation, we can focus more clearly on the politics. (Duverger, 1964, p.115)

According to Duverger (1964, p. 65-67), there are two main aspects of the geographical factor: climate and space. However, for him, climate action "is more sociological than psychological, because it influences the way of life in general, institutions, customs (...) exerts its most important action through plant and animal resources, which is an element of wealth or poverty of natural identical character to the soil composition, its configuration, and the elements of mining." Duverger argues that climatic-botanical or spatial influences are now of secondary importance due to the increased influence of the technological factor in relation to the geographical factor. However, from an environmental point of view, we could question this opinion of Duverger from the same technological argument. Precisely, technological development, riding on the expansion of global capitalism, has caused an acceleration in the impact produced by humans' activities on the environment, both quantitatively and qualitatively.

This is one of the reasons explaining the interest aroused in contemporary society by the defense of habitat, the conservation of natural resources, and the preservation of its geographical space. Although for Duverger, the influence of the geographical space does not directly work on the political activity of the rulers and the governed, but rather on the conformation of the state and international relations. It nevertheless affirms that "the natural space within which the human activity is developed, it lets its influence be felt in three major ways: 1) in the delimitation of

societies, 2) in the internal adaptation of the societies so delimited, 3) in the situation of these societies among themselves and in the resulting contacts" (Duverger, 1968, p.46-52).

In the first part of his *Introduction to Politics*¹⁶, referring to the factors of struggle, Duverger delves into the biological, demographic, and geographic aspects conditioning the political activity of man. When talking about the biological aspects of politics, he refers to the Darwinian theory of "the struggle for existence" and the theory of race, as examples of doctrines that try to rely on biological factors. Starting from the theory of the natural selection of species and the survival of the fittest, Duverger explains the transformation of these ideas into political theories that support the predominance of supposed superior races over the inferior ones. While Duverger warns that those theories lack scientific value, he points out that:

The idea that politics has a biological basis must not be completely rejected. The study of animal societies shows us that they also develop phenomena of authority and power organization, comparable, in certain aspects, to analogous phenomena in human societies. (...) Naturally, the differences between politics in human societies and politics in animal societies are very large (...) However, the assertion about the biological basis of politics remains valid. (Duverger, 1964, p. 25)

¹⁶ In his *Introduction to Politics* (1964) Duverger reflects the importance of biological, demographic and geographical aspects, which will eventually translate into forms of politics, which in turn will result in socio-geographic and geopolitical interpretations of the elements of the State: "The forms of political conflict depend, as well as the very existence of the antagonisms that form it, a series of elements that we can enumerate: biological, psychological, demographic, geographical, socioeconomic and cultural. the forms of political conflict and not the birth of antagonisms, we do not substitute for the observed object but only move the point of view ... In describing (...) the factors of antagonism here we have tried, in sum of relations between politics and other aspects of social life, but if we shift the point of observation, we can focus it more clearly on politics" (Duverger, 1964: 115, 116).

Duverger went on to describe the political relationships in animal societies¹⁷, emphasizing those of the higher vertebrates, where the existence of leaders who regulate the social set is explained by reasons of a political and not biological nature.

II.3.8. Ecology under the lens of a disenchanted modernity

A view into the anti-ecological discourse of so-called "radical modernism"

In his book, *Sociology of Social Change*, Piotr Sztompka (1996) offers a concise but accurate overview of the notion of modernity, which includes a quick tour of the different ideas, features, and principles developed by various modernist thinkers; among them, Anthony Giddens. Out of these, I believe it is crucial in this context to examine the work of Giddens, considered to be one of the most prominent modern sociologists.¹⁸ Although the importance placed on environmental issues by Giddens has evolved over time due to the reality of climate change and other ecological problems, my choice of Giddens is explained by his worldwide influence as a representative of modernism, and of its consequent anthropocentric ideology.

¹⁷ Duverger warns that these theories suffer of scientific value, he adds that "The study of animal societies shows us that phenomena of authority and organization of power, comparable in certain respects, are also to be found in them. Analogous phenomena in human societies ... Naturally, the differences between politics in human societies and politics in animal societies are very great. (...) Nevertheless, the assertion about the biological basis of politics ". (Duverger, 1968, p.25)

¹⁸ The specific Giddens' text I have chosen to examine from Sztompka's book is from 1994. In addition, two works of Giddens from the same period: a) *Beyond Left and Right: The Future of Radical Politics* (1996) and *The Third Way: The Renewal of Social Democracy* (1999)

Given Sztompka's interest in social organization, he emphasizes the consequences of modernism on social systems from the perspective of different spheres, such as economic, political, cultural, etc. This chapter of Sztompka's book is entitled "Modernity and Beyond." In it, the author addresses what he calls a "disenchantment with modernity" in recounting the various critical positions facing the phenomenon and postulates of modernity, which can take a negative or positive sign according to the origin of the questioning. Sztompka's positive critique of modernism, therefore, not only contemplates a review of its experiences and consequences, but also implies an adherence to "evolutionist" postulates that make modernity an "irreversible" historical category. The errors and uncertainties of modernity are consequently part of a perfectible but indisputable process. On the other hand, within the negative critique of modernism presented by Sztompka, there are "alternative" positions—presumably antagonistic to all modernism that pose a radical transformation of human society. Here, the presence of "ecology" is clearly identified as an antagonistic element to modernity. Adorned with an ambiguous and apocalyptic halo, ecology feels like the reincarnation of an ancient goddess who points her gaze towards the past, ignoring the present and the future.

It is not a leap to presume those negative images of ecology presented by Sztompka were influenced by Anthony Giddens' conceptions. In fact, the closing perspective that Sztompka chooses to explain is the notion of "beyond" of modernity, which is precisely the notion of "late modernity" or "high modernity" that Giddens himself admits is the most accurate. Thus, as we will see later, the vision that Sztompka presents in this chapter is that of a compiler, offering an accurate sketch of modernist thought; this allows us to identify the elements needed to consider Giddens' reading of ecology, which constitutes the central goal of this exercise. Indeed, we immediately

notice that Giddens' title, “Modernity under a negative sign: ecological questions and politics of life,” places us in front of an experienced and militant thinker engaged in production of ideas and concepts that reinforce his theoretical approaches toward modernity. In his book (Spanish translation), *Beyond the Left and the Right: The future of radical politics* (1996)—written well before *The Politics of Climate Change* (2009)—Giddens attacks the possibility of supporting an “ecological” reasoning that seeks to build a radical political proposal capable of confronting the dialectic of modernity.

For the reader, it is important to identify the manipulation biases that emanate from the sometimes-distorted presentation of environmentalism provided by Giddens. This offers a preliminary guide to attempt an analysis of Giddens' critical approaches in relation to his modernist vision of green radicalism. Some of these points include: a) One-sidedness from mostly British, exclusively Western, ecological thinkers presented as universal examples that could be refuted; b) Giddens reproduces very forceful ecological statements without the argumentative context to support them; c) An indiscriminate identification between the conservationism, ecologism, and environmentalism, which are related—through a casuistic logic—with conservative political thought and doctrine, with Giddens even relating ecologism to fascism; d) Ambiguous and distorted management of concepts such as tradition, nature, and conservation; and, e) Faced with the environmental issue, Giddens exhibited an extreme zeal of scientific purism with regards to the validity of empirical measurement-verification of facts that support or confirm the deterioration of the environment.

It is crucial to recognize that these and other points, which will be discussed later, seem to be marked by a direct confrontation between an ecological vision of the world and a vision of so-called "modernity." Giddens, as one of the strongest exponents of the latter, forces us to recognize the neonatal dispersion of environmental sciences and therefore its consequences, which are politically expressed in a green ideological diversionism that has impeded the maturation of the environmental movement as a social and political alternative. It seems, however, that both the radicalism posed by Giddens' modernism as well as recent political environmentalism represent two pathways to this crossroads of civilizing options, which are being confronted by the challenges of the 21st century.

The historical location of the concept of modernity

As Sztompka puts it, there are two possibilities for approaching a definition of modernity: analytical and historical. The latter clarifies the true metaphorical meaning of the term "modern," applying in this case to a period or periods in human history. This is considered metaphorical given that the description of historical periods is precisely that: trying to reflect the essential condition that marks or designates a space-time of human becoming with a powerful image. Various examples of these metaphors are found in the annals of all cultures: "archaic," "monumental," "classical" periods; "low middle ages," "high middle ages," "rebirth." These image-evoking names have been established by individuals from later centuries to describe periods that came before theirs. In the case of modernity, this refers to a present time distinguished from a past time. From this perspective, if the future remains excluded from the ancient-modern dialectic as a category, this affirms that the time of modernity is the present, always in relation to the past. In a strict sense, therefore, all historical time can be considered as modern in relation to its previous past: the age

of metals in relation to the stone age, gunpowder in relation to the spear, sailing in relation to rowing.

Although it seems evident that modernity is linked to the scientific and technological development of human society, we cannot ignore that the directionality of science and technology has in turn been determined by the culture and philosophy of the people who used it. If we accept the premise about the subjectivity inherent in the valuation of various civilizational models as valid, we can at least question the absolute and irreversible validity of the Western model of civilization. Accepting this leads us, at minimum, to deny the absolute appropriation that Western civilization makes of the term modernity. Giddens, in Sztompka's interpretation, refers to modernity as, "the ways of social and organizational life that arose in Europe around the seventeenth century onwards and that later became more or less universal in their influence." (Sztompka, 1966). Thus, what could be a metaphor to describe a historical time within a particular space gradually becomes a univocal paradigm of a particular model of civilization: Western modernity.

Of course, this theoretical speculation cannot ignore the reality behind Giddens' statement, relative to the worldwide expansion of modes of social organization that emerged during the European "modern age" of the 17th century. This has been expressed in the universality of systems of social organization based on the culture of the State, the laws of capital, the technology that supports the expansion of empires and markets, etc. Even still, reflection on new historical approaches is necessary to understand the phenomenon of Western modernity. Given the close interaction between the development of science and the notion of modernity, it would be useful to

propose an approach on the evolution of scientific objectives to identify the twists and turns of epistemology that may have determined what we experience today. From there, other expressions of industrialized modernity could emerge more clearly. Other categories of "dependent modernity" could also be constructed, which could reproduce the realities that determine the modernist structures of the centres of power and their peripheries with greater reliability. It is with these questions in mind that we present some considerations with which to propose alternatives to the institutionalized and hegemonic discourse of a particular perspective of Western modernity.

The search for scientific truth as foundation of a primal concept of modernity

Still considering the Eurocentric vision of civilization, we can identify the existence of a primitive modernity, understood as the humanist rebellion that began in the European Renaissance in open opposition to the theocratic order and feudal obscurantism, and which flourished two centuries later with encyclopedism. This first modernity—perhaps the only true one—can be recognized by its rebellion against the established power classes, which maintained absolute dominance of hermetic knowledge. In schematic terms, the driving force behind this first modernity was the ideal of knowledge of the profane path that leads to truth. At what point in history did the first deviation from the original spirit of this revolutionary modernity occur? When did these pioneers of science—quasi-alchemists—abandon their search for the philosopher's stone in exchange for the transmutation of lead into gold? It appears to be the wrong way to establish an exclusively temporal relationship to explain the nature and dynamics of modernity as a historical phenomenon. It seems more appropriate to attempt an identification of the ideals and objectives that drove those inventions and achievements as products of human ingenuity, freed from the doctrinal and oppressive yoke of feudal obscurantism.

Thus, it can be assumed that parallel to the revolutionary processes that shook Europe at the end of the 18th century, there was a gradual and profound change in the scale of values of the semi-feudal societies that had just released words of freedom. This new condition allowed individuals of ingenuity to ascend the social ladder through their own effort and inventiveness. Surely it would not take long to verify the veracity of a new equation, which conformed wonderfully to the sign of modern times. The sum of reason as an instrument, and knowledge as an input, therefore, almost infallibly produced a result of power. If we accept the hypothetical validity of this fabled approach in principle, we can easily summarize the process of substitution of the scientific mission: this changes the ideal of knowledge, whose ultimate goal is truth, to the ideal of reason as an expression of power.

Proposal for a concept of dependent modernity

An ecological and environmental approach (i.e., an approach that distances itself from an exclusively anthropocentric vision of reality) allows us to identify certain elements of the modernist discourse that determine the path of human thought and action, and in this case in particular, of western societies in their interaction with other cultures and models of social organization. Without offering a finished notion, I can sketch an approximation of the other side of the coin of modernity, in order to identify the contradictions and fallacies that would overthrow the alleged irreversibility of its Western paradigm.

For me, therefore, modernity is a diachronic and cumulative process, supported by a predominantly rationalist philosophy. This philosophy favours a mechanistic vision of reality,

which can explain an ideal of progress whose corollary is the justified expansion of values and Western culture, expressed in centre-periphery power relationships. This is done through the socio-political imposition of those concepts, which are representative of the dominant classes or nations' interests and ideologically manipulated as dichotomies (e.g., order versus disorder, civilization versus barbarism) and framed within a distorted notion of history and its future.

Modernity has become a prefabricated historical category used as an ideological weapon of domination, based on the verification of the following equation: reason + knowledge = power. Modernity can be identified as the Trojan horse that has allowed the penetration and predominance of a particular Western industrial worldview, even into other western societies, and different cultures and civilizations.

Giddens' Ecological Modernity

From our perspective, Giddens' analysis of Ecological Issues is an example of the limitations (of ideological or academic nature) suffered by modern thinkers in the face of fundamental ecological questions regarding the destiny of the human race. Given the density and breadth of Giddens' modernist discourse, it is difficult to channel the analysis of his critical approaches to green radicalism. This is why I began with a brief analysis of those elements, previously identified in his discourse on ecological issues, so that we consider ambiguous or potentially manipulated information in his work. In another context,

I propose to address one of the “core principles that provide the skeleton of modernity,” according to Sztompka. The principle of expansion (i.e., globalization) is understood as the

inherent tendency of modernity to widen its scope, both in geographical space and in culture. As stated by Giddens himself, quoted by Sztompka (Sztompka, 1996. p.98), “modernity is inherently globalizing.” That is, modernity tends to encompass ever-larger geographic areas, and ultimately, to spread across the globe.

Half-truths of Giddens' anti-ecological discourse

a) One-sidedness of the submitted sources:

The first strategy that Giddens used to dismantle what he calls "the ecological theory" is to present a series of claims by authors from the ecological camp, who presumably represent the quintessence of environmental political thought, including currents of green political radicalism.

The one-sidedness of the sources of these ecological thinkers—who are exclusively British—while being presented as universal examples, is unsatisfactory, especially given that particular currents of environmentalism (as is the case of Deep Ecology) are not necessarily the most representative of the environmental political movement. This way of presenting certain individuals and tendencies from ecology as main actors and spokespeople for the environmentalist political-philosophical process contradicts the methodology used by Giddens in his research. This implies a conscious action of presenting individuals as representative of a spectrum when they are not, or it means a reduced search on the number of actors and spokespeople from a broader international background.

b) Criticism without context:

When Giddens reproduces very forceful ecological statements without the argumentative context to support them, we are reminded of *noblesse oblige*, as the French saying goes. As a researcher and thinker, Giddens is fully aware of the limitations of language when the postulates of discourse are confined to the borders of paper and when the density and depth of ideas requires a prelude that makes their understanding possible. For example, when Giddens tried to explain, “the close connection that exists between modernity and the transformation of time and space” at theoretical and abstract levels in his book *Consequences of Modernity* (1990), he rightly allowed himself a long and complicated preamble to describe some contrasts in the time-space relationship within the pre-modern world.

Careful reading is required to understand Giddens' argument regarding the importance of the separation between time and space for the extreme dynamism of modernity, where “*its formation within standardized and empty dimensions, cuts the connections that exist between social activity and its anchorage in the particularities of the contexts of presence...*”. The choice of the space-time argument is made due to the theoretical importance placed on it by Giddens as a dominant interconnected source of modernity. This represents one step to understand so-called unlocking mechanisms and the concept of reflective appropriation of knowledge from which a modernist thinker solidifies the structure of their approach. These types of discursive “stratagems” can be two-way trap. Generalizing and simplifying arguments may appear as temptations to those who suffer the rigors of fame and recognition, those who tend to become synonymous with possession of the truth. Thus, when Giddens presents the thesis of biocentrism, he does so in a limited way,

with a tone of almost petty prejudice that seems to refuse considering these ideas seriously and deeply. As Giddens writes, interpreting the thought of Norwegian philosopher Arne Naess:

In summary, deep environmentalism proposes that a new political and moral philosophy that considers that human beings are in nature and are part of it, is necessary, and not that they are superior: biospheric equality places human beings at the same level with all other living things. In addition, it underlines the connections between nature and social community, something that, he claims, primitive cultures understood but modern civilizations have abandoned. Horticulturists and hunters offer models to which humanity should return (...) people will be able to live as primitive futures...” (Giddens, 1996, p. 205)

This is not a question of defending Naess's thesis. Nor do I try to defend the biocentric thesis, which is outside the objectives of this work. I can argue, however, that biocentrism arose as a response to anthropocentrism, which is a vision of the world from the exclusive focus of rationality and human needs. This came as a response to theocentrism, or a vision of the world from a magical-religious approach to reality. Likewise, we can point out that biocentrism does not necessarily posit a return to forms of social organization from the primitive past, but rather suggests a change of approach regarding our strategic position within the dynamics of the ecosystems on which life ultimately depends. It also calls for reflection on the experiences of other cultures that have practiced social and economic models that allowed for a sustainable balance with their own environment. Once again, the idea of equilibrium or balance—beyond the hippie connotations that Giddens imposes on it—does not refer to an ideal static stage of nature but is explained as a systemic notion where the flow and use of energy influences the levels of entropy that affect a system, be it an ecosystem, an agroecosystem, or a sociocultural system. These examples only corroborate the poverty of Giddens' critique of one of the many currents of ecologism.

c) Lack of identification of main trends:

Giddens makes an indiscriminate identification between the political thought behind conservationism and environmentalism, which are related—through a casuistic logic—with conservative political thought and doctrine, going as far as relating ecologism to fascism. It is not this work's purpose to delve into the origins, principles, objectives, and organizational models that make up the different currents of the environmental movement. It is obvious, however, that there are important differences in form and substance with respect to the vision and political action of conservationism towards the preservation of the natural environment; of environmentalism, directed towards the political and social denunciation of the industrial development model; and environmentalism, oriented towards a political and cultural change of current socio-economic structures and in accordance with scientific knowledge of the laws of nature. In the same way, fundamentalist environmentalism can be differentiated from the positions of pragmatic environmentalism, just as Marxist environmentalists can be distinguished from anarcho-ecologism, ecofeminism, ecoindigenism, etc. among the various "green" social movements.

The indiscriminate and constant references that Giddens makes to explain ecological theory cannot only be classified as imprecise or limited. What other criticism could be made about a researcher of socialism who presents the doctrines of national socialism, social democracy, and social Christianity as a homogeneous block? The *tutti fruti* of Giddens' analysis can only be due to two reasons: an intention to distort the observable reality of the ecological movement, or a grotesque omission by a researcher of Giddens' stature.

The first explanation appears more likely considering that Giddens, displaying a coffee shop syllogism, poses the relationship between political conservatism, nature conservation, and fascism. Given that the Nazis promoted the extreme conservation of their indigenous nature as another expression of their pan-Germanic racism, it seems extremely vulgar to propose a comparison where there are no similar motivations or doctrines, despite the common action of “conserving.” Or is it that we can blame modernity for its fascist penchant for science and technology just by naming Mengele or Vom Braum?

d) Biased handling of concepts.

The ambiguous, invested, and distorted management of concepts such as tradition, nature, conservation, balance, and primitive seem to be a constant throughout this chapter of Giddens. Many of these terms have a negative connotation for modernists, as Sztompka warns us when referring to the analysis of modernity from the view of polarity of opposing concepts. For example, modern society is presented as a more advanced stage than "traditional" society. In this sense, Giddens is a faithful exponent of this antagonistic view, where his modernity at all times represents a positive context that stands out against the limited, backward, and risky contexts of pre-modern societies. Beyond the evident subjectivity displayed by these judgments (which are also presented as scientific results), Giddens' inability to look at the past in a sobering way is clear, since this would apparently mean betraying the spirit of eternal innovation that fuels his view of modernity. Other terms analysed by Giddens also do not have a justification that allows for the militancy of these concepts. The poverty of his scientific perspective and handling of the biological aspects of ecology is expressed at the levels of a high-school boy. It seems that Giddens wishes to create an

image of environmentalism as a retrograde movement inspired by the darkest forces, summoning images of a bestialized humanity as Hieronymus Bosch portrayed them several centuries ago.

e) Scientist fundamentalism

Faced with the environmental issue, Giddens exhibits an extreme zeal of scientific purism with regards to the validity of empirical measurement-verification of facts that support or confirm the deterioration of the environment. Giddens dismisses the validity of investigations that project negative scenarios regarding the future of the biosphere as a consequence of human activities. The exaggerated or incorrect projections of reports made in past decades are sufficient enough to raise the possibility of an environmental conspiracy that seeks to misinform and raise public opinion for political purposes: *"How does anyone know what effects a process or a series of chemicals might have on the earth or human organisms 30 years from now or several generations from now?"* (Giddens, 1996. p. 215). For Giddens, the variety of available analytical methods and approaches makes it necessary to question the alleged consequences of pollution, rather than understand it as an expression of collective fear in the face of the uncertainties posed by the cultural changes of modernity.

f) The idealism of modernity and the rejection of nature:

As a good anthropocentric, Giddens evades the possibility of questioning the validity of the current human-nature relationship. He dedicates a couple of sub-chapters to this topic (Giddens, 1996. p. 209-220), however, where he makes use of all kinds of arguments while maintaining his tone of irony. It is here that we finally identify his level of understanding of "ecological questions,"

as Giddens himself likes to refer to them, inherent in the logic of reflective modernity. The author tells us:

I propose to suggest (...) that environmental issues should be understood as part of the process of adaptation to reflective modernization, in the context of universalization. The problems of ecology cannot be separated from the repercussions of detraditionalization. Each of them raises the age-old question, how are we going to live? In a new way, in a situation in which the advancement of science and technology, together with the mechanisms of economic growth, force us to face moral problems that, in another time, were hidden in the natural character of nature and tradition. The dangers associated with manufactured uncertainty make it necessary for us to address such problems, but if they are seen only as natural hazards, their character is misinterpreted. (Giddens, 1996. p.214)

Even without knowing Giddens' present philosophical affiliation, his previous work as a sociologist has certainly left a theoretical trace up to this day in the social sciences. Therefore, Giddens' stand on ecological issues and its contested notions on nature as an exogenous element to social life, have certainly had a strong impact on academia and politics. His position regarding the natural world reminds of the old Hegel, who in his abstract idealism, considered nature as an insensitive form of the reality of the spirit. A sort of delusion, as Einstein would say.

II.4. The Anthropocentric Rationality

II.4.1. From anthropocentrism to non-anthropocentrism

As stated in the main introduction, the search for a politico-ecological concept of space (and by extension to transitional space) implicates a relation between the habitat—a given environment—and its surrounding spaces in which the transitions serve as interacting elements of

a larger spatial system. Assuming that properties and functions of transitional spaces have an impact on the rest of the larger spatial system, which would imply that, up to a certain degree, transitions produce spatial effects. These effects will be different according to the kind of ecosystem—natural, rural or urban—in which transitions are being looked upon. These affectations could be interpreted as the result of combined geographical and environmental causes which, together with cultural processes, drive human adaptation. That is, basically, the middle ground proposed by ecological probabilism, sustained by landscape, cultural and human ecology (Andermatt-Conley, 2012; Campbell, 1985; Clark, 2001; Hawley, 1972; Rotenberg, 1993). These reasonings lead me to believe that the different ways in which either space, socioecological space, or transitional space can be identified, measured, differentiated, and analysed, depends on where the researcher stands in relation to anthropocentrism.

According to the reviewed literature, there seems to be two clearly defined extreme positions in relation to the place of human on Earth. Thus, between the hard anthropocentrism led by rational individualism, and the radical deep ecology biocentric positions. Between them there is a range of grays which somehow reconcile the extremes. The presence of axiological elements is a constant in the controversy. It is nevertheless surprising that the ultimate question about our place in the universe becomes at the end a question of value. It is nevertheless surprising that the ultimate question about the place of humans in the universe becomes at the end a question of value. In any case, as a question of value, it can be understood in its double meaning: a) On one hand, the axiological notion which questions the intrinsic ‘value of nature,’ proposing conversely the “utilitarian value” from which humans “produce” their living. Nature here is understood as everything which is not entirely human. b) But the axiological can also be understood as a matter

of personal belief, of personal ‘values’ in a more metaphysical sense, just as concepts like liberty and justice. In this sense, subjective and personal, I align myself with the non-anthropocentric side of this contested controversy.

As part of the research conversation, one can see reflected here the antagonism between *anthropocentric* and *biocentric-ecocentric* positions (Cocks & Simpson, 2015; Gough, Scott & Stables, 2000; Kortenkamp & Moore, 2001; Nettle, 2009). No doubt, these opposing views are part of the discourse that accompanies the theoretical debate about political ecology’s epistemology. As anthropocentrism places human beings as the measure of all things (Protagoras), its doctrine takes us back to the discussion about the great divide between human and non-human, highlighting a false dichotomy between nature and culture.

Another related aspect of the anthropocentric paradigm is notable in the opposition between *methodological individualism* and the *holistic* and *systemic* worldviews. Methodological individualism in social science presupposes that human organizations are determined by individual behavior. Groups or communities do not exist as such, but as gatherings of multiple individuals. Explanations, representations, and theories of social phenomena privilege the individual agency. Contrarily, social or ecological holism invites an integral approach in which interactions among species or among human groups are looked at beyond mere individualist approaches. Systemic perspectives of social sciences derive from these two last approaches. Properties and functions of any given system are more than the sum of its components, therefore the system as a whole determines or influences its individual components.

As described in previous pages (*Darwinian Territorial Biology*), I take notice that some features of *environmental determinism*, vis-a-vis *cultural possibilism*, seem to emerge on their own. I know what contemporary academia thinks about determinisms of any kind.¹⁹ On the other hand, possibilism seems to vehemently reject any kind of influence of nature over the human condition. In any case, environmental determinism seems to have become an unmentionable concept, while possibilism has mutated into hardcore anthropocentric paradigms, very much aligned with logical positivism. This short introduction shows how these schools of thought and their conflicting theories gravitate over the question of nature's role on human existence. As an unsettled debate, they fit well into the broader discussion that constitutes the realm of politico-ecological analysis of the research. At this moment, my standpoint is that biophysical space, being the constitutive matter of the environment and ecological systems, is simultaneously a factor that influences habitat and human agency; same way this biophysical space is conversely affected by humans. My intention is to hold an epistemic position supported by a systematic search on the different aspects of the space-nature relationship; not simply a *doxa* or simple opinion. Can this be considered as geographical or environmental determinism? I do not think so. I believe it is a question of perception (Merleau-Ponty, 1966) and logical common sense. From a theoretical perspective, the spatial handicap of political ecology is both epistemological and ethical. This calls for the reviewing of established paradigms and the updating of previous theories regarding humanity's relationship with its own *oikos*.

¹⁹ Many negative connotations of geographical determinism add to a theoretical colonial history of political domination, which surround the use of deterministic perspectives. Surely, classical environmental determinism stands for predictive, almost fatalist causations of the power of nature and predestination over human affairs.

II.4.1.1. Anthropocentric hegemony

The question of anthropocentrism is a key element in defining the theoretical grounds of political ecology. Either as a field of political studies, an area of social ecology, or as a possibility for political philosophy, anthropocentrism, and its opposites, biocentrism and ecocentrism, form conceptual blocks that split any common theoretical ground that may exist between environmental and ecological perspectives, schools of thought.

The problem with anthropocentrism is that it seems unable to analyse the human social condition within a wider context: a scope of an interconnected reality between us, humans, and biological, physical, and chemical phenomena that share different degrees of causality in the outcomes of human affairs. That is the reason systems theory appears better suited to deal with anthropocentric mainstream arguments. The problem is not humans' superiority respect of "other species." The issue is not a competition among predators. The missing block here is to recognize that under systems theory all elements are important and interdependent, even considering that one of those elements within a system maybe crucial for the maintenance of the system.

There is certainly a difference between 'soft' and 'strong' anthropocentrism (Koensler and Papa, 2013). It would be ridiculous to deny the place of the human species at the top of the ecological hierarchy. It would be blind to deny the immense gap existing between our evolutionary achievements and the rest of the living creatures of the planet. And yet, a huge misunderstanding erodes the very concept of anthropocentrism. And it goes well beyond the fact that we have the biggest brains, that our existence is well guarded with reason, which allows us to develop *techné*, *episteme*, and *Phronesis*, the triad of knowledge. It is not about that. Hard anthropocentrism relies

on scientific data to demonstrate the superiority of our species, even if no one is arguing that fact. But it does it in a primary unethical way. Homo Sapiens is portrayed as the centered top predator who usufructs without any physical or ethical limits from the elements and living creatures of its own oikos. As a variant of the geocentric thinking of the Middle Ages, it cannot help showing a link with modern Eurocentrism, since it is, after all, a refined product of contemporary Western thought.

Anthropocentrism seems to me a variant of a particular kind of dialectic which express itself in the center-periphery dualism; which far from representing an interconnected dynamic thinking about reality, is basically linear and prone to unidirectionality. Anthropocentric thinking seems to replicate the biblical idea of a 'manifested destiny' of humankind. That is why the idea looks so much theocratically primitive.

Curiously, we observe the existence of many of the analogies, similes and metaphors with which we humans tend to "humanize" nature, describe situations and stories where "other" living beings adopt behaviors specific to our species. Thus, it happens in a good number of deterministic and biologicist theses, impregnated with a human perspective that give non-existent values to the animal and vegetal world.

The case of the hierarchies granted to the animal kingdom, for example, illustrates our point perfectly. The humanization of the lion in "king," of the "worker" bees, the "murderous" shark, etc. creates a symbolic instrument—based on an alleged "law of the strongest" that is later used as a natural reason for explaining a social order. Not in vain, since Spencer's theses derived in

deterministic doctrines of a reactionary nature, ethology is viewed with suspicion by scholars of social phenomena. In fact, the view of a distorted Darwinism emphasizes, almost exclusively, the binomial cooperation-predation, dominant-dominated and its political expression by extension: friend-enemy ignoring other interactions equally determinant for the evolutionary state of the populations.

However, from the ecological perspective that I try to handle, analogical situations have, in fact, an inverse origin, that is, they originate in what, from a systemic point of view, we could classify as the system of interactions between groups of individuals, communities, and populations of living beings, within a given ecosystem. My view is not based on an anthropomorphic assessment of the behavior of our fellow animals or plants. My approach proposes that the interactions between human beings and their environment can be viewed from the perspective of Communities²⁰ Interactions (Odum, 1972), which form a classification system that allows a greater possibility of identifying and assessing the activities and behaviors of living beings, including humans, within any ecosystem, be it natural or artificial.²¹

²⁰ Thinking about spatial distribution and interactions on space between human and natural ecosystems, the perspectives on sustainable socioecological systems requires perspectives capable of responding to interactions between different species, even more when one of the elements involved is culture as a determinant factor of the equation. An ecological **community** consists of all the populations of all the different species that live together in a particular area.

²¹ Understood here as one of the principles and concepts corresponding to the ecological organization at population level, the *Analysis of the Interspecific Interactions of Population* of two different Species, could be transferred -by analogy- from the ecological field of natural sciences to the scenario of human societies. This could be considered as a non-anthropocentric methodological contribution of ecology to social sciences, and specifically to political ecology. This proposal would adapt the system used by general ecology to classify the expressions resulting from the interaction between species. The main interactions, namely, are: Neutralism, Direct and Indirect Competition, Amensalism, Parasitism, Predation, Commensalism, Proto-Cooperation, and Mutualism. (Odum, 1972;

II.4.1.2. The Idea of Social Ecosystemism

There is a final reflection I want to make in relation to the controversy between anthropocentrism and ecocentrism. From my perspective, the opposite to *anthropocentrism* should not be the so-called *ecocentrism*, but *ecosystemism*, or *social ecosystemism*, or *human ecosystemism*.²² As we shall see, the reason for rejecting the label of ecocentrism goes beyond a mere game of words, in order to place the argument on a different perspective which have epistemic consequences.

When we speak in anthropocentric terms, we are referring to a world vision where human interests are at the center of all knowledge, thought, word or action, either to a greater or lesser degree. Similarly, if we speak in ecocentric terms we would be referring to a vision of the world where ecological concerns are at the center of all human knowledge, thought, word or action. (Margaleff, 1996) This is not the case and should not be either. This would mean a narrow disciplinary approach to the complexities of human civilization, as reductionist in its own terms as anthropocentrism is.

However, my objection is ontological in nature and is based on the spatial notion of the word "centrism" referring to an ecological conception of the world. Living beings, ecosystems, and the biosphere as a whole do not have a central point, a preponderant element from where the phenomenon of terrestrial life is controlled or directed. Precisely, the enriching image that ecology

²² Systemism is a philosophical current developed by the Argentinean epistemologist Mario Bunge who establishes that everything is a system or a component of a system. See Chapter 3.

offers us as a science is that of the interaction and interdependence of the biotic and abiotic elements that form the ecosystem. Thus, the spatial reference to the center does not apply in this case to a systemic worldview, where precisely, as one of the principles of the systemic theory indicates, the whole is greater than the sum of the parts. So, there is no center, there is a system. This is precisely the innovative perspective offered by environmental sciences and a non-anthropocentric political ecology.

We are talking then of a very complex system where human beings have not yet found their position (List and Spiekermann, 2013) As a dominant and predatory species, humans look for alternatives that allow the sustainability of the biosphere on which our habitat depends. A more precise name is then required to reflect both the position and the proposal of the hybrid vision of political ecology as a discipline. Perhaps the denomination of *ecosystemism* will not be enough to transmit the systematic synthesis of a human and ecological vision.

Perhaps the notions of *social ecosystemism*, or *human ecosystemism* may be the most appropriate to refer to the antonym of anthropocentrism. This, of course, is the subject of a different research.

II.5. By way of conclusion

The renewed interest for understanding the concept of nature and space from a perspective of political theory takes place thanks to the emergence of ecology as science and more precisely due to the global awareness of a world scale ecological crisis, together with a fast-growing expansion of world urbanization.

The ideas about the natural world and the role of humankind have evolved slowly through centuries, retaining the worst arguments about human exceptionalism. The transition from religion absolutism to scientific hegemony holds the mark of anthropocentrism as a dominant paradigm in modern social theory. During the last two centuries, sciences such as geography, biology, sociology, and anthropology have sworn allegiance to economicist theses of radical utilitarianism. Both liberalism and neo-Marxism keep their focus on the exchange value of Nature. Philosophical schools are related to man's view of nature as from men's perspective, either as the observer philosopher or the object of observation in his relationship with nature and his concept of human nature.

These scenarios pose political challenges that cannot be fully addressed by limited anthropocentric perspectives. Nevertheless, the ecocentric points of view of political ecology keep being marginalized. This is especially true in theories of social spatiality that underrepresent those intertwined connections between human culture and the natural world. Conversely, research on human development, thanks to the advances in neuroscience, provide continuous evidence on "how our biology constrains, gives expression to, mediates, or moderates how culture operates on developmental processes, and how culture infiltrates and becomes part of our biology and basic developmental processes." (Garcia Cool, 2004).

CHAPTER III.

A Bi-disciplinary Approach to Political Ecology

III.1. Introduction

As stated in the title of this research, my aim is addressing the question of space and the notion of transitional space from a political ecology approach. But before moving on to issues of spatiality, it is necessary to have a clearer understanding of what we understand by Political Ecology in this research. Though it may sound as a very straight forward concept, Political Ecology has been conceptualized in many different ways. As we saw in the literature review, there seems to be many different approaches to this new discipline. They come mainly from Marxist and non-Marxist geographers, political economists, sociologists, anthropologists, ecologists, philosophers, political scientists, and other disciplines who understand political ecology according to their own standards. As stated in chapter 2, I believe the scientific and philosophical positions of social scientists in respect to anthropocentrism represent a dividing line between two different conceptions of life. These two separated world views, which point at a different object and different aims, most certainly will reach to different conclusions about most research done under the banner of political ecology. Those differences show the diversity of points of view regarding the meaning of political ecology and offers a comparative basis of where to locate my own conception with respect to other approaches.

In this regard, Chapter 3 outlines my own view of political ecology by proposing an epistemological exercise in which the specific contributions of politics and ecology can describe the process of amalgamation of this hybrid science. Beyond a political science with an ecological

foundation, or a politicized ecological knowledge, I assume political ecology as a discipline of synthesis, epistemologically attached to political science, but an interdisciplinary science by itself. My intention is to present a concomitant relationship between human ecology as a branch of general ecology and political science through a political theory approach. For this reason, the chapter will briefly address the issue of power, always in reference to the question of space, which will be treated more extensively in Chapter five.

Adopting Political Ecology as an independent discipline has big implications. As a discipline it may be considered as a branch of a major science; such as biology, geography, or even political economy. Adopting the “systemic mantra” stating that, “*the whole is more than the sum of its parts*,” the importance of political ecology as a discipline will be relative to its input to the system of sciences; not only because of the position it may occupy in the tree of sciences. If we consider political ecology as a systemic element within a complex system of sciences, its synaptic qualities aim to interrelate social, biological, and physical elements. Beyond building bridges of interdisciplinarity, political ecology offers the possibility of operationalizing a vocabulary and common language between natural and social sciences, and at the same time, forcing researchers to appeal to ethics and philosophy in their reading of “the place of humans in the world” and the rationality of organized social life in space. In any case, this third chapter aims at sketching an epistemology of the concept of political ecology that allows a systemic interpretation of it. By this, do I mean that we could characterize it as a Systemic Political Ecology? I do not go that far in the conceptualization of political ecology. But, in any case, the systemic perspective is certainly the chosen tool to reach with coherence an interpretation of space and transitional spaces through political ecology.

At a global scale we witness a growing number of social, economic, and political problems causing the destruction of ecosystems as a result of uneven socio-spatial relationships between human settlements and natural habitats. Conversely, an increasing number of environmental and ecological problems show the profound social, economic, and political consequences derived from environmentally unsustainable spatial relationships between bio-geophysical systems and human systems. In this sense, many traditional scientific disciplines are limited in their understanding of the problems that arise when facing complex systems, such as those posed by questions of spatiality within socio-ecological systems. This chapter serves as a non-anthropocentric introduction to the subsequent question of how political ecology should approach socio-ecological spatiality, and of how space may influence the theory of political ecology. I will talk about that in Chapter 4, where I will refer to the systemic notion of space and the concepts of ecosystems, both natural and human, understood as spatial units for political ecology.

III.2. From general ecology to human ecology to social ecology

Since the second half of the 20th century, the notion of political ecology has made a slow but steady emergence through social science scholarly spaces, not only in industrialized societies but in the developing countries as well. Considered an almost exclusive field of geographers, anthropologists, biologists, and naturalists during the first half of the 20th century, ecology as a topic of human interest has multiplied its scope to become a front-line issue within the agendas of modern societies. During the last decades, geography has been at the front of political ecology's academic research. Together with cultural ecologists, development theorists, anthropologists, and sociologists, a vast literature has contributed to making the case for political ecology. Curiously, this has not been the case among political scientists, with the exception of those who cultivate

political economy, and even then, there are not that many do so. Despite the fact that there is a body of research under the banner of political ecology, a confusion of theoretical languages creates a fragmentation of efforts preventing a coherent and unifying concept of what political ecology is, from a political point of view. Nonetheless, it is curious that a discipline marked by the concept of politics does not insist on deepening its roots, i.e., object and method, within the knowledge of political science.

If the theoretical weakness has led researchers to a sort of conceptual Tower of Babel, the need to find "the genetic code" of political ecology seems to be the challenge and a necessary step to reach a consensus about its place among social sciences (Goldman and Shurman, 2000). And yet the question remains identifying which disciplines are best suited to elaborate a concept of political ecology. We can ask the following question: can social scientists develop a concept that could be operationalized and adapted by other disciplines but still maintaining a certain rigor that would work for all? With that in mind, I approach political ecology as a hybrid notion, similar to other hybrid notions that already exist, i.e., political geography, political economy, political anthropology, and so on. As one may notice, those hybrid concepts tend to rely on the second discipline of the duet to describe their main disciplinary feature. Following these two words, political and ecology, I present my argument in simple terms, for they stand as their accepted meaning. It is, nevertheless, an epistemological approach in order to trace its genealogy. I will try to do so from a political perspective: exploring the ecological side of political ecology, or the political dimension of ecology, if you prefer.

There are plenty of arguments that justify this multiple disciplinary approach. Ecology is in itself a science of synthesis, being at the same time a physical, biological, and social science. Therefore, it forms a discipline of bonding and interplaying between natural and social sciences. According to Eugene Odum (1972), a pioneer in conceptualizing systemic ecology, it amalgamates different disciplinary universes formerly separated, thanks to a systemic view, to effectively achieve a description, analysis, and coherent explanation of the interrelationship between biotic beings and abiotic elements with their environment.

Ecology, a science that studies the grouping and functions of organisms in their environment, is a biological science. Understood as the study of the structure and function of nature, it is a physical science. Besides the social complexity studies of animal societies²³ and in the understanding that humans are part of nature, human ecology studies the interactions of human populations with each other and with their environment; hence, it is also a social science. Considering ecology as a social science is key for conceptualizing political ecology. It allows for establishing a direct genealogy through one of ecology's sub-disciplines: *Human Ecology*, the ecology of human species population.

²³ It is an accepted notion that plants, and animal organisms live in association or communities which are understood as societies. Invertebrates' societies, for example, show clear patterns of labor division and cooperation between individuals for breeding purposes. Similarly, "mammals' social relationships do influence their access to resources and reproductive opportunities". (Dieter, L. and Clutton-Brock, T., 2018)

III.2.1. Human Ecology: between the social and natural sciences.

The theory of human ecology, as proposed by Amos Hawley (1999), shares the same potential as general ecology, the different types of interactions among human societies and the relationships that the ecosystem or geographical habitat may have in those interactions. It includes the study of ecosystems, natural or built, and how they affect and are affected by human interaction (Margaleff, 1978).

Throughout academic literature, previous research done by anthropologists, geographers, urbanists, sociologists, and philosophers focused on ecological approaches to human society. Research of what came to be known as the “Chicago School” (Robert Ezra Park and others) in the first decades of the 20th century, influenced by the thoughts of Scott, P. Geddes, considered the founder of human ecology, were distinguished by an approach based on general ecology, meaning human ecology as a sociological branch that contributed to methods of natural science. McKenzie, the first sociologist to attempt formulating a definition of human ecology, described it as, *“a study of the spatial and temporary relationships of human beings, insofar as they are affected by selective, distributive, and accommodating forces of the environment”* (Theodorson, 1974, p.227). Researchers of the Chicago School worked on two levels of human society: biological and cultural. They established relationships between the concept of dominance and biological components and proposed a study of animal and plant communities in order to understand them. However, for the Chicago School, the relationships of competence that structure human societies were not a biological absolute, they were mediated by culture. Hence, the preference of this trend in the studies of urban systems. Human ecology was understood as, *“a study of the processes of change of the spatial and subsistence relations in which man organizes, to determine what he produces”*

(Gudynas, n.d., p.5). These early facts simply corroborate human ecology potential as a discipline capable of offering a shared foundation for interdisciplinary studies, serving as a guideline for alternative ecological research. Empirical and theoretical developments on bioregionalism and urban ecology are the offsprings of earlier human ecology research.

James A. Quinn (1939) proposed a re-examination and a redefinition of human ecology, limiting it to the social scope and distinguishing it as a special type of relationship and structure. He considered two levels of sub-social interactions. The first level was an ecological interaction of a sub-social type: those relationships without a definitive social structure influenced by the community itself. The second level: the sub-social aspect, differentiated and impersonal, of the organization of a community or region, originating in the activity of ecological interaction and being transformed by it. Essentially, this referred to spatial organization and division of labor. Note how it matches with the ecological definitions of Habitat²⁴ and Niche. From this approach, Quinn defined human ecology as, “a specialized field of sociological analysis” that researches 1. Sub-social and impersonal aspects of a community structure, both spatial and functional, that arise and are transformed as a result of interactions of people through the limited possibilities of the

²⁴ Another important aspect that highlights our environmental visualization is the presence of the notion of space, which can be expressed through the concept of habitat (or ecosystem, which is represented globally in the planetary biosystem or biosphere). The terrestrial biosphere, composed of biotic elements (living beings) and abiotic elements (physical-chemical elements) is, ultimately, the stage where the globalization process takes place. The process of globalization itself is expressed "culturally" in various ways in geographic space, in ecosystems, and in the global biosphere. The impacts caused by this globalization process have an expression in humankind's habitat. In other words, the cumulative results of the dialectical processes caused by the dynamics of globalization can be measured – in quantity and quality – through the gradual transformation of ecosystems. The habitat, therefore, becomes an indicator of the nature and trend of various globalization processes.

environment; and 2. The nature and form of processes through which the sub-social structure emerges and transforms. (Theodorson, 1974, p.236)

Amos H. Hawley is another researcher who has made significant contributions to the theoretical field of human ecology. His view of general ecology was influenced by the Darwinian view and the elements of “the struggle for existence,” from which he derived concepts that he later integrated with human ecology:

The idea of ecology as a study of the manner and unfolding of an organization in localities of living beings (...) takes up the study of how these living beings that grow and multiply, are able to survive in a constantly changing, but always limited, environment. (...) Stated differently, ecology is based on the idea that life is a continuous struggle of organisms to adapt to the environment. This struggle begins and continues essentially through different models of change of these two components of the life process. However, from an ecological point of view, life is not an individual phenomenon, but rather, collective. This is the presumption upon which ecology bases itself, that adaptation to the environment is a mutual function; de facto, a community function. Adaptation of a population to its physical world takes place through the independent actions of coordination and organization of many individuals. (Hawley, 1972, p.78)

Since 1944, Hawley’s research has emphasized the importance of the community, not the individual, as the purpose of human ecology, underlining the importance of the functions and relations of social behavior. His definition of 1944 proposed it as, “a descriptive study of the biological adaptation of human populations to the conditions of their respective physical media.” In 1986, in his book on Theory of Human Ecology, Hawley defined the human individual based on five premises: ‘the need to access the

environment, interdependence, inherent expansiveness, temporary construction, and a variety of behaviors with undetermined limits.’ (Hawley, 1986, p. 7)

Hawley affirms that the first four are common to all living beings. Only the last one, which is exclusively human, separates mankind from other species, with incommensurable consequences. Thus, Hawley defines human ecology as:

A paradigm composed of three propositions: 1) a functional adaptation with a formation of interdependencies among the members of a locality; 2) development of a proceed system—*ceteris paribus*—until achieving the maximum size and complexity permitted by the transport technology and communication of the locality; 3) development of the system recommences upon obtaining new information that increases the capacity to transport material, people, and messages and continues until the increased capacity is completely used. These propositions can be described as adaptation, development, and evolution, respectively. (Hawley, 1986, p. 7)

These different views evidence the confrontation that still exists between the approach of ecology and sociology. A great deal of research on human ecology has been performed in which the approach of general ecology and sociology alternate in importance. In this sense, it is worthwhile to mention the contributions of authors, such as Odum, Mann, Simpson, Chinoy, Rapaport, Levi-Strauss, and Marcuse, among others.

In their book *Fundamentals of Ecology*, Sutton and Harmon (1987) defined human ecology as a study of ecosystems and the manner in which they affect and are affected by human beings. In turn, Eugene Odum (1972) was brief but concise when he interpreted that human ecology can

be considered the ecology of the inhabitants of the human species. Going beyond the point of view of population, Odum affirms (Odum,1972, p. 561-569) that human ecology should take into account the relationships of human populations and their internal dynamics, with the external factors of the physical and biological media in the context of the biotic communities and populations of the ecosystem in which they live. Within this overview it is important to mention the Program of Man and the Biosphere, UNESCO, 1974. The term “social ecology” made its appearance at that time, both as a synonym of human ecology, as well as a term with a meaning of its own, used by various authors defending different points of view, which were sometimes contradictory. The description made by the American, Paul Ehrlich, is also important. In the beginning of the 1980’s he brought up the subject of the survival of the human species in his book Extinction. According to Ehrlich, human ecology at present focuses on four main study areas: dynamics of human populations; man’s use of resources; the impact of man on the environment; and interrelationships among the above factors. More recently, Edgar Morin indicated the existence of a more specific relationship between human ecology and social problems. This author defined ecosystems as social organizations with reference to a “city” and a “countryside” environment. Morin pointed out that it is in cities that one observed an anthropo-social ecology, which unleashed the idea of human ecology. However, this idea has also been associated with rural and wild environments (Gudynas, n.d.).

III.2.2. Social Ecology: Human Systems Interacting with Ecological Systems

As a specialized field of sociological analysis, human ecology opens the possibility for a new link within the lineage of ecological sub-disciplines: Human Social Ecology.

Eduardo Gudynas is a Latin American researcher who has fostered a theory of social ecology. His proposition is based on the fact that a study of human-environment relationships should include all living beings, human or not, and their physical environment. His claim is based on acknowledging the lengthy and jointed evolution of humans and environment. This sociological perspective of human ecology defines social ecology as, “a study of human systems interacting with their environmental systems” (Gudynas, E. and Evia, G. 1993). In spite of the fact that for these authors the perspective of social ecology bases itself on a consideration of human beings, both systems, as well as their interactions, are just as important and should be taken as an interacting unit, notwithstanding the fact that delimitation of the environment is made from the human environment. With this approach, the human system is compromised of the individual, through social groups, to a nation or group of nations.

In turn, the environmental system encompasses every element that interacts with the human system. According to this reasoning, authors distinguish the nature of an environmental system on the basis of the identification of three subsystems: human, construed, and natural. In this respect the authors explains:

The human component refers to other beings who are not a part of the human system mentioned at the beginning. Likewise, the construed includes houses, streets, cities, or cultivated areas, which are modified landscapes or made by human beings. Lastly, natural includes forests and rivers, mountains and meadowlands, and the animals and plants sheltered there. De facto, contemporary science is scientific perspectives that have restricted themselves to the study of the interactions of man with one of these environmental subsystems, forgetting the others. (Gudynas and Evia, 1993, p.19)

Gudynas attempted to develop social ecology as a scientific research program in which there would be a theoretical body that would acknowledge a staunch center offering a series of basic premises; and a spectrum of auxiliary hypotheses, in which changes would be expected depending on ongoing research presented at its *Cuadernos Latinoamericanos de Ecología Social* (Latin American Notebooks of Social Ecology, Gudynas, n.d., p.12). For Gudynas, social ecology is the study of human systems interacting with their environmental systems, considered a large division within the field of studies of human-environment systems, where the level of aggregation moves in a scale from individual, to group, to all of the species. The author sets up the premises of this approach in the following manner:

1. Man interacts intensely with the environment. Neither can be studied isolated from the other, as together certain aspects can be determined that do not appear when studied separately.
2. This is a dynamic interaction and develops with the passing of time.
3. The definition of environment depends on how the human object being studied, is defined.
4. The environment is complex and heterogeneous in time and space (anisotropic). (Gudynas, n.d., p.13)

From these central axioms, Gudynas formulated a series of secondary axioms related to methodology, ethics, and the practical application of knowledge. The methodological axioms proposed are:

1. Human systems cannot be studied isolated from environmental systems: A social science does not exist separately from an ecological science.
2. Consequently, there is no social practice different from an ecological practice. Environmental work is at the same time social work.
3. Processes should be recovered. That is to say, emphasis should be placed on history. The history of man and that of the environment, should be recovered, as well as the interactions that occur between them.
4. Rational knowledge offers a sectoral approximation, to

which the components of personal experience, should be added. 5. Since all humans have a particular interaction with the environment, ideally, a research of these interactions should be made with the participation of the persons involved. (Gudynas, n.d., p.13)

These ethical axioms pose a position that transcends the human and requires taking into account how human activities affect not only other people, but also how they affect other living, and non-living things. With respect to axioms for the application of knowledge, the author calls attention to basic criteria that should be considered in the use of technology.

This approach gave rise to the methodology of social ecology that we obtained from the manual of methodologies mentioned above, in which Gudynas and Evia affirmed that social ecology:

Acknowledges the environment as a heterogeneous system that becomes a site for many varied symbolic meanings. Each human being contending with the environment decides which elements will or will not be given symbolic meanings, their content, and relative value. A true, unique, absolutely approachable 'reality' does not exist. It will depend both on man, as well as the environments. Thus, human-environmental relationships will be different among different people and environments. Social ecology attempts to unearth these processes, and to do this in an ethically committed manner. This practice is done from an explicit ethical position on behalf of all forms of life. (Gudynas and Evia, 1993, p.22)

The importance of Gudynas' proposal lies in the acknowledgment of human ecology as a branch of science in the process of being rebuilt that gives priority to the need to research the human-nature relationship that other fields of learning neglected. The input of a Latin American view of social ecology establishes a concern for the study of domineering relationships

predominant in our continent, beginning with a reading of environmental history of autochthonous knowledge from indigenous cultures to the realities of tropical agroecology, visualizing the realities of Latin American urban and rural settings. It is an approach adapted to a specific social and historical background in search of alternatives for political and economic organizations, capable of understanding particular societies within the new global scenarios. Notwithstanding that Gudynas acknowledges a clear project of what these alternative relationships should be, but still does not exist, the Latin American social ecology that he advocates represents a path for developing a training-research-practice project to advance the task of searching for a new direction in the relationships of people among themselves and with their environment.

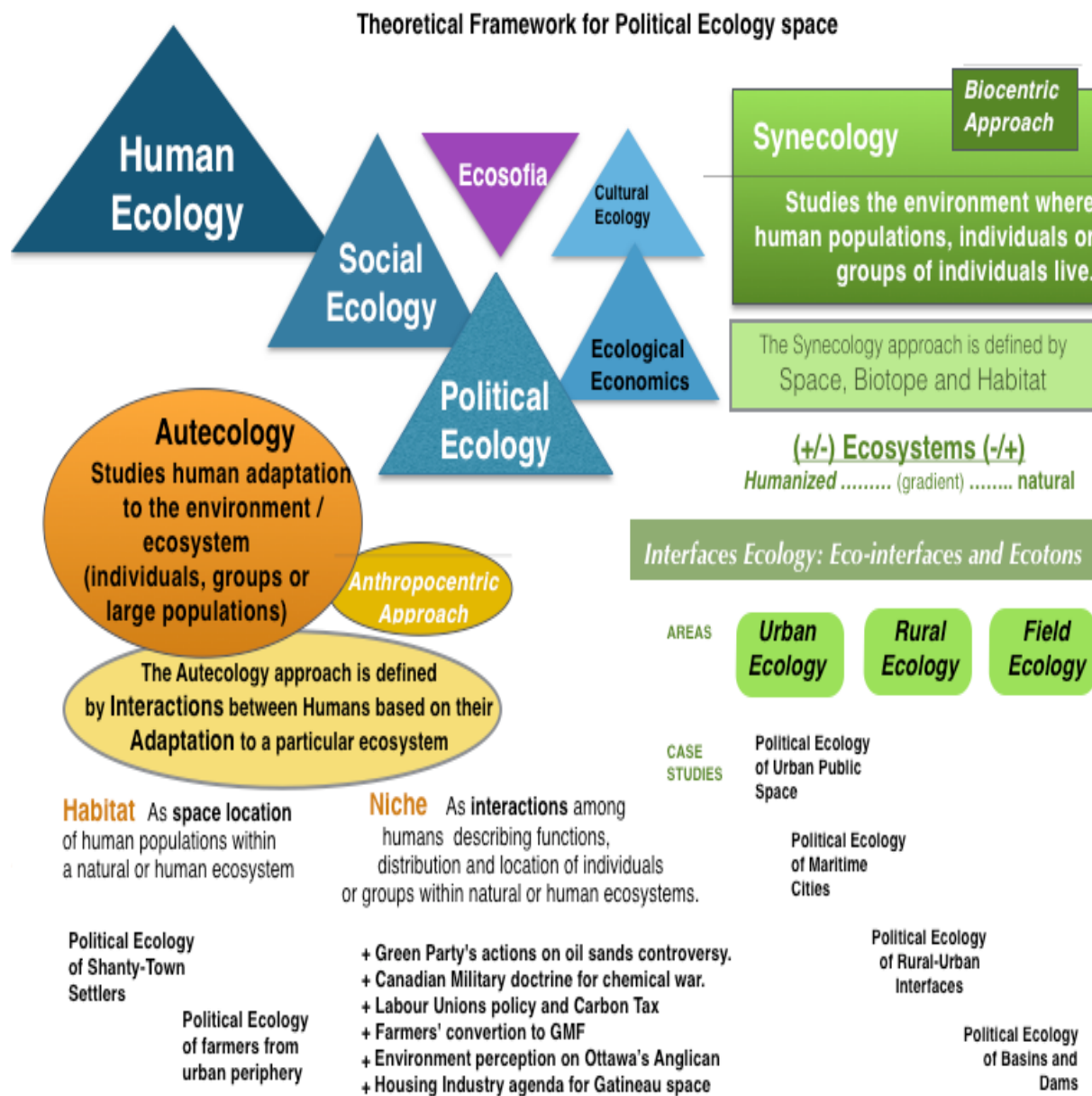
A more radical interpretation of social ecology was developed by Murray Bookchin (1990), who conceived social ecology as a field of study for dealing with problems created by social and environmental crises. His position offers many original points. On one hand, it maintains that the system of relationships among people influences their relationship with the environment, and at present this system is hierarchical. Thus, social ecology should analyse this basic problem. On the other hand, an attempt is being made to turn it into a field of study that will integrate criticism with construction, and theory with practice. Bookchin anarchist approach takes an all-inclusive view of reality, and a conscientious effort is being made to discern how the components of a community are organized and the processes determined by them. Lastly, there is an interest in history, since natural as well as social components take it into account, and it should be understood. Besides, a clear ethical concern also exists, which was observed in the study of hierarchy and freedom. According to this brief summary, and following this epistemic lineage, it can be affirmed that

political ecology could be understood as a direct branch of social ecology, which in turn derives from the broader disciplinary field of human ecology.

Figure 2. A Preliminary gaze of Political Ecological Space

From a basal ecosystemic point of view, the complementarity between *Synecological* and *Autecological* objects of study makes them in fact two sides of a same coin. For an ecosystem to function, the survival of individual species (autecology) will depend on the total number of existing species and the interactions between these (synecology) and an individual species.

In the study of transitional spaces within complex systems (such as social ecological ecosystems), the *autecological* and *synecological* perspectives become in fact a spatial approach shaped by the biophysical conditions of ecosystems and the social interactions of species that inhabit a shared space. At the same time, this approach describes how the communities of an ecosystem are composed and structured in the space they occupy, the Niche and Habitat variations over time, and the resulting spatial relationships between different human and not human ecosystems. We can notice that the autecological and synecological definitions presented are adapted to a human ecology perspective that by extension includes political ecology.



Autecology and Synecology perspective of Human Ecology (Lascoutx. 2014)

Figure 2. Theoretical Framework from Human Ecology to Political Ecology Space

This chart suggests a spatial approach to analyze complex systems from the perspectives of Synecology and Autecology as branches of general ecology, theoretically applicable to human ecology and hence to political ecology.

As shown earlier in Figure 1 (pag.83), we see again in Figure 2. Human ecology is presented as the source of social ecology. From the latter arise political ecology, ecological economics, cultural ecology and other sub-disciplines related to human social ecology (Blue). We also observe the presence of philosophy, in this case, ecosophy (Purple), as the set of reflections on the properties, causes and effects of the natural world on the essence of the human being and vice versa.

The autecology in this case describes human populations. The Habitat is understood as a spatial location that guides potential transitional space case studies to precise places within ecosystemic boundaries. The Niche is understood here as functional interactions among humans, and their location within a particular ecosystem. One could say that the autecological gaze is closer to an anthropocentric perspective. In turn, the synecological describes the environment (biotic and abiotic) where human populations dwell. This approach is shaped by the space, the biotope and the habitat that make up a given ecosystem. Therefore, in this case, are cultural spatial characteristics which condition and delimit the types of human ecosystems (Urban-Rural-Natural gradients), shaping the particularities of their interspatiality. Its gaze is closer to an ecocentric or biocentric perspective.

III.3. Approaching Ecology from Political Science

III.3.1. Ecology Amid New Perspectives for Political Science

The last six decades have been crucial for the evolution of the study of political science as a scientific discipline. Since the 1960's, "classical" political theory—or theory of the state—has been

driven to reconsider many of its fundamental postulates, up to the point of being forced to justify and defend the very existence of its greatest abstraction: the state (Heller, 1992; Garrido-Peña, 1996). In parallel, the changes experienced globally by human societies during these decades reflect a profound transformation in the systems of social organization of practically all nations. The technological revolution of communications and transport, and the trans-nationalization of the world economy have impacted the original concept of sovereignty and diminished the hegemony of the state as the central theme of the political (Bookchin, 1990, 2005; Dobson, 1997, 2003; Dryzek, 1997; Eckersley, 1995, 2004). Together with the emergence of new political actors and factors, the current reality reflects the simultaneous advance of modernity and postmodernity in its expansion towards the edges of the planet. It has been precisely those realities that compel political scientists to reconsider political approaches and policy scenarios in this new century. In this context, the powerful image of globalization emerges as the most appropriate guide to conduct an analysis towards the new perspectives of the political reality of the 21st century (Clark & Manley, 2004; Pirages et al., 2004).

Indeed, the realities of the global world seem to penetrate the sacrosanct borders and the sovereignty of states, exerting its increasingly greater influence on politics, economy, culture, and social organization. It seems that, suddenly, the scenario of globalization refers us to a different world where distances have mutated, and space takes on new dimensions (Beck, 1998). In this new spatial scenario, a multiplicity of cultures, societies, and nations face each other, as new scenarios of conflict are identified, and the old dilemmas about human nature and people's capacity for coexistence reappear. These realities suggest the need to address the problems of politics from an interdisciplinary view of science. A view that has no qualms about turning its gaze towards factors

and actors considered, until recently, as alien to the political (Boff, 1996, 1998). It is from this context that the political consideration of ecology and the environment is justified (Acot, 1988).

The depth of the changes that are posed to contemporary global society—produced by the technological, informational, economic, urban, gender, and cultural revolution, to name just a few aspects—is only comparable to the speed with which these changes take place. The increasingly complicated skein of elements that intervene in the development of modern society threaten to collapse the traditional approaches of political science. The ecological question is undoubtedly one of these elements.

Ecology, a science that studies the grouping and functions of organisms in their environment, is a biological science. Understood as the study of the structure and function of nature, it is a physical science. In the understanding that humans are part of nature, human ecology studies the interactions of human populations with each other and with their environment; hence, it is also a social science. This triple valence gives it a great capacity for understanding natural and social processes and to contribute to, with its own method, the multidisciplinary approaches that characterize modern science. Modern political science, despite its long and extensive history, still searches for new fields of study and new methodologies and instruments of research, but always mainly focused on an unshakeable anthropocentric perspective. In this sense, ecology poses a challenge to political science: to move its point of observation to reach a vision that encompasses the social, biological, and geophysical factors on which the life of people on Earth is based. Ultimately, the idea of a politics of ecology raised as a question of survival for the human race (Huxley, A. 1963), intends to push the conviction that political science cannot remain idle behind other social sciences actively working to find explanations and solutions to the environmental

calamities the world experiences (Bookchin, 1999; Dobson, 2003; Robbins, 2004; Dryzek, 2005). The global ecological crisis is no longer a science fiction future scenario, but a menace to human societies and their diverse government political systems. These critical trends are expressed through similar patterns from region to region, country to country, and from state to state. The manifestations of the breakdown of Earth's ecosystems and the impacts of climate change are as global as the market and communications. They can no longer be left as a central topic for political science (O'Connor, 1998).

Undoubtedly, the increasing data confirming the critical ecological situation of the planet and the socio-environmental impacts being projected by climate change, famine, military and social conflicts, species extinction, ecosystems degradation, demographic explosion, etc. should certainly be an object of more extensive political analysis. However, political science should not limit itself to using these manifestations of environmental deterioration just as factual variables. Political science is called upon to confront that reality from its own disciplinary perspective; that is, the ambiguity of the notion of power should be translated, eventually, into a political interpretation of an ecological-environmental problem, as well as into an ecological interpretation of a political phenomenon.

III.3.2 Rationale for a Political Consideration of Ecology as a Social Science

A first argument is provided directly by general ecology when it was characterized systemically by Eugene Odum (1982) as a science of synthesis which, through a systemic vision, manages to amalgamate formerly separate universes to effectively achieve a description, an analysis and a coherent explanation of the interrelationship between living organisms and the

abiotic elements within their environment. Human ecology shares the same potential as general ecology to describe and analyse vital aspects of human societies' interrelationships and their habitats. Human ecology as a social science seeks to describe and explain the different types of interactions among human societies and the relationships that the ecosystem or geographical habitat may have in those interactions.

By itself, this approach should be sufficient to justify the merge of theoretical and methodological constructions between ecology and politics, and the eventual development of a social and political ecology as sub-disciplines of political science and thematic objective for political philosophy. This argument pushes forward the implicit ethical obligations of any scientific field and the permanent debt of science to society: the advancement of knowledge to secure our own good as a species, and in this case, the habitat we share with non-human life on our planet.

For half a century now, a myriad of social movements, NGOs, and politicized popular organizations have been struggling worldwide for social justice under the green banners of ecology. Parallel to this growing social phenomenon, we witness a shift in the political agendas of traditional political parties, economics actors, unions, and the “apolitical” civil society to openly incorporate, sometimes in favor, sometimes against, ecological issues and environmental concerns into their decision making. All these actors require the support of political science and guidance from political philosophy to produce the advancement of a political praxis sustained by ecological knowledge.

Simultaneously, political praxis requires a systemic ecological vision to explain humans' political interrelations within the biosphere. Ecology's political task is to formally convey the urgency for a scientific product aimed at informing and educating societies about the negative political consequences to democratic governability of failing to achieve ecological sustainability with equity and social justice. Therefore, political theory must contribute to give solid ground, a wide perspective and deep critical thinking to the multiple dimensions of sustainable governance. As stated above, political science cannot remain idle.

III.3.3. Political Ecology as a process of interdisciplinarity construction

The need to integrate ecology and environmental sciences into the fields of political studies has several arguments to justify this interdisciplinary hybridization. The first of these arguments is precisely the interdisciplinary approach to science, a position that seems to be gaining ground within the new scientific worldview. But interdisciplinarity is not just a faddish scientific approach that has become an instrument for research, analysis, and scientific conceptualization. Interdisciplinarity arises from the questioning of a particular philosophy of science that has governed this Cartesian period, centered on radical empiricism: looking upon "reality" as a series of fragmented realities, in concordance with the positivist vision of science and knowledge. As expressed by Jean Piaget,

Nothing compels us to divide the real into watertight compartments or layers simply overlapping, corresponding to the apparent boundaries of our scientific disciplines. On the contrary, everything requires us to engage in the research of interaction and rare mechanisms. Interdisciplinary ceases to be a luxury or an occasional product, to become the very same condition of research progress. (Piaget, 1973)

Today, the perspectives provided by diverse disciplines are multiplied by the access to data processed by information technologies from which we can draw time scenarios, either global or local, impossible to obtain or imagine only few decades ago. Interdisciplinary reasoning opens perspectives towards political studies and political science, far from limiting its object of study to the classical view of the notion of power and the theory of the state. In fact, it provides an opportunity for a revival of political theory and political philosophy, as we witness the emergence of new scientific paradigms and their adaptation to studies in the human sciences.

These paradigms are renewed, innovative and enlightening approaches to interpreting new social phenomena for which univocal political approaches do not have adequate responses. This is the case for concepts generally found in environmental sciences and ecological theory, such as biosphere, ecosystem theory, climate change, sustainability, entropy, resilience, etc. This can be corroborated by the academic offerings that political studies encompass today. It is noticeable that there are a good number of essays and research in environmental ethics, philosophical ecology, and ecological philosophy (Whiteside, 2002; Keller, D. & Golley, F., 2000; Rolston, III.1989; Zimmerman et. al., 1996). This shows how much ecological problems are today embedded within all sort of every daily life issues and the governance of ‘the city.’ But it also shows how ecology becomes a variable of *the common good*, a main pillar of the philosophical quest. A question then opens naturally: being connected to life in all its forms; being a key factor for the future of surviving possibilities of human species; being a subject that question us about the place of human on Earth, isn’t political ecology then a field of political philosophy?

On reading Levi Strauss' depiction of political philosophy²⁵, it does not take much effort to make a comparison between the two:

The meaning of political philosophy and its meaningful character are as evident today as they have been since the time when political philosophy first made its appearance in Athens. All political action aims at either preservation or change. When desiring to preserve, we wish to prevent a change to the worse; when desiring to change, we wish to bring about something better. (...) If this directedness becomes explicit, if men make it their explicit goal to acquire knowledge of the good life and of the good society, political philosophy emerges. (Levi-Strauss, L. 1989, p. 3-4)

III.3.4. Political Ecology on notions of Power and Space in Political Theory.

To consider political ecology from political science's point of view means counting on a discipline with an inherent methodological capacity to identify, analyse and manage interactions among individuals or groups of individuals' power-related issues. It means to mobilize political science's expertise to produce theory and policies at different levels of society and government institutions. From a scholarly perspective, political theory has the methodological means to contribute in the construction of a normative political ecology. This normative discipline would find ground on the idea of a natural-non-human order, an ecosystemic or biospheric order. That

²⁵ "All political action is, then, guided by some thought of better or worse. But thought of better or worse implies thought of the good. (...) All political action has then in itself a directedness towards knowledge of the good: of the good life, or the good society. For the good society is the complete political good. By calling this pursuit political philosophy, we imply that it forms a part of a larger whole: of philosophy; or that political philosophy is a branch of philosophy. In the expression "political philosophy," philosophy indicates the manner of treatment: a treatment with both goes to the roots and is comprehensive; "political" indicates both the subject matter and the function: political philosophy deals with political matters in a manner that is meant to be relevant for political life; therefore, its subject must be identical with the goal, the ultimate goal of political action" (Strauss, L. 1989, p. 3-4)

notion of order would probably emerge from concepts derived from the second law of thermodynamics and notion of sustainability, considered by many as a new scientific paradigm.

As we saw in Chapter Two, the concern with biological and geographical factors by political thinkers is certainly very old and goes along with the concern for human nature and the place of humankind in the universal order. There is certainly a strong tradition in political theory concerning the human/nature relationship. Either to deny it or to embrace it, both western and eastern philosophies and religions have speculated around nature/culture dualistic formula and consequently derived from it those political philosophies that have developed into various anthropocentric versions. In the previous chapter, I presented some examples of how these diverse theories of political philosophers—from the Greeks' era to the Enlightenment to modernity until now—have influenced our way of thinking about the human/non-human relationship.

To what extent have certain traditions of political thought misled our understanding of the role of humans in the biosphere? Even today, in the so-called postmodern world, how much does the anthropocentric tradition influence our worldview? Political ecology offers us the opportunity to emphasize the questioning of the skewed dialectic between anthropocentrism on one hand, and ecocentrism, biocentrism, or ecosystemism on the other. A non-anthropocentric perspective can be described as a social and ecological systemic view of the world, where the subject who observes is part of the observed object. It is the gaze of the subject from the inside of the observed object, in which the human subject recognizes himself/herself as interactive and interdependent element of the system.

That is precisely the limitation of the anthropocentric view: wanting to understand the world from the outside. By not recognizing himself—in praxis—as an element of the natural system, the anthropocentric observer makes an incomplete reading of the world-system represented in the biosphere. A misguided reading, therefore. This brings up one everlasting political philosophy concern: humanity's place in nature.

The German philosopher Rudiger Safranski (2005), arguing about distinctions between understanding and reason, affirms that the notion of understanding can be shared with other animals. But reason, Safranski says, is the capacity that allows humans to relate and step outside themselves and beyond themselves. It is what philosophers may call “transcendence of the self.” Puzzled by technological advances, the human condition seems trapped between biological limitations and transcendent reason as a result of the nature/culture dualism. Is the tension between the human-animal's first nature and the transcendent second nature? Safranski asks two fundamental questions about the complexity of today's globalized world: How far can humans' second nature depart from their first nature? Can this second nature oppose the first nature in a self-destructive way? Following Hobbes and Machiavelli's tradition, Carl Schmitt's (1995) concept of the political as struggle is based on the distinction between friend and enemy. Every part of society, cultural, religious, economic, ethical, etc. becomes political when it achieves in grouping human beings around the notion of “the enemy,” understood as “the necessary other” involved in power's antagonism.

We can disagree with this notion of politics and support the idealistic theory where cooperation is key. But that does not suppress antagonism. We need a deeper understanding of the

ecological dimension of the political as well as a sound comprehension of the political dimension of ecology. As Hans Magnus Enzensberger points out in his *Critique of Political Ecology* (1973), a hybrid science which is forced to use categories and methods from social science and natural science faces great theoretical difficulties. And yet, political ecology's integrated visions have the necessary potential to defy the understanding of radical anthropocentrism and provide socio-environmental reasoning to confront the self-destructive notions of humanity becoming its own enemy. As far as political studies are concerned, there are many approaches and perspectives to what “the political” means. Gradually, conventional approaches to politics have seen the need to widen narrow definitions of power relationship to include the diversity of particular ways in which power circulates among human societies. As far as political studies are concerned, there are many approaches and perspectives as to what the object of politics is, what “the political” means, and what the role of power means within the interactions between human groups and their biophysical environment. Though I do not intend to elaborate deeply into these notions, I will make some observations that may help in following the line of argument I am proposing.

The political as a study of power remains a common concern among political scientists. Indeed, most political thinkers place power as a unifying concept among different political theories, particularly in those concerned about notions of state, sovereignty, and social contract. Max Weber's well-known statement clearly defines that, “The objective of politics is power (...) and the power resides in the State” (Weber, 2004). Among political theorists there seems to be a certain consensus, a dualistic one, that there are two broad ways of looking at the idea of politics, two visions of understanding the political. On the one hand, the idea of politics is understood as conflicts among forces dominated by antagonism. Here, politics signifies struggle led by the will

for power. The stronger imposing his/her power on the weaker. Here are located concepts like state of nature, hierarchy, class struggle, control and domination (Hobbes, Schmitt, and Gramsci). On the other hand, we have politics understood as an axiological system, that is, a philosophy of values where common good and justice are the goals led by human reasoning. Politics then signifies the pursuit of a natural order of things, the need for a social contract. It is power understood as political democracy. Here we find concepts of interdependence, cooperation, and freedom (Rousseau, Arendt, Garcia-Pelayo). Of course, these two extreme abstractions are never found in their pure form but intertwined with their own contradictions. In any case, they express the tensions between political realism and political idealism as worldviews. Our point here is how to frame these two visions within a framework of political ecology. We could rely on Hannah Arendt as the contemporary thinker who looks forward to differentiating political power from powers that emerged from different causalities and with different expressions (Arendt, 2006). Similarly, Michel Foucault searches beyond the politically absolute to find, discover, and recognize the dynamic essence of power spread through history among the multiple institutions of civil life (Foucault, 1995).

The substantive here is showing how the progressive deviation of the univocal meaning of politics shifts away from the hegemony of the *Theory of the State* towards other topics, actors, and subtler scenarios. Generalizing, it could be said that power expresses itself through interactions among different spaces, elements or actors, and causality circumstances. If we think about power in systemic terms, I could describe it as certain types of interactions and interrelationships among individuals, or large groups of humans—considered as elements of one or more social systems—which implies that those exchange-participants receive gains or losses in the value system of their

living conditions. From a systemic point of view, power seems to be the result of interdependent variables between two or more competing elements within a system or environment. This reflection may find its place in pursuing the debate concerning the political aspects of ecology as social science. It involves the search for a politically and ecologically endogenous meaning of power, capable of reflecting its diverse dimensions within the conceptual framework of political ecology. From this perspective, power relations and interactions would develop within two main dimensions: the biosphere as an integrative spatial system of living creatures which includes the lithosphere, atmosphere, and hydrosphere; and the human dimension or anthroposphere.

Again, Foucault gives key clues to understanding power in an anthropocentric sense: power is a type of relationship among humans. This relationship develops at different scales: micro and macro, positive and negative; and is exercised at all levels of human society. After all, power is everywhere, and as he would state, “we must cease once and for all to describe the effects of power in negative terms: it ‘excludes,’ it ‘represses,’ it ‘censors,’ it ‘abstracts,’ it ‘masks,’ and it ‘conceals.’ In fact, power produces; it produces reality; it produces domains of objects and rituals of truth. The individual and the knowledge that may be gained of him belong to this production (Foucault, 1991, p. 194). Leaving aside the fact that this description of power limits itself to a human realm, it leads Foucault to question if power is not a thing but rather a relationship. Power is not simply repressive, but productive. Power is not simply a property of the state. Power is not something that is exclusively localized in government and the state, which is not a universal essence. Rather, power is exercised throughout the social body. Power operates at the most microscopic levels of social relationships. Power is omnipresent at every level of the social body. This reasoning should convey an alternative notion of political science, which far from limiting its

object of study to the classical view of the theory of the state, provides on the contrary, innovative and enlightening approaches to interpreting new social phenomena for which classic political approaches do not have adequate responses.

Embedded in a political economy perspective, Alf Hornborg's definition of power, "as a social relationship built on the asymmetrical distribution of resources and risks and places power in the interactions among, and the processes that form, people, places, and resources." (Quoted by Paulson, Gezon & Watts, 2003. p.208). Therefore, a preliminary political approach to political ecology could define it as the study of social environmental phenomenon being described, analysed, and explained through the lenses of the political in its wider sense. In this case, ecology affects the political as an enhancer widening the notion of power.

III.4. Advancing a Definition of Political Ecology

The different arguments I have provided in the literature review, and at the beginning of this chapter, show the many levels of understanding implicit in a definition of political ecology; that is, it is susceptible to being approached as a binary concept composed of words that signify (or refer to) internal relations different from other words in the language. My intention is to approach the meaning of political ecology as a binary epistemology, that is, to explore the meaning of each element (the political and the ecological) of this particular syntagma and to look for the characteristics that define it as a system of signs in relation to other linguistic signs (for example, economy or geography) and other syntagmas (for example, political economy or political geography). Let me proceed then to explain the contributions that political science on the one hand,

and ecology on the other, give as inputs of a theoretical framework for advancing deeper into a concept of political ecology, as proposed.

In explaining his thesis on concept formation, Giovanni Sartori (1995) refers to a process that encompasses the formation, treatment, and systematization of concepts. Sartori defines “concept” as a unit of thought. The structure of a concept can be outlined with the interrelationship of three elements: meaning, word, and reference. A “concept is the expression of a term (word), the meanings of which are declared by definitions, which are related to the references” (Sartori, 1995, p.65). Sartori explains that, “relationships between meanings and words stumble with the problem of ambiguity and particularly with error (few words, many meanings).” Thus, “reducing ambiguity in the vocabulary is a preliminary problem that has to be solved. On the other hand, relationships between meaning and reference (things represented and meanings) stumble with the obstacle that we call vagueness or indeterminacy. A concept is vague when it denotes wrongly or slightly” (Sartori, 1995, p.57).

Therefore, identifying the types of definitions assigned to the concept of political ecology is the first problem to solve. To this end, Sartori proposes a series of operations to define a concept. These operations are within the same scheme of the cognitive process and are represented in a classification of different types of definitions. Sartori calls the first type a *declarative definition*. Its purpose is to reduce the ambiguity of the concept by making clearer the meanings of the words used. The second operation consists of achieving the *denotive definition*, whose function is to define and limit the referent, establishing what it includes and excludes. The third step is to achieve

a *characterizing definition*, in order to enumerate and bring together the definitive characteristics of the concept.

III.4.1. Reducing political ecology's conceptual ambiguity

To approach a concept composed of these two terms: ecology and politics, requires defining what the generating concept is. Therefore, let us go back to the premise that political ecology exists as an extension of general ecology, and as a subdivision of human ecology. Ecology, as a science that studies the relationship of organisms with their environment, has a sufficiently broad and universal criterion to derive from it guiding biophysical principles for a deeper understanding of human social systems. But the interests of political ecology in studying the interactions of human species within natural or humanized ecosystems diverge from those pursued by general and human ecology.

As an elemental notion, political ecology arises from our species' primitive concern for our own survival, habitat, and well-being. In fact, these concerns have always been a constant in human evolution. One can easily relate this elementary concern of political ecology to the philosophical concepts of *Phronesis* and *Eudaimonia* (Aristotle) and therefore to the ideal of the polis and its *Chora*²⁶. The utilitarian representation of these interactions is manifested through the human will to possess, extract, preserve, and perhaps dominate those geographic spaces that can provide us

²⁶ The politics of the habitat may be described through the development of a practical wisdom - *Phronesis* - that achieves balancing individual's good life and the well-being of the city and its territories. In today's terms, this political concern for the habitat, understood as oikos, as polis, or as *Chora*, is adopted and adapted by political ecology. Its aim is to explain the nature and consequences of our interactions with the earth's systems: the biosphere, geosphere, atmosphere, hydrosphere and cryosphere. (Author's note)

with abundant material resources. The hunting grounds of kings, the protected hydrological basins of cities, the large estate private properties, state territory, and lands to conquer are a geographic and ecological axiology of power in organized social systems. In this sense, nature has always had a sense of value for people. Natural resources became a symbol of the power of force for those who controlled and possessed them. This allowed for the development of different types of technologies, evolving in time from survival kits to elaborated divisions of labor, from stages of handcrafted local production, to commodity mass production on a global scale. The overall result of the utilitarian human-nature relationship is what is described as culture, or in a reductionist gaze, a part of the notion of what culture signifies²⁷.

As a core human concept, the idea of nature goes deeper than the notion of an endless resource reservoir. Over the centuries, the objectification of nature as the source of life, has given it an axiological value, even if recognized in different and contradictory ways. Also, being part of the biosphere gives humans a value to the rest of the living beings. Just as the skin of a tiger may have value for a human hunter, the hunter's flesh has value for the tiger. An axiological statement from outside the anthropocentric box would argue that within the systems of nature, all living things have intrinsic value. This axiological sense of nature will be appropriated by the concept of

²⁷ **Culture.** From an environmental point of view, culture becomes the differentiating element in the purely biological processes of growth and natural expansion of animal or plant species (Sanchez-Fernandez, 1996). Culture is the determining variable that transforms the purely biological processes of growth and expansion of the human species into a global process. From this perspective, globalization is a particular process of growth and cultural expansion of the human species. The broader perspective of culture encompasses all human endeavor. As a cultural process, globalization implies a general and profound transformation of the structures of social systems hitherto known and practiced by humankind.

political ecology as a characteristic element of its definition. The intrinsic value of the biosphere as nature gains new perspectives and as humanity faces ecological crises, which seem to return human species to a survival scenario. Due to the concern generated from the negative impacts of human activities on the biosphere, the social, economic, and particularly the political manifestations of ecological depletion are made self-evident as negative values. At this stage of human evolution on the planet, human, social, and political ecology begin to value nature in negative terms: as scarce, limited, extinguished, fragmented, polluted, depleted, etc. These axiological negative values represent a certain ecological state of nature to which political ecology must provide explanations and suggest policies to maintain adequate levels of entropy within the humanized ecosystems. Therefore, the axiological positive values of political ecology are closely linked to the sustainability of natural ecological processes, either by allowing the resilience of ecosystems, or by reconstructing ecosystems dynamics. From political ecology emerges guidance and direct contribution towards these objectives. After the 1960s, ecology became a topic of interest for researchers of political science and political economy, who explore the relationships of environmental factors with the activities of human societies. Thus, ecology's contribution will be what will illuminate the intuition of political theorists who observe natural dynamics.

Following Sartori's steps, I intend to approach a simple definition of political ecology that would contain those political elements missed by other definitions born and built from disciplines alien to political theory and to the political mind. As an approach to a first definition, the result may not be so impressive: too close to general ecology, and the political element limited to a shallow presence of a notion of power. In any case, my preliminary definition highlights political ecology lineage as:

A discipline derived from general ecology—from a subdivision of human ecology and a branch of social ecology—whose object of study is focused on the interactions of human beings with their environment. These interactions are defined, determined, and supported by a complex social system of power relations among individual and human groups whose agency and structure determine or limit the degree of eventual anthropic transformations of ecosystems in time and space.

As can be observed, this definition is imbued with ecological, rather than political concepts. However, it is useful to reduce the ambiguity of the concept. Our zeal to identify precise aspects of its possible objects of study require that we add the knowledge derived from the object and method of political science in order to develop an interdisciplinary research field between two branches of knowledge, the former deriving from natural science and the latter, from social science.

Starting from a general consideration of political ecology as a discipline that studies various types of interrelationships between human activities and natural systems, certain methodological options would be deduced. For example, by identifying interactions between socio-economic models from diverse types social systems and their impact on the bioregional geographic space, in order to analyse their effects on the governance and characteristics of these societies' political systems. Conversely, by the identification and analysis of how natural ecosystems may influence diverse types of social systems, according to its place on the geographic space.

Although correct, this first reading is insufficient to understand the challenges faced by an ecological dimension of political science. Even assuming that the researcher has an open and

interdisciplinary attitude towards integrating fragmented scientific knowledge, the prospect of political ecology becomes confusing and extremely vast. I agree with critical observations from academic authors who perceive an erratic development of the political. The reviewed bibliography shows cases of research that define themselves as ecopolitical, assuming this term without offering explanations or references of the disciplinary approach that they claim to be applying. Therefore, I will follow on Sartori's method for conceptualization and attempt to delimit the references to "ecology" and "politics." I will work with a sort of comparative analysis of two terms with different meanings, from which a merger is attempted in order to form a third concept.

III.4.2. The Role of the Political in the Construction of Political Ecology.

On maintaining the thesis that this research is oriented from a political theory perspective, I will now look to the contribution of political science in the construction of political ecology. This is an area in which the research line is directed towards an exploration of natural factors as concomitant elements of human factors, joined in the construction of political reality. As we saw in the first chapter, this line of thought can be clearly traced back to the influx of classic geopolitics. However, in spite of its particular orientation, this line of research has common concerns with other political theories. In effect, from the most reactionary to the most revolutionary of political theses that succeed in identifying causal relations between humans and nature, all appeal to the unifying concept of power through its varied manifestations, particularly in the form of the Leviathan State.

Thus, in approaching a hybrid concept for political ecology, I opted for assigning to *the political* the responsibility of contributing to its object of study, which is, the question of *Power*.

Though the notion of power is present all along the environmental and politico-ecological literature, is not an easy concept to grab. The difficulties begin in the fields of social theory. Mostly related to ideas of force, might, strength, authority, coercion, domination or submission. These notions take us to dialectic scenarios of strong and weak, master and slave, friend and enemy, ruler and ruled, etc.

Among all attempts, weber's definition of power is the opportunity that an individual or group of individuals within a social relationship, can achieve their own will even against the resistance of others (Weber, p. 212). Even though it is a very general definition, it is a starting point that presupposes the idea of interactions among humans at different scales and positions within the social system. Elaborating on it, we can visualize the role of Space in which the geographical and environmental context interplays within the mechanisms of complex social power relations. In any case, until now, I am referring mainly to interactions among human beings who inhabit a certain space we call environment. This trend can be identified as an anthropocentric look at power relationships, present in most of the specialized literature. But how shall we understand and interpret the notion of power when it is meant to describe human and non-human relationships? This is precisely what Rafi Youatt asks when referring to interspecies power interactions:

However, to generalize, most of this work has been concerned with power as something that operates and might reside among humans, rather than seeking to understand the ways that power itself resides in an Inter species matrix. When power has been thought of across species line, it is tended to emphasize a relationship of domination or instrumental use of nature. How does an Inter pieces perspective change the way we think about and approach political power? (Youatt, 2016. p.221)

However, even when we focus ourselves on the broad meaning of power; political ecology cannot escape the inherent duality of power itself. As I pointed out before, there are two antagonistic categories grouped at each end of the meaning of power. On one side are the concepts of hierarchy, control and dominion. On the other are the concepts of interdependence, cooperation, and freedom: a sort of replica of the realist and the idealist theory of politics. It is a dialectic reading of *the political*, by means of political ecological concepts, between the organization of a society in search of common good, and the meaning of domination—in the Weberian sense of the state as a depositary entity of political power. The most aggressive and dominant expressions of power seem to have changed just little throughout the history of human social organizations. Power tends to benefit individuals and groups who control its mechanisms, either by the coercion of brute force and violence, by establishing pyramidal class hierarchies in the social division of labor, or by imposing a hegemony of oppressive ideological and cultural values.

For political ecology, these expressions do not represent the entire picture of power relations as they take place in ecological systems. Political ecology acknowledges the existence of levels of ecological hierarchy among living organisms, going from the simplest gathering to the most complex ecosystems. Hierarchy theory²⁸ involves interaction and interdependence among living organisms. Here begins the interest of political ecology to study and compare, from a natural

²⁸ “Hierarchy theory studies the holonic levels of complexity within complex systems, with particular focus on the emergent phenomena at various scales and the role of the observer at different levels” (Esbjorn-Hargens and Zimmerman, 2009). In systemic theory refers to a structure of organization in which one level is made up of several parts and is itself a component of the next level, including the interactions between and within the levels: A higher levels constrain and provide context for lower levels, lower levels provide the “information” to explain the structure and functions seen at higher levels, and in that way the different components of each level interact independently due to different temporal and spatial scales.

approach and a cultural approach, the concepts of dominance and hierarchy which tend to be humanized and placed at the service of particular ideologies. Nevertheless, the notion of power is a non-static cultural construction sustained by values, beliefs, and social codes which can evolve in time and from one culture to another. That means the human notion of power is susceptible to transformation. Ideally, from the point of view of political ecology, power should be oriented towards principles of democracy, equity, social justice, and democracy; deepening the search for an environmental ethic capable of safeguarding human and non-human habitats, as well as interspecies spaces.

It is my understanding that the questions posed by political ecology refer not only to how the human element of power can be transformed, but where the transformation should begin. For Political ecology, a place to start should be in the spaces occupied by socioecological systems. This would imply a new type of approach between humans and biosphere. This metaphorical encounter specifically means acknowledging ourselves as an integral part of the natural ecosystems that sustain us as the organisms that we are. From this self-acknowledgment, which also implies becoming aware of the importance of the preservation of the biosphere, human beings would be more willing to modify their particular cultures and values, based on a new perspective of themselves in the world. This is one of the reasons why political ecology insists on revealing the false dialectic between anthropocentrism and non-anthropocentrism. Ecocentrism can be described as an ecosystemic view of the world, in which the individual who observes forms part of the observed object. It is the view of the individual from within the observed object, in which the individual acknowledges himself as an interacting element of the object. This description shows precisely one of the limitations of the anthropocentric view: trying to understand the world

from the outside. When in practice an individual does not recognize himself as a component of the natural system, the anthropocentric perspective makes an incomplete reading of the world system represented by the biosphere. Thus, it is a mistaken reading. The idea of *ecosystemism* would go a step ahead of ecocentrism because of its more refined and abstract possibilities of system thinking. Ecosystemism would argue that Homo Sapiens are a transformative element (an alpha element, if you will) acting within the structures of living complex systems, but where the totality of the system—the biosphere—has higher intrinsic value than any of its constitutive elements, including the human. The remoteness, the human estrangement from the natural system, makes the individual view nature as something apart from him/herself. This incorrect reading may explain the resulting ignorance of people looting the house they are part of.

III.4.3. The Role of Ecology in the Construction of Political Ecology

As we saw at the beginning of the present chapter, one of the objects of study of ecology focuses on the interactions of organisms among themselves and with their environment. Regarding the interest in studying the relationships between living beings, ecology and political science share the purpose of this study in a distant and partial way. This similarity increases when we compare it with the examples shown in Chapter Two. The influence of geographic space and biological factors establishes similarities with the influence of the environment on political ecology analysis. A higher level of empathy is achieved if the comparison of the study's purpose is carried out between human ecology and politics. As has been said before, human ecology is understood as the ecology of the human species. It is important to note again that human ecology is not humanized ecology, in the sense of the fable that transfers human characteristics to the animal kingdom. Human ecology applies the same methodological criteria used in general ecology for the study of

non-human populations. Obviously, these criteria become more complex when facing the peculiarities of our species, marked by culture. The social ecosystemic approach, which permits the identification of levels of organization in human localities, as well as interactions and interdependencies among humans and their environment, is maintained in human ecology. In accepting political ecology as a subdivision of human ecology, the former shares the methodological criteria of the latter.

Thus, for advancing the meaning of political ecology it is essential to refer to the idea of *Sustainability* as an emerging paradigm, and to the concept of *sustainable development* as a fundamental notion of a policy model. From the diverse approaches I take *the model of the six dimensions* that makes up the political integrality of the concept of Sustainable Development; that is, the economic, ecological, social, cultural, political and technological spheres (Gabaldon, 2006).

Next, I propose to assign to the systemic ecology the role of contributing partially with its diverse methodologies to the construction of political ecology's object of study. That is to say, prioritizing the analysis of social ecological systems. This way I advance a second pre-definition:

As a discipline, political ecology aims to identify, analyze and explain—from an ecosystem perspective—the interactions and/or power relations between human and non-human species that inhabit the various hierarchical levels of social ecological systems, at different spatial and temporal scales, in order to produce equitable access to natural resources and environmental services, and maintain sustainable democratic conditions of governance within diverse habitats and ecosystems, particularly in those spaces necessary for urban sustainability.

Political ecology studies the dynamics of power relations among human beings based on two opposite forces exerted from within the environment: 1) The geographic and ecosystemic realities influencing the political, social, economic and cultural organization models of human societies; and 2) Conversely, the ecological impact of human activities on the environment, including human habitats, which in turn determine present and future scenarios of governance, development and social structures.

III.4.4. Characterizing Preliminary Objects of political ecology

Here I arrive to the operational level that Sartori calls the *characterizing definition* which has more complexities than the former ones because, “*the problems of connotative wealth of meaning and its specification in characteristics, properties or attributes, interweave*” (Sartori, 1995, p.68). Sartori highlights the importance of the subjective choice made by the researcher, implying that the theoretical model is influenced by his/her points of view—political, social, economic, and cultural—and by his/her personal interests that arise from practical applications of theory, pressures that can determine different directions. Idiosyncrasy, experience, and needs, all play an important role in the orientation of the research. This is evidenced through the set of reviewed concepts of political ecology in literature review, which expose the many different possible approaches depending on values, ideology, and academic background. Some examples of the scope are:

- a) Ecological-environmental problems addressed from a development models perspective: pollution, climatic change, desertification, biodiversity extinction, etc.;
- b) Social-economic problems analysed from a political economy perspective: uneven development, migration and population studies, urban poverty, corporate capitalism.
- c) Cultural ecology from the perspective of anthropology, cultural studies, and human ecology.

- d) Public environmental policy, environmental law, the state and international ecological policy.
- e) Environmental international relations, from an environmental geopolitical perspective.
- f) Spatial political ecology from the perspective of landscape ecology, bioregionalism, urban-rural dialectics, scalar scenarios from local, regional, national, international.
- g) Political philosophy, environmental ethic, anthropocentrism and biocentrism, ecosystemism.
- h) Future studies from a political-ecological perspective.
- i) Marxist approaches, Christian values, anarchist ideas, metaphysical worldviews, cosmological explanations, etc.

III.4.5. Operational Definitions by Philosophical Criteria

Halfway between the natural and social sciences, political ecology represents an epistemic and ontological challenge for political theory. During my search for its meaning I have identified a large number of categories used by both, philosophy and science. This moves me to compare philosophical-scientific categories that belong to the philosophy of social science. Mario Bunge's *Finding Philosophy in Social Science* (1999) proposes alternative approaches to social science's philosophical and methodological problems. Bunge refers to the manner by which theoretical research compares various theories. Bunge indicates that in this type of research are compared fundamental philosophical ideas, intrinsic to social and natural sciences. They present philosophical problems as results of methodological research differences and the development of these sciences. Nevertheless, Bunge affirms, science and philosophy share some very general views, principles, and even key problems (Bunge, 1999, p.13-17). The particular field of study of *philosophy of social science* is defined by Bunge as, "a branch of the meta-science of social science. Philosophy (or metatheory) of social science refers to the ideas and methods that appear in synchronous and diachronic studies of social facts" (Bunge, 1999, p. 20). For Bunge, the

philosophical statements about the constructs in the social sciences can be classified into various categories. As a systemic theoretician, Bunge understands philosophy as a system of ideas of different classes and interdependent components. He proposes seven different areas by which to evaluate the systemic character and analytic components of social sciences' philosophies. Backed by Bunge's study, I schematically reproduce here his seven philosophical criteria and their enunciates with respect to social science constructs, which he divided as follows: "a) Logic; b) Semantics; c) Gnoseology; d) Methodology; e) Ontology; f) Axiology; g) Ethics" (Bunge, 1999, p. 21-23).

By transferring this classification of categories (which belong to the philosophy of social science) together with their statements, I find that it offers definitions for political ecology's philosophical classification. Following the same order suggested by Bunge, I try characterizing each definition:

1. Logic of social science, analyses the logical form of ideas, propositions, theories and inferences within social science, whatever the content. Logical enunciates are those that refer to logical form, or structure. Therefore, following the logic criteria, *political ecology can be understood as a field of study that analyses the logical fundamental principles by which the reality of the biosphere is exposed. These principles mainly have to do with the behaviour of energy in the ecosystems and with the dynamics of populations and communities within the ecosystem, with a particular emphasis on human species. Reading about interactions among organisms and the environment, common to all ecological approaches, directs us to an analysis of the system as a logical construct, intrinsic to the meaning of political ecology.*

2. Semantics of social science, refers to the meaning, sense, and interpretation of linguistic signs, exploring symbols, words and representations, views and references to reality, as they appear in the language of social science. That is to say, in formal or factual way, and total or partial manner. Therefore, from a semantic perspective, *political ecology can be described as a concept that explores its own meaning from two different perspectives, social and natural science, in an attempt to define its reason for existing from a biological, geophysical, and social approach.*

3. Gnoseology of social science, examines the role of observation and perception, speculation, intuition and rationing, analogy and induction, discovery and invention, of the formation of constructs and methods in social science. Gnoseological constructs are those that discuss the manners in which constructs are formed; and how principles, premises and methods of human knowledge extend and pertain to science. From a gnoseological perspective, *political ecology can be explained as a preliminary, partial, result or product of gnoseological observation of complex living systems, both human and non-human, in which numerous analytical elements intervene. The most outstanding of these are the role of induction to apply isomorphism, homology, and analogical thinking as constructive methods for political ecology's hybrid approach.*

4. Methodology of social science, examines the nature of data and hypothesis, the meaning of data interpretation, the role of indicators, types of empirical validation, etc. Methodological constructs are those directed towards matters of method, theoretical analysis and specific techniques. From this point of view, *political ecology can be defined as a field of study sustained by a crossover of methodological theoretical approaches and techniques from general ecology and political theory. As an interdisciplinary experimental science, it nevertheless is bound to*

offer verifiable data and indicators. However, its incipient evolution has not permitted it to develop a specific method.

5. Ontology of social science is in charge of the analysis and systematization of general views, nature, space, society, history, etc., of what exists, or seems to exist, and the relationship between universal and particular entities. The ontological approaches, Bunge advises us, are not exclusive to any science in particular. Ontology examines the nature of society, classes of social processes, the difference between law and rule, the roles of causality and the nature of planning. Constructs are ontological when they deal or relate with the nature of their referents. Therefore, from an ontological criterion, *Political ecology is a branch of political philosophy with the vocation to attempt the analysis and systematization of general views explaining the human species' social relations and the concomitant influence of their ecological and geographic environment.*

6. Axiology of social science, investigates the meanings and judgments of value in the major social sciences. From this perspective *political ecology can be defined as an axiological discipline which object is reinterpreting the intrinsic value of the phenomenon of life and, as branch of human ecology, explain the value and purpose of the human species as an integral part of the biosphere.*

7. Ethics of social science, examines the code of conduct of social science and the morality of the use of social studies and politics. According to this ethical premise, *political ecology is a field of study concerned with a moral idea of political power applied on environmental ethics and capable of distinguishing right from wrong, and good from bad sustainable ecological*

policies, concerning the intrinsic value of human and non-human life and the protection of the biosphere.

I argue that political science, as a branch of human sciences, aims at a diverse, diffused, and imprecise target: the study of human social systems—from individuals up to entire populations and communities—in the ecological sense, deepening the understanding of how complex power structures interact within the material sensible world, whether it be called nature, territory, geographical space, environment or ecosystem. From an ecological point of view the object of the study of human sciences could be summarized as a quest to produce knowledge about human nature and its habitat relationships.

In summary, with the methodology suggested by Sartori, and with Bunge's social science philosophic perspective, I have described my preliminary approaches in defining political ecology as a discipline derived from general ecology, from a branch of human ecology, and as a field of social ecology, whose object is the interdisciplinary study of the ecosystemic interactions among populations of the human species within given environments and non-human populations on a given scale of time and space. The space-time factor is present through the concept of *ecological succession* and the evolutionary mechanisms, the nature of interactions, the species involved and the spatial conditions. Political ecology is focused on the identification and analysis of different types of power relations, influenced or determined—directly or indirectly—by ecological variables.

III.5. Conclusions

Among the many issues concerning today's political agenda, ecology is certainly one of them. Being a multidisciplinary science—biological, physical, and social—the influence of ecology in modern political thought is an increasing task for newer research. As the study of the form and function in which living organisms merge as communities and populations, it is a biological science. Understood as the structure and function of bio-geo-chemical cycles' study, it is a physical science. But ecology also studies the interactions among living creatures, both within themselves and with their physical environment. Then, as human ecology, it is concerned about how human populations interact among each other and with the environment that sustains their complexes vital activities. In that sense it is considered a social science as well.

At the opposite shore and spite of its ancient and extensive history, today's Political thought is engaged in a quest for new horizons to its object and method of study; but mostly centered from an unshakeable anthropocentric perspective. In this sense, ecology poses a challenge to politics: to move its point of observation until reaching a vision that encompasses the *natural world* on which human life sustains itself on Earth. If the analogy may be allowed, today's ecology quest resembles ancient philosophy in a sense of being a discipline that seeks a whole understanding of the world where no straight line differentiates the social (politics) from the natural (physics), leading both to an ethical proposal of a new social contract—in this case with nature itself—as a pre-requisite for the *Good Life* in *Polis Earth*.

CHAPTER IV.

System Theory, Political Ecology and Space

IV.1. Introduction

In Chapter Three I advanced several definitions of political ecology, framed under systemic ecology lenses and rooted in the general theory of systems and the thermodynamic laws that govern life on Earth. This systemic interpretation of political ecology allows us to understand life as a series of hierarchical systems organized according to their complexities. Among these complex systems is human society. Now, Chapter 4 seeks to demonstrate the possibilities of applying systems theory to address political ecology issues common to social sciences and ecology. The Chapter offers a very general perspective of system theory with the aim of guiding the research towards building up a common spatial language, based on a systemic thinking suitable for political ecology. I will go to some of the classic work of Talcott Parsons, David Easton, and Niklas Luhmann as pioneers on the use of system theory for the research and conceptualization of social and political systems. This will give me a minimal base to connect with the notion of socio-ecological systems.

As systemic researchers, Parsons, Easton, and Luhmann were interested in identifying different types of social systems as well as defining its borders. Their contribution to my research lies on their investigations about systems borders and interactions between different types of social systems. It is what they called as *Interpenetration*. By using the concept of interpenetration and basic systemic concepts related to edges, transitional areas and exterior environments overlapping within the spatial continuum, I attempt a deeper integral understanding of the territories that make

up socio-ecological systems, SES. The relatively newly developed ideas on socio-ecological systems, provide a key concept for this research. From my point of view the question about space is inherent to its definition, even though questions of boundaries among involved ecosystems is still a debated issue. The function of borders is subject to interpretations about the value of nature, confronted by utilitarianism philosophy guided by the anthropocentric paradigm.

In this chapter I assume that the concept of ecosystem involves a dynamic notion of space that can guide the research towards a more concrete sense of spatiality. As we shall see, the concept of ecosystem shows enough flexibility to adapt itself to different typologies, multiple scales, and diverse forms of social ecological organizations (e.g. ecological populations and communities) either human or not. For that reason, I briefly refer to the concept of complex systems, in order to link it with the concept of Socio Ecological Systems. Following the principles of Odum's systemic ecology, and the ecological concepts known as *the edge effect* and *the ecotone* (Odum, 1972, p. 174) the notion of a political ecology transitional space starts taking shape.

IV.2. An Outline of System theory

In the ecological context of political theory, the General Systems Theory and system analysis have gradually provided methodological instruments to undertake the many theoretical challenges posed by political ecology. Understood as an abstract representation of the nature of reality, system theory offers an ontological worldview. The elements that make up this segment of reality formulate empirical conceptualizations about objects and observable physical phenomena (Stock & Burton, 2011). Fundamental concepts of systems theory provide a wide perspective for the

integrated research of social, environmental, and ecological phenomena. By integrating into the analysis what used to be considered external variables, the systemic view understands the whole as an operative concept inside the notion of a complex network of interrelations where diverse types of elements coexist, influencing the state of a given system... its approach seems a more appropriate framework in which to undertake interdisciplinary research (Bunge, 2000, 2004). The work of various systemic theorists allows researchers to approach an understanding of the dynamics of social, political, and ecological interactions within the space occupied by any given socio-ecological system, the environment that contains it, and the boundaries between these systems.

The concept of system is essentially a term to designate the connectivity of parts or elements among themselves (Rotundo, 1973, p.17). At the most basic level, a system can be defined as “a set of interacting elements” (Bertalanffy, 1981, p.38). Systems Theory talks about dynamic interactions. The more complex a system is, the more properties the system adds to its own performance or productivity. As a principle, a system’s productivity is more than just the sum of its individual elements. The idea of system, as a critical paradigm, is in opposition to scientific reductionism and methodological individualism.

In his mathematical considerations on some concepts of systems, Von Bertalanffy handles complex or groups of "elements," of which he can set three different types of systems: a) according to their number; b) according to their species; and c) according to the relations between elements.

For Bertalanffy, the mathematical differentiation of system’s elements can be understood by the characteristics resulting from the sum of their elements and their behavior in isolation. Other

systems must be understood not only by identifying their elements, but by establishing the types of interactions and relationships among those elements (Von Bertalanffy, 1981, p. 54).

There does not exist among scholars a single criterion concerning the concept of system and its relationship with the concept of Structure. Two clearly divided approaches emerge from these two concepts. For some, structure and system are equivalent terms and mathematical similes which convey the same idea (Rotundo 1973, 17). For others, the structure is part of the systemic notion but not the system itself. From this point of view, system and structure are different things²⁹. This parallelism between the concepts of system and structure can be observed in the definitions of structure used by social psychologists working on the concept of social representation, in which the relationship among elements is such that any modification of a component implies the alteration of the rest of the elements. That is the argument advanced by Jean Piaget as he states that, “there is a structure when the elements are assembled in a totality which, as such, present certain properties, and when the properties of the elements depend, in whole or in part, on these characteristics of the whole.” (Quoted by Rotundo, 1973 p.18).

But there are also philosophical considerations regarding the concepts of system and structure. Such is the case of the differentiation built by Mosterín (1984, p. 57) based on the interpretation

²⁹ Anything composed of many or few component elements related to each other (...) that make up a whole defined, very clearly in some cases, less defined in others, but that they constitute a whole that, in one way or another, we can define, circumscribe, determine. (...) The word system is essentially a term to designate the connectivity of the parts between themselves.” (Rotundo 1973, 17)

of the ideas of Karl Popper on the falsifiability³⁰ of any scientific hypothesis. In fact, Mosterín explains his differentiation of system and structure by historic arguments and theory of science.

Based on the conditional thesis that all theory is mathematical, the author goes on to distinguish between theory and hypotheses. Mosterín distinguishes true theories, calling them stories³¹ or historical hypotheses. But these stories must be understood in their broadest sense and in their original sense. "The story, thus understood, is about all kinds of issues, human or non-human, and does not need to be temporal" (Mosterín, 1984, p. 50). Applying this historical logic, the author comes to the conclusion that a story is the description of a system, while a theory is the description of a structure. A system is the "well-defined set of objects, together with certain properties, positions and interrelationships [that] are well defined between the same," while structure refers to "certain traits more or less formal, common to several systems." Therefore, the notion of structure is more abstract than that of the system. If the systems are things, simple or complex, the

³⁰ Falsifiability or refutability of a statement, hypothesis, or theory is the inherent possibility that it can be proven false. A statement is called falsifiable if it is possible to conceive of an observation or an argument which negates the statement in question. Unfalsifiable theories are weaker than falsifiable ones. But depends on the definitions given to the nouns used on the statement (Sandroni & Olszewski, 2008). Now, when relating to *Space* and *Time*, are these unfalsifiable statements? Can space or time be proved by mere observation or tested as matter, as a physical object? in the real world we cannot live without assuming that space and time exist. Then, if according to Popper, the only genuine test of a theory is one that is attempting to falsify or refute it.... How do we do this with space as an unfalsifiable theory? Irrefutable theories are not scientific. Where are the limitations? (Author's note)

³¹ Referring to system as a story, says Mosterín: "A system is something extra-linguistic (though delimited by linguistic means), is a piece of reality seen from a certain angle. The story of a system, however, is something linguistic (in the broad sense of the linguistic, which includes not only sound utterances or graphic inscriptions, but also the ideas expressed in these utterances or inscriptions). In summary, what system we are considering depends on what concepts we are using in our history. By adding new concepts to our history, we are changing the system, we are going to an expansion of the system first considered. But once determined the system and set the corresponding concepts of our history, our historical ideas on that system are true or false, depending entirely on the system itself and not from us. The story is intended to be objective truth, the story is not science and literature. It is precisely the feature of the system that determines the truth of a certain idea of its story is what we call a fact, the fact corresponding to that idea, the pendant aim of the true idea, the ontological correlative of the semantic relation of truth". (Mosterín, 1984, p. 57)

structures are the forms of those things. Just as a thing can have different shapes (the various shapes of pine trees, for example), a system can also have more than one structure (by the combination of mathematical elements in a system), (Mosterín, 1984, p. 51).

Systems can be differentiated in other ways, according to certain variables: the number of elements that form a given system; the nature or distinct species of those elements; and the types of information channels or modes of interaction using the system elements, either among themselves or in relation to other systems³².

Critical reading of the work of various systemic theorists bring us to the understanding of the dynamics of social, political, and ecological interactions within the space occupied by any given socio-ecological system, the environment that contains it, and the boundaries between

³² Among the types of differentiated systems can be identified: 1. Deterministic systems that operate tidily within certain limits of complexity that make it accessible to knowledge (computer). 2. Probabilistic, which by their nature or complexity cannot be known in detail; their behavior can only be described in terms of statistical probability. 3. Simple, uncomplicated systems composed of few elements. These may be predictable or not (switch-currency). 4. Complex, composed of many elements and relationships, predictable or not (computer-industry). 5. Overly complex probabilistic systems that cannot be described in detail, requiring special analytical instruments. They are the specific field of cybernetics (economy-brain). 6. Natural Systems, created by nature, whether organic or inorganic (atom, planetary, brain). 7. Human Systems or man-made systems (machines, tools, social organization, scientific). 8. Dynamic, those systems that are constantly changing in their internal systems. They have a variable and mutant behavior and are in constant activity (living beings, social systems, atom). 9. Static, compared to dynamic systems, present sluggishness but they are never entirely static (a table). 10. Open systems in their processing activities to receive inputs from the environment and drive their outputs to it. They are in constant communication with their environment. Open systems compensate for entropy by acquiring new information and energy. 11. Closed, however, no system is completely closed as it always keeps some kind of relationship with the larger system to which it belongs. Compared to open systems, closed systems can operate without a permanent exchange with its external environment. Closed systems are not able to import energy and information from their external environment to compensate for losses suffered (physical systems and mechanical systems) (Rotundo, 1973. 23).

different systems. On parallel grounds, system theory has served as a theoretical scheme and cognitive mental map to visualize human society and explain human behaviours as interactions among multiple interrelated systems, offering an integral vision of individuals, societies, and their environment. Therefore, the idea of a temporal mental map fits very well with Anatole Rapoport's definition, "a system is a set of interrelated entities connected by behavior and history, in which elements and their relations can be identified" (Fisher, 2010).

Before advancing into the discussion about the spatiality within systems theory, some questions and clarifications need to be made about borders, boundaries, and externalities of systems regarding the contested issue of their existence as such. In other words, do spatial borders and boundaries really exist in biophysical systems? Do living systems, either social or ecological, have spatial limits and external environments? According to Donella Meadows, what we see as borders or boundaries of systems are actually the beginnings and the ends of flows of energy and information represented as stocks or resources of the system itself (usually ignored for purposes of simplifying explanations). These flows represent "boundaries" on systems diagrams, but they are not real since as the systems they are themselves abstractions, mental models, and social constructions created for a better understanding of systems complexities. (Meadows, 2008, p. 95). These thoughts lead us to the notion of a geographical spatial continuum (to differentiate it from space-time continuum) and the idea of a holistic and borderless biosphere.

Under the premise that everything is connected to everything else by ways not always clear to us, Meadows affirms that, "we have to invent boundaries for clarity and sanity." But there is an

exception that she identifies in the imaginary borderless systems: The concept of *limiting factors*³³ would be analogue to the notion of boundaries within a system. And the limiting factor will always depend on the purpose of a given system. That is why Meadows' definition of system includes the notion of boundaries in a precise and particular way, i.e., as a condition of the system's purpose or function: "More than the sum of its parts, a system isn't just any old collection of things. A system is an interconnected set of elements that is coherently organized in a way that achieves something. If you look at the definition closely for a minute, you can see that a system must consist of three kind of things: elements, interconnections, and a function or purpose" (Meadows, 2008, p. 11).

VI.3. Social Systems and Space

VI.3.1. Parsons and Easton: The Systemic View of Human Society

Now that we have seen the basic conceptual vocabulary of systems theory and the importance of thinking about interfaces between systems, how has the notion of systems been understood specifically within social/political theory?' A review of the work of various system theorists, such as Parsons and Easton, shows some fundamental considerations about the concepts of social interaction, political interaction, and environmental interaction.

³³ Limiting factor: A necessary System input that is the One limiting the activity of the System at a particular moment. (Meadows, 2008, p. 187)

In his book *The System of Modern Societies*, Talcott Parsons (1974) performed a comparative study of the evolution of social systems from antiquity to modern societies.³⁴ Regardless of the validity of his contested theories regarding the role of Western societies, there is one aspect that is necessary to highlight: his consideration of human societies as social systems. In this sense, Parsons is one of the pioneers in using systems theory in the field of social sciences.

I am therefore interested in the work of Parsons from the standpoint of the study of society as a system, and the concepts and methodological tools used for his investigation. Keeping the ideological constraints posed by the author, one can assert that the history of a vitiating system of certain elements and information will determine the description of the reality of the system of modern societies that Parsons poses. For Parsons, "social systems are 'open' and part of a continuous exchange of inputs and outputs with their environments. Social systems are internally differentiated by several orders of sub-components that also participate in the exchange (...) social systems are formed by states and processes of social interaction among acting units" (Parsons, 1974, p. 16). Parsons, however, does not adequately take into account the acting units to deduce the properties of the interaction as these reinforce a position contrary to his, that social systems would be epiphenomenal; they would be governed by "accidents" or phenomena that are the product of individual volitional action—individualistic social theory of some of its members,

³⁴ Parsons proposes the thesis that the modern type of society we know today has emerged in a single evolutionary field: the Western civilization, consisting essentially of the part of Europe that inherited the Western half of the Roman Empire, north of the Mediterranean Sea (Rome, Medieval Europe, European renaissance and Christian reform). For Parsons, the role of culture is essential. Possession of culture means the ability to create, learn, use symbolic systems as language and other means. The ability of Western societies to use symbolic systems would be one of the reasons for its dominance as a species and as a civilization. (Parsons, 1974, p. 43-66)

which would hinder the characterization of such systems. Parsons is supported by Durkheim, in the sense of asserting that society and other social systems are a *sui generis* reality.

IV.3.2. Four Subsystems for Four Functions of Social Interaction

For Parsons, social systems are considered, "as constituents of the most general system of action, while the other primary constituent elements are the cultural systems, the personality systems, and the behavioral organisms. The four are defined in an abstract way in relation to the concrete behavior of social interaction" (Parsons, 1974, p.13). It is important to note that Parsons treats the three subsystems of action as constituents of their own environment and different from the social system. Each subsystem suggested by Parsons has four primary functions. 1. Integration: coordination of its constituent units (human beings, actors). 2. Maintenance of Patterns, and/or creative change of patterns: ordering around the characteristics of complexes of symbolic meaning (codes). 3. Scope of goals: the personality system is the primordial agent of the processes of action; the fundamental goal of action lies in the compensation or optimum satisfaction of personalities. 4. Adaptation: comprises the primary mechanism of interrelation with the physical environment, especially through the entry and processing of information in the central nervous system and motor activity to cope with the demands of the physical environment.

In addition to these subsystems, there are others that Parsons calls Systems of Reality. There are two systems of reality that can be considered environmental but are not part of the systems of action in the analytical sense. These are 1. The physical environment: phenomena in terms of physics and chemistry, the world of living organisms, to the point that they are not included in the systems of action. 2. Ultimate Reality: independent of the physical environment and systems of

action, which derives from the traditions of philosophy, concerning the "problem of meaning" of human action (religion).

From the environmental or ecological point of view, it is somewhat paradoxical that Parsons recognizes the existence of a physical environment, where the systems of action are developed, but places it on a plane exogenous to the system. It is as if Parsons intended to argue that social interactions occur in a vacuum chamber, as if the natural environment did not influence the elements of the system in any way. In this sense, Parsons falls into a contradiction when he asserts that social systems are open systems but analyses them taking into account only human elements. This isolates them from their spatial or environmental context, which means that we are describing not an open system but an artificially closed system, even if it is due to methodological or ideological considerations.

The study of some fundamental concepts from systems theory has provided social ecologists with wider tools for the analysis of reality. This is the case of the concept of social systems, as evolved originally from Talcott Parsons. It implies interrelationships among individuals and groups of individuals in a continuous exchange of resources and products within a spatial range of its own environment (Parsons, 1974, 1991). The consideration of physical environment is a distinctive element of Parsons social system. Beyond the many criticisms to his work, Parsons is seen as one of the pioneers in considering human societies as social systems and using systems theory in the field of social sciences (Parsons, 1974).

Nevertheless, as I will show ahead, my focus on Parsons' social system theory is limited to the concept of *interpenetration*. The concept of *interpenetration* (Parsons, 1991) as a theoretical and methodological contribution for understanding the functioning of social systems, is defined as the overlapping boundary between any two systems of action. The interpenetration happens, theoretically, where a bordering "zone" of structured components or patterns is treated as common to both systems. Parsons describes the interdependencies of social systems using the concept of interpenetration, meaning that systems may enter or overlap partially into one another. Exchange processes between the systems can take place under the existence of zones of interpenetration.

IV.3.3. The Political Systems as a Unit of Systemic Analysis

In the second chapter of his book Scheme for Political Analysis, David Easton (1979) guides his conceptual research from the systems analysis approach, starting from a fundamental premise: "political life can be considered as a system of behavior. The political system will be its main and coarser unit of analysis" (Easton, 1979, p.46). To develop this premise, Easton endorses his consideration of politics from the point of view of systemic analysis, where the concept of system emerges as the main element. These premises are:

1. System: It is useful to consider political life as a system of behavior.
2. Environment: A system can be distinguished from the environment in which it exists and is open to influences from it.
3. Response: Variations in structures and processes within a system can be interpreted as constructive or positive alternative efforts by members of the system to regulate or cope with a tension that comes from both environmental and internal sources.

4. Feedback: The ability of a system to survive in the face of tension is a function of the presence and nature of information and other influences that bring back its actors and decision makers. (Easton, 1979, p. 47-48)

As Easton puts it, the first two premises can be shared with other modes of systemic analysis, while the latter two suggest a difference between this type of system analysis and other policy research criteria. Easton says:

As I see it, systemic analysis generally starts from the conception of political life as a delimited set of interactions, embedded in and surrounded by other social systems, and whose influence is constantly exposed. In this sense, it is useful to interpret political phenomena as constituting an open system that must address the problems generated by its exposure to influences from these environmental systems. (Easton, 1979, p. 48)

Easton questions the meaning and relevance of the term “system of conduct” as a simile of political life. His systemic interpretation leads him to suggest that political life is a system of adaptive, self-regulating and self-transforming behavior. But how can these assertions be demonstrated? For Easton, it is not reliable to separate the elements of political analysis from other non-political elements, resulting in a limited view of reality. At the same time, Easton recognizes the impossibility of including all variables or interacting elements in the analysis of a political system. To solve this methodological dilemma, Easton proposes to consider the existence of two systemic levels. An Empirical level, which refers to the observable and characterizable empirical political behavior that must be understood and explained. The other level is the Symbolic, referring to the set of ideas or theories that allow a more global understanding.

IV.3.4. The concept of structural systems

Easton distinguishes between two types of Empirical Systems: Natural and Structural. We are not going to delve into the argument about the essence and preponderance of one system over another because as the author himself states: those discussions distance us from the central objective. In this case, we are interested in reviewing the concept of Easton's constructive system from the moment he decides to abandon the idea that political systems are given in nature and postulates that "any group of variables selected for description and explanation can be considered as a system of behavior, 'which remarkably simplifies' the problems of analysis without forcing empirical data in any way" (Easton, 1979, p.55).

What matters to Easton is that the elements chosen for the analysis of political life are, "relevant, show some degree of interdependence, and seem to have a common destiny." Only in this case, according to Easton, will we be in the presence of an interesting system capable of giving the keys to the functioning of political systems. On the contrary, continues the author, if we are in the presence of elements that have little or no connectivity or interrelation, then we speak of a trivial system. It is important to note that even though Easton considers trivial systems to be a system of political behavior, he grants them independent ownership. "What happens to one does not affect the other" (Easton, 1979, p.56), which for the author makes it less important due to the little interrelation between its parts, making it practically a non-system.

It is not my intention to devalue the capacity of this empirical approach as an instrument of systemic analysis, but it raises a question that perhaps can be better understood later in our proposal to compare the interactions in the structure of populations in an ecosystem, with the interactions

between human social groups, starting from the analysis of interactions between populations of two species, following an ecosystem approach. Indeed, the seemingly scanty interaction that a trivial system might present can conceal a deep systemic significance of homeostasis between two social groups, which theoretically can share a political, economic, social, or cultural "space" without one affecting the other. The possibility of analyzing these relations of apparent non-relation would imply discovering the nature of adaptation mechanisms and tacit cooperation between societies, in function of social equilibrium or social homeostasis, to put it in systemic terms. The transcendence of these "neutral" relationships between social groups can be expressed in potential mechanisms of human coexistence that minimize the possibilities of conflict.

VI.3.5. Systems of Behavior, Social System and Political System

Easton's concern is based on a methodological question: he asks how to delimit the universe of study of a political system, knowing that the behavior of political actors simultaneously maintains parallel behavior as economic, social, and cultural actors. Hence his quest is centered on finding tools to simplify reality for the purpose of studying it. Easton argues that, "all social systems are composed of interactions between people and that these interactions form the basic units of such systems. A political system is not a collection of human beings chosen for our research, but a set of interactions isolated from other types of interactions in which human beings intervene" (Easton, 1979, p. 63). The author raises the need to differentiate two kinds of systems: a) member systems, which include the concrete and total individual as a basic unit; and b) analytical systems, which represent the abstract interactions in which individuals participate, "interactions that have been separated from the total fabric of behavior of which they are part of." Hence, "to analyse any set of interactions it is mandatory to separate them from the total matrix of

behavior in which they take place. We will refer to this when we say that a political system is analytical" (Easton, 1979, p. 64).

Again, avoiding another polemic, this time between the concepts of member systems and analytic systems, I am interested here to understand Easton's argument about his assertion about the analytical character of all social systems. The author invites us to adopt as a unit of analysis of the political system the most inclusive social unit: society, theoretically understood as the all-encompassing supra-system and in which "a group of biological persons" participates (Easton, 1979, p. 66). Preserving the author's own words³⁵, we cite parts of Easton's arguments regarding the conceptual relationships between society, social behavior, and social interactions in order to comment on them from the ecosystemic perspective:

The concept of society draws attention to the great mass of conceptually unorganized social interactions that we could perceive if we were to take a literary look at the whole of a society... My use of the term society in this case includes the social behavior of a group of biological persons, conceived in their entirety. A social system identifies a more restrictive aspect or part of the social interactions in which these biological persons intervene. These interactions represent the diverse roles that people play, so that the same biological people can play different social roles. (Easton, 1979, p.66)

³⁵ The conceptual relations between society, social behavior and social interactions. Easton says: "In the course of time it seemed useful for scientific purposes to identify various types of interactions, each of which had revealed its importance in explaining the functioning of societies ... we have classified them into religious, economic, fraternal behaviors, educational, political, cultural, and the like. When it seemed advisable, each of them was studied separately as a system. Bearing in mind that these systems do not represent the totality of the interactions that exist in a society, but only parts abstracted from the perceptual mass of behavior, they are, in my opinion, analytical in character. Political interactions constitute one of these types" (Easton, 1979, p.66).

For Easton, the term society comes to be the result of the social behavior of a social group or groups and that this behavior is expressed through the quantity and quality of the interactions that individuals or groups perform with each other in its totality. A question arises when Easton gives a degree of similarity to the interactions between the roles. The question becomes clearer when Easton blends role with interactions and then behaviors by listing behavioral classifications: religious, economic, political, fraternal, educational, cultural, etc. Does this enumeration of words actually express units of analysis to measure behavioral interactions? Or do they not refer to sectors of activity? Somehow, it sounds so general, that on Easton's list we could add an infinite number of human activities which will certainly conform to social systems, but do not explain the nature of interactions.

When Easton speaks of behavior, it suggests an action (or a non-action) with a certain load or quality carried out by a biological person which influences the social system, thus creating the first step of an interaction whose sign can be positive, negative, or neutral (their impact may be favorable, unfavorable, or neutral). In this sense, I believe that if the political system is to be the unit of analysis, it must reflect the power relations between individuals (either cooperation or domination). Therefore, we believe that units of behavior analysis should reflect not only the totality, but the universality of the interactions between the beings that make up society. From this perspective, ecosystemic analysis can offer some alternatives in its consideration of the interactions of a population from the ecological point of view, as we will see later.

IV.4. Questions of Space in System Theory

IV.4.1. Borders, Boundaries and Externalities

The primary definition of a system inherently involves two spatial elements, which are fundamental for the theoretical quest of this research: the notion of *boundaries* within each system, and the idea of an existing *surrounding environment* outside each system (Cárdenas, 1982, p.20. Garcia, 2006, p.48). One could extend the description of these spatial elements of any system into a more complex proposal of four elements: 1. The space occupied by matter (elements) within the recognizable area of the dynamic system itself; 2. The idea of a surrounding space (a surrounding environment) existing outside the system; 3. The notion of a boundary or border that limits the inner area of the system, and, 4. The border or boundary seen from the outer system-space (Cárdenas, 1982, p.21. Garcia, 2006, p.49) acting as an outer layer of the inner edge of our reference system, but in fact acting as the inner layer of the edge belonging to the neighboring system or "surrounding environment." According to this, there would be two main explanations to describe the "outside" space of any given system. The first explanation describes an "environment" surrounding each and every one of the existing systems. Let's say, there is a System *A*. In this case, the environment surrounds System *A*. Therefore, the "environment" would be everything exterior, existing outside System *A*. Therefore, System *A* may form a system within another system which plays the role of environment for System *A*.

A second possibility to understanding the nature of this outside space, exterior to System *A* would mean that this outer space belongs to or is actually another system of a different nature;

neither greater nor less than the first, neither containing nor contained in another system. In other words, a neighboring system of different sign, with different structures. Nevertheless, as I will show next, my focus on Parsons' social system theory is limited to the concept of *interpenetration*. As a theoretical and methodological contribution for understanding the functioning of social systems, the concept of *interpenetration* (Parsons, 1991) is defined as the overlapping boundary between any two systems of action. The interpenetration happens, theoretically, where a bordering "zone" of structured components or patterns is treated as common to both systems. Using the concept of interpenetration, Parsons describes the interdependencies of social systems, meaning that systems may enter or overlap partially into one another. Exchange processes between the systems can take place under the existence of zones of interpenetration.

From the perspective of an environmental systemic approach and for the purpose of seeking space, the original concept of interpenetration shows the anthropocentric limitations of Parson's ideas of the social system, since in theory, interpenetration refers to the connectivity among different human social systems. Nevertheless, following Parsons's logic, it would be feasible to inquire into the nature of the structure of interpenetration that would be established, for example; between planted forestry expanding into the savanna, or a city expanding into a forest. Interactions among different systems penetrating each other's space. Interactions among human social system and ecological systems. That is, something that could be called, a Humanized Ecosystem. These notions of spatial intersections and cross-linking between different systems of diverse nature are theoretical elements that build on analogical concepts related to the notion of transitional spaces. Hence, its inclusion here constitute a building element for the particular ecosystemic theory that I intend to recreate (Parsons, 1974).

IV.4.2. Interpenetration: A Forgotten Theory

As stated above, my focus on Parsons' social system theory is limited to the concept of *interpenetration* (Parsons, 1991). My intention is to adopt and adapt the theoretical concept of *interpenetration* for a better understanding of socio-ecological systems. From the perspective of an environmental systemic approach and the purpose of seeking space, the original concept of interpenetration shows the anthropocentric limitations of Parson's ideas of the social system, since in theory, "interpenetration" refers to the connectivity among different human social systems. Nevertheless, following Parsons's logic, it would be feasible to inquire into the nature of the structure of interpenetration that would be established, for example, between the forest expanding into the savanna, or human settlements expanding into the forests. Interactions among different systems penetrating each other's space. Interactions among human social system and ecological systems i.e., the socioecological systems from which an alternative notion of Humanized Ecosystems can derived. These notions of spatial intersections and cross-linking between different systems of diverse nature are theoretical elements that build on analogical concepts related to the notion of transitional spaces. Hence, its inclusion here forms a particular building block of the spatial ecosystemic theory I intend to approach.

My interest in the concept lies in the fact that interpenetration as a concept linked to the theory of social systems supposes the existence of edges or limits for one or more systems, which in some way have correlation, affinity, or which are spatially arranged so that they share a common border (Parsons, 1974). It also implies that when a system is penetrated by elements of another system, a space for systemic integration is created. Hence, we could say that a new subsystem is produced as a result of interpenetration. It is clear that the original concept of Parsons later adapted by

Luhmann, refers exclusively to mechanisms that occur in sociological systems. In fact, Luhmann strongly rejects the possibility of processes of interpenetration between human social systems and other kind of systems.

For the analysis of the edges of interfaces and ecotones, as well as the notion of the external environment of the system, I will turn to the arguments offered by Niklas Luhmann in this regard. In his book *Society and System: the ambition of theory* (1990, original title: *System und Funktion*, 1984), Luhmann outlines much of his general theory of society where he incorporates systems theory as an instrument to describe society (1990, p.17). Luhmann starts with the incorporation of so-called *self-referent systems* that are distinguished from the system's conception of Bertalanffy.

As we saw at the beginning of this chapter, the classical system theory comprises a series of elements that interact with each other, and that are distinguished or separated from other elements thanks to a given environment. The relationship between environment and system characterizes this view where each system is defined based on its environment. On the other hand, in the cybernetic theory of self-referential systems, the system is defined by its difference with respect to its environment, but at the same time it includes the environment in its definition. Systems theory must always bear in mind the fact that it is itself one of its objects (Luhmann, 1990, p.43). "There are self-referential systems, that is, they are capable of establishing relationships with themselves, and of differentiating these relationships from their relationships with their

environment" (Luhmann, 1990, p.44). This is the result of incorporating the ideas of Maturana and Valera and their theory of autopoiesis³⁶ (Arnoldi, 2006, p.116-117).

For Luhmann, the general theory of social systems aims to cover the whole field of sociology and, therefore, wants to be a universal sociological theory. In society, as a self-referential system, Luhman distinguishes 3 types of self-referential social systems. He features: 1. Living systems, life and vital systems; 2. The psychic or personal systems and consciousness; 3. Social communication systems. Each one differs in the way that it produces its own autopoietic operation and its own space to operate and reduce complexity (Luhmann, 1990, p. 47). Despite being closed systems in themselves, their autopoietic character implies that they have incorporated an opening and closing (Input and output). The relationships that exist are known *as interpenetration*: "an operation through which a system makes its own structure available to another so that the complexity that is its own can continue to be built" (Luhmann, 1990, p.25). For Luhmann, society is a self-referential and autopoietic system that consists of communications. A system that differs in social subsystems, each with a specific communication and operation scope that allows reducing complexity and determining the environment. Starting from the concepts of observation, difference, and self-reference elaborated by him, Luhmann proposes a radical thesis: "Society is made up of communications and not of human beings. The relationship between human beings

³⁶ The concept of autopoiesis was developed to give an answer to the question 'what is life?' Dissatisfaction with the state of the question (vitalists theories, systems theories, functionalist or teleological theories) moved Maturana to construct a definition of life as "*networks of processes of production*" of components that are continuously and recursively generated and realized as a concrete entity (unity) in the physical space, by the interactions of the same components that are produced as such a network" (Maturana, 1975, p. 313).

and society is given as the relationship between environment and system. Men are the environment of society, not components of it. (Luhmann, 1990, p.28). Certainly, an approach that clashes with the thesis of traditional humanism.

According to Luhmann, any systemic-theoretical analysis that exists in the scientific community must have as a starting point to establish the difference between system and environment (Luhmann, 1990, p.50). Systems are not only oriented occasionally or by adaptation to their environment, but structurally, and could not exist without the environment. They are formed and maintained through the production and maintenance of a difference with respect to the environment and use their limits to regulate that difference. Without reference to the environment, there would not even be self-reference, since difference is the premise for the function of self-referential operations.

In this sense, the maintenance of the borders (boundary maintenance) means the maintenance of the system. The limits do not suppose any rupture for the interdependence. It cannot be said that the internal interdependencies are stronger than the system/environment interdependencies. But the concept of limit means that the border processes (for example the exchange of energy and information) when crossing the limit, continue to work but in other conditions. The environment gets its unit only from the system, and its relationship with the system (Luhmann, 1990, p.51).

According to Luhmann, the environment is not a system. Each system has a different environment, since each system can only put itself out of its own environment. This does not mean that the system depends on the environment or that the system can dispose of the environment: the

complexity of the system and the environment exclude any totalizing form of dependence in one way or another. One of the most important consequences of the system-environment paradigm is: we must distinguish between the environment of a system and the systems in the environment. Thus, we must distinguish, above all, the relations of dependence between environment and system, and of the dependency relationship between systems. The systems in the system environment are in turn oriented towards their environments. However, no system can have a total relationship between system and environment because they are alien to it, unless it is due to destruction. (Luhmann, 1990, p.52).

Thus, there are also internal environments between the subsystems of the system. "Each difference between internal subsystem and internal environment reconstitutes the system as a whole, but always from a different perspective. Systemic differentiation is an instrument to increase complexity (Luhmann, 1990, p.53). The line of separation between environment and system cannot be understood as isolation or summary of the most important causes in the system, rather it fragments causal relationships. To this, Luhmann raises a question: From what point of view does all this happen? And he replies: "From the point of view of social systems, both system and environment always intervene, for the mere fact that without awareness of psychic systems there is barely any communication. Hence the need to explain how the causality between system and environment is given and distributed" (Luhmann, 1990, p.57).

This leads us to the consideration already drawn in chapter two on systems theory, considered as a polyvalent paradigm (Marin-Gallego, 2007), as a scientific theory and as a science (Bertalanffy, Bunge, Cardenas, Morin), but also as a scientific method. Taken as the latter, the

theory of systems as we have seen does not offer a unified field but many interpretations and is considered as a discipline still under construction (Bunge, 1979). There are, however, common elements on which the different systemic tendencies are more or less in agreement. One of these aspects has to do with the components that integrate a simple open system, in order to be identifiable, that is: 1. The elements (substances) that form the internal structure of the system, 2. The border or limit of the system, and 3. The (external) environment of the system. There are interpretations that also assign an 'internal environment' where the elements are located. In our case, we ignore the notion of internal environment because it is considered part of the internal structure of the system together with the elements (Luhmann, 1990).

At this point the two elements that have been part of our conversation throughout this chapter are: a) the notion of border or limit, and b) the notion of external environment.

With these two elements, borders and externalities, is where my reflection around the notions of the *social ecotone* and the *ecological interface* begins. Suppose we are in the presence of two or more systems that interact with each other. If we start from the understanding that this group of systems can be identified or qualified as equal or similar in nature, then the study of the interactions between them should not represent greater problems than those implicit in any analysis of interactions between actors belonging to similar categories (interactions between institutional systems, interactions between plants of a forest system, interactions among animals, etc.).

The problem would arise, theoretically, when we are in the presence of systems of a different nature. This would be the case when an urban system with a natural system are confronted (dialectically) or interacting on the same spatial plane. This means that systems pursue different

objectives or teleologically diverse purposes (if it is the case that they pursue a goal at all), whose functions and properties (e.g. the international financial system or the blood circulatory system) start from different spatial dynamics (a system of central cities and the solar system) and different temporal dynamics (an electoral system and a climate system) raising questions on how to undertake the analysis of this type of interactions. Interactions happening at all times and places, well beyond obstacles or theoretical improbabilities of this anthropocenic era.

Now, let's go back to the original premise about the three components of a system, of which only two interest me: the border and the external environment. Let us take that abstract image to the concept of ecosystem, while we observe the graphs of the previous pages in this chapter (*mutations of a spatial continuum*: graphs 1-8). We see there are three spaces that correspond to differentiated systems, *U*, *R*, *N* (Urban, Rural, and Natural). In the external spaces to these three systems, is where transitional areas, transitional spaces or interfaces are located. For the purpose of this exercise, the analysed interfaces correspond only to spaces external to the system. I do not analyse here the internal interfaces corresponding to urban systems (squares, avenues, transport stations, markets, etc.), or rural systems (villages, roads, fields of crops, storage structures, etc.), or natural ecosystems (basin hydrographic, life zones, climatic floors, etc).

Thus, in the differentiated spaces of the three (Urban, Rural, and Natural systems), the edge of each of them corresponds to one interface or transition space that is shared within the closest system. There is therefore a single interface or edge for each of two (or more) systems. Thus, in our example, a single interface is shown in the example between *U* and *R*, or between *N* and *U*, or between *N* and *R*. In this case, it is irrelevant if the systems observed are of the same nature or

different (that is, no distinction is made as to if they are social systems or natural systems). The notion of edge and external environment corresponds, at first glance, with what the elementary system definition dictates.

On the other hand, what we understand by the 'external environment' of the system is represented, in this case, by the natural space, which in the beginning is dominant and covers most of the spatial continuum. But the spatial and temporal dynamics of each represented system (U , R , N) are mutating until what at first was considered the external, that is, the natural space, disappears or diminishes. Then, there is a sudden change in the theoretical appreciation of the 'external environment' of the system and it would eventually affect the very conception of the three fundamental elements of the system: the external is not really an empty space, it is not a sort of 'void' on which our system floats in space under scrutiny. On the contrary, beyond the edge or limit of the system under observation, the 'external environment' is discovered as another adjoining system, that is, another space composed of elements in interaction, also delimited by 'an edge,' a border that identifies it as a particular system.

A first general deduction would imply that there is no external environment as such, but what exists outside the outer edge of a particular system is simply another system. Although it is true that under these arguments the notion of the "external environment" of the ecosystem has been diminished or has changed towards another proposition; not so, in principle, is the case of the notion of 'border' or limit of the ecosystem. This observation is much more explicit in spatial terms, where landscape and territory differ or merge. Now, if this were true for the effects of systems of the same category or nature, what should be said then of those systems that adjoin, interact, or

interpenetrate (Parsons) are being of a different nature? Specifically, and even more clearly, to which of the two systems in interaction does the interface we see in between belong to, or is it part of? How is a single interface integrated into two borders, each coming from a system of a different nature?

Figure 3. Systems Interpenetration by Double Boundary and the Emergence of Interfaces.

Figure 3 (a,b,c,d). Represents a sequence detailing four different views of systems boundaries.

Figure a) shows the classical representation of a *spatial system* inner space including elements and interactions taking place within the system. The outer space, also known as the *system environment* is separated by a particular boundary or edge. **Figure b)** Deduces that the environment or outer space of a given spatial system is in fact another spatial system which elements, properties and functions can be distinguished from one another. **Figure c)** Shows the moment of Interpenetration between systems at a scale where two boundaries collide. **Figure d)** During interpenetration process the dynamic properties of each system lead to contractions and expansions of their bordering systemic spaces creating temporary hybrid areas which we identify as interfaces.

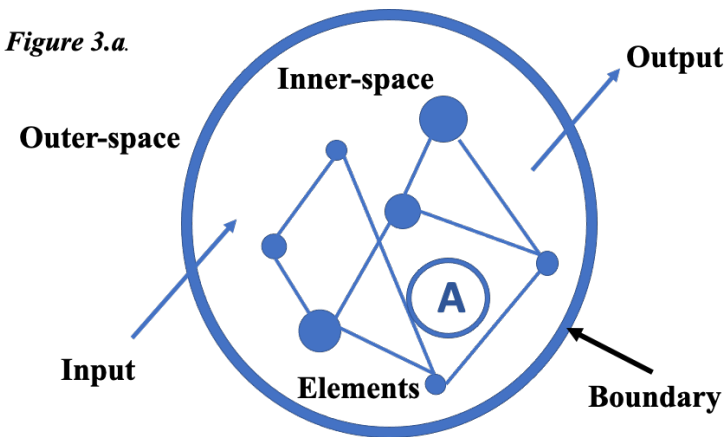
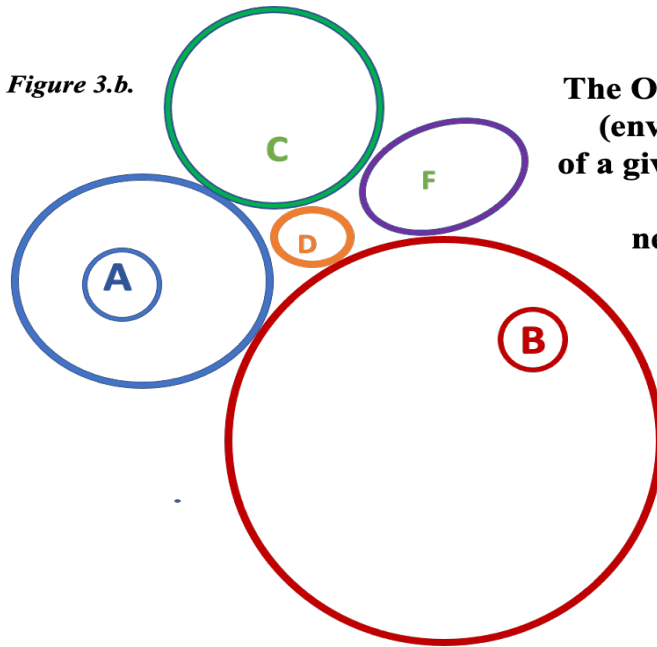


Figure 3.b.



The Outer-space
(environment)
of a given system
are the
neighboring
systems

Two edges of two systems make contact, stick, collide ...
Eventually, a process of *Interpenetration* gives rise to
interactions of different kinds across boundaries
between both systems producing
dynamic changes in the space
connecting them.

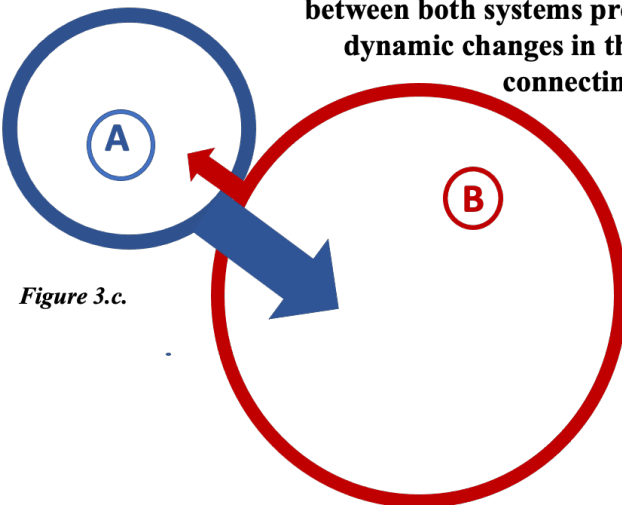


Figure 3.c.

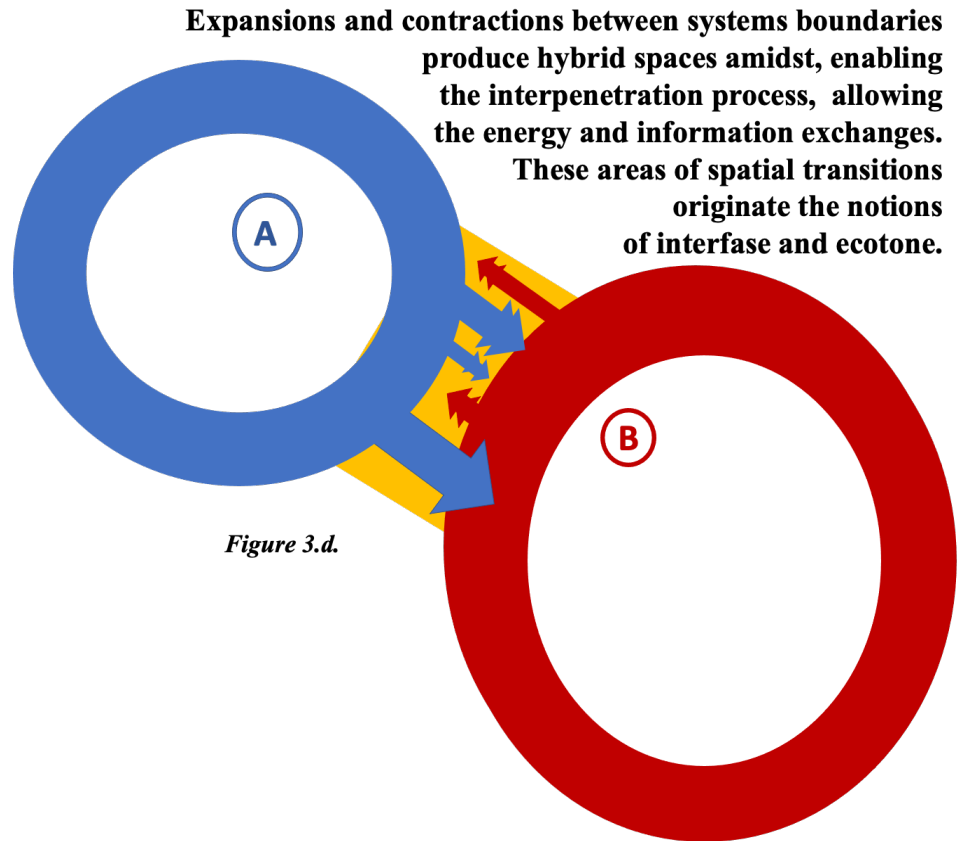


Figure 3.d.

IV.4.3. A Double Perception: A Double Interface?

Returning to the issue of the external edge that transitions into an 'external environment,' whether it is an interface or an ecotone, the question that arises is easy to assume: is there a double interface between neighboring hybrid ecosystems in the process of interaction?

If we assume that each ecosystem (or system) has its own border, edge, its aura, its area of influence and integration to the external environment (another ecosystem), the obvious answer should be yes. If so, the border or limit of a human ecosystem (A) implies the existence of its own

interface (*AI*) that moves in space and progressively transform itself in its transit towards that "external environment" (in our example, another ecosystem) to which it will interpenetrate. Conversely, the same thing happens with the other ecosystem (*B*), which constructs its interface from its external edge (*BI*) and also moves in space towards an 'external environment,' either expanding or contracting, as develops the retreat or advancement of the adjacent ecosystem.

It is logical to assume, if this argument is consistent, that each border of the system produces its own interfaces: varying in shape and size, diversity and temporality. The interface is thus a sort of by-product of the system, an-output, or a feedback. It is also, metaphorically, an effect of its spatial or systemic delimitation: the interfaces reflect the spatial dynamics of production and transformation of ecosystems of different sign. They are the result of the emergence, advancement, retreat, or disappearance of transitional spaces between systems over time. This process, described in an abstract way, should be much more explicit at a spatial level, which is ultimately the subject that concerns us. This would represent the mutations that occur in space due to the meeting of two or more ecosystems, especially if we speak of human ecosystems (towns, cities, metropolises) that border on natural ecosystems (forests, lakes, savannas, etc.).

IV.5. The Space of Ecosystems

The concept of ecosystem is an instrument equated to studying the behavior and the interactions of the elements that are part of the structure of a given biophysical system. As stated in the introduction of this chapter, I assume the concept of ecosystem involves a dynamic notion of space that can guide the research towards a more concrete sense of spatiality. But the real link to address spatiality comes from the fact that the elements and interactions that occur within any

given ecosystem are represented and explained through the General Systems Theory and systemic thinking. As an integral part of the biosphere, all ecosystems are connected spatially in a “spatial continuum”; i.e., cities as humanized ecosystems are connected in various interdependent ways with other ecosystems through the spatial continuum. From a political ecology analytic approach, the ecosystem (either natural or human) should be the basic spatial unit of the spatial continuum. Transitional spaces are a structural part of the system of ecosystems that make that continuum.

IV.5.1. The System Theory within the Ecosystem theoretical framework.

“In a world where the relationships between men, their physical, biological, social and political environment must be represented and where several goals are pursued simultaneously, proper structuring is required. This is the philosophy of systems engineering and the multilevel approach.” Miguel Cardenas³⁷

My interest is on the notion of systemism as a theoretical body that claims to be providing input for an integral vision of reality (Bunge, 2004; James, 2004). There are literally thousands of articles and books related to basic social systems theory and ecosystem theory. As shown in the literature review, I have focused on research related to systemic socio-ecological approaches that may offer clues on how to reconcile interdisciplinary concerns regarding the transitional spaces within human dominated ecosystems. In the available literature, some topics are highlighted because of their importance to my research object. The need to integrate a common conceptual

³⁷ Cárdenas, M. (1982). *El Enfoque de Sistemas: estrategias para su implementación (The Systems Approach: strategies for its implementation)*. Editorial Limusa. Mexico. p.93

framework for socio-ecological research goes in hand with questioning the temporal scales by which those researches should be conducted, as is the case of socio-ecological long-term research (LTSER) methodologies (Collins, et al. 2010). The temporal scales are inherent to the concept of ecological successions as the process by which ecosystem spatiality varies.

The topic of ecosystem modeling involves not only understanding the properties and functions of the system's constitutive elements, but also acts as the cognitive instrument of social ecological representation, suited for academic communication, environmental education, and sustainable planning (Bates, 1997; Currie, 2010; Machlis, Force and Burchjr, 1997). Within the complexity of the human-dominated ecosystem, the question of culture rises as a multidimensional variable which affects social and ecological interactions. This transformation turns human ecosystems into “wicked problems” that reproduce their complexity systematically in time and space (Currie, 2010; Poe, Karma, Levin and 2014).

Finally, the decision to partially entrust the theoretical framework of the research to system theory, and by extension to ecosystem theory, comes naturally to the specific object of the investigation: space from an ecosystemic perspective. One key element in searching for this ecological space, which leads us by extension to search for an “ecopolitical space,” is that we start from the premise that life, as cosmic phenomena, makes a difference when considering spatiality. But, if ecosystems are representations of reality at different levels, how can space be read from a holistic ecosystem perspective? How can it be represented? If space has a structure, how does space change from living matter to non-living matter? Is there an occupied space and a non-occupied space within tridimensional real and space-time fourth dimension? Up to what degree

should we consider the laws of thermodynamics when asking, through ecosystemic representations, about human spatiality? Some of these questions are going to be answered by Vladimir Ivanovich Vernadsky (1998) and his primer concept of the biosphere, advanced in 1928. Vernadsky transferred his questions about life on Earth starting from the Cosmos, just as Humboldt did a century before.

IV.5.2. The Social-Ecological Systems

Though there are multiple fields for system theory on social studies, my research concerns highlight the notion of systemism as a theoretical body providing an integral vision of reality (Bunge, 2004; James, 2004). Engaging systems theory allow us to access a notion of the human species as an interacting element among others within a given system, at different scales of complexity (Bunge, 1979). System theory has the theoretical and metaphorical capacity to explain causality via the interrelation between human interactions and other elements of the system. This complexity represents a paradigmatic challenge to the linear Cartesian logic embedded in anthropocentrism and the methodological individualism that guides the rationality of socio-economic and political unsustainable developing models (Bunge, 2000; List and Spiekermann, 2013; Mihail, 2013).

Applicable first to biology, the system theory made a straightforward route to ecology, adopting it for the study of natural systems. From this fusion has developed the specific field of system ecology and ecosystem theory. (Sutton, and Harmon, 1987; Odum, 1972). The ecological systemic research reached a turning point in 1935 with Tansley's definition of Ecosystems, understood as spatial units where biotic and abiotic elements interacted in a given area determined

by boundaries (Currie, 2010; Pickett and Cadenasso, 2002 a). Besides the system's elements and interactions, the definition clearly provides three spatial components: the system's physical space (terrestrial ecosystems), the outer "environment," and the boundary that differentiates and defines the unity of that system from other systemic spaces (Pickell, 2007).

The ecosystem notion soon began to be extended to study humans' interactions within natural ecosystems (Bekowitz, 2003; Odum, 1972). This theoretical merger of the human into the natural world grew parallel to the urban studies of the Chicago school of human ecology, which developed its spatial sociological research on ecological theoretical grounds (Hawley, 1999; Theodorson, 1974).

Those efforts to integrate human species into the concept of the ecosystem were not driven only out of scientific curiosity but also as a response to the increasing disturbance created by human agency on the natural biosphere (Gough et al, 2000). The idea of a human ecosystem (Chapman, 1977) breaks through into the disciplinary lines of human ecology; and doing so, has opened new fields and sub-disciplines based on ecosystemic theory, such as social ecology (Schandl, 2012); urban ecology (Alberti et al, 2003; Gaston et al., 2010; Mandelbaum, 1985; Pickett et al., 2001; Pickett and Cadenasso, 2002 b; Pickett et al., 2011); or human social ecology, and sociopolitical ecology (Bates, 1997).

Given the exercise I intend to develop at this point, it is more enlightening to talk about ecosystems, since we have already agreed sufficiently on the ecological perspective that drives the research. Thus, when mentioning 'system,' I am referring abstractly to natural ecosystems, human

ecosystems, agroecosystems, urban ecosystems, etc. All this leads us then to ask ourselves about the nature of human ecosystems interacting with natural ecosystems, or as they are mostly known, with the hybrid³⁸ concept of *socioecological systems*. This makes us wonder about the coordination of their objectives as a system; about the alignments and clashes between its various properties and functions; and about the coupling of its spatial and temporal dynamics. All these, taking into account the complexity of ecological systems and their biodiversity, in addition to the sociocultural diversity that predominates in the human urban environments.

It is pertinent to clarify that as many other terms are linked to human ecology (social, political, urban, rural, etc.), the concept of *socio-ecological systems* is still under construction. There are also other terms to refer to the same object of study, as is the case of *human-ecological systems*, as Marina Alberti (2008), a cutting-edge researcher in urban ecology issues, labels them. Although both terms present reference problems, I personally prefer the term social ecological systems, as long as you make the clarification that the term social is used in a restricted way to refer to human societies. In general ecology the terms societies, communities, and populations are commonly used

³⁸ The Oxford Dictionary of Geography (2009) referring to *hybrid geography* states: Rose (in R. Johnston et al., eds 2000) writes that hybrids ‘transgress and displace boundaries between binary divisions and in doing so produce something ontologically new’, a notion picked up by Kwan (AAAG 94,4) who recognizes two major divisions within geography: the partition between physical and human geography -of nature and society; and the separation of spatial-analytical geographies which attempt to create ‘a mode of disembodied geographical analysis’ from social, cultural, and political geographies. Oxford University Press. p. 243. / The Oxford Dictionary of Environment and Conservation (2008) defines *hybrid* as: ‘an organism that is the offspring of two different *varieties, *breeds, or *species.’ Oxford University Press. p. 216. / The Oxford Dictionary of Sociology referring to *hybridity* states: ‘More recently, hybridity has been re-appropriated by social and cultural critics. Its transformation into a positive condition of cultural change and creativity has attempt to challenge fixed or essentialist accounts of identity and culture (...) Hybridity acknowledges that identity is formed through an encounter with difference’. (Oxford University Press. p. 284.)

to refer to the spatial and temporal organizations of plants and animals³⁹. On the other hand, the concept of human-ecological system seems redundant, since the human is an intrinsic part of the ecological system and expressed in that fashion it seems to refer to an exclusively human ecosystem, without interactions with natural systems.

We shall take a preliminary characterization of socioecological transitions as compass for this matter: “A socioecological transition is a transition from one socioecological regime to another. How may we then define a socioecological regime? A socioecological regime is a specific fundamental pattern of interaction between (human) society and natural systems” (Fisher-Kowalski and Haberl, 2007, p.8). Starting from the existence of the biophysical dimensions of social systems and the biophysical structures of human society, the notion of socioecological systems, by the reason of their hybrid nature⁴⁰, implies that there is a meeting between two different ecosystems. The metabolic fluxes of human society, transitions in the use of energy, materials converted into products and services and eventually transformed into dissipated heat, CO₂, liquid and solid waste, etc. they imply different patterns of socioeconomic metabolism, but also different patterns of land use (Fisher-Kowalski and Haberl, 2007, p.9).

³⁹ Ethology studies "animal societies". The term vegetal association is used in Phytosociology to describe the spatial and temporal relationships between plants. Sociobiology as: "The systematic study of the biological basis of all social behavior".

⁴⁰ Bruno Latour theses refers directly to the condition of hybridity to which he relates to the condition of modernity: “The word 'modern' designates two sets of entirely different practices which must remain distinct if they are to remain effective but have recently begun to be confused. The first set of practices, by 'translation', creates mixtures between entirely new types of beings, hybrids of nature and culture. The second, by 'purification', creates two entirely distinct ontological zones: that of human beings on the one hand; that of nonhumans on the other.” (Latour, 1993, p.10-11)

In any case, a hybrid or mixed system can be conceived in at least two temporal dimensions. The first, where the present time reflects an accomplished fact of hybridization. An observed 'state of the system' that stopped being *A* or *B* and definitively became a *C* system, different in its objectives or development, properties, functions, and dynamics to the previous systems (two or more) that gave it shape. However, this also implies that, at some point in the history of the ecosystem, prior to the merger, there was an interaction between a 'social' ecosystem and a 'natural' ecosystem. From the spatial point of view, the interpenetration between ecosystems meant expansion and contraction of the constituent elements of each ecosystem in the particular space of each one and then in the hybrid space. This space-time dynamic is known in ecology under the concept of ecological succession⁴¹, and eventually it leads to a new cycle of "creative destruction" where the ecosystem *C* will interact with the ecosystem *D*, to become *H1*, *H2* ... *Hn*.

The second temporal dimension when observing an ecosystem state is to assume that we are facing a process of evolution in full development. In ecological terms, it depends on the concept of rhythm⁴². Process that may be in an initial phase, in the consolidation phase, in the climax phase

⁴¹ Succession is understood as the change in the properties of communities over time. Or the change of the different populations that make up the communities over time. Ecological succession is also understood as a dynamic process through which ecosystems are gradually modified. For this reason, it is affirmed that the communities indicate the level of development of the ecosystem, since they are the ones that modify the environment. The succession is a consequence of the ecological predominance. (Wagner, 1999, p.162)

Each time the community changes its population composition, a "Seral Community" or "Seral State" does appear. The seral community is then a transitory community in the process of biological succession. The succession through each of the seral states eventually leads to the climax or climax state of the ecosystem, where stability is achieved between the populations that inhabit there and the abiotic physical environment. The climaxes are classified according to the dominant factor that guides them and we can speak of climate climax, edaphic climax and atmospheric climax. (Odum, 1972, p. 278)

⁴² As a dynamic entity, the population is in a continuous process of change. In addition to its density and composition, there are a number of important characteristics that are subject to rhythm or speed. The index is always obtained by dividing the change observed by the period elapsed during it. The rhythm marks how quickly something varies over time. It also belongs to the field of study of demography and on this principle, Malthus

of maturation, or in the decay phase where the ecosystem (human or not) shows exhaustion and options are opened to move to another state, either by destruction or reversion, as the case alluded to above (ecosystem *D*, becomes *H1*, *H2* ... *Hn*), (Fisher-Kowalski and Haberl, 2007, p.14).

IV.5.3. Approaching Space in Socioecological Systems

As argued in the introduction, entrusting the theoretical framework of the research unto system and ecosystem theory fits naturally to the specific object of the study: placing our focus on those blurred spatial notions that point intuitively to existing interface spaces between socioecological systems. That is, shedding theoretical inputs—descriptions, analysis and typologies—upon those dynamic areas bordering human and non-human ecosystems. In other words, within and between humanized ecosystems, we will find humanized ecotones.

The developed ideas on socio ecological systems, relatively new, is a key concept to this research. Though the notion on space is inherent to its definition, the question of boundaries among involved ecosystems is a debated issue. The function of borders is subject to interpretations about the value of nature, confronted by utilitarianism philosophy guided by the anthropocentric paradigm.

The study of some fundamental concepts from systems theory has provided social ecologists with wider tools for the analysis of reality. This is the case of the concept of social systems, as originally evolved from Talcott Parsons. It implies interrelationships among individuals and

built his famous arithmetic and geometric models of population growth, referring to the production and consumption of food worldwide (Odum, 1972, p.183)

groups of individuals in a continuous exchange of resources and products within a spatial range of its own environment (Parsons, 1974, 1991). The consideration of the physical environment is a distinctive element of Parsons' social system. Beyond the many criticisms of his work, Parsons is seen as one of the pioneers in considering human societies as social systems and using systems theory in the field of social sciences (Parsons, 1974). His influence in North America has been overpassed in Japan and Europe where many of his theories are being revisited.

IV.6. Conclusion

What was Originally inspired by Odum's systemic ecology (Odum, 1972), proved that a suitable link to address spatiality from a political ecology perspective, comes from the fact that the elements and interactions occurring within any given ecosystem can be represented and explained through the General Systems Theory, and systemic thinking: It was there that I found the notion of ecotone as a dynamic transitional space interacting among different neighbouring ecosystems.

The chapter briefly explored the concept of systems, in order to link it with the concept of Socio Ecological Systems, SES. As it can be deduced, beyond the inner complexity of biological and geochemical interactions within natural ecosystems, and the complex cultural diversity of human ecosystems, such as metropolitan areas; the presence of the SES's notion implies the image of a clash of systems of different nature over the space. There again, the idea of transitional spaces gains clarity thanks to the principles of system theory. As we can see, a system is defined as an entity with spatial limits. Theoretically, there exists a space inside and a space outside of every

system. But there is also another element which will be highlighted for its spatial characteristics: the border space within every system. Something that will prove fundamental for this research.

In the same way, I assumed that the concept of ecosystem involves a dynamic notion of space which can guide the research towards a more concrete sense of political ecology spatiality. As we shall see, the concept of ecosystem shows enough flexibility to adapt itself to different typologies, multiple scales, and diverse forms of social ecological organizations (e.g. ecological populations and communities), either human or not. The question is how to find a common language able to analyse ecosystems of different nature, i.e., human and natural ecosystems. This is the case of the boundaries between urban ecosystems, agroecosystem or natural terrestrial ecosystems. The importance of these edges between urban ecosystems, agroecosystem, or natural terrestrial systems arises from the internal dynamics of how the interactions occurring within any given ecosystem are represented within General Systems Theory, and systemic thinking: It was there I found the notion of ecotone as a dynamic transitional space interacting among different neighbouring ecosystems.

CHAPTER V

From Social Space to Socio-ecological Space

V.1. Introduction

Following the first reflections made on the idea of nature as a geographical and a political space (*Chapter Two*), I followed up by showing how we can arrive at a bi-disciplinary concept of political ecology by adopting fundamental principles of ecological theory and adapting philosophical ideas and political theories that may widen our horizons of power, social organization, and sustainability of our habitats (*Chapter Three*). As a next step, I entered into the principles of systems theory (*Chapter Four*) in order to find a common language between ecology, that is, natural systems, and politics, that is, social systems. This demonstrates not only the possibilities of systemic thinking as a disciplinary link, but also offers possibilities to advance the investigation on the theoretical uncertainties of transitional spaces.

In this chapter I present some brief reflections on the nature of space and its perception, intended to deepen an ontological perspective of environmental spatiality. I stop at the topic of spatial perception because I believe it is inherent to a political ecology approach of reality. Space is not only a phenomenological “essence” which expresses itself on the landscapes of terrestrial geography or in the biodiversity of ecosystems. Space is also a psychological phenomenon based on the sensorial capabilities of living creatures, and therefore it is an object of human perception.

At this point, diverse elements that make up the interdisciplinary framework for my investigation have been progressively presented: a background of geographic and political doctrines about space, an epistemological approach to political ecology, an outline of system theory and social ecosystems. They now merged into a concrete approach towards questions of transition among urban, rural, and natural spaces. In this chapter I present two spatial notions for theoretical consideration: The *social ecotone* and the *ecological interface*. They are meant to shed light on processes of *interpenetration* occurring in socioecological systems, and it intends to become part of a methodology for the spatial scrutiny within political ecology.

Questions arise on why and what for to such a proposal. Are the notions of interface and ecotone not adequate enough to explain the processes of spatial transitions between differentiated systems? What do they add to the idea of space in systems theory? The answer to this question lies on the original systemic concepts of interpenetration sustained by Parsons and Luhman, in the sense that systems of different nature cannot interpenetrate each other. As mentioned in chapter four, this position shows a self-limiting and anthropocentric approach to space. Another expression of the division between the natural sciences, and the social sciences, these ones are understood as human sciences. This division, increasingly questioned, contradicts the universal character that all sciences should have. However, the desire for unification does not mean ignoring the existence of two different dimensions, or if you prefer, two views of reality, two paradigms about structure of reality (Kuhn, 1982). One dimension tries about the biophysical, the natural world; and the other dimension focuses on human nature and its social organization. Two worlds that socioecological systems' theories essay addresses through an integral ecosystemic view of those spatial conflicts

and land struggles developing on the surrounding areas of big urban settlements, affecting the ecological services of human populations.

My contribution in this chapter consists of describing the spatial dynamics of the peripheries and surrounding urban territories in which the expansion of cities become the contraction of agrosystems and ecosystems. This exercise serves at identifying graphically those transitional spaces called interfaces and ecotones, introducing some of their characteristics and properties. By following system's spatial theory (Chapter Four) I come to a preliminary conclusion: when talking of systems of different nature, we face not one interface or ecotone, but two perceptions of what seems one intermediate space. This double ecotone perception makes sense not only under human rationality but it is consistent with the particular structure and purpose of each hybrid system on the geographical space (Meadows, 2008). This is also the reason why I visualize an *ecological interface* and a *social ecotone* as a conclusive proposal for this chapter.

V.2. Questions and Reflections over the Nature of Space

Space is a fundamental theme inherent in all human activity. Our existence, our work, our past, our future, everything happens in space, and in a place. From the complexities of the human being, the human mind, and the richness of language, a series of terms arise that emulate and derive from the intuition, notion, object, and concept that is space. Curiously, space seems to have a double condition. On one hand, being always present within our surroundings, space seems like something to be aware of when perceiving the immediate landscape, as concrete as the distance that separates us from distant objects and tangible in the movement of matter, in the dimension of things. On the other hand, space is invisible; it can go unnoticed, intangible, taken for granted as a

fact of existence which is there but not. In fact, we humans consider this abstract invisibility to be *space*, a kind of mystery that surrounds our existence day and night. There are classical perspectives from which these space problems can be addressed; the epistemological, concerning the logical possibilities to define it and the methodology to achieve it; the ontological, determining what kind of object, substance, or essence it is; the geometrical—mathematical, as it is also a question of dimensions and scales; the physical, as it relates to material terrestrial space, to land, and to geography; the gnoseological, as it concerns different categories; metaphysical, as a wider problem of understanding the structure of reality; and psychological, as space is object and subject of perception (Sato, 2010; Tuan, 1974).

V.2.1. Nature and Perception of Space

The investigation of space as a structural element of human life has been a constant inherent in man's desire to know himself. The question about space is thus implicit in all the activities that humans carry out on Earth. The relationship between man and his space takes on special meaning in the context of the proposal that concerns us, that is, the investigation of space as a category of analysis of Political Science and Political Philosophy.

From the late 18th century up to the 20th century and beyond, the idea of space has gradually taken importance in science and Western philosophy. Discussions of real and absolute space *versus* relational and ideal space, and the relationship between space and time, takes us back to the Leibniz-Newton controversy. From the mathematical-geometric point of view, space will be the place of dimensions, while from the physical point of view, space will be related to the theory of relativity and to the continuous space-time unit. This brings us closer to philosophical dimensions

of the space question where two confronted notions seem to point at opposite directions. First, the idea of space as a social construct belonging to the domains of the so called Second Nature, which results from the work produced by human beings. On the other hand, the idea of space as a constituting element of nature (the first nature) which can be reached by the environmental perception of the geographical and ecosystemic space.

In any case, space as a category brings us closer to dissimilar philosophical perspectives from multiple disciplines, as described by Ferrater-Mora⁴³:

From the psychological point of view, space is considered as the object of perception, and the response to the problem has resulted in different theories about the different spaces (tactile, auditory, visual, etc.), as well as the acquisition of the idea of space (empiricism, nativism, etc.) From the geometrical point of view, space is considered as "the place of dimensions." From the physical point of view, the problem of space is intimately related to questions that relate to matter and time, and the answer to these questions also affect, as in recent physics, the geometric constitution. It is thus spoken in physics, for example, of a continuous space-time. From the gnoseological point of view, the space in terms of special class of categories is examined. From the ontological point of view, as one of the determinations of certain types of objects. Finally, from the metaphysical point of view, the problem of space encompasses the broader problem of understanding the structure of reality." (Ferrater-Mora, 1982 p. 147)

⁴³ Ferrater-Mora. Spanish philosopher of the 20th century. He created the philosophical method called integrationist, with which he aimed to integrate opposing systems of thought. The Dictionary of Philosophy, his best-known work. "The idea of space occupies a prominent place in all the important currents of the nineteenth century, and only radical naturalism will admit, without criticism, an outer objectivity of space. There have been numerous discussions about the absolute or relative, objective or subjective character, of space, as well as on the problem of the relations of space with time and matter (Ferrater-Mora, 1982 p. 146)

Space is also considered a psychological phenomenon and an object of perception. This approach leads one to propose different sensory spatialities (visual, tactile, auditory, *etc.*) and an empirical or natural understanding of the notion of space. The environmental perception of space is one of these possibilities.

In a similar vein, but from another context, we find the characterization of a “lived space” in Friedrich Bollnow’s book *Man and Space* (1969), where he confronts diverse philosophical spatial visions and reformulates his concept of *experiential space*, which breaks with spatial mathematical notions, and preludes the *lived space* of Henri Lefebvre and the importance of everyday life. Bollnow quotes Minkowski,⁴⁴ who argues that space cannot be reduced to geometrical relationships, “that we sit as if, limited to the simple role of curious or scientific spectators, we were outside of space. We live and act within space and in it both our personal life and the collective life of humanity develop” (Minkowski, E quoted by Bollnow, 1969 p.26). Bollnow gives some characteristics of the experiential space, which he prefers to name *espace Vecú*. Bollnow says:

There is a certain central point, which is somehow given by the place of the man who “lived” in space (...) In it the regions and places are qualitatively different (...) The “experiential space” shows true discontinuities. (...) It is not a reality detached from the concrete relationship with man, but from space as it exists for man and, accordingly, from the human relationship with this space, as both are impossible to separate:

⁴⁴ Minkowski, E. *Le Temps Vecú. Etudes phenomenologiques et psycopathologiques*. Quoted by Bollnow, 1969.

"... there is a determined central point, which in some way is given by the place of man who is existing in space (...) In it, regions and places are qualitatively different. It is based on their relationships in a multifaceted structure of lived space, for which there is no analogy in mathematical space. (...) There are not only fluid transitions from one region to another, but also sharply cut boundaries. Lived space shows true discontinuities (...) In its totality, the lived space is not a zone of neutral value. It is linked to man by vital relations, both fostering and restraining. In one case as in the other they belong to the field of the human vital attitude. (...) Each place in the lived space has its significance for man. (...) It is not a question of a reality detached from the concrete relationship with man, but of the space as it exists for man and, accordingly, of the human relationship with this space, since both things are impossible to separate" (Bollnow, 1969, p.25).

But the concept of space will be defined according to the scientific discipline in place. From a multidisciplinary point of view among different criteria, I look for a “common” direction. Space as common for political science, geography, and ecology demonstrates how difficult it is to delimit the transition between social and natural sciences. From the classics of political thought, we saw the importance given to geographical space and how it had influenced diverse theories of state. Space not only becomes a political and juridical issue, but one of the constitutive elements of the theory of state.

Clearly, the earthly space in which we humans live, is that scenario where our existence takes place, where our doings impact, our culture expresses, our development as species reveals itself. It is, as we said, our main scenario. Among the diverse and multiple activities we human undertake, like hunting, farming, building, exploring, studying, we are also fond of making war. But we cannot give exclusive responsibility to geography for that as Lacoste (1976) pretends. Geography- as an archaic notion has served to describe the earth, the land and its elements, to humans. From

the beginning of our saga, nomads or sedentary, we have served ourselves of that particular look, that specific description of the space we confront in order to move on as a species, as people, as nations, as community.

From this perspective, Virilio's (2001) insights on the concept of speed points out the remarkable changes human civilization has achieved, from a *dromocratic* dimension, in the past fifteen decades or so. He establishes a very basic parameter by giving political power qualities to the speed of human actions, setting a social pyramid that expresses a political economy of this velocity property. We can induce that the speed property expresses itself in multiple ways and it has done so along human history, keeping a tight relationship with science, technology, and methodology. The main goal seems to refer to basic communications needs and skills within a systemic matter/energy exchange. Nevertheless, it takes place somewhere in the space.

I arrive at the question of how to understand power in relation to space. The domain exercised over a certain territory can be expressed by the description—the knowledge—of its topography, its elements and accidents such as mountains, valleys, flora and fauna, rivers, forests, minerals, etc., identified as natural resources from which humans serve themselves in first place. If that *landscape* is to be considered either a developing resource or a war plunder is another matter. In other words, it is up to us to consider Geography as a tool or a weapon, which certainly can be both if we accept as a premise that there is a difference between knowledge and the use of knowledge.

We can argue that all political analysis is geographical, one way or the other, because they express events that take place in a certain space where a certain population lives within a certain environment. Therefore, maps as representations of geographical analysis (understood as descriptions or writings of The Earth) are developed over the space which serves as the basis of vital resources. So we can have—for non-military purposes—maps of rivers, mineral mines, forest, farming lands, etc., as tools to arrange and put the territory in order, to govern it, to exercise power in the sense Foucault proposes as alternative: proactive management of developing resources for the good life of the polis, the State, the nation.

Beyond its evolution—from ancient times up to the first half of the xx century—Geography could be considered as a hybrid science, both human and natural. The emergence of ecology has impacted the very objectives of Geographical studies entering in a new period where new methods are required to keep it as an independent discipline. That is why the idea of the Foucault's (2000) methodology of discontinuity seems appealing. And that is precisely one of the questions that this paper searches: how can we express the nature of this discontinuity, besides historical approaches, from a geographical—spatial—point of view? Foucault is useful to our arguments when he connects the city as phenomena deeply related to space, knowledge, and power. He describes the XVII century French conception of the nation's territory following the model of an ideal city becoming a matrix for the regulations of a whole state. Foucault accepts the fundamental relationship between power and space. Curiously enough, many of the canonical utopias—and dystopias—have produced their philosophical and political discourse through the description of imaginary cities and States, where at the end, the ideal society has a correspondence with a certain order of human structures placed in space.

It is also curious—up to a certain point—that the historical work of Foucault lacks a direct relationship with geography, but not specifically with space. There is a constant reference from Foucault to the *Annales* School that can be identified by the periodization of his historical research which reflects certain kind of events that necessarily lead us to a demarcation of space. He seems to be also constrained by the dialectics of natural and human science in which geography appears as an uncomfortable discipline difficult to locate and deeply understand. Therefore, he missed the questions about the possibility of an archaeology for geography, understood as a possibility of interpreting the *discourse*, the mentality, the arguments, and the language of what has been called geography.

But the space and territorial nomenclature are part of a language shared among diverse disciplines for long. Besides geography, hard sciences such as mathematics and physics up to the sphere of arts, architecture, and urbanism; to geopolitics, sociology, even psychology and lately political science, they all have something to say about space. Adding another perspective to the list above, we will approach some environmental and ecological outlooks of space and territory. This common interest is perhaps, as we will see, the very reason why it is so difficult to agree on a sole perception, say, a unique definition of space and its dimensions.

Regarding Bourdieu's (2002) concept of *Habitus*, it seems to have potential as a methodological tool that may serve to identify certain functions and properties of elements related to space and therefore territory, zone, area and other spatial denominations. I must admit that it is not entirely clear to me how to proceed to instrumentalize it, but the proximity of the notion has a

certain resemblance with the concept of *Habitat* and Ecological *Niche*, understood as the interrelationship between organisms and its environmental factors. Meanwhile the *Habitat* describes the position—*the home address*—of the organisms, the *Niche* describes the function—*the profession*—of this population of organisms—or part of it—within the ecosystem. The role of each species in the ecosystem, and thus its ecological niche, is determined by a number of factors, the main factor being competition with other species. All these are useful concepts to handle when relating the ecological notions of population and community with those of human settlement and habitat.

As part of the *Spatial Turn*, which I will look at in the next chapter, we find the concept of *Social Space*, referred to by Henri Lefebvre in its most influential work, *The Production of Space* (1991), we cannot think of it but as a metaphor, certainly a human idea of a very specific mode of how living creatures organize themselves in the *espace première*. Let us not forget that from an ecological point of view, terms like community and society are more than valid for living creatures. And certainly, with respect superior animals (vertebrates), all of them have their way of making a society. Anyway, we are talking here about a category of space, a descriptive one. Real but submitted to a higher conception of space.

That is precisely the case of the urban-rural space relationship. From a systemic point of view the relationship of specific human spaces, say constructed space, can be viewed as a gradient that depart from ‘natural’ pristine original spaces—with no human or minimal human intervention—passing by agricultural spaces where nature cycles heavily rule the agroecosystems and define the characteristic and properties of that space; up to the urban space which being an entirely cultural

construct is evolving at high speed—as Lefebvre well points out—threatening to transform the original ideal polis into chaotic urban planet megapolis. This aspect of space, (understood from a wider astrophysics and philosophical natural conception) is certainly an example of the stage where political science must reflect and do its thinking in order to intervene, say, in “nature’s way,” according to a social flow that would eventually align us —as human species—with the place we are meant to occupy in between the macro and micro cosmos.

Finally, this brief review has connected us to the concepts of *scale* and *territory* to which Amin’s (2002) article theorizes on the emphasis given to the impact of globalization. Amin insists on the need for a new ontology of space, one that can go beyond the fixed definitions of constrained spatial scales as city, region, nation, and continent. He identifies the nature of place/space relationships as a fundamental question of geography. The author warns us about the traditional approach that tends to view globalization through a historical sense of scale interpreted as a spatial process of tensions between territories. He argues that the notion of scale should be approached in plural, that is, the existence of a complexity scale, or many different forms of scales.

Though we agree with Amin’s statements, we would add to the quest for understanding the relationship between spaces and place the search for the link that allows those relationships between two notions united by ontology. We cannot detach ourselves from what we consider a fact: the uncertain nature of space. Though being emptiness, a void, still it refers to a materiality, an existence, a certain intangibility given its mathematical nature, and still part of the sensible world. In any case, away from abstractions and depending on the sense we give to the word space, we can look at a place as a sub-system of a major space scale. For us, a *scale* is a way to perceive

quantity as a reality that can be sensed independently whether the scale is used for measuring qualities of the elements or individuals or not. As any natural, geographical, or social phenomena changes in size, intensity, volume, or time, its process of change usually transform—metamorphosis—into different qualities, changing its nature (ontologically) or at least the way it is being perceived. In geographical terms, I am thinking of scales to be from mountains to hills, seas to oceans, bushes to forest, populations to communities, etc. Again, we think it is important to look in-between, where the scale changes from quantity to quality. In this respect, ecology offers us the crystal of the ecosystemic perspective as a way to connect things, places, and individuals without so much concern for the scale and its emphasis on size, but as a tool to identify the interactions, the relationships which Amin seems to be searching for. As we have mentioned before, those spaces are conceptualized in ecology as ecotones, as we will see in the next chapter,—places of energy and information exchange—and can be translated into environmental terminology as interfaces where Lefebvre's scales of imbrications and spaces of dependence are found. Veering off from an exclusive anthropocentric point of view, we can see that in nature (in the ecosystem) scales exist as part of the interconnected web of living creatures and abiotic elements. And as they sustain life, human life is bound to this scale in different ways.

We can argue then that the conflict or difference between the concepts of place and space is non-scalar. But again, a first property we can view on the notion of *place* regarding its peculiarity as a non-scalar concept is the idea of *position*. Beyond the local/global dualism related to the notion of place, from a geopolitical or geostrategic point of view, the position that a place occupies has great significance in its functions as part of a system. From this consideration we can arrive once more at a scalar consideration, but even more important than quantity is the quality it gives to

surrounding space relationships, that is, its function as a connector between places. So, the position becomes a very important property of a place: beyond the geostrategic placement of a coastal shore, a forest, a river, the human factor, a road, a bridge, a city, it can work as connector within a bigger space creating circuits, flows. From here we can derive a relationship to the concept of *domain* as an effect over territory and making an essential difference with sovereignty. In our specific case, the question is how to analyse the notions of space, and from which perspectives? Multidisciplinarity advocates for looking from more than one point of view simultaneously. But the questions remain: What new approaches and methodologies should be incorporated in order to give a contemporary sense to urban spaces and regional territories? Can a socioecological systemic notion of spatiality help us to discover the thresholds of the social production of space? Can perceiving transitions in the geographical continuum help us to understand space as the scenario of power? What are we to understand by power in order to read the space?

To end these brief reflections, I have chosen the work of Robert Sack where he explores the many *Conceptions of Space in Social Thought* (1980), precisely because it offers a universal geographic reference focused on the social sciences. In referring to space in clear terms, Robert Sack provides a straightforward explanation based on a combination of the *principles of action by contact* and the first law of thermodynamics, or law of energy conservation. Sack rightly points out that, “This conflation is the primary way in which space is conceptually, albeit mostly unconsciously and uncritically, recombined to substance and time in social sciences and in

practical view. It is the way in which space and its properties can be seen to affect things”⁴⁵(Sack, 1980, p. 9).

Thus, the principle of cause and effect, which is essential in our way of seeing the world and which influences scientific and social practice, takes concrete form in the combination of the principle of action by contact and the principle of conservation of energy. Sack uses the example of the theory of infectious diseases to illustrate this point. He also explains that the first conceptual connection between *substances* (things or elements) and space is given through the location of the former in the latter. For Sack, there are two ways to approach the meaning of space. The first is the logical and conceptual connection that occurs between spatiality and matter through the location of *substances* (things or elements) in space. This is what allows for describing and particularizing facts and phenomena. The second way of understanding the meaning of space is the conceptual connection that occurs when the meaning of spatial properties of things and elements is established according to laws and scientific theories (Sack, 1980, p. 14).

⁴⁵ Sack schematically describes an example of interactions between *x* and *y* that either occurs through direct contact or due to a series of substances (*a, b, c ...n*) that connect *x* with *y* when they are physically separated. These substances are represented as mediums, connectors, or networks. Sack argues that if these connecting paths do not exist, then it cannot be said that *x* affects *y*. However, Sack adds, if we insist on the interaction between *x* and *y* in spite of not objectively observing connective substances, this would mean there must be another way of seeing or perceiving space. Looking at this phenomenon from an opposite perspective, Sack summarizes that the properties of space, such as distance and location, do not themselves have any influence on substances. On the contrary, they are the "substances in space with spatial properties which affect other substances in space with spatial properties" (Sack, 1980, p. 9).

Sack also suggests that approaching conceptions about space leads to establishing a division between space and the elements (i.e., substances or things) that occupy it. They are two separate but intimately linked conceptions that recombine in different ways, constituting complex indicators of different conceptions of space: social, scientific, socio-scientific, aesthetic, child, pragmatic, and mythical-magical (Sack, 1980, p. 23). He proposes a theoretical framework of human geography for space that is based on an integrated 'landscape' rather than a dialectical scenario. It establishes three spatial domains (the domain of the physical sciences, the domain of art, and the domain of the social sciences) to be understood from two different perspectives: the objective views of the sciences or the subjective visions of the arts (Sack, 1980, p. 24).

This framework makes it evident that the relation between space and substance (i.e., elements and things) that characterize each spatial conception depend on the degree of objectivity and subjectivity with which the facts to be analysed are designated, and the way in which they are performed. Because of this, a clear understanding of the concepts of space in social sciences is necessary to evaluate the contributions of both approaches and determine to what extent they can be separate and still remain within a scientific conception capable of offering a comprehensive view of human behavior (Sack, 1980, p. 24). The two perspectives noted by Sack—the objective and the subjective—are particularly important for understanding human spatial organization beyond traditional and purely anthropocentric visions. In Sack's view, they allow for locating important elements of social practice according each of the three domains (i.e., the physical sciences, the arts, and the social sciences). Beyond this, the author continues to develop his theory from two perspectives. The first, referred to as 'sophisticated,' is demonstrated through fragmented spatial patterns. It developed initially from the legacy of the 'objective' physical sciences, on

which a realistic view is already based with respect to the so-called positivist objectivity. Because of this, Sack adapted his view of the subjective characteristics of social sciences to be closer to their own uncertain nature (Sack, 1980, p. 35-108).

The second perspective, referred to as 'unsophisticated,' is demonstrated through molten spatial patterns. In it, the objectivity of the world's gaze is an exercise closer to the natural and the primary. This is why Sack describes it based on Piaget's theories (i.e., the child's experience of seeing the world), which provides a stronger subjective view. Sack's phenomenological view is a space where the senses and emotions are also elements (i.e., substances) that build the perception and conception of space. Myth and magic are part of the symbolic domain of art, understood here as the language to express and describe the reality that connects with the human psyche (Sack, 1980, p. 121-148). Given that his conception of space provides many theoretical possibilities leading to different routes, this research will not further explore his framework. Instead, it will focus on finding those elements (methodological, conceptual, and factual) that can provide inputs to advance the construction of a preliminary spatial theory for political ecology. Adopting these conceptual elements of Sack's theoretical framework for social space provides ample substance to support and elaborate on some of the claims this research is seeking to advance. Given the still-uncertain epistemological position of political ecology as a discipline, it is important to add that this provides input into discussions regarding contested—or false—dialectics between positivist objectivity and social subjectivity.

Sack's theoretical framework can be adapted for research into socioecological systemic perspectives. It offers imaginative possibilities to transfer what Sack calls *the art domain* into a

notion that could work for physical and social sciences as well as culture. This realm could be considered *the symbolic domain*, which incorporates most of the fields that express observations and perceptions of reality: language, alphabets, numbers, geometry, music, color, gestures, movement, etc. This symbolic domain allow for work within the principles of human ecology, at the interface of anthropocentric and ecocentric perspectives, at two different dimensions: one, to study human spatial behavior from an anthropocentric point of view inside socioecological systems (i.e., biotic and abiotic elements) by identifying which spatial domains are prevalent (i.e., the physical, the social, and the symbolic); and two, to study spatial characteristics from an ecosystemic point of view (biotope, biome, agroecosystem, urban ecoregions) in social ecological systems where human populations live. His arguments feed the possibilities of other scientific views that, by being ‘subjective,’ give a threshold for non-anthropocentric interpretations and representations of social ecological spatial realities.

V.3. The Transitional Spaces of Political Ecology

V.3.1. The Space of Nature in Humanized Natural Spaces

From a politico-ecological perspective, as previously explained, we can argue that the notion of *natural space* refers to a broad concept of ecosystem understood as the basic spatial unit of the biosphere, formed by the interaction between living organisms and the chemical and physical components of the environment. Thus, considering the concept of biotic community in relation to the inanimate environment, we find that these elements act together as a system. The abiotic elements of the physical environment are added to the biotic elements, synthesizing an ecosystem. From this elementary structure, we can differentiate ecosystems by their location on the terrestrial surface, which implies a climate and a particular geology, or topography, which in turn determines

the fauna and vegetation of the natural environment and the landscape. This location, or habitat, is expressed in the interaction and regulation of functions between biotic communities spatially organized in a territory, which we call natural space. Before the emergence of homo sapiens, the natural spatial order product of successive ecosystems evolved, reproducing itself. Hence, this evolved natural space of hundreds of thousands of years of evolutionary history, should be considered as an independent reality of man, to whom nothing owes its original natural evolution. That story will change after the Paleolithic era.

However, from the geographical and ecological points of view, it has been argued in favor of a broader vision of the notion of natural space. One argument for widening its meaning is to balance the small number of "pristine" natural spaces still existing due to human activities. Given that human intervention is present in practically all regions of the planet, I choose to give another meaning to the notion of natural space. For the purposes of this research, I will call 'natural spaces' those biomes, or natural regions, in which the characteristic plant and animal communities live in dynamic homeostasis with their environment; and at the same time, have sufficient carrying capacity⁴⁶ to adapt to external conditions of their environment (humanized spaces). The *carrying capacity*, also shows other inherent features that counteract any the *limiting factors*⁴⁷ present in an

⁴⁶ The ecological carrying capacity of an ecosystem is the maximum growth limit of a biological population that the environment can support in a given period, without negative effects on that population or on the environment (Wagner,1999. p.167)

⁴⁷ Limiting factors are the components of an ecosystem, whether biotic or abiotic, that limit the distribution or number of components of a population. Biotic limiting factors include interactions of organisms, such as competition or predation, and abiotic limiting factors include physical components of the environment, such as temperature, salinity, pH, oxygen, carbon dioxide, light, hydrostatic pressure, water flow, wind speed, type of substrate, amount of rain and humidity. (Odum, 1989 p.129)

ecosystem. The most important of them is well explained by the concept of *resilience*, allows the ecosystem to self-regulate, compensate and neutralize impacts that occur in the core or the periphery of their space, caused by interactions with biophysical factors, including of course human beings.

From this point of view, the proposed notion of natural space preserves the fundamental properties that define its functionality as a physical and biological system; humans' presence is considered an external element to the natural space. It also gives us the opportunity to focus our attention on peripheral or indirectly established interactions. An example of this peripheral interaction of the natural space in contact with human activity is clearly specified in the so-called boundary line or agricultural frontier, understood as the space that delimits cultivation areas from natural ecological formations, especially forests. As this line moves, the forest undergoes a process of gradual elimination.

During the high peak of the agricultural frontier extension in Latin America (Eichler, 1966: vol. II p. 416), a spatial classification concerning the *Habitat and the Conservationist Fronts* around the planet was prepared by the *International Union for Conservancy of Nature*, IUCN⁴⁸, where it defines a protected area as, “a clearly defined geographical space, recognized, dedicated

⁴⁸ **The International Union for the Conservation of Nature (IUCN)** is an organization composed of sovereign States, government agencies and civil society organizations, based in Switzerland.

and managed, through legal or other effective means, to achieve the long-term conservation of nature with associated ecosystem services and cultural values”⁴⁹ (UNEP-WCMC, 2018).

V.3.2. Environmental Perception: the empirical observation of spatiality

As stated in the main introduction (Chapter One), an initial fieldwork approach to social ecological systems can be obtained through environmental perception. Closer to a qualitative research methodology, the environmental perception’s framework favors inductive methods of theoretical construction taken from empirical observations. This method has been used as a tool to identify values that confer qualities to the environment and is used as part of a more complex methodology of environmental analysis to address theoretical, empirical, and technical dimensions. It has been defined, “as the process of acquiring knowledge through the senses and understanding of the environment by humans. It involves, therefore, not only the perception through sensations, but also cognition, prior or subsequently acquired by intelligence” (Castello, 1995) (Lineu, 1995, p. 142).

⁴⁹The definition is compatible with the Convention on Biological Diversity (CBD) signed during United Nations Congress on Environment and Development in Rio de Janeiro, 1992. Adopted by United Nations Environmental Program, this Management Categories of Protected Areas of IUCN still serves as general parameters to establish a differentiation of possible natural spaces according to the new contemporary ecological context: 1. Areas of natural concentration of species: It would correspond to the ecologically pure space, in a state of natural succession and homeostatic equilibrium. They are the remote regions, the virgin jungles, the ecosystems separated by great distances of human agglomerations. 2. Economic landscapes: It is related to the primary forests that are preserved and/or the protective plantations that are established in the limits of the geographical areas subject to economic activities, mainly agricultural. 3. Protective areas: Those areas contemplated by law as protective areas, such as water divides and mountain slopes, springs of water, riverbanks, etc. 4. Areas under the spatial administration regime: They are national parks, forest reserves, nature reserves, biosphere reserves, wildlife refuges, natural monuments, etc. See: Management categories of protected areas of IUCN: <https://www.iucn.org/es/regiones/am%C3%A9rica-del-sur/nuestro-trabajo/%C3%A1reas-protegidas/categor%C3%ADas-de-manejo-de-%C3%A1reas-protegidas-de-uicn>

Environmental perception is a method frequently used today by disciplines such as geography, ecology, and sociology, though it was formally located in the field of psychology. Researchers using perception as a tool are often attempting to determine the basis for methodologies that seek to exemplify the "Perception of the Environmental Structure": a structure that is determined by the relationships between people and their environment and is expressed through recognizable spatial 'patterns' (Tuan, 1974, p. 3 / 113-128). This type of research values empiricism and intuition as instruments of phenomenological knowledge. It identifies two methodological trends: the first is structuralist, which aims to identify the components of the environmental structure. Within this research study, this refers to the structure of social and ecological systems and their elements. This means taking into consideration the properties and functions, inputs and outputs, and the interactions within a system and with other bordering systems.

The second trend is phenomenological. As such, it is a subjective and idealist perception and description of how the world manifest itself to consciousness. Through this lens, the presence of topological space attributes is also analysed by examining the sensations that they transmit to their users (Castello, 1995). Being phenomenological, these observations must be made at three empirical scales of action: the micro, medium, and macro. These scales are considered part of a continuum that spans from a house, through a neighborhood, to the city, region, nation's territory, and then global space. Among the techniques used are so-called "urban walks" and implementation of mental maps techniques (Gehl and Svarre, 2013; Lynch, 1960), through which the elements that structure the city images, as well as people's perceptions of them, are identified.

Following a socio-ecological systemic approach, I provide a number of generic examples from direct empirical observations of urban areas and rural peripheral landscapes, aiming to identify and describe potential sites of transitional spaces. The goal of this exercise is to contrast and compare the nature of these places with the theoretical body corresponding to spatial ecology (i.e., succession, ecotone, and border effect) together with sociological notions of space.

As previously noted, these observations must be made on at least three empirical scales of action: 1) the micro-scale, at the personal or group habitat level; 2) the mid-scale, at the level of collective habitat; and, 3) the macro-scale, at the level of larger territorial units, such as cities or populated regions. Given that these scales are on a geographical spatial continuum, environmental perception implies the existence of a systemic vision that seeks to identify the constituent elements and relationships inherent to the socioecological systems. Nevertheless, the indispensable spatial practices including walking in the city (De Certeau, 1988, p. 91; Buchanan, 2000, p. 108) meant in this case crossing from the urban core towards the peripheries, but also conversely, trailing the peripheral fields of neighboring rural spaces into the urban lands. The walking practice is not only a theoretical exercise, however; it is a type of fieldwork that can be performed archetypically in medium-sized cities (up to one million inhabitants) in order to obtain a general vision and pattern, though at other scales it is not really feasible. I chose a number of pre-determined locations that met the general criteria for defining transitional spaces, interfaces, borderlands, and ecotones within the urban-rural-natural continuum. Expanding on the notions of public space and public life, I included built environment and the places in between (Gehl and Svarre, 2013), considering physical and biological elements of the urban system, i.e., rivers, parks, forests, agricultural fields, bridges, roads, etc. as spaces belonging to the realm of public life. These locations were used to

test, compare, probe, or dismiss some of the theoretical findings from the proposed concepts of social ecotone and or ecological interface, providing inputs into a spatial theory of political ecology.

The insertion of environmental perception in environmental analysis methodologies seem to be a common practice in the literature on the subject, which deals with aspects such as: the language of spatial patterns; the qualification of structuring landscape attributes; distinction between space and place through affective ties; environmental communication processes; and, human behaviour (feedback) to the 'messages' (indicators) issued by the environment.

V.3.3. Perception and representation of spatial dimension

I have followed the epistemological work of the Swiss geographer George Nicolas Obadía, professor of the University of Lausanne relative to his observations on the problem of representation of the spatial dimension. In his work, *The Space of Geographers, Epistemology of Geography* (1991) Obadía argues that classical and neoclassical geography has remained, to this day, clinging to the cartographic view of space as two-dimensional (Obadía, 1991, p. 91). To demonstrate this assertion, he elaborates an intriguing theory based on Jean Piaget's research on the development of human intelligence and its relation to the construction of perceived space.

According to Obadía, the idea of the space of topological reference is implicit in the use of methods of analysis privileged by geographers. Specifically, the differences between totality and parts, where "the spatial relation given by primitive perception would be then of closeness,

separation, order, involvement, and continuity. These relationships are of a topological and non-Euclidean nature and are incorporated into the working mechanisms of the schemes” (Obadía, 1991, p. 96). Following the reasoning of Piaget, the author confronts the concept of projective space with that of Euclidean space. The projective space—despite using three dimensions—is constructed through the projection of the two-dimensional line (up, down, left, right), which then becomes a topological line thanks to perspective, but does not become a three-dimensional space. In formulating a series of critical observations on the use of space by geographers and their spatial representations, however, Obadía recognizes the representative subjectivity of Euclidean space and is therefore accepting of the search for multidimensional spaces and other spatial categories.

It is at this point that Obadía introduces the reader to the methodology of Camille Vallaux, disciple of Paul Vidal de la Blanche. For both Vidal de la Blanche and Vallaux, the direct visual perception of the landscape, together with long walks—*des promenades dans la campagne*—across fields, villages, and cities, was the chosen method to discover the geography of places and regions. A method that much later was claimed by geographers and sociologists such as Lefebvre, De Certeau, and Bourdieu, under the concept of “walking through the city.” The geographer’s work in perceiving the surrounding landscape begins on the terrain itself in a “journey of the horizon,” or an overview from a privileged point. According to Obadía:

From these points the geographer observes all the sets made (the complexes) that can be grouped in his field of vision: the relief, the running waters, the stagnant waters, the marine waters, the atmosphere, and the associations. It is evident that the topographical map is insufficient to carry out this work (...) For Camille Vallaux, consequently, geography must be freed from the subjection of the map and establish an immediate contact with the outside world (...) If the theses of Camille Vallaux ended up succeeding, it is because they are based on a correct analysis of the circularity of the relationship established between the geographer and

the observable objects, material or immaterial. In effect, ‘complexes’ constructed from observation cannot be understood without using non-geographic systems. (Obadía, 1991, p. 108)

Although Obadía warns about the abuse of non-geographical interactions to explain geographical space, he nevertheless reiterates the need to understand how to select non-geographic facts, and in particular those that explain the differentiation of space, in order to recover analysis of spatial or general causality by means of representations —Euclidean or not—made by an observer. Vallaux's proposal, in this research's view, is an advance—and perhaps the origin—of what we know today as the method of environmental perception, hence its relevance to this study.

V.3.4. An Ecological Perception of Space: Autecology and Synecology

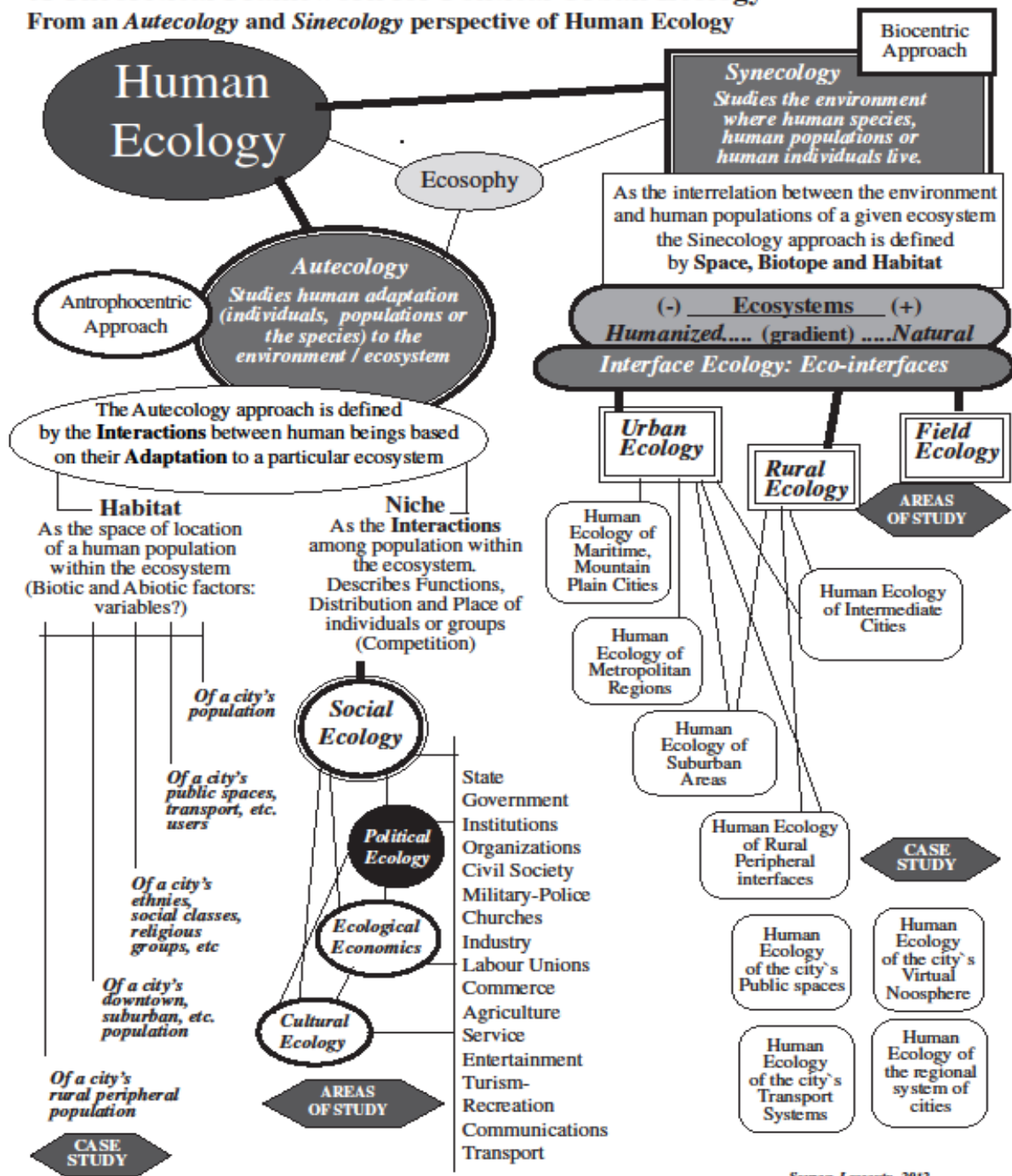
In 1963, Eugene Odum defined ecology as the science that studies the structure and functions of nature (1982). He proposed to divide it into several branches from which the most important are: *Autecology*, referring to the study of the relationships and adaptations between organisms of the same species and the environment where they exist; *Synecology*, the study of the relationships between different species grouped in the same place, and the environment surrounding them; and Populations Dynamics, dedicated to analysing the causes of the abundance and variation of nature as well as the balance of nature in the rural and urban human environment. Besides these strict ecological interpretations, I am adding my own views from a human ecology standpoint. In this case, I seek alternative perspectives for understanding the role of space as key element of political ecology. As concepts borrowed from systemic ecology, and depending on a spatial perspective, it becomes a modeling method for observing socio-ecological spatiality.

From a human ecology perspective, autecology is concerned with the nature of the interactions among humans and between them and their environment, be it natural, modified or constructed. (see fig. 4). It could be argued that this approach is closer to anthropocentrism, as attention is focused on human agency. Humans study themselves as a species. Therefore, researchers perform autecology at multiple levels. Nevertheless, the same autecological perspective is used by scientific ecology to observe and study any form of life on the planet. It is, therefore, an observational method focused on the perspective of only one species, amid a surrounding ecosystem.

Habitat is the place that individuals or groups occupy within a given ecosystem. In urban ecosystems, for example, you will find that differences in habitat location translate into degrees of access to public and ecosystem services, proximity or remoteness to hazardous areas, *etc.* The ecological niche represents the set of functions that each individual or group perform within the ecosystem. It is the concept of division of labour in human ecology terms. As previously stated, this ecological dimension of spatial differentiation shows the socio-economic and political orientation of human ecology. In this sense, human ecology becomes the disciplinary link to social and political ecology. For social and political ecology, using autecology's approach means keeping a focus on human behaviour and adaptation to environment in two distinct ways: the habitat and the niche.

On the other hand, *Community Ecology* or *Synecology* is a sub-discipline of ecology that studies the composition and structure of communities formed by different species; their changes that occur over time; and the relationships between the species of the community, *etc.*

A Theoretical Framework for Political Urban Ecology From an *Autecology* and *Synecology* perspective of Human Ecology



Source: Lasconts, 2012

Figure 4. Autecology and Synecology approach for Urban Case Studies

As described by Schroter in 1902, synecology analyses the relationships between individuals belonging to different species of a group and their environment. While autecology focuses on a single species, synecology studies the interactions among diverse and multiple species, at different spatial and temporal scales. If adapted to human ecology, it would encompass a historic and spatial concern for human socio-cultural diversity at biospheric scale (Earth). It would study the structure and organization of specific human ecosystems (cities and rural areas) and the nature of specific individuals or groups of individuals' environments (neighbourhoods and hamlets). It can be argued that synecology provides a closer biocentric or ecosystemic approach, or at least less anthropocentric (See fig. 4). The reason is due to the way the researcher's attention widens to consider the whole and the part (human /environment) with a single systemic glance. It offers an integrated vision of biotic (human/non-human) and abiotic (geophysical-chemical) elements within a network of ecosystems considered as a geographic spatial continuum.

The possibility of becoming the observer and the observed at the same time may offer new perspectives about the object and methods of political ecology. Instead of enforcing dualistic perspectives, autecology and synecology approaches could create a methodological platform to view our own agency from within and from without the social ecosystem space. That could mean a breakthrough, the notion of an ideal objective observer supported by positivist paradigms going beyond the dialectics of the human/nature divide. In this sense, human ecology becomes a disciplinary link between social and natural sciences. In the case of human ecology, the role of autecology and synecology can be considered beyond just being a branch of general ecology. They could be integrated as components of a methodology of observation and environmental perception that works to analyse the same reality from two different spatial perspectives. In this sense, as we

will see ahead, following Lefebvre's trialectic logic we could argue that the operation of spatial integration between *the autecological and synecological perception* would represent a breakthrough within the dialectic of natural space and human space, which should be concretized in a third space conceived, perceived, and lived. It would be the space of humanized ecosystems, an interface, physical, biological, and socio-cultural at the same time.

Obviously, developing working hypotheses, methodologies, and an eventual theory would encounter many obstacles. Even when human ecology follows the general parameters of natural ecology, "the human species belongs to a particular biological species, with multiple endogenous characteristics that transcend the ethological parameters of other species" (Nazareth, J., 1993). In addition, the possibilities of modifying its environment and building its own environment make it a highly complex living organism. A basic synecological principle is that all species have the same interest to be studied. If the "general ecological approach is to consider all species on the basis of equality, in human ecology a particular species stands apart and becomes a 'reference group' self-ecology, or anthropocentric ecology" (Nazareth, J. 1993). Structural human ecology "emphasizes that basic features of all ecosystems, such as demographic and resource factors, and the material conditions of human ecosystems, such as the mode and scale of production and consumption, are key drivers of anthropogenic environmental change" (York, R. and Rosa, E. 2012). The combined autecology of individual species is expected to reflect the synecology of their respective functional groups and *vice versa*, but this assumption has not been adequately assessed.

V.4. FLACAM Methodology

Environmental Perception and Interface Identification

Among the methods used by *The Latin American Forum of Environmental Sciences*, FLACAM,⁵⁰ the *environmental perception* is the key methodology for environmental planning using its action-research methods, also known as the ‘the project process.’ FLACAM, has developed multivariate analyses of diverse information systems leading to inter-sectoral diagnoses via *interfaces*, or the *perception of interfaces* (R. Pesci, R., Di Castri, F., Folch, R. et al. 2004). The method of perception is used by FLACAM researchers all along the process of building the project. Perception is one of the tools that can be used to approach social groups and cultures in order to produce a diachronic forecast. Furthermore, after applying pre-designed ‘patterns of action,’ the FLACAM methodology reviews those identifiable interfaces in an effort to preserve the local culture and actors’ involvement. This allows for a redesign of urban space, giving shape to four different patterns: *Eco-form*, *Socio-form*, *Time-form*, and the *Management form*. All four constitute what is known as the ‘morphogenesis design’ of FLACAM’s environmental project process (Lascoutx, 1997a)

⁵⁰ FLACAM: Based in Argentina and represented in eleven Latin American countries, this methodology has been endorsed by the *Man and Biosphere* Program of UNESCO to conduct environmental research. It has developed a methodology based on ecological concepts as research-action proposals for sustainable development praxis and environmental planning. It is based in Mérida, Venezuela, at the *Inter-American Center for Environmental and Territorial Research and Development* (CIDIAT). I acquired the method during the seminars of the Master's on Sustainable Development in 2006-2008 at FLACAM’s headquarters.

V.4.1. Social and Physical Interfaces

The concept of Interface comes from both ecology and physics, and represents a novel notion of great analytical and operational value that has been originally developed for the study of metropolitan areas by urban ecologists. As stated by the research architect Jorge Pérez, from the Latin American Faculty of Environmental Sciences, Flacam: “The interface is the meeting point and superposition of different systems, through which there can be multiple channels of interrelation, capable of containing intense flows of matter, energy, and information” (Pérez: 1995, p. 36). Thus, the ecosystem approach of the Interface—or point of exchange between two or more subsystems—has contributed to the development of new perspectives in the study of the relationships between urban and rural spaces (Lascoux: 1997).

FLACAM’s interface methodology has advanced since its formulation during the 1990s, and now incorporates various points of view. The first step of any FLACAM project is to identify the interfaces as *an interpretation space*. From a neatly urban perspective, FLACAM proposes two different types of interfaces in order to understand city systems. *The Active or Social Interface* typically refers to areas and places related to the notion of public space, and which are understood as sites for encounters and exchanges: parks, bus terminal, theatres, markets, etc. *The Passive or Physical Interface* refers to material urban structures or natural geographic accidents that by their very nature serve to unite or divide different areas of a city: rivers, channels, tunnels, bridges, highway, etc. For its communicational value, they consider two types of interface: “1. *Positive interfaces*, that allow and provoke the elaboration of information, or that adequately perform their role as edge or separator. 2. *Negative interfaces* (that do not allow it or provoke it or that are ineffective in its role of channeling flows of matter or energy.” (Pérez, 1995. p.148). Interfaces are

the meeting and overlapping points of different systems, through which multiple interrelation channels can occur, capable of containing intense flows of matter, energy, and information. An interface is, in this sense, a zone or area of great diversity; if it is organized around the competitiveness or struggle for predominance by the niches it contains, it can become an area more significant than the phases of its own system.

The interfaces of urban and rural systems can be recognized as: 1. The zones of exchange between ecosystems strongly disputed by anthropic pressure. 2. The point of maximum conflict in the country-city dialectic. 3. The point of maximum conflict in the center-periphery contradiction. 4. The point of maximum social interaction between different groups. 5. The point of social centrality (Pesci and Perez, 1995). But recognizing interfaces allows for something greater than just drawing a line among different ecosystems. It is a tool to identify the range of interactions that take place within and between the urban, rural, and natural spaces of city regions. From the interface perspective, we can deduce the properties and functions of these border areas and how they impact the urban territories of an intermediate city as a whole.

But the study of the concept of Interface also represents a spatial element of great importance for geography since, from the systemic point of view, there is a strong exchange of information between one system and another. Hence, the interface can be defined as the transition space between different geosystems. Theoretically, this allows us a particular geopolitical reading of those areas or territories where formal elements—such as borders or sovereignty—are presented in a diffused and contradictory way.

TYPES of INTERFACES	FUNCTION	SPACE and URBAN ROLE
SOCIAL (active)	Elaborator, re-processor or transmitter of information, communication and decision making.	Political and civil institutions
		Cultural and recreational institutions
		Community organizations (non-formal)
		Urban productive centers
		Communication Media
		Open spaces
PHYSICAL (passive)	Separator - Border - Boundary (internal or external) between urban territories	Natural conditioning factors to external and <u>internal urbanization</u>
		Built conditioners (large infrastructure and equipment)
		Jurisdictional and normative constraints
		Marginal or non-formal built areas

Table 1. Types of Interfaces according to the FLACAM Model

By combining the various elements exposed in the notions of Interface, we can attempt a conceptual approach appropriate to the field of urban ecology. Hence, in political terms, an urban Interface is the physical or social space (real or virtual, tangible or intangible) of interaction where diverse interests coincide or face each other, through multiple media and channels and in different spheres of the urban system (the citizens) and the particular interests of stakeholders within the social systems belonging to the metropolitan area (the private).

We say that the urban Interface is physical (real or tangible) when its function is to serve or act as a separator, border or limit (external or internal) between sectors, areas, and urban territories.

Its most diaphanous expression is the municipal borders of the urban territory, which can be natural determining factors of geography (rivers and mountains); large artificially built conditioning structures (Wall, highways); Jurisdictional and regulatory conditions (residential, industrial, and commercial).

We say that the urban Interface is social (virtual, abstract, or intangible) when they have a unifying, elaborating, re-elaborating and / or transmitting information, communication, and decision-making function. Its most exact expression is represented in the spaces occupied by municipal or provincial institutions and organizations of a political, economic, social, and cultural nature, within the national or regional scope.

To understand the nature and dynamics of these interactions, this research proposes an approach from within the paradigm of sustainability. That means to consider the city-region from the multiple dimensions of sustainable development: political, economic, social, environmental, and cultural. This approach allows us to profile the metabolism of the organic city and measure its homeostasis and resilience capacity in five different areas of human habitat organization.

In my own adaptation of the FLACAM methodology, the first step is to observe the interface from the urban point of view. Firstly, how the state-municipality behaves in relation to a space that does not belong to it, in political-administrative terms. At this stage, the expansion movement would require arguments (its discourse), strategies, and practices to widen, as well as clarify the role of expansion as a stimulating element of administrative growth and territorial domain. Secondly, occurring simultaneously, the local or international agents of capital who bet on the

appropriation of that space must be identified. The role of interdependence of city and countryside must also be identified in terms of objectives (in either sustainable or unsustainable management systems). Finally, the role of the citizens in relation to that space.

My personal strategy has been to combine this point of view with a perspective from the other shore; that is, to identify interfaces from the point of view of the rural space (as a social agroecosystem). This Rurban transitional space is the first trench where a different economic, political, social, cultural, and environmental rationality advances from the city. It is comprised of: a) the local governmental vision: urban-rural municipality, b) agents and economic actors, producers, as well as local, national, and international capital, and c) the rural population and its relationship with the city. In order to complete my own classic triad, there must be a perception of the interfaces from the spatial position or perspective of natural spaces as the ecological factor (i.e., ecosystem as an actor) that are involved in the development of reading and describing the general landscape. This includes: a) the vision of the national, federal, or provincial state, b) political speech regarding the territory or region involved in the expansion process, c) the ecosystem from the socio-environmental point of view, as well as the bio-geo-chemical reality, and d) the ecological- environmental vision of both rural and urban citizens regarding their relationship to those spaces, which would demonstrate the level of ecological discourse and the flaw spot where greater citizen environmental education is required.

The interface concept offers a number of paths to follow. For example, it can make up part of a human ecology perspective in what I call the social ecology of interfaces. Within the spatial dynamics of our species, ecotones and urban and rural interfaces represent an uncertain territory

where human-nature and human-human relationships adopt particular characteristics that differentiate them from conceptually pure spaces, such as the city, the countryside, and certain natural spaces. This reality, still palpable in large territories of the American hemisphere, is observable in the processes of organically disorganized human settlements, like the misery belts, barrios, and favelas existing across numerous third world cities from underdeveloped countries. It is expressed most dramatically in the expansion of the agricultural frontier at the expense of forests and other natural areas, as well as in urban expansion at the expense of rural spaces.

Efforts to achieve satisfactory levels of territorial management that meet the requirements of environmentally sustainable development as well as equity and social justice have been hampered by a lack of understanding regarding the potential (i.e., conceptual and methodological) of human ecology to support this objective. The study of various interfaces and ecotones (field-city, field-natural areas, city-natural areas) from a human ecology focus would allow for the identification of a range of specific interactions that are expressed in those spaces. This would offer answers—from a social, economic, political, cultural, and ecological perspective—to the origin, development, and resolution of socio-environmental conflicts that are characteristic of the population dynamics of the 21st century. These transitional spaces would also serve as a tool to measure gradients of human habitats and environmental interaction on a scale that could be applied from mega-cities to rural settlements to remote territories and natural spaces. Indeed, Interface Social Ecology can play a role in an urban and rural geography perspective. Given that the rural interface is situated, theoretically, between the city borders and wilderness frontier, methods to identify and analyse the geographical continuum may be drawn from it, giving values, properties, and characteristics to those uncertain spaces. Furthermore, the social ecology of interfaces could also play a role in a

political science perspective. Because of this, the interface concept proposed by this research is directly linked to the concept of ecotone and the systemic perspective of ecology.

These interfaces are understood as humanized spaces of high energy and information exchange among individuals or groups of individuals, and between those individuals and their surrounding environment. The interface spaces help us to pinpoint the social, economic, and political networks of interactions within human habitats, communities, and populations. This concept can also be transferred to geopolitical scenarios of international relations. Several previous researchers, besides the purely geopolitical ones, provide a possible path to be explored through the analogies of the interface notion. In this vein, we acknowledge the ideas led by James Rosenau and his concept of overlapping local-to-global politics spheres; the work developed by Andrew Hurrell and his interdependent global political ecosystem (Hurrell and Kingsbury, 1992); and the research of Venezuelan Elsa Cardozo on the multiple dimensions of cross-linking geographical fronts.

V.4.2. A typology of Transitional Space: Properties and Functions

The following Table 2 is based on FLACAM's methodology. Seeking to convey a better understanding of the nature of Transitional Spaces and a view of their potential characteristics, properties and functions, I propose a description from elemental criteria of four different approaches, i.e., *Politico-Juridical*, *Socio-Economic- Geographical*, and *Ecological*. (See Chart page 275)

1. The Transitional Spaces from the Political-Legal point of view. As part of a national territory, these transitional areas and regions are susceptible to be regulated as organic elements for

territorial planning. They represent buffer zones where maximum differentiation between urban, rural and natural spaces take place. Its regulatory and delimiting functions potentially emerge as specific spatial legislations.

2. The Transitional Spaces from the Economic-Social point of view. As a delimiting zoning strip bordering residential, commercial and industrial suburbs, peri-urban agricultural and unspoiled lands, this transitional area represents a point of greatest human activity in exchange of goods between different systems of settlement, production and consumption.

3. The Transitional Spaces from the Ecological point of view. As transitional borders between human and non-human ecosystems, social ecotones and eco-interfaces represent spaces of ecological productivity exchange (energy and information flows) and high interaction. It is also an area of maximum conflict over access to natural resources and environmental services.

4. The Transitional Spaces from the Geographical point of view. Usually identified as mountainous areas, topographic features, hydrographic basins, water courses, wildlife areas, etc., constitute natural limits determining the bioregions, and the types of settlements, productive activities, trade, communications, culture, etc. They have always been an inherent element of territorial planning which gains momentum as environmental planning.

Dynamism and Mobility in transitional spaces:

Two Contextual Inherent Properties

There is a property of transitional spaces that does not appear in the chart, but somehow contains all the rest of properties present in the graph: that is Mobility. One fundamental characteristic of the Transitional Spaces in its dynamic nature. It is dynamic because as a living space is in permanent movement, always changing, evolving and transforming itself. This phenomenon is known as *Successional process* by field ecology and is based on the colonization of new species over the space of a particular ecosystem, until the structure of the original community changes over time (Odum, 1992). In socioecological systems, the colonization process and inter species exchange includes the presence of human beings.

Examples are not far from our daily experience. If we think of a forest as ecosystemic space, we easily will notice how the forest-space may have shrunk for years. What used to be covered by trees is now partly empty land, partly houses in construction. If we think of a city in the same terms, we will observe a new city-space that did not exist before. Where used to be a dairy farm and corn fields, there are now hundreds of identical houses.

These basic conceptual spaces I described as urban, rural or natural are not fixed spaces. They move by expansion and contraction. Within these conceptual spaces travels along the transitional space. The transitions in space may move ahead, as a vanguard of an expansive system. A transition can also move in retreat. For example, when the interaction between two ecosystems has been negative for one of them, meaning the loss of land areas of the neighboring ecosystems involved. It is important to note that the loss of properties and functions of ecosystems

define their place in the hierarchy of complex systems, with which subsystems interact and interdepend. That means the negative impacts do not limit itself to the loss of land-space but to the properties and functions those areas played on the carrying capacity of the ecosystem being impacted.

Transitional spaces, as said, become the new area where those impacts will emerge and eventually change the elements and interactions of the system. In these ways they are dynamic: At certain moment there is no more an original natural ecosystem, or no more a rural agroecosystem, but an urban space. That space has transitioned. And neighboring it, there are new spaces in transition: retreating from natural to rural, and from rural to urban

Properties of Transitional Spaces

A second step in the identification of Transitional Spaces is based on the same four criteria, but now indicating general properties of interfaces and ecotones, hypothetically derived from the existing context between boundaries of urban, rural o natural ecosystems. The description and analysis of these properties, which we qualify as *contextually inherent* to Transitional Spaces, would serve as a guide to understand the ambiguous nature of these spaces.

The spatial properties of the transitional space in our proposal (See chart, page 275) would be the following:

Table 2. A Typology of Transitional Space

Tentative Analytical Approach for a Typology of Transitional Space

<i>Criteria</i>	<i>Politico-Juridical</i>	<i>Socio-Economical</i>	<i>Geographical</i>	<i>Ecological</i>
CONCEPTS	Frontier – Border. Political Buffer Zone Territorial marker for Political and Administrative Divisions. Technical notion for integrated state policies of territorial planning.	Space dividing or linking productive areas with different economic activities. Urban nodes interactive networked spaces within urban hierarchic spatial system.	A connecting zone in between two geographical areas. Geophysical link or separator acting as a buffer zone. Connecting passages and corridors between urban, rural and natural spaces.	Ecotone. Border area between two ecosystems. A site within the seral stage of evolving ecosystems. Area of connection between different life zones.
SEPARATOR – OPPONENT – DIALECTICAL – TRANSFORMER – TRANSITIONAL – DYNAMIC – UNIFIER – DIFFERENTIATOR – TRANSMITTER				
PROPERTIES	Maximize differentiation between zones subjected to different legislations and bylaws. Capacity to be legally conceptualized as regulatory term for land planning policies	Enhance connectivity and interactions between urban and rural populations. Provide spatial references identifying urban divide between socio-economic classes. Allow separating and characterizing diverse socio-economic zones within the spatial continuum.	Maximize connections among geographical regions and urban-rural spaces. Maximizes differentiation between life zones. Provides geographical connectivity to regions across trans-national boundaries.	Spatially brings together a high volume of interactions between different ecosystems. Spatial convergence of high level of conflict between human and non-human populations. Maximizes area of conflict over access to land and vital natural resources.
POLITICAL - NORMATIVE - COHESIVE - PRODUCTIVE - ORGANIZATIONAL - REGULATORY - PROTECTIVE - DIFFERENTIATING - SPATIAL				
FUNCTIONS	Regulates specific boundaries between natural, rural and urban spaces. Regulates specific boundaries between diverse economic activities. Regulates the specific character of the spatial organization of the population.	Delimits the space between residential areas, service economy and industry activities within the urban region. Delimits the space of agricultural activity towards urban space Delimits the agro-frontier facing natural areas. As marker, provides progressive data on the time-evolution scale of socio-cultural changes on space.	As a marker, identifies geographical boundaries between rural, urban and natural areas. Connect Spatially diverse social and economic areas, drawing a geographical web of systemic interactions. Separate spatially diverse social and economic areas by drawing conceptual perspectives of geographical borders within urban, rural and natural systems.	Defines urban public spaces and buffers the urban sprawl's impact over rural land. Defines and protects natural areas providing ecosystem services. Establishes spatial connections between human activities and vital resources. Regulates and defines the space of interactions between diverse human and non-human populations.

Figure. 4. Lascoutx, A. 2015

- a) Differentiating: It establishes spatial differences between natural habitats diversity, populations, and human activities.
- b) Opponent: Identifies opposing dynamics between human and non-human populations, and their respective activities.
- c) Dialectic: Confront and synthesize the conflicts of human and non-human populations, of different essence and dynamics.
- d) Transformative: It is a space for re-elaboration and synthesis, where conflicts over space and resources are transformed into new organizational models, positively or negatively affecting the homeostasis of the prevailing ecosystem.
- e) Transitional: It is an area of continuous mobility and varied dynamism, a product of the number of interactions that take place in its area, so its functional structure is ambiguous and mutant, and it can be a space for conflict or consensus between populations, both biotic and human.
- f) Binder: It is a space for social interaction, meeting, concentration and reunion. A strip of compulsory passage to access other areas or regions.
- g) Transmitter: It is an area for communication, the elaboration of messages and the exchange of information.
- h) Connector: It is a strip that unifies the perimeters of fields, cities and unspoiled lands.

Functions of Transitional Spaces

A third moment in the analysis of the Transitional Space is expressed in each of the four selected criteria, but now from a functional point of view. The identification of hypothetical functions and the consequent proposal to assign some evaluations to the transitional space, would have the objective of systematizing certain dynamics typical of transitional spaces between urban, rural and natural areas. The proposed functions (See chart, page 275) inherent to the transitional space would be the following:

- a) Policymaker: Identify and define relations of political and socio-economic power between private and public interests of various populations, municipalities, jurisdictions, etc. that share the area and scope of a transitional space.
- b) Regulator: Identify the social and ecological elements that will serve as the basis for regulating spatial limits of legal-administrative, socio-demographic and productive, geographical and environmental areas between socio-ecological systems.
- c) Cohesive/Divisive: It serves as a meeting point or conflict area between properties and functions present in territories of complex socioecological systems.
- d) Productive: From the integral perspective of the intermediate city, it has the function of preserving the peri-urban space destined for food production by creating a point of interaction for the local and / or regional agri-food system.
- e) Organizational: As a meeting point, it spatially organizes the flows resulting from the interactions between urban, agricultural, and natural ecosystems.
- f) Regulatory: As a transition zone, it regulates the flows produced by interactions between ecosystems of different nature. In its scope, the tendencies that accelerate or reverse entropic processes of anthropic origin are determined. Its objective is to achieve sustainable homeostatic states.
- g) Protective: As an edge or limit, it spatially consolidates the occupation areas between different ecosystems.
- h) Recreational: Establishes reference points for cultural exchange between urban and rural and natural areas. It is the first access zone to open spaces with potential for urban recreation.
- i) Separator: Delimits natural habitats, biotic and human populations, productive activities, systems of social organization.
- j) Spatial: It determines the *Successional Process* and *Seral State* of each conceptual space within the geographical continuum.

V.5. Transitions on the Rurban Territory

V.5.1. Continuum Territorial Scenarios

The notion of territory is claimed by many disciplines, though geography has been the science to make it an object of study. In particular, the emergence of environmental sciences has proven the close relationship between the two sciences and the concept of territory. From an epistemological point of view, there are multiple possible paradigmatic perspectives to relate territoriality and sustainability that are present in both environmental sciences and territorial sciences (Bozzano, 2000). An environmental perspective of territory merges human sciences with ecology, and for this research, with a focus on human ecology. It is important to stress that human ecology is not human scale ecology in the sense of when human characteristics are transferred to the animal kingdom. Human ecology applies the same methodological criteria that general ecology uses to study other populations. In this sense, the research requires a methodological stand-in to develop an ecological-geographical approach to territory that may serve the proposed spatial hypotheses of a sustainable intermediate city. This method of reading space must be related to the open and hidden interactions that occur in the intermediate and transitional zones, areas, and territories of the urban hinterland. This perspective is provided through an integrated view of the intermediate city as a geographical and ecological continuum that includes rural and natural spaces.

This perspective of a continuous space has significant consequences from a theoretical point of view because it dramatically changes the distances this research can cover with its analysis. The most radical view of a continuum is one that integrates human territories with the planet's Ecumene, including cities, farms, forests, mountains, lakes, oceans, and islands (i.e., the whole

Earth's biosphere); however, the continuum that will be used in this research allows us to develop an analytical sight that can move freely from local to global perspectives and vice versa. This reinforces the idea of a deep breakdown of traditional concepts that have sustained international relations' paradigms and geopolitical theories in the past.

A second consequence of an environmental continuum approach is the emergence of the bioregion as an evolved sibling of regional studies. Though this mainly employs the same conceptual cartography as geography, the environmental bioregional perspective does not only challenge the traditional concepts of sovereignty—either internationally or federatively—but defies the very meaning of borders in respect to national and regional security.

A third aspect of the continuum relates to the revaluation of landscape as a political issue. Indeed, from an eco-political point of view, the implications of landscape go beyond being a visual problem to become an environmental security issue, a public health agenda, and a sustainable development indicator. As we approach the core of the intermediate city hinterland through a gradual global-to-local pathway, the continuum becomes the perspective of the urban territory previously referenced: an integrated micro-bioregional landscape.

V.5.2. The intermediate spaces

I will extend myself here on some clarifications of the terminology and concepts I will be using ahead, as many of them sustain the principles and points of view that guide the research. My aim is to provide a better understanding of the dynamics of natural areas, rural and urban spaces,

and more specifically, for the study of the intermediate spaces between both. I am building my research on earlier works done with FLACAM's interface methodology, in order to move towards an 'ecological spatial turn' beyond traditional town-countryside space duality. The goal is then spatial and ecological, as it does not aim for exposing the urban-rural dialectic but unity. Conversely, it looks to integrate it into new concepts of space that can be identified and recreated in a mixed account of social ecology and politics of the land. It is also part of our objective to contrast several typological criteria, in order to build a series of characterizations that lead to a particular approximation of the notions of *social ecotone* and *ecological interface*.

V.5.2.1. Rurban Space

The certainly ambiguous concept of *rurbanization* can be understood from different points of view: as a residential tendency of the urban population of a Central Place, within the peripheral rural space; or as the set of processes that affect the rural peri-urban space and translate into a breakdown of urban functions. During France's post-war years, the efforts to reconstruct the country went hand in hand with the land policy of *Aménagement du Territoire*. The analysis carried out by members of the Rural Spaces Team of the Human Geography Laboratory of the University of Paris I (Berger, Fruit, Plet and Robic: 1980 .305-312) focused on a critical review of the concepts developed by French geographers G. Bauer and J.M. Roux on the possibilities of the urban-rural space. Despite its date, I believe that this analysis serves our purposes, since it provides the fundamental elements related to the concept of rurbanization. These concepts are still in use by France's National Institute of Statistics and Economic Studies (INSEE). From the free translation of this work, I have incorporated directly into the text some of my own reflections and pertinent observations.

The analytical journey through this intermediate space must start from the understanding of the Rurban neologism, which is based on the association of two concepts: the urban concept, where the spaces of interest for rurbanization are affected by its proximity to urban zones or population concentrations (Tacoli, 2006). Villages and hamlets affected by urban growth present an active agrarian land market, directed above all towards the demand for construction and the real estate industry. It also has a clearly positive migratory balance, mainly due to the exodus of the urban population. A dynamic vision of the urban space prevails. The second concept is the rural, which is characterized by a very low-density occupation of the space, compared to the city. Unlike the "classical" peripheries where the built space is continuous; the rurban space is characterized by the permanence of a silvopasture predominant surface, where the built space is a discontinuous one. A static vision of the rural space prevails.

The evaluation of rurbanization exceeds the fixed schemes of the definitions contributed by Bauer and Roux (Berger et al., 1980), for them, a way to measure the rurbanization is through the increase of the rural population in areas defined as industrial and urban settlement. However, this measure is imprecise, given the differences among economic production models and industrial complexes which leads to the uneven development of the various regions of a country (Smith, 2008). On one hand, a measurement in these terms limits the concept of urbanization to a strictly urban phenomenon and ignores the potential contributions of population to urban areas, either as a result of migrations from remote rural areas, or as an effect of a revitalization of the local economy. On the other hand, the urban populations are visualized in an "elastic" way. A method of sociological analysis used by Bauer and Roux, is to draw an average of the total population

occupied by the peri-urban and rural spaces, in order to establish their social composition. The results show a slight tendency towards higher social strata, which can be explained as a consequence of the agrarian market that allows certain urban estates to acquire properties, where the value of land use predominates, translated into the physical characteristics of the rural environment: qualities of the landscape, tranquility, clean air, etc.

According to the analysis of the aforementioned Human Geography team, the available studies on peri-urban spaces privilege four themes (Berger et al., 1980, p.1). 1. Changes in soil affectation and space consumption: the theme of green spaces is incorporated. From an urban perspective these are understood as open spaces for reunion and communication (parks, gardens, etc.). From a rural perspective, these include agricultural areas under crops and pastures, as well as the natural areas with vegetation and forest cover. In case of agricultural persistence, the crops are oriented towards a specialized urban demand. Different forms of urbanization are differentiated according to their costs and spatial effects: a) new cities; b) large residential complexes; c) group private developments; d) individual and isolated private developments. 2. Social change: the aim is to analyse the socio-professional characteristics of the inhabitants of the peri-urban countryside, giving priority to new residents. From the rural point of view, it is necessary to study the phenomenon of the substitution of the original population with new residents. The real estate agent emerges as an important actor in the process of change. There is a relationship between spatial occupation and the socio-economic range that is expressed in social segregation. The changes in rural peri-urban areas rethink the study of social conflicts and interactions. 3. The Land Question and the Rent of Land: from the study of the agrarian structure of the peri-urban space are the keys of the agrarian land market available. Again, the role of the real estate agent is strategic since

his/her knowledge of the market and local legislation allows him/her to manipulate, with supply and demand, the most advantageous prices, to the detriment of agricultural activity and rural development. 4. The specificity and future of peri-urban agriculture: the agriculture of the urban periphery is transformed into specialized crops destined for certain urban sectors. A question arises about the viability of agriculture and its function within the structure of urban regions. In this regard, we find trends that prioritize the ecological aspects of agriculture over economic and propose an investment scheme of "strips of declining activity," in order to establish a non-polluting agriculture that can be integrated into the management of green spaces. Other opinions estimate that there are no impediments, in terms of the economy of space or production, to develop a specialized peri-urban agriculture.

The potential variability of peri-urban land uses and the increase in the price of land tends to produce contradictory effects. These are usually expressed by a reduction in economic investment and the cessation of productive activities, all of which await an increase in the exchange value of land to the detriment of its social and agroeconomic value. In this, the agrarian structure and the strategies of the owners play fundamental roles, which differ according to their socio-economic condition. The authors of the work point out that peri-urbanization takes place within the framework of numerous systems in interaction: the particular socio-economic system of each country, the political system of each State, the system formed by the settlements or the urban regions studied. Criticism of Bauer's and Roux's notion of the urban space arises because its analysis obeys a predominantly urban perspective, where the consideration of the rural space is that of an empty space, available and reserved for urban expansion. In contrast, from an exclusively rural point of view, the study of the rural zone is viewed as the measurement of the risk of

degradation that agricultural lands run and the possibility of rural space disappearing. The study warns that the analysis of the rurban systems must take into account the diversity of existing geographical means and avoid limiting itself to an exclusively urban approach from the perspective and interests of the predominant central place. Agricultural and rural spaces must be valued both for their economic function and for their environmental function. The rurban landscape, managed with environmental criteria, provides spatial solutions to the psychosocial needs of the urban population.

On the other hand, the analysis of the rurban space must arise from an integral conception regarding the effective unity of the urban-rurban, and rural-natural system. Although the arbitrary division of space is justified as a method of scientific analysis, we must remember that it only represents an abstraction, a model of reality. The rurban strip is an element of the spatial continuum and can be valued from this perspective. Likewise, cultural factors must be taken into account to explain many phenomena of rurbanization, among them the policies of the state and the legal regime of territorial organization. Likewise, it is essential to take references from the demographic and economic context in which the rurban fringes have been developed, since they allow us to explain the differences in the nature and dynamics of settlement processes, and their positioning in rural areas.

V.5.2.2. The peripheral space

Considering peripheral space should be part of a strategy to tackle the phenomenon of current urbanization, which is expressed in the high levels of urban concentration and expansion, and radically affects the economy and society outside the urban peripheries, the surrounding

agricultural lands, as well as the protection and buffer areas that are absorbed by the disorderly growth of cities (Allen and Lacabana, 2003; Bazant, 2001). Urban development and rural development, each having technological uses, social, economic, and cultural relationships that in turn determine the model of applied development, must consider man and his environment as an integral and indivisible unit. This unifying perception may allow us to find new indexes and values to measure the development degree of each locality, region, or nation with broader and deeper criteria than simple quantitative research indicators such as the Gross Territorial Product (McGregor et al., 2006). Under this same preponderance of utilitarian capitalist economic rationality in the forging of urban-rural interrelationships, we point out three of the serious impacts that affect major world cities peripheries today:

1. The impact of urban input voracity: cities are high energy consuming systems, either expressed in food, goods, electricity, oil, or commodities of all types. At the same time, cities tend to recycle little or nothing of what they consume. The city that will be suffocated by its own waste. It corresponds to the type of society characterized by "linear flows," which depredates resources, paying little for what it extracts from nature and recycling almost nothing.

2. The impact of urban sprawl: also, a manifestation of consumerism, in this case of the soil resource, a product of not recycling the old city, of not rethinking empty spaces, their densities and their social production process. It is, of course, the dialectic between use of value and exchange value which produces the ground rent. In general, third world cities, from underdeveloped Africa, Asia or Latin America, frozen by means of artificial plans where environmental management of territorial planning is absent, ignore the symbiotic dependence of the natural resources of the environment from which it is supplemented, speculating on the fattening of land, or its

mobilization only to increase its exchange value, while being saturated by low class internal migration, future inhabitants of metropolitan poverty belts.

3. *The impact of unsustainable planning systems*: following the capitalist spirit, even in self-proclaimed socialist systems. Developers planning the cities according to the law of offer and demand is perhaps one of the worst expressions of modern capitalism in industrial and post-industrial societies. Take for instance the case of China, which has developed a sort of Urban Fordism, building cities for millions thanks to an economic rationality of mass production of housing.

Figure 5. Mutation of a Hypothetical Geographic Spatial Continuum

The representation and analysis of a hypothetical spatial continuum aims, in this case, to emphasize the interactions of the rural-urban continuum. A concentric model, the graphics (pages. 294-303) show the presence of two urban-rural continuums, separated by a natural area, which represents the territorial basis of occupation in its broadest sense, and which determines the spatial differentiation between the *A* and *B* developments. Taking the Theory of the Central Places⁵¹ as a reference, we try to describe, hypothetically, the occupation dynamics of the space, starting from a supposed process of urban expansion in both developments. Starting from the Theory of the Central Places, we know that the separation between both developments, and between the fringes that comprise it, can be expressed spatially only in a relative way. The spatial differentiation between both developments implies in turn the existence of a complex set of dynamic interactions, endogenous and exogenous, that are performed between the populations of the fringes and between

⁵¹ Walter Christaller's Central Place theory is an urban geographical proposal that looks into population size and location of human habitats to explain the way a city system works. The theory emphasizes that settlements simply functioned as 'central places' providing services to surrounding territories.

both developments. As a parallel reference, two topological alternatives for the development of the continuum are also presented. This is explained by the rugged geographical area of the mountainous regions, where the valley system conditioned the growth of urban space, which—as in the previous figure—is limited for a concentric expansion, taking longitudinal forms whose characteristic shape is the growth in the form of an "oil stain," which is adapted to the morphology of the few flat areas.

We find again the specific relationship of the center with the natural periphery, and a "corridor" type formation to access other fringes.

Figure 5-2. A rugged geographical area (mountainous region) is presented; the urban space can be seriously limited for a concentric expansion, due to natural limitations (mountains, rivers, streams) which would determine a particular growth, where the center remains in contact, by one of its poles, with natural or marginal urban areas. The spatial possibilities of the urban-rural continuum are expressed under the following key:

U: Strip or urban area proper.

RU: Strip or Rurban zone where the interface is located.

R: Strip or rural area proper.

M: Strip or marginal zone of transition between the rural and the natural area.

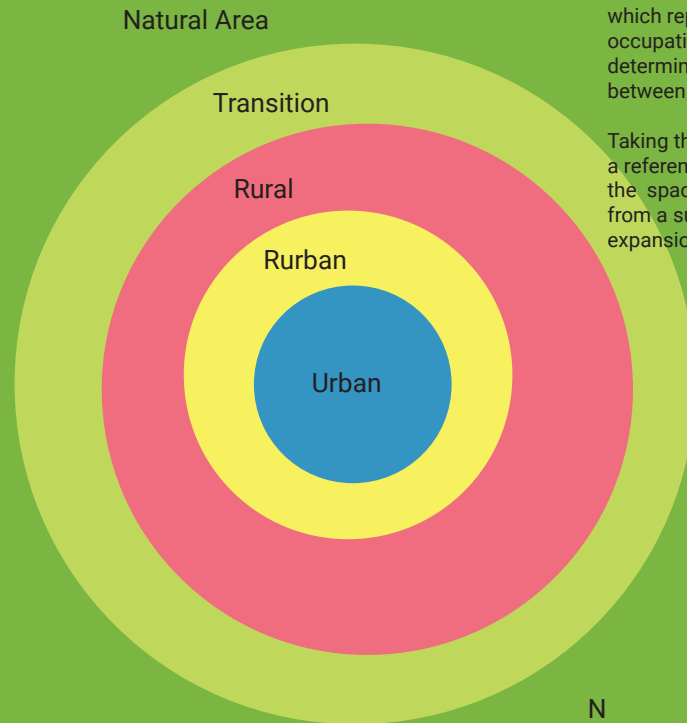
N: Natural area, whether or not regulated as such.

Ideal vision of the urban-rural continuum.

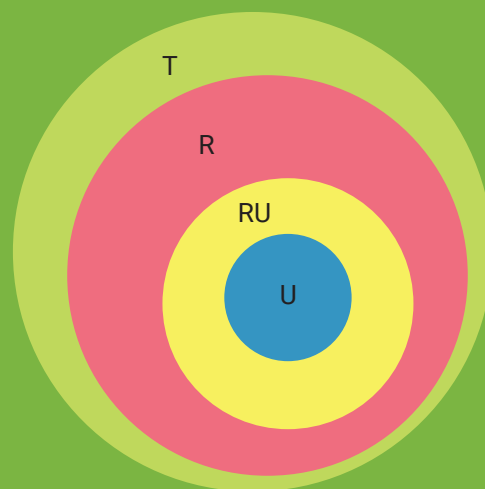
By means of a concentric model, the graph shows the presence of two urban-rural continuums, separated by a natural area, which represents the territorial basis of occupation in its broadest sense, and determines the spatial differentiation between developments A and B.

Taking the Theory of the Central Places as a reference, is to described -hypothetically- the space occupation dynamics, starting from a supposed process of urban expansion on both developments.

Development A



Development B



- U Fringe or Urban Zone
- RU Fringe or Rurban Zone
- R Fringe or Rural Zone
- T Rural-Natural Area or Socioecological Transition
- N Natural Area Fringe or Zone

GRAPHIC 2

Spatial possibilities of the urban-rural-natural continuum within rugged geographical areas

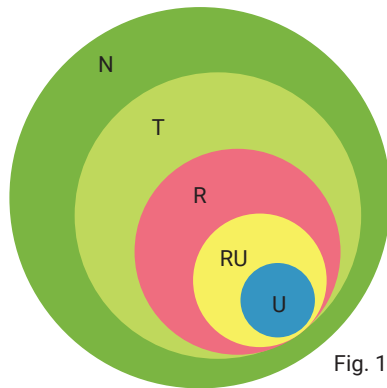


Fig. 1

Figure 1:

In a rugged geographical area (mountainous region) the urban space can be seriously limited for a concentric expansion due to the natural constraints and topographical limitations (mountains, gorges, rivers, streams) which will determine a particular expansion and city morphology. There the center remains in contact -for one of its extremes- with the non-urbanized natural, underdeveloped or marginal areas.

Figure 2:

In the rugged geographical area of the mountainous regions, the system of valleys conditions the growth of the urban space, which - as in the previous figure - sees itself limited to develop a concentric expansion, taking instead longitudinal shapes, whose characteristic growing form is the "oil stain", adapting itself to the morphology of the few flat areas. We find again a particular relationship of the center with the periphery of the natural area, and a type of "corridor" formation for accessing other fringes or areas.

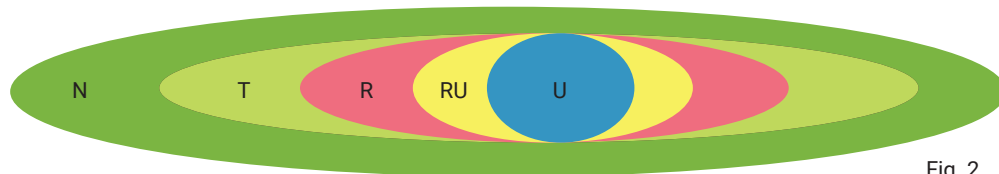


Fig. 2

U	Urban fringe. The properly urban area.
RU	Fringe or Rurban zone corresponding to the urban- rural interface.
R	Rural fringe. The properly rural area.
T	Fringe or marginal zone of transition between rural and natural areas.
N	Natural area, whether or not regulated as such.

Figure 5-3. Represents the "static" moment where both developments, A and B, are spatially defined by the natural area. The urban space is surrounded by the different fringes, where the rural area stands out. Due to its function of primary production, it has presumably served as an economic base for the original urban settlement.

Figure 5-4. Represents the starting point of the spatial movement. The rural belt expands, either due to its own internal dynamics, or as a result of urban expansion. Consequently, the rural zone moves, occupying old rural spaces. The transition zones between the rural strip and the natural area of both developments are touched. A communicating vessel of the natural area is closed.

Figure 5-5. Expresses the contact between the rural areas of the two developments, a "climax" moment of the rural space is represented here. Potentially, it seems to take possession of a new territory with force, involving a continuous circuit of two different rural zones. This situation has not prevented the expansion of the urban space and the rural zone. The zone of transition to the natural area is now a belt that borders the rural area, which translates into the disappearance of a wide stretch of the buffer zone of the natural area. Rural areas theoretically expand their radius of action, thanks to their dominant peripheral position that allows a greater number of interrelationships between themselves and towards urban centers.

Graph three (3) represents the "static" moment where both developments, A and B, are spatially defined by the natural area. The urban space is surrounded by the different fringes, where the rural area stands out, which due to its function of primary production, has served -presumably- as an economic base for the original urban settlement.

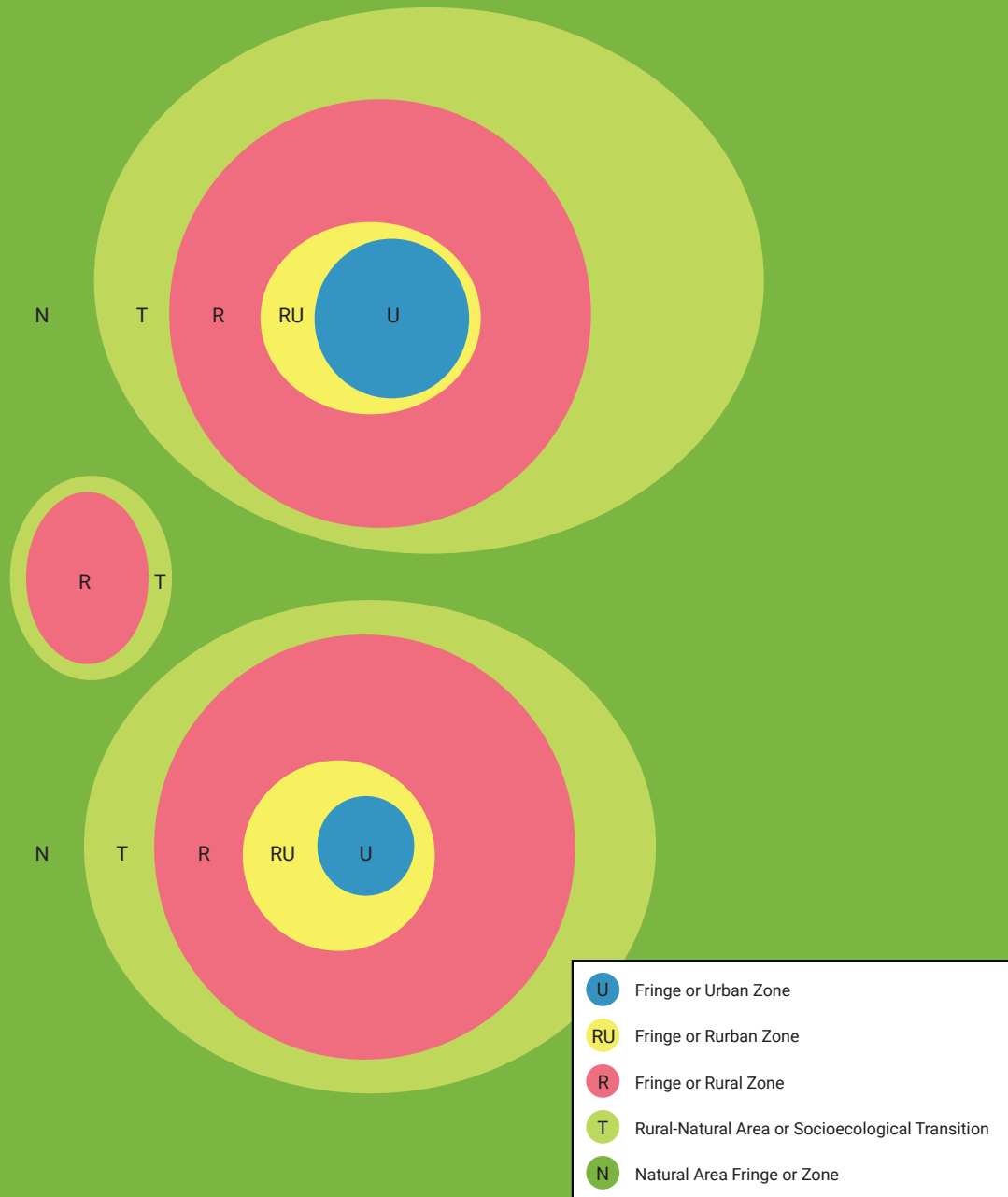


Figure four (4) represents the starting point of the spatial movement. The rural belt expands, either due to its own internal dynamics, or as a result of urban expansion. Consequently the rururban zone moves, occupying old rural spaces. The transition zones between the rural strip and the natural area of both developments are touched. A communicating vessel of the natural area is closed.

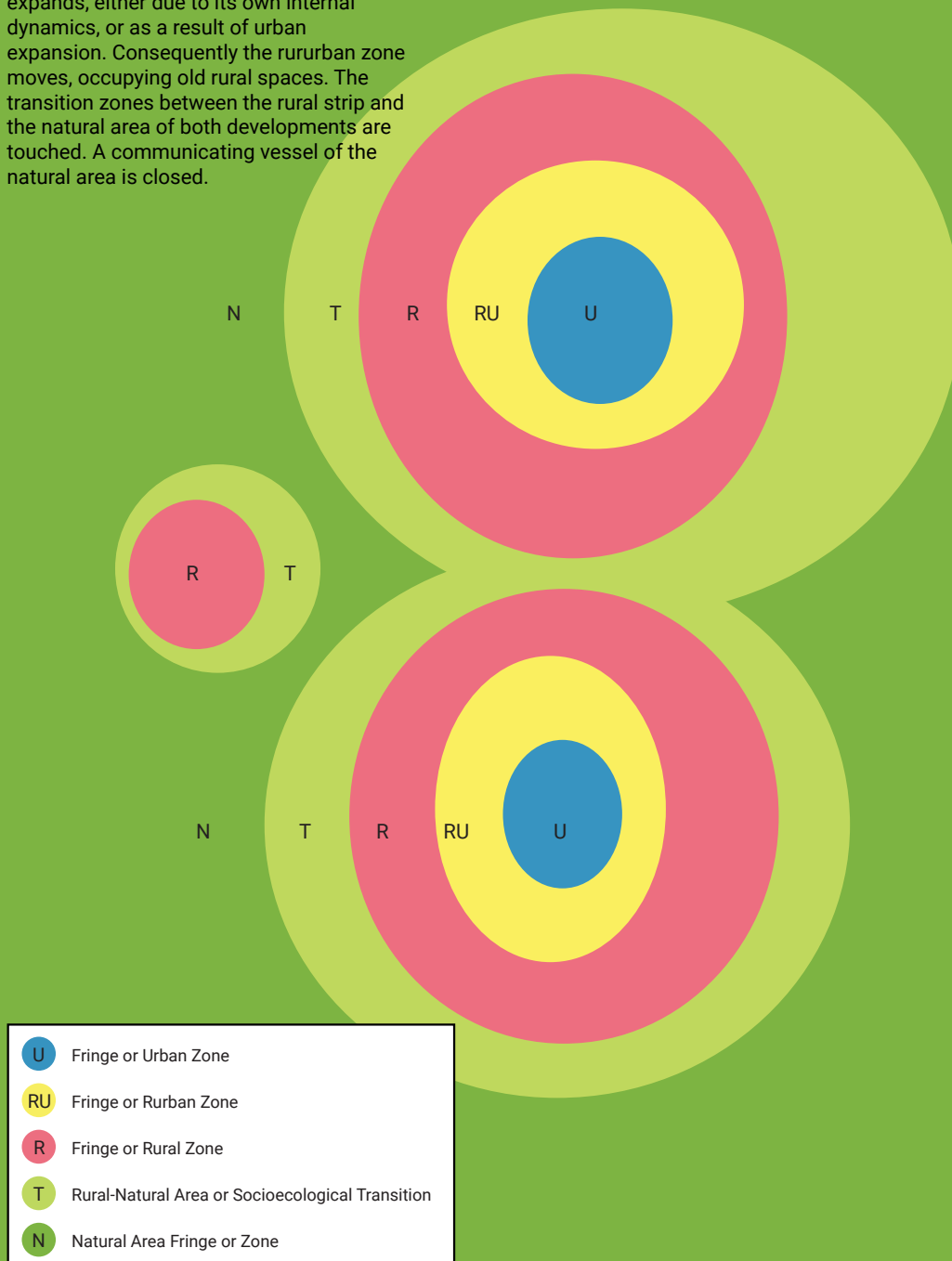


Figure 5-6. Shows the expansive pressure of the city that is evident in an extension of the urban areas. The union of developments A and B, through these strips, seem to reverse the trend shown in the previous graph, as the area of influence of the urban space is now consolidated. The rural space, reduced to a single circumference that includes two cities, maintains a wide radius of action. However, the routes to effect potential rural interrelations have been distanced.

Figure 5-7. Indicates that as urban growth is expressed through the expansion of the urban strip, the latter produces the rupture of the continuous rural space, which is, therefore, fragmented. From that moment, the nature of rural interrelations is modified. The original form of concentric circles has been completely modified, allowing now the urban strip to come into direct contact with the natural area, with the transition strip and with the rural area, simultaneously. It could be inferred that this spatial movement subordinates the urban space to the influence of the city.

Figure 5-8. Shows the definitive merging of two urban spaces into one. It is now the city that comes into direct and simultaneous contact with the other areas, previously located in a concentric way with respect to the city. We observe that the graph raises the possibility of an expansion without transition to the natural area, as well as a concentric reordering similar to the original one. The solutions will depend, ultimately, on the policies of territorial order that are adopted. However, in spatial terms, it is evident that the quantitative growth of the new model (C) has been made at the expense of the rural and natural primary spaces. At this point, the changes in the social, economic, political, and environmental interrelationships are confronting a new reality; a new spatial system much more complex than the sum of its components in a previous stage.

Figure five (5) is expressed by the contact between the rural areas of the two developments, a "climax" moment of the rural space is represented here. Potentially, it seems to take possession of a new territory with force, involving in a continuous circuit two different Ruruban zones. This situation has not prevented the expansion of the urban space and the rururban zone. The zone of transition to the natural area is now a belt that borders the rural area, which translates into the disappearance of the buffer zone of the natural area, in a wide stretch.

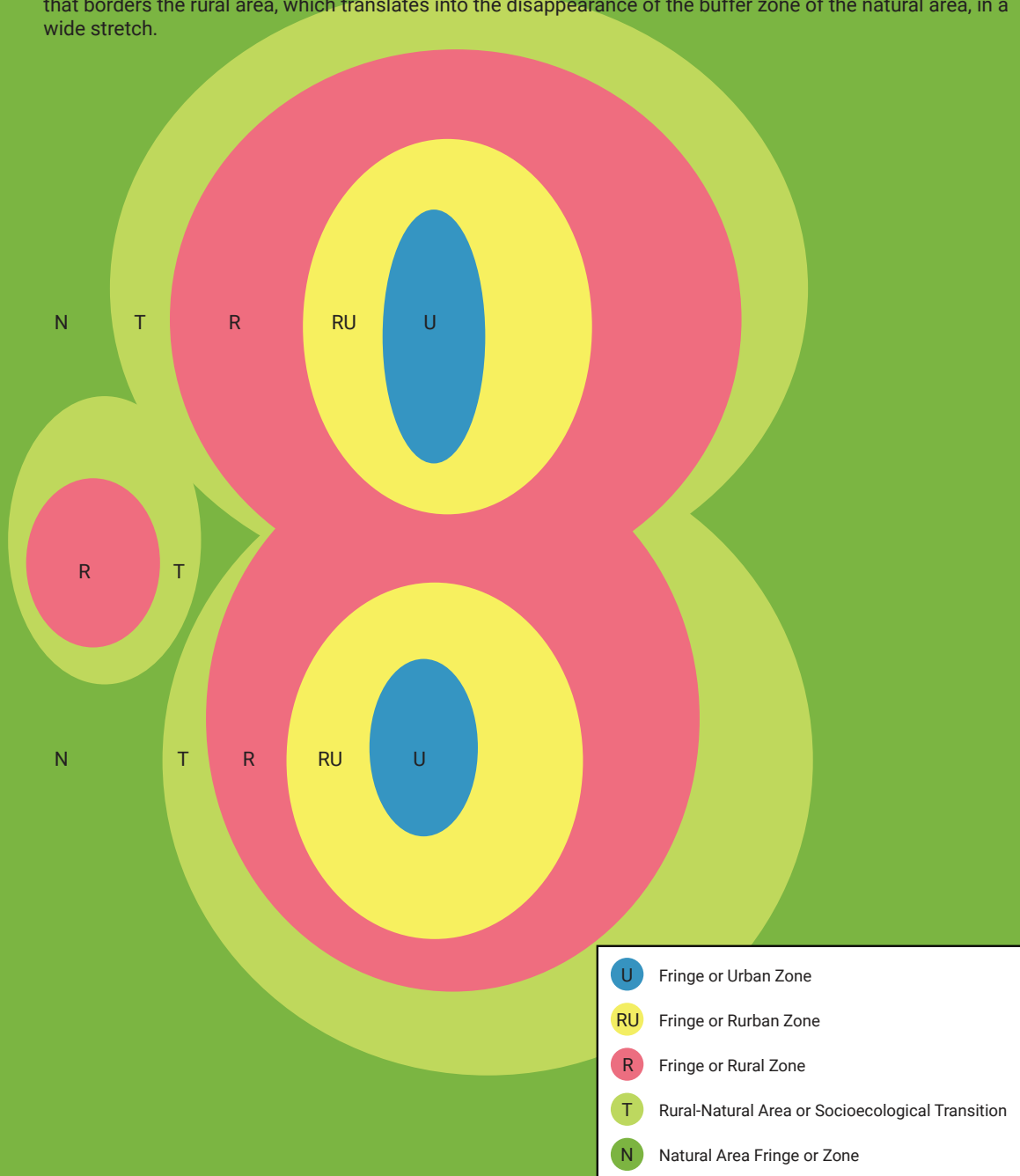
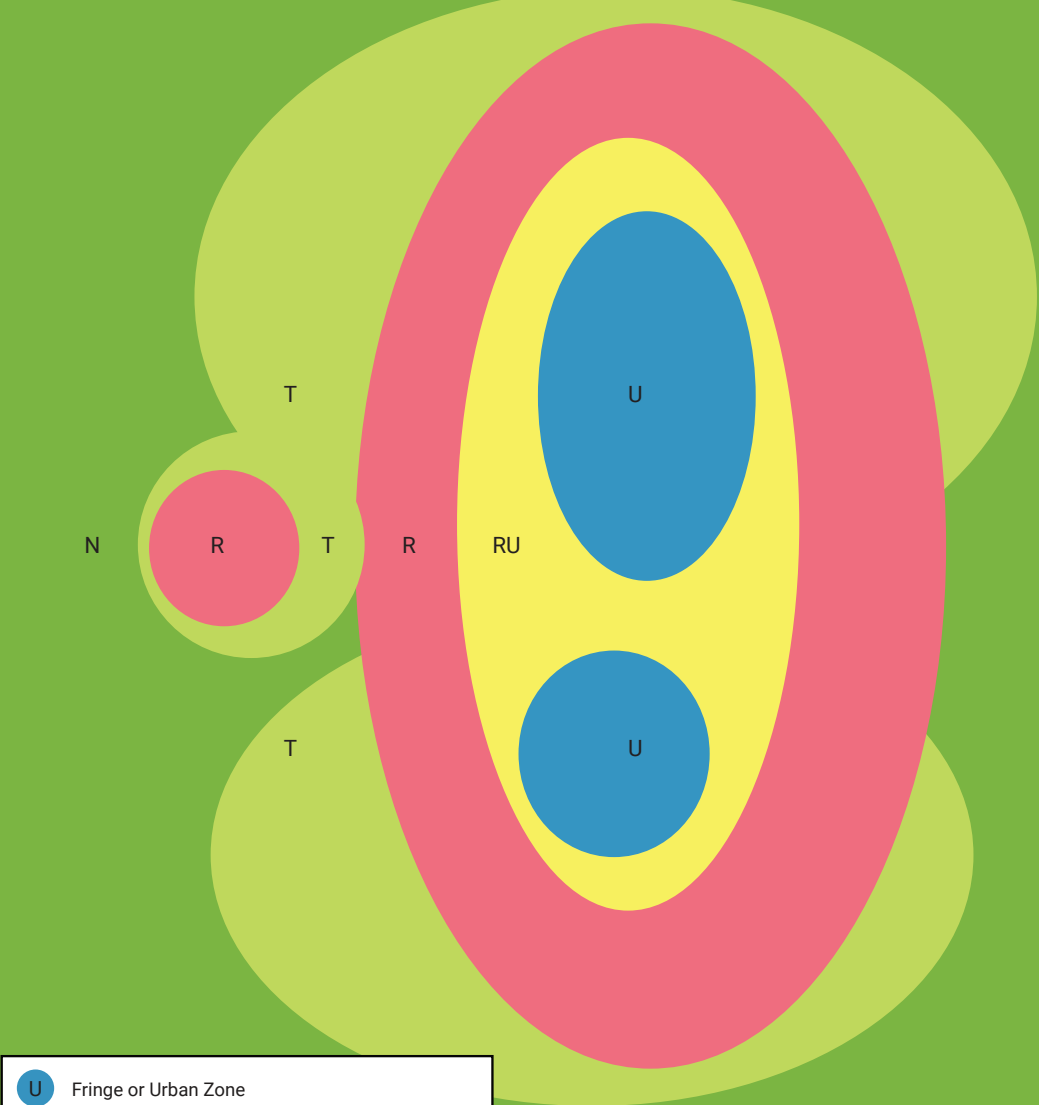


Figure six (6) shows the expansive pressure of the city that is evident in an extension of the urban areas. The union of developments A and B, through these strips, seems to reverse the trend shown in the previous graph, as the area of influence of the urban space is now consolidated. The rural space, reduced to a single circumference that includes two cities, maintains a wide radius of action. However, the routes to effect potential rural interrelations have been distanced.



- U Fringe or Urban Zone
- RU Fringe or Rurban Zone
- R Fringe or Rural Zone
- T Rural-Natural Area or Socioecological Transition
- N Natural Area Fringe or Zone

Graph seven (7) indicates that as urban growth is expressed, through the expansion of the rururban strip, the latter produces the rupture of the continuous rural space, which is, therefore, fragmented. From that moment, the nature of rural interrelations is modified. The original form of concentric circles has been completely modified, allowing now the rururban strip to come into direct contact with the natural area, with the transition strip and with the rural area, simultaneously. It could be inferred that this spatial movement subordinates the rururban space to the influence of the city.

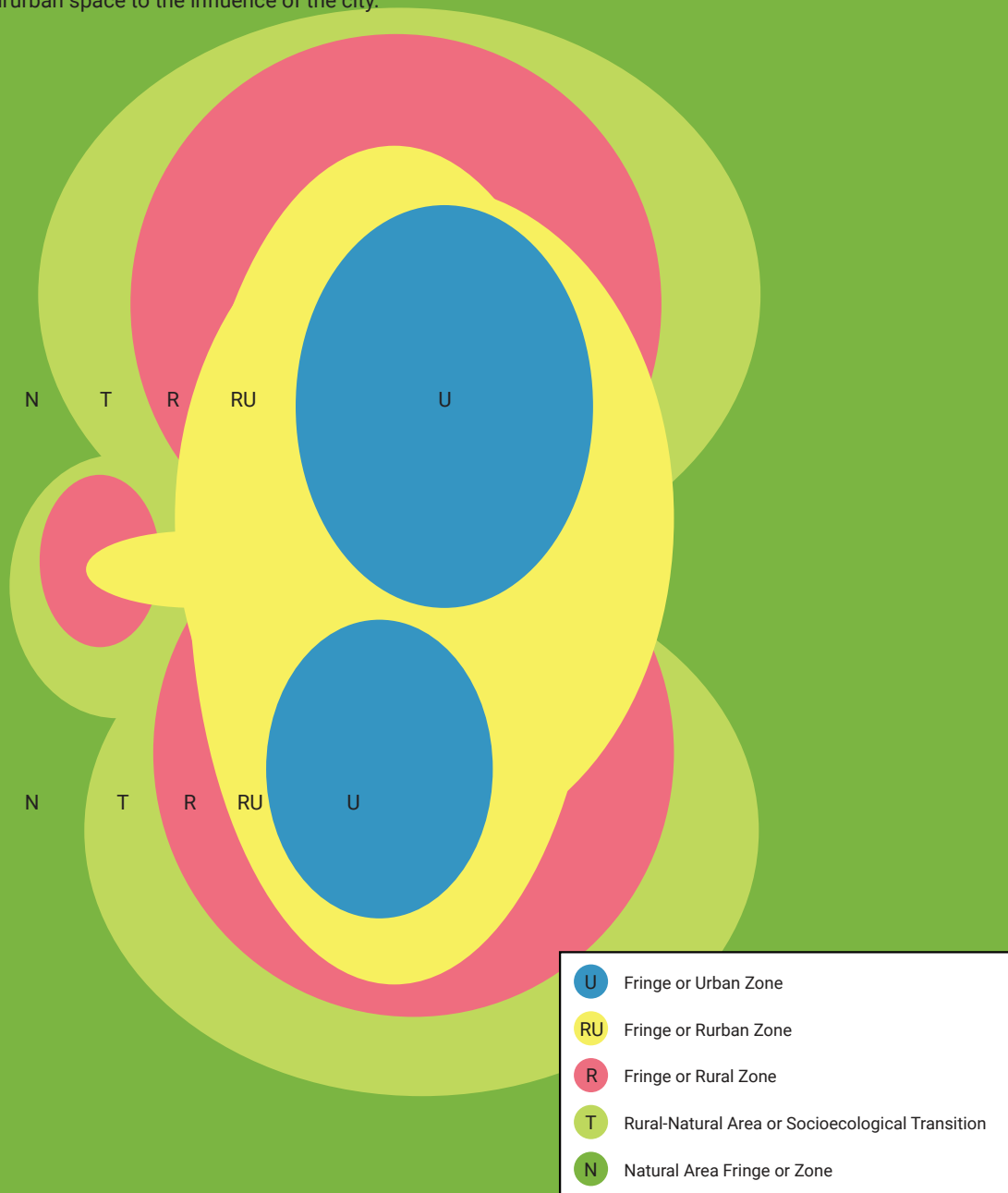
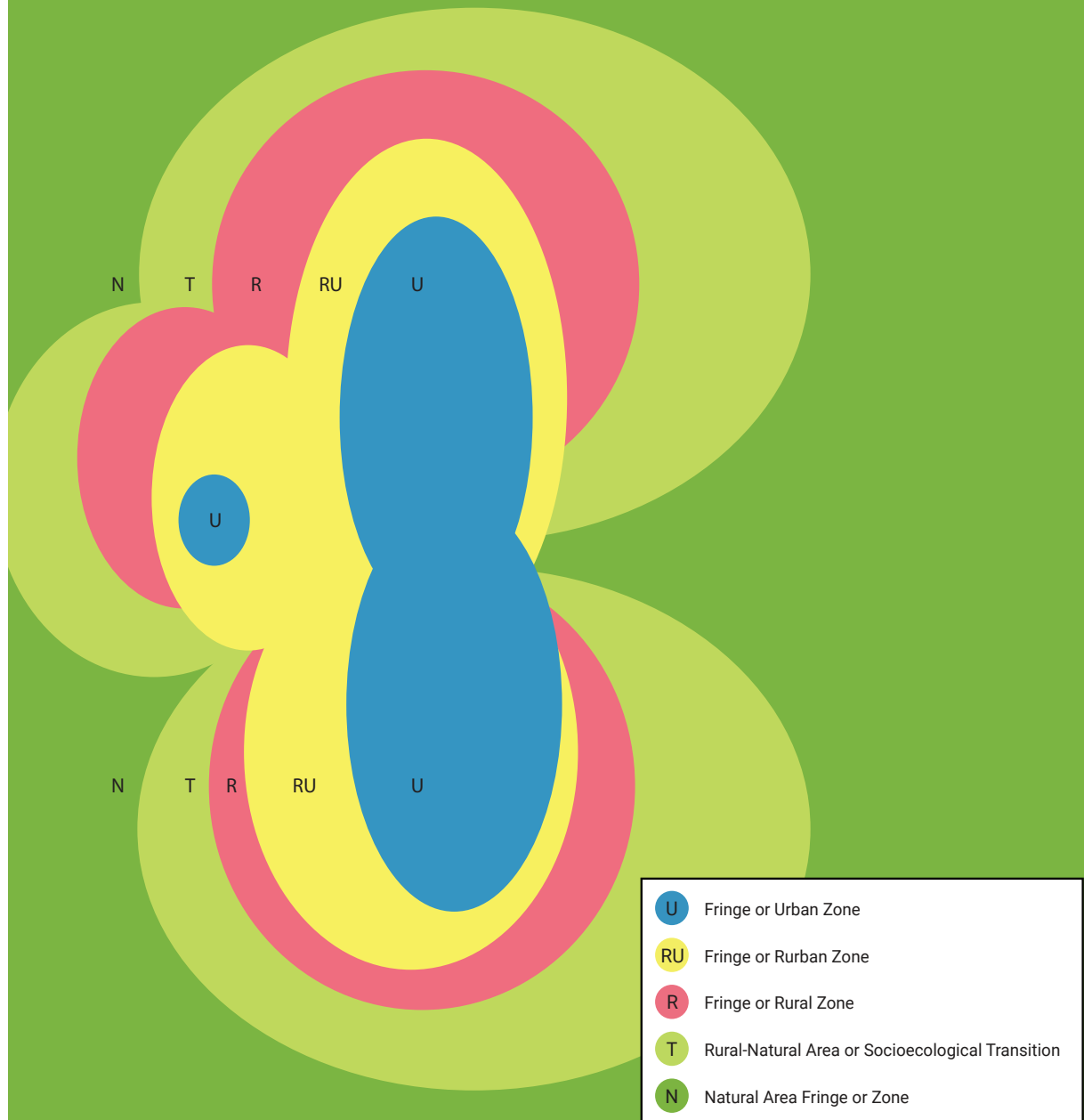


Figure eight (8) shows the definitive conversion of two urban spaces into one. It is now the city that comes into direct and simultaneous contact with the other areas, previously located in a concentric way with respect to the city. We observe that the graph raises the possibility of an expansion without transition to the natural area, as well as a concentric reordering similar to the original one. The solutions will depend, ultimately, on the policies of territorial order that are adopted. However, in spatial terms, it is evident that the quantitative growth of the new model (C) has been made at the expense of the rural and natural primary spaces. The changes in the social, economic, political and environmental interrelations, pose at this point confronting a new reality much more complex than the sum of the parts.



V.5.2.3. From the urban interface to the rural interface

One objection that can be made to the methodological approach suggested by FLACAM is that rural space must be considered within a physical-passive interface. Actually, it makes sense from an urban point of view. From a functional point of view, assigning a 'negative sense' to rural space, in physical and geographical terms is based precisely on its character as a limit or separator between an urban structure and a rural structure. In this case, the adjective "passive" acquires a static connotation, which according to the FLACAM methodology, can also be assigned to internal elements of the city such as a park or a river that divides different sectors of a city. The urban space is seen as an artificial ecosystem, as opposed to the rural space that is seen as an agroecosystem given that it is closer to the inherent properties of a natural ecosystem. This distinction of functions, however, uncovers a conception of the urban as an autonomous entity that is self-sufficient, independent, and self-regulated, which appears to ignore a more holistic conception (i.e., a characteristic of its ecological-environmental approach) and disrupts the view of the geographical continuum that should prevail in a holistic approach. For these and other reasons, the consideration of rural space as a spatial unit of agricultural production that actively contributes to the maintenance of the urban food system is relegated. This happens equally with its agroecological condition, as an agroecosystem with a base of sustentation in the cycles of nature, on which the countryside and city both depend. From this perspective, the rural space becomes an edge, a limit, or an obstacle; it can also become a natural conditioner to urban expansion, which also makes it a potential subject of this very expansion.

Another consideration that can be deduced from this approach is the tacit exclusion of rural culture and its society, which becomes categorized as 'foreign' or secondary to the scope of urban

social interactions. Indeed, seen from another perspective, the urban interface could be considered as active with an agglutinating function with respect to the rural environment. Although this appreciation of rural space as an edge translated into an obstacle does not cease to be true in the face of a city's expansive dynamics, it seems to methodologically contradict the integrative principles proposed by the methodology. Because of this, it is necessary to rethink the interfaces that mark borders or limits, not only for cities but for the countryside and natural areas. Establishing a passive categorization of rural space from an urban perspective devalues the functionality and *raison d'être* of holistic perspectives, leaving the door open to conflict over the occupation and use of land between rural and urban space.

V.5.2.4. Urban-rural peripheral interfaces

The agricultural condition of rural space can be assumed as an agroecosystem or as an artificial ecosystem supported by natural cycles with its own subsidized energy flows, created based on an organization that emulates nature but pursues specific human needs. Given this condition, the concept should be tested from the rural perspective, especially given that the peripheral rural fringe itself is an active element. The peripheral rural fringe is also an active interface with the city and considered by environmental planners to be an integral part of urban ecosystems, due to its dynamics governed by the interaction of natural cycles and human activities and considering its productive function as a food generator (Lascoutx, 1997c)

A URI, understood as the specific zone that borders the periphery of an urban-rural space, is also a term susceptible to conceptualization and connotation in different ways. From the identification and description of its spatial properties and functions, and the nature of its

interactions with other spaces, we can derive potential methodological approaches that contribute to the study of rural space and base territorial planning policies, based on geographic, ecological, economic, sociological, and legal criteria. The identification of URIs and their differentiated classification by social, physical, and productive aspects, can result in an appropriate method that can be transferred to larger areas of rural space itself. As previously noted, this research will take elements from the analysis of urban structures and ruralize them in the context of the functional processes that determine agricultural-economic relations and cultural relations of inhabitants in rural areas, within their particular habitat. The research's approach, however, will seek to adapt this proposal to strengthen a comprehensive vision of the urban-rural binomial, and if possible, the vision of the urban-rural-natural spatial trinomial, from the perspective of the geographical continuum.

V.5.2.5. Social Peripheral Interface

It is an active interface with an agglutinating, elaborating, re-working and / or transmitting rural function of information, communication, and decision-making (hamlets, villages, rural towns). The space and rural role that they occupy is represented in the political and civil institutions (municipalities located in rural areas); cultural and recreational institutions; community organizations (producer associations, formal and informal); rural productive centers (collection, reception, and distribution centers); media; population spaces conceived as meeting places (squares and churches).

Following the reasoning of the methodology proposed by FLACAM, we reject any possible urban bias which consider the Rural Social Interphase as "space-less" character. Hence, the defining accent of its transitional nature rests rather on the idea of those "internal spaces" that constitute areas of maximum interaction for communication, exchange, and the encounter between individuals who share the rural environment experientially. This sociological perspective of space enriches the concept of both urban and rural social interfaces, since it recognizes the existence of "zones of social transition" that certainly occupy or establish "living spaces" where the different social, economic, political, and cultural agents that define rural and urban society. But in addition to this active, internal, agglutinating, and communicational function of the rural interface, as a dynamic element of the rural space; we can deduce that there is also a function or a passive state of the rural space with respect to the urban space. This relationship can be explained by the fact that these zones of social transition do not always coincide in the geographical space with the physical transition zones that mark the border between an urban and a rural area (Lascoux, 1997b)

However, as evidenced above, the expansive dynamics of capital is also space-less. The process of urbanization of the rural environment, can be expressed through a penetration of capital that, emulating the movement of the chess horse, makes a great leap, avoiding the limits of the urban frontier, to be placed on the periphery of social institutions of the rural environment and dispute his living space. Thus, the Passive Social peripheral Interface is a "virtual" space that is established between the social peripheral interphase and the extended urban space thanks to the communication systems that support the penetration of capital in the pre-capitalist areas of rural areas.

V.5.2.6. Physical peripheral Interface

The Physical peripheral Interface performs a delimiting function, separating or differentiating the rural space from the urban and natural space. We could differentiate two types of Physical peripheral Interface, depending on their spatial location within the territory, from an endogenous or exogenous view of the rural space.

a) Passive Physical peripheral Interface, could be defined as the area or strip of space, whose nature or rural function is to act as a separator, border of internal boundary between rural territories, and determinant to the internal organization of the rural space in relation to natural areas (forested areas, watercourses, geographical features, very steep topography that prevents occupying the space for agriculture or rural settlements, forested areas, watercourses, geographic features, and all those areas under special administration regime, national parks, protective zones, nature reserves, etc.).

This is expressed through those large structures and artificial facilities (roads, highways, reservoirs), as well as in the expansion of industrial and residential complexes in suburban areas and marginal areas, which condition and demarcate the limit of rural space with urban space in a legal manner, as a legal and normative constraint for the planning and consolidation of the rural territory (urban polygonal, areas decreed as urban or industrial reserve lands).

b) The Active Physical peripheral Interface. We could define it as the area or fringe of space, whose nature or rural function is to do the times, or serve as differentiator, organizer, regulator, and cohesive of the flows (population, energy, trade, etc.) and interactions between territories in rural and urban areas. The Rural Physical Interface is active, since it conditions the expansion of artificially constructed spaces (large structures, such as communication routes, reservoirs.).

V.5.3. The Ecotone

We understand *ecotone* to be the gradients or points of connection between two different ecosystems. The explanation is for many more holistic and integral ecology, since the ecotone delimits systems allowing their identification and particularism (Odum, 1986). Along these phases (described by general ecology since the beginning of the twentieth century⁵²) is where the biggest exchange of bio-energy between neighboring ecosystems takes place.⁵³ The *ecotone* focuses on the gradients or points of connection between two or more ecosystems allowing the identification of their properties and functions (Sutton & Harmon, 1987; Odum, 1986; Margaleff, 1992). Understood not as a limit zone that divides, but as an area that unites different ecosystems, the concept of ecotones can be easily adapted to a social science perspective. In terms of intermediary spaces, the concept of *ecotones* have multiple implications and possibilities suitable to different types of research, according to different perceptions and conceptions of Space: Instead of being a closed frontier, the *ecotones* are an open space where multiple interactions take place. Most ecotonal systems “*are in a state far from thermal equilibrium*” (Li 1995a). Phase transitions are characterized by a fundamental change in an order parameter (Uzunov 1993). They can be discontinuous, as first-order phase transitions or continuous, as second-order phase transition (J. Blundell, S. 2011). In those very fringes, we can observe the state or interface, which is, in fact, a state of a macroscopic system. Changes here are not only measured in decades but centuries: “A

⁵² The concept of *ecotone* was first used by Frederick Clements at the beginning of the 20th century to describe the merging area between different ecological communities. (Holland, M. Risser, P. and Naiman, R., 1991, p. 1-7)

⁵³ *Interface* is a term acquired by analogy from systemic ecology and its concept of *Ecotone*; understood as the area of connection among two or more different ecosystems, resulting in an interaction space with a major energy exchange within its biotic population (Odum. 1986).

phase state (...) is qualitatively different in its characteristics from other states of the same system.”

A phase transition is a qualitative change in the state of a system under a continuous infinitesimal change in external parameters” (Uzunov 1993).

Nevertheless, as a concept, the ecotone lacks a clear theoretical description given precisely the uncertainty of its natural features. However, biologists have devoted great attention to the study of these vague areas given the potential importance attached to the study of ecosystems (Kormondy, 1985). In fact, it can be said that the creation of the discipline called Sinecología—which focuses on the study of relationships between communities—has its basement in realities posed by the study of the ecotones. Sutton and Harmon refer to the Ecotone as the effect of border and define it as a transition between two biotic communities’ areas (Sutton & Harmon, 1987). In search of a better understanding, we must copy verbatim here the concept of Ecotone and border effect, enunciated by E.P. Odum:

“An Ecotone is a transition between two or more communities. (...) The ecotonal community commonly contains many of the organisms of each of the overlapping communities and, in addition, organisms which are characteristic of and often restricted to the ecotone (...) This tendency for increased variety and density at community junctions is known as the edge effect (...) In our opinion, the concept of ecotone is one of the most interesting in general ecology since it has a large connotative wealth that suggests a series of images and symbols open to induction and speculation, which can be transferred by analogy to experimental models of social science research. (1986, p.174)

At the end of 1980s, another definition of ecotone was put forward as “zone of transition between adjacent ecological systems, having a set of characteristics uniquely defined by space and time scales and by the strength of the interactions between adjacent ecological systems” (Holland,

1988). Furthermore, the concept of ecotone can also be part of a political science perspective. Thus, the concept of Interface we propose is directly linked to the concept of ecotone and the systemic perspective of Ecology. The interfaces are understood as humanized spaces of high energy and information exchange among individuals or groups of individuals, and between those individuals and their surrounding environment. The interface spaces help us to pinpoint the social, economic, and political networks of interactions within human habitats, communities, and populations. The concept can also be transferred to geopolitical scenarios of international relationships. Several previous researchers—besides the purely geopolitical ones—show us a possible path to work on the analogies of the interface idea: the route led by the concept of overlapping politics from local to global; the interdependent global political ecosystem (Hurrell and Kingsbury, 1992), and the multiple dimensions of the cross-linking geographical fronts (Cardozo, 1988).

The increasing depletion of natural resources and ecological problem will require a better understanding on how ecosystems behave over long-time spans, especially with respect to land use practices and policies. The recognition that landscape consist of interacting ecosystems is therefore fundamental, as well as the fact that between ecological systems there are boundaries, interfaces, or ecotones that affect the dynamics of the landscape spatiality as a whole (Naiman, R. and Decamps, H. 1989, p.130-137).

V.5.4. A preliminary description of Social Ecotone and Ecological Interface

Through the arguments presented above, I arrive at some preliminary conclusions about the existence of these dynamic transitional areas that expand or contract from the outer edges of different types of ecosystems occupying the intermediate spaces between them.

Firstly, we start by theoretically identifying the existence of a double or multiple interface in the inter-systemic space. Thus, the characteristics, properties, and functions of the intermediate spaces between two or more ecosystems, respond to the nature of each ecosystem involved in the interaction space.

Secondly, when it comes to the spatial interaction between ecosystems of different sign (urban ecosystems, agroecosystems, and natural areas), there is a phenomenon of systemic hybridization between human and non-human elements, which requires identifying and differentiating the nature of each interface.

Thirdly, I propose to designate the interface that emerges from human ecosystems as *social ecotone* (Se1). As an ecotone it performs the conditions described in 'the edge effect,'⁵⁴ referring to the interactions between ecosystems. However, this interface comes from an ecosystem where social relationships are mediated and determined by culture, an exclusive patrimony of the human species.

Fourthly, the transitional space which emerges from natural ecosystems, (or agroecosystems) and I propose to designate it as an *ecological interface* (Ie2). Here, the term interface acquires a

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The edge effect is part of the process of ecological succession: "It is known as an edge effect to the tendency of an increase in the variety and diversity where two communities meet" (Ramirez, P. and Gonzalez, P., 2005, p.154)

more appropriate connotation to human ecosystems, with which it will precisely carry out an interpenetration process. However, its contribution to hybridization with the human ecosystem weighs more than its ecological burden as a system based on the cycles of nature.

Fifthly, the notions of social ecotone and ecological interface represent the extremes of the interfaces that occur between a human ecosystem and an ecosystem governed by natural cycles. Hence, this denomination is congruent—mainly—in hybrid ecosystems, such as socio-ecological systems. Through these denominations I seek to find spatial representations of the cultural dimension of human ecosystems. Through the notion of humanized ecosystems, interfaces can be identified where the transformation processes of hybrid ecosystems take place, and eventually the stage of its development phase can be identified as well.

V.6. Conclusion

These explanations are intended to show how certain concepts of ecology can be adapted by social science and eventually considered as part of political ecology's toolbox. Nevertheless, autecological and synecological approaches certainly have a long way to go before becoming useful tools; and yet, they teach us how political-philosophical questions can be drawn from a political ecology point of view. This way, we approach a bit more to the conversation of a notion of space for socio-ecological systems and humanized ecosystems.

Chapter VI

Intermediate Cities or Urban Conurbation

La Long Durée: The perception of Time as Sibling of the Perception of Space

“I doubt that studies about a city can be the object of sociological research without being inscribed in historical time. Every city has to be studied with reference to the complex of rural zones and neighboring cities that surrounded it, and also with reference to the movement, often very remote, that initiated that complex. In investigating rural-urban transition, or an industrial or mercantile rivalry, is it really unimportant whether it is a case of a young movement in full flow, or the end of a process, or a far-off resurgence, or monotonous recurrence?” (Fernand Braudel)⁵⁵

VI.1. Introduction

This chapter introduces some of the ideas central to contemporary social theories of space that emerged from or were related to the academic movement known as ‘the spatial turn.’ This new awakening in research on the concept of space took place during the 1960s, in the middle of the Cold War, when ideas were being confronted by ideologies of all kinds. Previously, during the period in between the two World Wars, only the ‘Chicago School’ (Theodorson, A. G., 1974) had developed advanced human ecology studies on spatiality and urban space (see Chapter Three). During this time, however, research followed the turn of geographers and social thinkers who took space as a category of analysis, in part as a reaction to the predominance of a temporal-historic

⁵⁵ Braudel, F. (1958) History and the Social Science: La Long Durée. Annales, No 4. October-December. p.725-753

worldview. Two French thinkers are credited as pioneers of these new approaches to space: Michael Foucault (1926-1984) and Henri Lefebvre (1901-1991). From Foucault's works (1977, 1984, 1986), this research will make a brief interpretation of his proposed concept of 'heterotopia' as a space with alternative meanings and properties, which resembles the incertitude of interfaces and notions of transitional spaces. (Lefebvre, 1996, 2013) *The production of space*. In terms of space, the chapter emphasizes the thoughts of Lefebvre as the guiding figure of the *spatial turn*. My approach to his work is to structure and locate a series of spatial concepts, related to the political and the ecological, within multidisciplinary frameworks. It is a non-linear and contested approach, as it does not correspond to well known or accepted spatial categories. It is an uncertain investigative path which can easily be challenged.

The chapter follows Lefebvre's arguments about social space and the urban-rural relationship in an attempt to understand his thesis on the role of 'nature' (understood here as the environment in ecosystemic mode) in the process of production of space. Beginning with general notions of space, Chapter Six accounts for the idea of social space, moving towards a socioecological spatiality, and its derivatives through the idea of intermediation. My goal in this last chapter is to describe the concept of Intermediate City, as a theoretical and empirical possibility of applying the concepts of transitional spaces (ecotone and interfaces) in a context where sustainability is still a feasible process.

VI.2. The Spatial Turn in a Context of Urban Expansion

The global phenomenon of urban growth synthesizes some of the circumstances that best describe my interest in researching the problem of space from a political perspective that finds itself affected by ecological incertitude. A new spatial and territorial reality in which human existence unfolds are the complex scenarios of metropolises. The characteristics of these extended cities are the geometric increase of their dimensions, volume, and uneven internal connectivity which embraces a planetary context.

At first sight, two movements can be distinguished in the new urban era: the increasing number of cities that arise and maintain continuous expansion and population growth; and the size, scale and density of those cities. These are conurbations, megacities, metropolises, or, it is fair to say, newly inhabited territories. The expansive phenomenon can be considered or understood as the formation of urban regions that tend to expand far beyond their original borders (CIMES). In its process of expansion, the urban area agglutinates, amalgamates, and engulfs neighboring regions, agricultural lands, rural areas, and neighboring municipalities. The process systematically homogenizes citizens' identities, hitherto alien to the phenomenon of metropolis. Suddenly, in less than three generations, the cultural footprint of the hamlet, small town, or medium size city changes and mutates, together with its old spaces of municipal allegiance. They are incorporated into new macro-administrative units centralizing regional powers in a sort of a multipolar reissue of feuds, or in a techno-capitalist edition of global city-states (Sassen, 2001).

Of course, the general description and particularities of these patterns of the new urban era will depend on which part of the world one examines. Present urban challenges merge with widespread ecological decay (Athanasiou, 1999) to affect post-industrial, underdeveloped, rich and poor, Northern, Southern, or tropical cities' populations around the planet in one way or another. This results in uncertain urban scenarios, which are only recently being investigated by political studies: the concentration in small territories of a high number of inhabitants per square kilometer; and the new networks and their adaptation, redistribution, balance and rearrangement of the decision-making, information, production, marketing, and consumption networks (including the system's outputs, the circulation and disposal of waste) between these new metropolitan scenarios and the traditional centers of power, either the state, provincial governments or municipalities.

Above all, it means that at the interior of those human (spatial-territorial) conglomerates, represented by big new metropolises, we witness new types of social relations being produced, as well as new social relations of production, which in turn will have their expression in new power relations and new spaces of power (Lefebvre, 1991). Thus, the occupation of space becomes a fundamental variable. The production of space, as Lefebvre would call it, will determine to a great extent the characteristics, the sign, and the properties of those socio-economic, socio-political, socio-cultural, and socio-ecological relationships. This has been the fundamental framework of the previous investigations carried out by thinkers within the Marxist and social democratic tradition. However, our interest is in annexing other variables to the perspective of the occupation of space by the human species seeks to deepen and highlight the role played by the natural environment (or the elements of nature present in Earth's biosphere) in this process. It has been repeated, almost as

a commonplace, that humans have occupied, or in the least case explored, the vastness of the terrestrial ecumene. There is no contradiction on the fact that global urbanization concentrates about 70% of the world's population in relatively small territories, and the fact of the general advance of human presence in all geographical spaces. The ecumene has been occupied, colonized, and exploited by our species in leaps and bounds as of this first quarter of the 21st century. Hence, some thinkers would imply that nature as such has ceased to exist.

Certainly, the old dichotomy that separates human beings from their environment, the classical man and nature division, today takes on new dimensions, new borders, new features and new depths. From the second half of the twentieth century, it became clear that the technological model that drives our civilizing process based on the consumption of fossil energy found its dialectic contradictions in the economic rationality of both capitalism and socialism. Ultimately, the concept of nature for Ricardo, Smith, or Marx represents above all an immeasurable reservoir of raw materials from which, thanks to a manifest destiny, human beings are ready to serve themselves. The rationality of economic materialism has philosophical and religious roots based on particular conceptions of nature, and by extension, on anthropocentric beliefs about human nature. Thus, the economic development models carry a cultural and ideological imprint that has become evident in the way modern societies have occupied the terrestrial space since the nineteenth-century industrial revolution. Therefore, although words remain the same, the terms of what is understood by *nature*, as wilderness non-inhabited by humans, as well as *ecumene* and *polis*, have dramatically changed in the last three centuries.

I will be moving around these terminologies used broadly in various circumstances and meanings. In the case of this research, my understanding of nature, refers primarily to a spatial notion of ecosystems which in spite of human presence maintain high levels of load capacity and resilience, its systemic functions keep working, and its limiting factors are under dynamic balance control.

VI.2.1. The geographical uncertainties of space

On his critical description of the general state of the space question, Lefebvre refers with a certain irony to those jumps, from a *macro-cosmos to micro-cosmos* perspective of space (2013), which some theoretical proposals show. Lefebvre relates this vision with the wider and confusing concept of nature. From there he proposes for the discussion of the concept of *social space*, not quite as a social construct but as an expression of la *nature seconde* (2013, p. 90), a second degree of nature. At that stage he refers to a very specific issue of space: the rural-urban conflict which implies a whole lot of different conception about how human space shapes itself. I will refer to the three instances of space reflection, trying to join them in an argument that would serve further to argue on behalf of an environmental perspective of territory.

We can agree without difficulty that the concept of nature is perhaps one of the most controversial and complex terms in any major language. The reasons for its confusing interpretations are many, but I will refer overall to the historical anthropocentric perspective that has ruled the word *nature* for centuries. Being so, it is no wonder that Earth was once considered the navel of the universe. Today's astrophysics knowledge recognizes not only a

conceptual/theoretical unity with the universe but a material link, easily proved by astrobiology discoveries that shows Earth's chemical elements originated from outer space. So, I can argue that for today's science, nature is the whole universe, and is one.

The space in this sense is a *mysterious milieu* that sustains and connects the whole cosmos together. It is the void that joints the matter, which gives to space—from a materialist point of view—a very paradoxical meaning. It gains even more complexity from Einstein's relativity theory where time and space melt at a certain point. Through these paths, one can easily arrive at metaphysical conclusions from where our three-dimensional space slips into the fourth dimension of time.

“While space and time may seem ubiquitous, human experiences of space and time are remarkably specific to certain groups and cultures in particular places and times. The production of space occurs through both social practices and material conditions, meaning that space and time are contingent upon and shaped by macro-scale policies and innovations, such as calendars and maps, as well as by everyday routines like finding a parking space⁵⁶.”

⁵⁶ Reproduced from Giesecking, J.J., W. Mangold, C. Katz, S. Low, & S. Saegert (eds.). 2014. *The People, Place, & Space Reader*. New York: Routledge.

VI.2.2. The Transformation of Rural spatiality

Perhaps the best way to approach the contemporary urban phenomenon is by looking at the great transformation of rural spatiality. When considering the notion of the rural, we find diverse categories of analysis expressed in terms such as: rural society, agrarian structure, rural space, peasant society, agricultural space, agricultural areas, etc. There is also a series of scientific disciplines: agronomy, rural sociology, agricultural ecology, agrarian law, rural geography, rural demography and many other disciplines that have the adjective of rurality attached. However, despite the richness of the term, there seems to be no consensus regarding the parameters that should be used to define, today, the nature of rural space.

Starting from a preliminary notion of the term *interface*, the first stage of the research made sense only after assuming the need to adopt a spatial context so as to develop a theoretical framework. My interest in the subject of geographical space in general, and of rural space in particular, finds concrete methodological criteria in the systemic approach of geography. The rural space is considered as a sub-system of the geographical space, where *the Rural* shapes a differentiated spatial unit whose most peculiar features are expressed in the discontinuity, dispersion, and heterogeneity of the elements that constitute it, due to a diversity and multiplicity of physical, biological, economic, social, political and cultural factors (Briceño-Méndez, 1991).

Spatial differentiations reveal complex interaction processes based on the concentration of urban-industrial capital that define the urban or rural nature of spaces, depending on their predominant activities. The territory is considered both as a material basis of the productive

processes, as well as a geographical condition of its historical development. Thus, the geographical space is defined by its infrastructure and superstructure components, whose correspondences express a spatial totality, observable at different theoretical-methodological levels (Briceño-Méndez, 1991. p.6-7). Differentiating between rural organization of space and organization of rural space distinguishes a series of processes of permanence and change that take place within the rural sphere and that are expressed in social typologies (Briceño-Méndez, 1991. p.8).

From the point of view of this research, I identify here the intuitive notion of rural social interfaces, which are expressed theoretically in degrees of rurality. It is important to point out that any proposed rural typologies are spatially manifested insofar as their social and cultural function corresponds to the nature and dynamics of their agricultural economic activity, displayed as a gradient of greater or lesser rurality. It is a clear example of the spatial interactions between economic factors and social and cultural factors (Briceño-Méndez, 1991. p.8-10). In this research, I generalize the statements about these relationships because I am not discriminating between rural development models or agricultural management techniques that differ greatly between poor and rich, industrialized or underdeveloped countries, septentrional or tropical nations. I limit myself to observe the layers of spatial differentiation between the different systems of agricultural production and its relationship towards natural areas and urban areas.

In any case, the systemic view of the geographical space proposed broadens the perspective of spatial organization and raises questions about the modes that it adopts: Are we observing rural spatiality as a way of organizing the rural space, or conversely, are we in the presence of a rural organization of space. The author solves the problem, distinguishing between agricultural

production systems and rural networks: "Consequently, it is about defining rural networks that are established from the agricultural production systems to interpret the organization of rural space; and there are interrelations with urban networks to interpret the rural organization of space" (Briceño-Méndez, 1991. p.10).

I assume that the organization of the geographical space is the morphological and structural expression of the historical-geographic location of the resources. The territorial base and population settled by reason of city-centers where exchanges of goods and flows of information are generated. This set of elements are those that define a human spatial structure. Then, the national geographic space is no more than a selective integration of urban structures and rural structures organized according to their own specific systems. From these ideas, three main instances of rural space can be distinguished: *a. Agricultural spaces*: where the productive social relationship between humans and nature are materialized in agroecosystems and agricultural landscapes, managed by rural land and the normative criteria. *b. Agrarian Spaces*: where the relationship among social actors is subject to agrarian land law and agrarian systems, understood as organization of rural space susceptible to being ordered territorially. *c. Mediating spaces between the countryside and the city*: where the relations between local power and global society are expressed, through populated centers of rural content, which are integrated into a rural network and make up the rural organization of space (Briceño-Méndez, 1991. p.11).

These observations certainly offer a strong argument in defense of the Rural Space as a whole. Nevertheless, they leave open questions about how the transformation's pushed by the urban expansion affects the intermediating properties of rural space with the city periphery:

Within the frame of integrating city-countryside processes (...) the rural space becomes an extension of the city, in terms of the growth and expansion requirements of the urban space, but at the same time it establishes its own responses to this expansion whose formal limits are to be defined in terms of agricultural space (...) Within these integrative tendencies of the current processes, the rural spaces are undergoing profound transformations in their intrinsic nature, favoring the rural organization of space for the sake of new spaces that are morphologically rural, structurally urban, and culturally rural. (Briceño-Méndez, 1994. p.13)

However, if we accept that the rural organization of space is framed within an urban structure, it would be equivalent to saying that political-administrative management is generated from the urban center. One questions to what extent the logic that regulates urban activities would be able to manage those spaces where rural logic predominates. Following this reasoning, we would find ourselves before an urban organization of the rural space, which, faithful to its urban expansion process, would eventually take over the rural space. Under municipal regimes, the administrative borders determine the scope of the rural organization of its urban space. In terms of municipal management, this situation would tend to be complicated in the cases of cities that have more than one municipality. On the other hand, if the policy of rural organization of the urban space contemplates a management that includes several municipalities or microregions, perhaps then we would be in the presence of a policy of rural organization of the state or regional space, which is perfectly feasible, but would overflow the initial scope, that is, the particular management and governing of the transitional spaces between the countryside and the city.

An intermediate solution to the potential contradictions posed by the notion of a morphologically and culturally rural space, but structurally urban, could be resolved through the

figure of the rural municipality. We can suppose that the legislation of a rural municipality should contain certain guiding principles, designed according to the requirements of the agricultural and agrarian space that forms its scope of action. From this it could be deduced that its political-administrative management would guarantee an adequate representation of the interests of the rural society it represents. This could be an alternative for those settlements considered as rural, with populations under twenty thousand inhabitants. Similarly, it could be the case of *urban intermediate settlements*, with populations ranging from twenty thousand to one hundred thousand inhabitants, adopting mixed municipal legislation oriented towards the balanced representation of urban and rural interests (Briceño Méndez, 1991).

There is another alternative to work on the political and socio-economic contradictions regarding stakeholder's representation within rural-urban space. This will be explored with the theoretical possibilities offered by the concept of the *Intermediate Small Medium City*, which we will approach further ahead. Meanwhile, based on the three instances of rural space proposed by Briceño Méndez, the notion of *mediating spaces* between the countryside and the city gives me the track to follow the concept of transition and intermediated spaces.

VI.2.3. Urban Growth as Spatial Reference

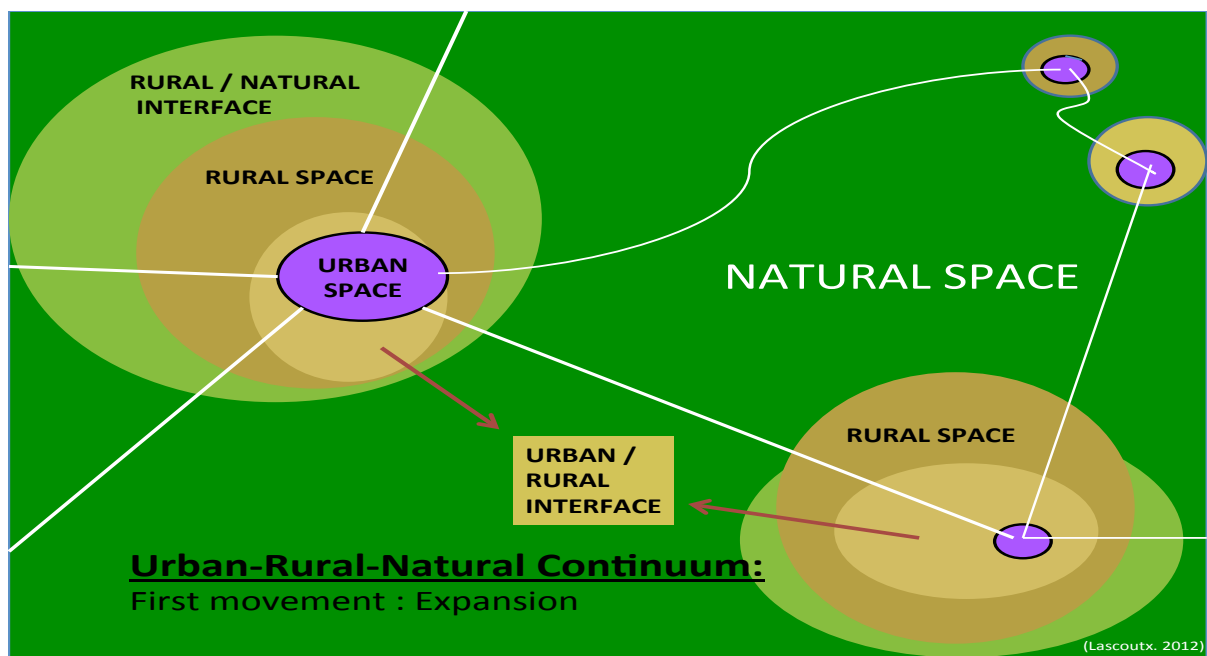
Given the explosive phenomenon represented by the boom of urban development in the late twentieth century, it would be almost useless to try to ignore even the tremendous influence exerted by the city on all modes and diverse lifestyles and cultures known to humans. Precisely, the use of urban influence has been felt with a determining weight on the general context of the so-called

rural society. The urban environment has modified the agricultural economy, the main base of rural productive activity; it has caused the migration of large human contingents from the countryside to the city; it has broken down the traditional agrarian society and rural culture.

We can say, in summary, that the urban space has invaded in a decisive way the rural space. In other words, today, the majority of human society lives under the hegemony of urban space.

This argument has as a corollary the implicit need for an updated re-evaluation of rural space. Therefore, the investigation of the urban phenomenon, the possession of urban approaches and the characterization of urban spatial dynamics look like an activity that is necessary to undertake, for the purposes of the preservation and consolidation of rural space. This is the meaning of our contribution in the matter.

Figure 6. Three Moments of Urban Expansion



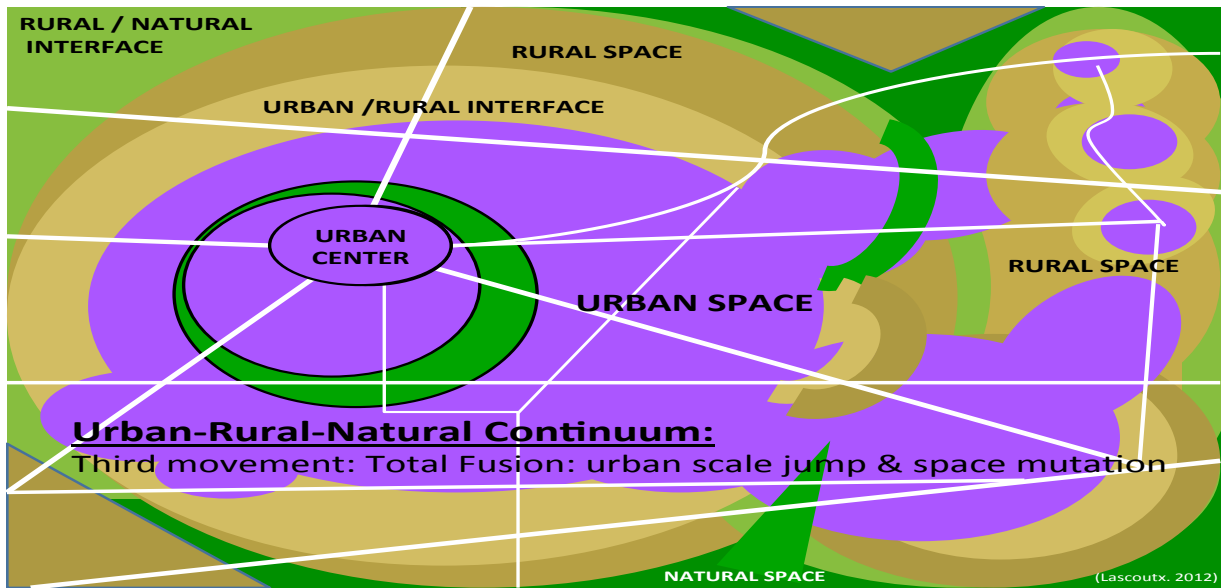
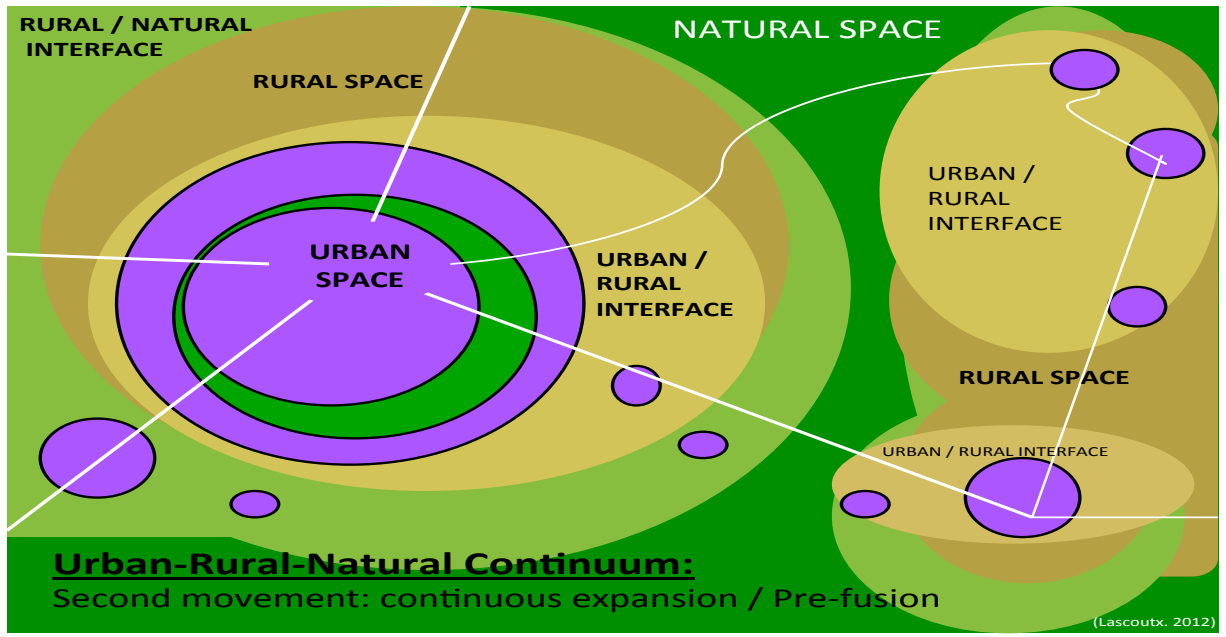


Fig.7 (7a-7b-7c): A city core “producing transitional spaces” in the process of connecting its own satellites cities and amalgamating with their peripheries. As the amalgamation of urban space advances, so does the fragmentation of rural space and natural areas. The fragmentation of natural areas is one of the causes for the loss of biodiversity, the decaying of environmental services to the urban areas. Fragmentation eventually leads to low degrees of resilience capacity of ecosystems.

In the field of urban research and planning, much has been done to categorize the dynamics, variables, and factors that affect the origin, behavior, development, and evolution of cities. Numerous studies, of various kinds, present us with the matured image of urban spaces and the so-called "urban structures," which—regardless of their location and historical evolution—present common functional characteristics.

It is true that spaces and urban structures are conditioned by a series of economic, social, and cultural factors. From the Marxist point of view, the very nature of the city is the reflection of the social relationship of production and exploitation, which occur in the first place between the countryside and the city (Lefebvre, 1978). This same relationship, where the city serves as an accumulator of the productive capital of the primary activity of agriculture and translates it into financial capital, is reproduced in the center-periphery relationship, where the large metropolises of developed countries—even in centers of power—concentrate the wealth coming from other cities, regions, or dependent countries.

With the birth of "Urbanism" —as a science and technology developed in the nineteenth century—there is a gain in the functional and hygienic management (sanitation, transport, parks, and paths) of the cities. When the complication of rapid urban growth—of the last century and the beginning of the present—seemed impossible to solve with urbanism. Urban planning was then invented, which first proved both to regimental and segmented to restore order; giving way to zoning. It was quickly discovered that the responses were insufficient to urban dynamics and thus adopted the first systemic approaches: mathematical, modeling, and flow based.

The population explosion, industrialism, and rural migration are some of the problems faced by the new city that was modeled. This resulted in an unusual concentration of activities to a new space, in a world increasingly industrialized and above all with a preponderance of the services sector. Until now, only the city has represented the suitable space for the accelerated development of the productivist capitalist model and the consume society. This has led precisely to further enhancement of the accelerated urbanization process, producing more relative employment, more relative consumption, and more absolute growth of urban space.

VI.2.4. Centrality of Lefebvre Urban Thinking on the Production of Space

Lefebvre looks at the city as the main element of the capitalist society in which the process of growth and expansion goes hand in hand with the process of accumulation. Lefebvre centers his analysis in the European context, in which this slow process begins in the middle ages. In turning his attention to the urban phenomenon, he does so not only with political economy arguments, but incorporates into his analysis other disciplines and views such as architecture, art, geography, history, planning, transport, agriculture, and trade. At this time, the prototype of traditional Greek cities still in use gives way to the development process of urban phenomena. Though some of the original characteristics of the original cities remain, the urban process became the trend and the practice (Martinez-Lorea, 2013. Prologue to The Production of Space. Spanish Edition, p.14). For Lefebvre, during this process the city fades and dies; meanwhile, the urban becomes the new sign of the times.

In the case of the city, it deconstructs the thinking of architecture and functionalist urbanism that assaults natural spaces based on technocratic representations: the planners of theoretical practice. But at the same time, he attacks the mercantilist vision that imposes the exchange value on the value of use, which turns the space into a *sui generis* product, what we would call today the space-commodity. Lefebvre calls our attention to one big contradiction of our time: the world is being urbanized and at the same time space is being fragmented and segregated. Space is colonized, parceled and sold. The result is a huge contradiction: a combination of the homogenization and fragmentation of space. *“The dominant space of capitalism is the abstract space, an instrumental space. This space transits over a previous space (religious, historical, and political) that serves as a base still remaining, and another new differential space being created in the inside⁵⁷”* (Martinez-Lorea, 2013. Prologue to The Production of Space. Spanish Edition, 2013 p.14). This abstract space is shown as an isolated product, totally separated from the complexities of human society, alien to the social relations of production, domination and exploitation (Martinez-Lorea, 2013. Prologue to The Production of Space. Spanish Edition, 2013 p.15).

⁵⁷ Ion Martinez-Lorea. Prologue to, *La Producción del Espacio (The Production of Space)*. Spanish Edition, Capitan Swing. Madrid. 2013 p.15).

VI.3. The new ideas of a ‘spatial turn’ in Social Thought

The stormy war times are over, and with it the odious relationship between the notion of political space and the doctrinaire geopolitics used as ideological weapon for the expansive militarism of the totalitarian Nazi-fascist regimes. The neo-Darwinian biologist theories have been left behind at the, for now, abandoned territories of the *lebensraum*. Ironically, for science and philosophy, the vital importance of space has been silenced due to the ideologically stigmatized “vital space.” After an interlude of more than two decades, contemporary spatial thinking finds its way back to prominence. But this *spatial turn* did not appear by chance. It was the product of series of changes ... and series of transformations.

This spatial turn was inspired by the political, social, and philosophical ideas on how space affects, influences, or even conditions the interactions between the external environment and human societies. Nevertheless, as stated in the introduction, the main element of conceptual ambiguity and discord continues to be the concept of space itself. Even deciding to focus on socioecological and environmental spatiality, the philosophical questions regarding “the big space,” the total space, will still remain unsolved.

VI.3.1. The Production of Space

From a neo-Marxist stand, the extended work of Henri Lefebvre introduces the concept of *production of space*, constructed by a particular interpretation of Hegel’s and Marx’s dialectics and a dense elaboration of the concept of production *vis-a-vis* nature’s creation. Lefebvre’s concept

of space understood as a concrete abstraction, distinguishes between abstract space and social space (Tally, 2013, p.116) and is intrinsically embedded in Marxist historical materialism and contributes to the critical social theories of David Harvey and Edward Soja. His Marxist approach gives his spatial theory a definitive anthropocentric understanding of nature. My intention is to analyse some of Lefebvre's most illuminating ideas and methods regarding his theory of space by looking at them from a non-anthropocentric perspective. A social space based on some of Lefebvre's theory would help to approach a notion of social ecological space suitable to the principles of a less anthropocentric political ecology.

Lefebvre's work provides us with key terms that will allow the return of the concept of space to the social sciences. Considered one of the most influential authors of spatial theory, "at once both a reflection of and a motive force in the spatial turn" (Tally, 2013, p.117) and will have a wide impact not only in philosophy, but in geography, architecture, urban planning, sociology, cultural studies, and political sciences. Taken in its historical context, Lefebvre's work gives a new twist to the language of space. He defines and conceives it as a social product, a social construction, and from there he makes a characterization based on his Marxist notion of production. Lefebvre identifies or recognizes a particular vein that has been overlooked for a long time. Speaking in terms of political economy, Lefebvre explains in a novel way how capitalism produces surplus value through the rent of land and how the transmutation of use value to exchange value of space in the contemporary capitalist system occurs.

There is much value in Lefebvre's work, and we will focus on the social production of space and how some of its ideas can be re-interpreted from an ecological context. These theoretical and

empirical discussions on the dynamics of space, and in particular the social space, translate into a new challenge for other disciplines in which this knowledge must be contrasted. In my case, I want to contrast that renewed spatial knowledge from a less classical perspective, a more exploratory perspective, towards a discipline that still seeks its place within the system of science: political ecology.

VI.3.2. Space as a Product

The Production of Space (1974) is the most known philosophical work done by Lefebvre. It is a book that fascinates by the erudition of the author, who transports the reader through multidisciplinary times and places of space. The eclecticism of Lefebvre allows him to argue his central thesis from different perspectives, sometimes with apparent dissonance (Elden, Lebas and Kofman, 2006). On the one hand, (social) space is produced from the logic of capital on the rent of the land which imposes the hegemony of exchange value over any use value principle. So, the space finally becomes a product, a commodity of particular characteristics that is bought and sold under the precepts of property. But for Lefebvre, it is not the production process itself that he is most concerned about analysing. His focus is “on the reproduction of social relations of production, which—he says— “constitutes the central and hidden process of capitalist society, and this process is inherently spatial” (Smith, 2008, p.123). In other words, it is the “space as a whole” where the reproduction of relations of production takes place.

Although many of Lefebvre’s ideas and methodological proposals about space are highly original and attractive, it is not my intention to elaborate an analysis of his vast collection of works.

More than one seemed adaptable to political ecology spatiality; and some arguments seem incomplete, objectionable or out of our focus of concern. One of the aspects that makes Lefebvre's work interesting in terms of my research is the fact that he exposes the contradictions between the countryside and the city (Lefebvre, 1975). In this book, his Marxist perspective marks a correct analysis of the phenomenon of the degradation of the rural life system and the migration toward cities, as well as the migration of financial capital to cities. Lefebvre describes the accelerated and massive urbanization process in his country, a phenomenon that, as we know, has been and continues to be at a global scale in different times and circumstances.

Although Lefebvre's description of the transformation process of the nature-countryside-city space is precise and profound, it does not properly identify the empirical and theoretical value of the consideration of the intermediate spaces or transition areas that form the zone of expansion/contraction in the production process of the space. Or to put it as Lefebvre, where the transformation of use value to exchange value of a particular geographical space takes place—the edges of the urban periphery—leads to the production/reproduction of a new social space where the power relations between the actors involved are modified. Lefebvre seems to object to analyses based on methodological postulates that offer a fragmented disciplinary view of reality. For instance, during his initial research on the countryside and the city, and the urban and the rural, it became increasingly evident to him that the conception of the space for the time was not adequately handled or failed to understand the social phenomena. As he himself refers to it in the preface to LPE, "the conceptions of space were confused, paradoxical and incompatible" (Lefebvre, 2013. Spanish edition p.53). The mathematical, geometric, and Euclidean conception of space is contrasted with the philosophical, Platonic, Cartesian, and Kantian conception of an absolute and

empty space, seen as a static category. Likewise, he refers to "fragmentary" sciences, such as sociology, geography, history, etc. However, he also makes his sociological analysis based on political economy principles, and his particular management of the notion of space from his own methodological postulates.

It is not always science that fragments academic research; ideology also plays its part. For a revisionist Marxist, Lefebvre was in fact loyal to the principles of dialectic materialism from which he draws on and widens his research. By his previous training, Lefebvre had his own solid perspective of the Marxist methodologies he follows to achieve a humanist understanding of space. His writing from the early 1960's already shows his interest in the spatial dimension through the idea of recovering the urban space for the proletariat, as promoted by students during the May 1968 revolts (Martinez-Lorea, 2013. Prologue to *The Production of Space*. Spanish Edition, 2013 p.13). At the end of the 1960s, Lefebvre concentrated on the study of the urban transformation of society. Six main texts are meant to encompass this task: *The Right to the City* (1968), *From Rural to Urban* (1970), *The Urban Revolution* (1970), *Marxist Thought and the City* ((1972), *Espacio y Política* (1972), and *The Production of Space* (1974). During this period, Lefebvre travels from the Euclidian void space, the inert receptacle, to the social space. He exposes the absolute, immutable, objective, neutral space as an illusion that hides the social reality of space. According to Lefebvre, this misinterpretation gives place to an ideology imposing certain power relations. This illusion hides the reality of space as a social product. Space is a result of social relations being at the same time part of them, merged. There is no social relation without space, as there is no space without social relations (Lefebvre, 2013 p.221).

At this point, the nature of Lefebvre's space begins to be revealed and gives the possibility of framing it among certain borders, or elementary variables. Lefebvre space is first a human space and its limits are constrained to the Earth space; it is an anthropocentric space. Lefebvre's main argument in *The Production of Space* is that space is in fact a social product, a cultural construction that rules over socio-spatial practices and determines its symbolic and concrete social perception. Adopting this perspective as a method would imply researching from theoretical (abstract) concepts of space towards an empirical investigation of processes of how space (concrete) is produced. This Lefebvrian premise questioned the entire idea of ecological space as a concept. Lefebvre confirms that space intervenes in the productive event and therefore becomes a product. Not being a concrete thing, space ends up being a *sui generis* product. Beyond this, space and time can be parceled to be exchanged as a commodity or workforce; space remains in being, an essence difficult to conceptualize. It is what Lefebvre will call a concrete abstraction. A second consequence of Lefebvre's vocabulary is that not being a dominant product (57e) of the mode of production, its function would be to link the productive process. Space is part of the production mode being "at the same time effect, cause, and reason" (57e) and therefore modifying this mode of production, which is tantamount to affirming that the (social) space changes with each society and its particular mode of production. These arguments and premises are taken as part of our argument, meaning three things: the (social) space mutates, evolves in time and does so together with the society that belongs to it; each space is determined by its own economic productive realities; and the social space has connecting properties and from it acquires power. Lefebvre focuses on understanding how the capital exercises its power of domination.

VI.3.3. Lefebvre's Spatial Triad

Even though understanding Lefebvre's ideas as a sociologist philosopher would require studying all his works, that is not the purpose of this research. I want to focus on Lefebvre's spatial theory, understood as a proposal of looking at the world while considering the particular perspective which space gives to the understanding of the structure of reality. Therefore, I will focus mainly on two of his books on space and politics: *The Right to the City II*, published in French in 1972, for which I will be using a Spanish translation from 1976; and secondly and most importantly, *The Production of Space*, first published in French in 1970, followed two decades after by the English translation of 1991 and the Spanish translation of 2013. It would be impossible and unfair to do any analysis of Lefebvre's spatial theory without referring to his Marxist thinking, which permeates all of his work: his study of logic, his research of the rural-urban divide, his approach to everyday life as a field of study, his trialectic proposal, *etc.* I will focus on space, touching as little as possible the connected tributary themes. Therefore, I will give a broad picture of Lefebvre's spatial theory neither from a Marxist nor a neo-Marxist point of view. However, I approach Lefebvre's Marxist categories of analysis through non-Marxist ecological points of view. This requires, nevertheless, looking at Lefebvre's Marxist definition of production and the consequent definition of production of space. It also requires Lefebvre's understanding of Marx's idea of "concrete abstraction" from whom he takes that concept to develop his own, referring to space as a concrete abstraction. The notion of dialectics moves to a trialectic. Finally, it assumes a deeper, clearer definition between space and social space.

Though very much engaged in political activity, Henri Lefebvre's theses were not so praised during his lifetime as philosopher and professor at the University of Nanterre, Paris, in the 1960s. However, his work eventually moved the social discourse into a consideration of space as a primordial element to analyse human societies' political realities from a Marxist stand. This was a new view of social and economic power relationships through the glasses of spatiality. The slow re-discovering of space as an analytical element took different paths before the so called "spatial turn" began to take shape in the 1960s, before coming to be understood as a sociological instance that could be subject to a Marxist analysis of local or global capitalism, as Lefebvre proposes with his theory of the production of social space.

Lefebvre proposes advancing on what he calls a unitarian spatial theory to overcome what he understands as analytical dichotomies. These are the origins of the conceptual triad composed by spatial practices, the representations of space and the spaces of representation. To each of these dimensions corresponds a type of space: *l'espace perçu*, the perceived space; *l'espace conçu*, the conceived space; and *l'espace vécu*, the lived space (Martinez-Lorea, 2013. Prologue to *The Production of Space*. Spanish Edition, 2013 p.16). The spatial practice describes the physical patterns and places of social activity; it is the perceived space. In this category, space is a social product that can be perceived in the everyday citizen's routines (resting, working, buying, playing, traveling, etc.) in everyday spaces (home, office, shops, and streets) (Lefebvre, 1991 p. 38 Spanish Edition, 2013 p.97). Representations of space are made up of those spaces conceived by architects, engineers, urban designers, developers, bankers and other dominant groups through plans, designs, drawings, maps, and budgets produced to define the space. They use systems of signs and codes to organize and direct spatial relations (Lefebvre, 1991 p. 38-39 Spanish Edition, 2013 p.98).

Representational spaces, or spaces of representation, are those spaces dominated by other modes of spatial production that seek to be appropriated by the imagination to become alternative lived spaces by artists and others who do not share control on the power system. Spaces of representation overlap and go beyond the physical space because of their association with images/symbols, implying that they are spaces for communication, language and the media. Lived space encompasses the spatial representations which ordinary people make in living their lives, the mental constructs with which they approach the physical world (Lefebvre, 1991 p. 39-40).

Edward Soja, who became a student and propagator of Lefebvre's theories, refers to the triad as *Firstspace* (perceived space) associated with physicality; *Secondspace* (conceived space) arises from ideas about space; and *Third space* (lived space), which he defines as "another way of understanding and acting to change the spatiality of human life, a distinct mode of critical spatial awareness that is appropriated to the new scope and significance being brought about in the rebalance trialectics of spatiality-historicity-sociality" (Soja, 1996 p.10). Massey noted that the last two categories are difficult to separate and that professionals also experience space as ordinary people, as well as through their professional discourse. This trialectic typology has a Hegelian dialectic origin (Schmid, 2008. Elden, 2001) that is important to know in order to understand and assess Lefebvre's proposition. In this respect, Lefebvre is considered an advanced Marxist theorist, as he appropriates Hegel's binary notion of dialectic and extends it to a third element. The third element is not a result of a synthesis of the previous two but is an integral part of the reality of the social relations of production. The third element, "the other," is always present. Lefebvre inverts, as Marx does, the Hegelian idealism into a materialist trialectic where not only history (time) has

to be looked upon, but space. Therefore, space becomes to the Marxist thinker the category that was needed to analyse contemporary global capitalism.

According to Lefebvre, there is a permanent tension among these spaces. These spaces are not separated from each other but function on interconnected processes. The struggle among these three spaces seems to gain in favor of the conceived space. Nevertheless, the lived space hardly yields to the rules that the representation of space attempts to impose. Lefebvre proposes the use of this trialectic tension to capture the spatial changing experience, vindicating the potential of spaces of representation to act on representations and spatial practices (Lefebvre, 2013 p.112). The function of this triad would be to shed light on the social relationships produced by urban contemporary capitalism under the shadows of an abstract space.

VI.3.4. The Lefebvrian Concept of the Production of Space in Tandem with Socio Ecological Perspectives

Does the Lefebvrian concept of the production of space serve as a metaphor for ecological transitional space? How does the Lefebvrian concept of the production of space help us understand ecological transitional spaces? Establishing correspondences between the social analysis of interactions among humans and institutions, on one hand; and their interactions with biotic/abiotic elements of the ecosystem, on the other hand; implies the idea of a space that holds the environmental system within its “domain” boundaries (Prickett and Cadenasso, 2002). But it also suggests the idea of a transitional space where those mixed human/non-human interactions meet and develop in a gradual expansion of the human ecosystem. What could be called in ecological

terms a gradual process of *succession* and could be interpreted by Lefebvrian terms as the *production of space*. This correspondence gives a meaning to the idea of a concept of social ecological space, or environmental space: It can be matched with Lefebvre's conception of social production of space as the integrative concept to the construction of an ecosystemic transitional space theory.

Lefebvre's main argument in *the production of space*, is that space is in fact a social product; a cultural construction that governs socio-spatial practices and determines its symbolic and concrete social perception. Adopting this perspective as a method would imply researching from theoretical (abstract) concepts of space towards an empirical investigation of processes of how space (concrete) is produced. This Lefebvrian premise set a big question mark on the whole idea of ecological space as a concept.

I have chosen establishing a correspondence between Lefebvre's space and ecosystemic space for various reasons. In *the production of space* (2011) Lefebvre highlights his concept of social space where three instances, as conceptual moments, interrelate to give a full explanation: a) the *spatial practices*, b) the *representations of space*, and c) the *spaces of representation*; corresponding—each of them—to the unfolding processes of *perceived* spaces, *conceived* spaces, and *lived* spaces.

Lefebvre widens his spatial philosophy towards a theory of everyday life that combines with a geographical and sociological interest for exploring the multidimensional aspects of rurality,

urban life, and modernity. All of these elements represent convenient methodological approaches and empirical scenarios for my research.

VI.4. The Challenge of Intermediate Cities

VI.4.1. An Urban Tsunami

Though world urbanization is a process in actual development and constant increase, we can say that the rural-urban migration is happening today but is not yet settled: it is a future event. A near future trend that materialize itself each day in small proportions: poor villagers from India, landless peasants from Latin America, war refugees from Africa, jobless people from rural areas of industrialized countries, all heading to big metropolis via a circuit of towns and small cities with the sole aim of surviving and making a living.

Is this trend unavoidable? We do not know. But what we can foresee without much effort is a direct relationship between city development and human development. The obvious task would then be to research on the type of cities we have, imagine the kind of cities we need, and come out with an agenda to make all feasible changes possible (Bozzano, 2000).

The past decades have seen deep changes in the way world population settles. According to UN sources the speed of world urbanization has jumped from a 29% by the half of last century to over 45% at the end of it. By 2025 it is expected to cross the 60% line⁵⁸. Data from 1996 reports a

⁵⁸ United Nations Department of Economic and Social Affairs. Population Division. World Urbanization Prospects: 2009 revision. File 4 Rural Population⁵⁸

54% of world population living in cities sheltering a population of half a million inhabitants. Further reports from 1998-2000 profile a 7 % of world's population living in megacities of over 10 million inhabitants, while a 35 % live in cities of over a million inhabitants. The reports showed that Europe and Africa had the majority of small and medium size cities.

Today, about 50% of the planet urban population (3.500 million) live in settlements with less than 500 thousand inhabitants. As urban research around the world point out, there is a common trend in city inquiries: there are very few studies—either international or regional—focused on small and medium size cities, therefore it is difficult to obtain data from them. Of a total of 3, 400 cities studied with populations of over 100 thousand inhabitants, 90 % of them have populations between 100 thousand and one million. For the United Nations, a one million city is considered to be a big city. Within this 90% some 2, 000 cities house more than 32 % of the planet's total urban population. A different statistical perspective is given by cities between 20 thousand and one million: in this case it represents between a 40-45 % of total urban population. Again, cities between 20 thousand and two million represent more than 50 % of total urban population.⁵⁹

These numbers show us two main facts of actual world demographics. First, it shows a gigantic shift from rural to urban settlements. This has mainly occurred in the less developed regions of the planet. Secondly, it shows that the trend moves towards cities with about one million

⁵⁹ United Nations Department of Economic and Social Affairs, Population Division. World Urbanization Prospects: 2009 revision. File 3 Urban Population⁵⁹

populations. Therefore, the megacities are not representative of the world urbanization process. At least not yet.

VI.4.2. An approach to Intermediate Cities

We can approach an operative definition of Intermediate City through different ways. First we will summarize a global perspective of the planet urbanization. By dropping some statistical perspectives of urban growth, we intend to alert about the actual lack of sustainable development measures regarding city planning policies in most nations of the world. By doing so, we advocate in favour of promoting intermediate cities' research programs as an option to be considered for territorial policy plans. Secondly, we intend to identify some of the space properties inherent to the concept of intermediate city. We will emphasize the environmental approach from a very general theoretical perspective of our reading. Thirdly, we submerge fully into the dimension of geographical and ecological space. This description of possible scenarios adds substantial elements to the identified properties shaping a more clear profile of Intermediate Cities. A last step to frame the nature of intermediate cities consists of providing some considerations regarding the potential of its social system, or better, its human ecosystem.

VI.4.2.1. Cities and the political ecology of space

The main question in this essay orbits around the impact that the world urbanization process may have on human societies as a whole. For some, this is a major event in human history. Slowly our species seem to transform from *homo sapiens* into *homo urbis*. As millions of people coming

from rural areas around the planet keep turning their destinies towards the cities, this shift will express itself at all levels of world society. Though the issue can be boarded by diverse disciplines and perspectives, one fact seems to remain highlighted, no matter how you look at it: if cities are going to become the habitat of the majority of Earth's population, then we will be able to tell, by the kind of city human will live in, what kind of existence they are going to have.

This paper attempts an environmental approach on some spatial properties of *the city* as a human habitat within a given territory. More specifically we focus on what will be properly defined, further on, as *The Intermediate City*, that is, those cities already existing—or planned for the future—according to certain urban characteristics, within certain population scales, located at strategic points of a city system's geography, and maintaining a certain type of territorial relationship with its rural and natural surroundings. As any human settlement, like villages, towns, or metropolis, intermediate cities inherently express a set of properties which describe their particularities as a habitat. Although we are interested in identifying and learning about such potential properties as *mobility, connectivity, interaction, access, proximity* as intermediate city properties, this paper will focus on the notions of the city *scale* regarding population and the areal size of its basic urban structure.

We will begin by explaining why, among the different possible types of cities, we have selected this particular one. We intend to show why the choice of the intermediate city is concomitant with an ecological approach as they can be understood as part of an environmental planning policy or in a deeper sense as part of national territory planning. They can be assimilated by the broad spectrum of green policies in search of sustainable parameters for the cities of the 21st century. From a human geography point of view, they certainly pose a different outlook at the

space occupation and settlement. Similarly, from the habitat perspective they will possess many characteristics of their own that will mark the differences with other types of urban settlements.

By embracing three dimensions—space and territory, ecology and environment, and intermediate cities—our search aims, in the long term, to identify property patterns common to diverse cities in different parts of the world. On parallel we will go on describing and defining some of the common links that relate intermediate cities and the uncertain nature of intermediate spaces. Again, we are interested in adding to our inquiry the theoretical potential of concepts like border, limit, frontier, fringe, and all those notions concerning transitional areas, unidentified zones, the in-between sprawls, the no man's lands... Places—finally—that do exist and perform certain functions within the system they belong to, but which are usually ignored in most political-geographical research.

Deeply rooted with the idea of intermediation I relate *the Interface* to the elemental properties of the intermediate city, the interface's research approach sustains itself in a geographical *continuum* a perspective which allows uniting urban, rural, and natural spaces in a holistic territorial vision. The interface thus becomes part of the intermediate city's scenario. I pretend to outline some explanations towards a variety of questions related to the research: How much does the population scale contribute in keeping intermediate cities on sustainable levels? How can we identify and study intermediate cities' interrelation with its bioregional territory? Why does it make a political difference in terms of governance to develop intermediate cities as part of an *Aménagement Durable du Territoire*, an environmental land planning policy? These questions confront a wider spectrum of political, geographical, and environmental topics interweaved by the

ideas of *State* and *Sovereignty* and dimensions of spatiality, territoriality, and the surrounding notion of *Domain* as a glimpse of a future work of research.

VI.4.3. A Profile of Intermediate City

Intermediate Cities can be understood as part of an environmental planning policy, or in a deeper sense, as part of national territory planning. They can be assimilated by the broad spectrum of green policies in search of sustainable parameters for the cities of the 21st century. From a human geography point of view, they certainly pose a different outlook at the space occupation and settlement. Similarly, from the habitat perspective they will possess many characteristics of their own that will mark the differences with other types of urban developments. In fact, Intermediate cities are all these and more. And that is one of the reasons why we refer to them in plural. Their diversity is as wide as human culture and geographical landscapes but still they share a set of properties and functions that create a pattern that allows us to draw some clues about its possible functions, dynamics, and the way they respond as part of interconnected human and non-human systems, from a local to global scenarios.

The *Intermediate City Program, CIMES*, of the International Architects Union is perhaps the main researching group working today on the subject of medium scale cities. Though one of the variables used to define what an intermediate city may be is its population-based data, at the same time one of the first obstacles to reach a definition regarding the size of the population is the wide gap between the upper and lower scale standards used around the planet. The indicators, as CIMES team puts it *there is no single set of quantitative indicators to define an intermediate position in*

different socio economic and cultural contexts (Llop & Bellet, 2000. p.554). That means different perspectives in Europe, Africa, America and Asia.

According to Llop and Bellet, the population scale is not the defining property of an intermediate city: *More important than population is the role and function they play in their areas of influence. The nature and degree of the influence they exert over such areas and the flows and interactions they generate towards the exterior. They organize their territory and act as centre of reference for the immediate surrounding areas* (Llop & Bellet, 2000). Thus, the intermediation property has more to do with the roles these cities play and the relations they maintain with their territories: a providing network of social, economic services and cultural interactions between urban and rural municipalities; sharing a web of infrastructures and government administration centres connecting from local, regional, and national networks up to the international periphery of metropolitan areas (Llop & Bellet, 2000, p.555).

The CIMES program has also identified a series of characteristics in relation to larger urban settlements and megapolis. Among them those more directly related to an ecopolitical perspective: *Due to their scale, intermediate cities constitute a more balanced and sustainable system (...) easier to manage, govern and control which should foster greater public participation in the government of such cities (...) they do not have the environmental problems of megacities which give them potential and advantages in terms of social and economic success* (Llop & Bellet, 2000).

VI.5. Intermediate Cities and Surrounding Territories: A Theoretical Model for the Interface and Ecotone

The studies of urban politics and its interactions with rural territories and natural protected areas is a niche that should be re-examined by modern political thought in light of increasing climate change and diverse ecological problems. Besides the theoretical challenges posed by political ecology perspectives, social scientists have been confronted by the actual process of world urbanization as a fast-growing phenomenon. By halfway through the 21st century, the majority of human society will have changed its habitats in favor of an urban way of life. As worldwide nations become urban nations, majority of its citizens will be concentrated in small territories. This creates a picture of human habitats never experienced before in history. Furthermore, future cities will have to cope with realities of population, food, natural resources scarcity, deterioration of basic public services, and different types of environmental problems. The result of this equation could result in low degrees of governance that would eventually affect the very basic conditions in which democracy sustains itself. In this scenario, the traditional approaches to urban planning, environmental management, and democratic governance are not only insufficient, but inadequate. As geographic-ecological realities infiltrate City Hall agendas and municipal laws prove incapable of coping with the multiple impacts of urban growth, the need for a better understanding of space-power interactions increases.

As megacities grow in number, becoming challenging places to live for millions of struggling middle classes and urban poor, the notion of supporting the alternative of intermediate small-and

medium-sized cities gains importance as part of a strategy of sustainable global urban development, as proposed by the United Nations for a number of years.⁶⁰

Current urbanization patterns, especially in poor countries in the Global South, bring along with them significant spatial problems for the distribution of resources and population, and in particular for the use and consumption of land for urban use (Bolay and Rabinovich, 2004). Unsustainable urban zoning artificially divides the rural countryside from city life. Dominated by car-centred policies, big-box commercial areas are separated from residential areas, creating extended sprawls that eventually create a process of urbanization without cities, as Murray Bookchin (1992) predicted: settlements without cores, without identity, and where the sense of citizenship declines.

This research's approach to these questions is based on a holistic perspective of urban ecology. The *Polis* serves as a reminder of the image of ancient feuds extending their domains beyond the burg to the farming fields, and even further to the surrounding forests and wild lands that shape its urban territories. This analogy serves to visualize the urban-rural-natural *continuum*, as a space of human ecosystems that gradually becomes 'natural'; this creates a mental landscape that appears to match the reality exposed by satellite images of regions and city systems. While urban settlements continue to be defined mainly by their spatial position within local and international urban networks and demographic criteria, the potential of intermediate or small-and

⁶⁰ Cuenca Habitat 3. The city of Cuenca, Ecuador, hosted in 2015 a thematic meeting entitled *Intermediate Cities*, as part of the preparatory events for Habitat-III, the *United Nations Conference on Housing and Sustainable Urban Development* held in Quito in 2016.

medium-sized cities lacks the specific indicators that could demonstrate its true advantages. These variables, together with the quality of urban planning and development, as well as political, socio-economic, cultural, environmental, infrastructure, services and institutional aspects, all play a role that can make SMICs “act as an interface to the outside world,” superseding the importance of big cities and metropolitan areas (Bolay and Rabinovich, 2004, p. 401).

Defining intermediate or small-and medium-sized cities has proved to be a difficult task as the notion includes two variables. First, their geographic position in relation to existing city systems’ networks, and secondly, that their scale is considered in a variety of forms (i.e., the size of the city infrastructure, its jurisdictional limits, its real physical expansion, the population density, etc.).

Any intermediate position is relative to the upper and lower ends of a hierarchy, which must first be established. This presents us with our first problem of definition: the context for analysis on a world scale. What should be the limits for a world scale analysis? There is no single set of quantitative indicators to define intermediate positions in different contexts: cities are defined in different ways within different socio-economic and cultural contexts. We hope however to discover a physical size which determines urban travel times and that, in turn, is related to overall density (expressed in H_b/H_a) across a wide populated area. (Llop-Torne, J. 1999, p. 42)

There are series of characteristics that help to define or describe the SMIC, including being part of a network of regional infrastructure, market circuits, and economic production; being within a township of decentralized local or regional government public administrations, etc. In this sense, SMICs have less economic competitiveness, especially in accessing the main flows of information

and capital, compared to large metropolitan areas concentrating the higher functions of the city systems (Llop-Torne, J. 1999, p. 43).

With the assumption that the intermediation properties and functions are narrowly related to questions of scale, this research will focus on the latter aspect of scale. Although there are different parameters to consider for the base of an ideal population scale (from 10, 000 or from 25, 000 to 500, 000), major UNESCO nations agree that the top level must be under one million inhabitants. Due to their scale, SMIC characteristics are multiple and positive: “[they are] are more easily governable, manageable and controllable and allow, in principle, greater citizen participation in the government and management of the city” (Llop-Torne, J. 1999, p. 43). SMICs also present less social conflict, create lower social costs, and provide greater support in interpersonal relationships at the neighborhood level, helping citizens to identify more with their city and create their own identity. From an environmental point of view, SMICs represent a more sustainable and resilient urban system in relation with their hinterland and surrounding territories; they do not experience the ecological problems that affect megacities, which is a positive advantage for a city’s social, economic, and environmental success (Llop-Torne, J. 1999, p. 45).

In 2008, the UNESCO *Chair on Intermediate Cities and World Urbanization* launched an initiative aimed at developing a model to screen urban spaces from all over the world. The idea’s predecessor was a United Nations habitat agency’s search for a model for town planning.⁶¹ The

⁶¹ UNCHS HABITAT (1996) *An urbanizing world: global report on human settlements 1996*. Oxford University Press, London. UNCHS HABITAT (2001) *Cities in a Globalizing World. Global Report on Human Settlements*. Earthscan Publications Ltd, London. / UN (2002) *World Urbanization Prospects. The 2001 Revision*. ST/ ESA/SER: A/216, United Nations Population Division, New York. / UNCHS HABITAT (2003) *The global campaign on urban governance*, UNCHS, Nairobi, Available from <http://www.unch- s.org/campaigns/governance/principles.asp>.

model was structured into six main considerations: setting the limits of urban areas (consolidated, extension and reserve), free spaces and green zones, connectivity (roads and transports, among others), equipment and basic services, compactness (population concentration in concrete spots and the interconnection among these areas), and zone identification (diagnosing the points where reforms or urban transformations are needed).⁶² This tool was conceived to help study over 150,000 intermediate cities around the world with more than 10,000 inhabitants.

Among the initiatives undertaken by the chair of SMIC was the development of sustainability indicators for intermediate cities in Europe as part of a project entitled *Medium-sized Cities and Socio-economic and Environmental Improvements in the Regions of the EU*.⁶³ The main urban sustainability indicators proposed for SMICs were: 1. Global Climate, Air Quality, Acidification and Ecosystem Toxification Indicators. 2. Urban Mobility, Waste Management, Energy Consumption, Water Consumption, and Disturbance Indicators. 3. Economic Sustainability Indicators. 4. Quality of Green, Monumental and Public Space Indicators; Citizens' Participation and Uniqueness Sustainability Indicators. It is also worth noting that all of these indicators align with the parameters of this research.

⁶² Chair UNESCO. Intermediate Cities and World Urbanisation. <http://www.unesco.org/en/university-twinning-and-networking/access-by-region/europe-and-north-america/spain/unesco-chair-in-intermediate-cities-urbanization-and-development-823/>

⁶³ Intermediate Cities in Search of Sustainability (1995) Pioneers cities: Alicante, Spain; Siena, Italy; Freiburg, Germany. European Foundation for the Improvement of Living and Working Conditions 1996. Luxembourg: Office for Official Publications of the European Communities, 1996 / Loughlinstown House, Shankill, Co. Dublin, Ireland

In post-industrialized nations there is a higher level of acceptance among governmental institutions of the notion of urban sustainable development as a set of diverse processes that walk along with institutions and policies, guided by principles, and oriented toward the safeguard of sustainable world for present and future generations, not only in the sphere of human-nature relationships but also in between humans and human-society relationships. In addition to European advancements in policies and organizations supporting sustainable urban development, during this project four theses were presented that highlight the coherence of the SMIC initiatives:

Without prejudging or reducing the capability of future generations to optimize the satisfaction of their interests and needs (and) in line with this concept, a wide range of empirical data provides the support to the following four theses: 1. The urban sustainability of SMC depends to a larger extent on the sustainability policies and the results achieved in the end by the large cities. 2. There is no urban sustainability in the absence of social sustainability. 3. Sustainable development depends on a normal functioning of the politeia (i.e. the principles and rules established by society to ensure the highest degree and quality of political representation and promotion of the res-publica). 4. Urban sustainability cannot be left to market mechanisms—the market pretends to govern the short term whereas sustainability is a matter of long term. (Petrella, 1996)⁶⁴

These four theses illustrate the reasons why this research employs the concept of *Intermediate City* (with under one million inhabitants) as a reference model that allows us to draw certain general conclusions that could *eventually* be applied on a broader range of city case studies. In

⁶⁴ Petrella, R (1996) Is it possible to promote “intermediary” cities sustainability within the present context of triumphant global market competitive capitalism. In *Intermediate Cities in Search of Sustainability*, European Foundation for the Improvement of Living and Working Conditions. (eds.) J-Ph Leresche, D Joye and M Bassand, Loughlingstown, Shankill, Co, Dublin.

addition, their geographic location within city systems of national territories, and the medium-size scale that is inherent to their nature, make SMICs a convenient theoretical model for recognizing different interfaces aligned among different ecosystems, and for identifying the different interactions that take place within and between the urban, rural, and natural space of city regions. To understand the nature and dynamics of these interactions, this research proposes an approach from within the paradigm of sustainability that considers SMICs as a sort of a territorial city-region.

United Nations urban statistics note the existence of some 3,200 *Intermediate Cities* that already shelter the majority of the world's population. Unfortunately, all major social science research is currently being done within the *megapolis*, which demographically speaking, is less representative. To this day, the concept of intermediate cities is little known. It still does not appear to fit into the definition of urban systems and the comprehension of their dynamics, and also, urban stakeholders lack understanding of SMICs. Because of this, a flaw in the policies emerges when attempting to effectively integrate the SMICs' characteristics, properties, and functions into sustainable development strategies. Most actors focus on the SMICs' intermediation aspects and do so from a capitalist global market perspective.

Following the premise that an urban majority of the world's population will inhabit cities in the near future, questions emerge regarding the socioecological spatial variables that will determine the state and development of each particular city and of each urban society. How will the size of the scale, place, geographic location, intermediations, and demographics interface within the surrounding environment of a given city to impact, modify, interfere, influence, affect,

or determinate political governance and civic life? “If it were better understood, its typological characteristics and appropriate indicators could turn it into a formidable instrument for analyzing urban reality and managing the interaction between cities and their environment” (Bolay & Rabinovich, 2004, p. 401)⁶⁵. This is why this research has chosen to focus on the intermediate small-and medium-sized cities’ “concrete abstraction,” as Lefebvre would say, to guide future research on interfaces and ecotones.

VI.5.1. City Systems and Ecosystems

There are two main perspectives from where we can visualize intermediate cities. The first regards the city system itself, which includes its immediate surrounding territories; that is, from local up to regional level. The second regards the city as part of a broader system that connects a web of settlements, towns, metropolitan areas and larger national urban complex that eventually joins the main global stream of energy and matter exchange at planet scale. The research does focus on the first perspective as the starting point to a later investigation on further properties that could describe the nature and dynamics of intermediate cities within the global village.

At this stage, I have cleared out some misconceptions regarding the population scale of intermediate cities. Though they have a media size of one million inhabitants, following CIMES’ ideas we visualize the difference between a medium size city and an intermediate one. Although, in the context of globalization, city size and scale are relatively unimportant due to the changes in

⁶⁵ Bolay*, J.-C and Rabinovich, A. (2004) *Intermediate cities in Latin America risk and opportunities of coherent urban development*. Cities, Vol. 21, No. 5, p. 407–421, 2004

mobility (Sheller & Urry, 2006), world-scale economic processes (Amin, 2002; Jacobs, 1984), and the emergence of global cities networks with specialized functions (Sassen, 2000) at a local and regional level population scale and city size remain important. The difference lies within ecological and geographical considerations. Here we can translate the word *considerations* for the notions of data, variables, or a deeper look at the bio-geo-chemical cycles that govern as real facts over the biosphere. I am talking, of course, of ecosystems, topography, and geographical landscapes. The consideration or not of these eco-geographical facts in the actual urban planning will—eventually—express themselves in higher or lower degrees of sustainability along the territory occupied by the cities in question.

Nevertheless, some more traditionally directed political scientists seem immune to the influences of environmental sciences and ecological knowledge over their political thinking. Somehow the magnitude of the globalization phenomena, along with its exponential consequences in the transformation of the concept of space, produces a sort of attraction-deviation on these researchers' theoretical focus. They may, as we saw at the beginning of this paper, widen their optic to identify and create new spatial concepts, they can be sharp on their critics to traditional conceptions of State sovereignty and national territories. But they are short sighted to identify the interconnection between human and nature. We argue that existence of a new global context of space, sovereignty, and territory cannot overlook the real existence of geographical and ecological facts and its determinant influence on the global system starting at the basic scale of small and medium size cities around the world.

So, it seems that we are back to a scale perception of reality. Certainly, the way historical events develop, the becoming—*le devenir*—of the human social evolution at a global scenario constitute a sole continuum, a constant flow of human performances moved dialectically by cause and effect, interacting permanently within the different environments of the planet. As a system it is one. Therefore, it could be argued that scales are artificial devices created with the intention of splitting reality. It may be so. But since we still lack a unified theory of science allowing us to explain reality as a whole, we need to move in scales of comprehension based on a multidisciplinary approach.

Allow me to use an ecological example to better explain our systemic point of view. The major Earth's system, the Biosphere, functions in a combined web of subsystems, the ecosystems. The characteristic and particular dynamic of each ecosystem start at the very smallest scale of life's forms and from there it develops into more complicate and intricate interactions, creating sophisticated subsystems, growing into bigger complexity and size, forming wider ecosystems. But still, the capacity of these ecosystems to maintain their functions depends on the degrees of stability of its minor subsystems and on the homeostatic interactions among communities, populations, and individuals. In other words, the levels of entropy and the capacity of resilience of the major systems can be identified and worked out at the basic levels of the system.

This long analogy only seeks to demonstrate our point from a human ecology perspective. The human ecosystem, as we have seen, transforms itself into a global urban ecosystem. The basic nodes from which the global city system is constructed are the small and medium size settlements. As CIMES's program has understood, these urban settlements play a key role in the interaction—

intermediation—along the whole system. Therefore, to play their role they must keep their elemental characteristics and properties in order to sustain the system flow. Hence, the environmental sustainability of the small and medium size intermediate cities is kept by preserving both, a certain range of population scale and a certain size of city growth.

It is certain that the concept of sustainability and with it the notion of sustainable development is a broad one and does not only refer to environmental standards. There are several dimensions—economic, political, social, and cultural—that integrate the sustainable development model besides the ecological one (Gabaldón, 2006). Being the natural ecosystems, the ones that sustain life, it can be argued that the environment, or socioecological systems in the age of Anthropocene, is at the base of the sustainable development concept and the ecological sciences are the ones in charge of sustaining the paradigm.

VII. Final Conclusions

Any study, whether philosophical or scientific, that attempts to address the concept of space will be challenged by uncertainties and contradictions as to the ultimate meaning of the word. There are a number of questions that arise from the study of space, and which will vary depending on the perspective being used. My inquiry about the concept of space, from the point of view of political ecology, emphasizes the importance of ecosystems as a spatial reference to address the environmental problems on peripheral urban areas and the interfaces between human systems and the rest of the biosphere.

Overall, the questions posed in the introduction and developed throughout the five following chapters seek to advance the research in the spatial field, in addition to addressing each chapter's specific themes: a summary of systems theory; an approach to political ecology; ideas about anthropocentrism; notions about 'social space'; and, an exploration of the spaces bordering socio-ecological systems. From these explorations, some pertinent questions arise. What aspects determine the integral study of human society through the concept of space? To what extent do ecological factors determine the characteristics of human society? Can a rich discussion of human social space take place without incorporating the notion of 'ecological space'? To what extent can we analyse the categories of human social space and ecosystem space under the same theoretical framework? Within a systemic vision of political ecology, is it possible to theorize a greater understanding of the spatiality of socio-ecological systems?

In the face of these questions and other similar ones, this research has found its greatest epistemological obstacles in how to approach the issue of space. In other disciplines such as geography, an investigation related to space is developed solely and exclusively within the discipline's parameters, meaning that the objectives, method, and lexicon will share commonalities that will lend themselves to the construction of a coherent theoretical framework. If, however, an investigation about space is undertaken from a single disciplinary vision (e.g., geographical, sociological, biological, physical, mathematical, etc.) but alongside or in confrontation with other, separate disciplines, maintaining a single line of spatial thought that responds to that vision's unique nature may be difficult. Because of this, it is likely that during the research process, different meanings of the concept of space from various schools of thought will converge in a kind of direct or tangential shock. For example, research on territorial space may result in a geographer's conceptions of geographical space being confronted with a sociologist's notions of social space, a biologist's emphasis on 'zones of life', or the perspectives of a physicist or mathematician who consider the issue from dimensional or geometric spaces.

The issue becomes more complicated when the concept of space being proposed as a research topic originates from a multidisciplinary approach. In this case, the research process should not only use and share different concepts of space, but in theory produce another spatial concept (e.g., new, renewed, integrating, eclectic, totalizing). This new concept of space should be the result of a systemic reading and interpretation that goes beyond the sum of partial definitions (i.e., beyond specific disciplinary conceptions of space that share a single theoretical framework). It should establish a renewed concept of space grounded in the unique perspectives of the various disciplines involved. Moreover, the level of complexity can also increase when the particular space being

studied becomes the hypothetical result of a systemic synthesis between natural sciences and social sciences. When attempting to create an operational concept of space, epistemological difficulties can grow and with them the risks of misunderstanding from the scientific point of view.

To develop an investigation at this level, the imbrication of different spatial concepts must be presented in a totalizing notion that illustrates clear linkages between the different spaces of the physical-material plane; can accommodate a theoretical function that is both innovative; and is able to express integrating and synaptic properties that allow harmonization between diverse disciplinary conceptions of space.

This is, in a few words, the challenge this research represents: trying to galvanize subjects that are clearly dissimilar, coming from different scientific traditions, different objectives and methods, and from dialectically opposed worldviews. It could be considered an exploration in *Terra Incognita*, taking on the uncertainties and contradictions that the themes of these chapters pose from the perspective of a spatial core.

VII. 1. The Body of the Research

A first topic addressed by the research is the relationship between what we call political theory and the topic of space, which in this case we see combined with the topic of nature as space. Though I do not presume of having discovered anything new; I demonstrated that there is a diffused linguistic relationship between both concepts, nature and space. Although the examples I placed in **Chapter Two** are few, they speak to us of a vision about nature that in Western civilization has been going on for more than two and a half millennia. It began by classical Greek philosophers and since then this particular view of nature has kept within the geographical borders of what we understand as Western hemisphere.

Human exceptionalism is certainly not an exclusive thought of Western paradigms. The Arab civilization, the Ganges Hindu civilization, the Chinese, the Incas; all major culturally developed societies have cultivated different kinds of human centrism. What draws attention to the European human centrism is the fact that it evolved from a religious theocratic order to a new order: The scientific technocratic centrism which places Man as the measure of all things. We could conclude then that the history of Western science is narrowly related to the paradigm of human exceptionalism. Inherited from the divine original statement, “men made at the image of God”; science evolution has—by empirical observation—demonstrated the superiority of Homo Sapiens in every possible respect when compared with any other form of life on the planet. Curiously enough, these assertions seem to project a big circle of returning ideas: From *the World* as center of the universe during the Middle Ages, to the accepted questions about the unclear possibilities

of intelligent extra-terrestrial life. This opens the door for a new type of cosmo-scientist human centrism, this time at the scale of the universe, and beyond.

A second conclusion we can derive from **Chapter Two** is the semiotic context that surrounds the idea of nature with the notion of space. When we observe the interweaving of similar semantic properties between the nature-space signs, their meanings clearly blurred by a cumulation of factors, such as religious or ideological beliefs, ethical and economic values, historic and geographic context, etc. It is my understanding that this is a line of interdisciplinary research that could open new fronts for semiology, philosophy, and history with the natural sciences.

In any case, one big conclusion I take from my research is that the scientific search for a non-anthropocentric line of investigation needs to find new ways of confronting questions of ethical values, religious beliefs, and political ideologies with high hard science standards. Conversely, there is a need for more philosophy, even metaphysical, in discussing about non-anthropocentric views without the restraints imposed by radical positivism. An inheritance of enlightenment, the positivist rationality, intends to gaze towards nature from the distance of an inexistent scientific objectivity. One big question for political theory would be to inquire about the way scientific knowledge filters into philosophy and *the political* in today's world. Examples abound in 20th century Western history. Neo-Darwinism, geographic determinism, and extreme scientific positivism have led to all sort of "exceptionalists" argumentations.

Here we observe a weak point on the side of humanistic political theories that refuse to open towards non-anthropocentric perspectives. Science, by positivist definitions, is a branch of human

knowledge built on observation, experimentation, and verification. But the nature of science is dynamic, not static. Knowledge evolves through trial and error. This is what explains the evolution of knowledge in constant advancement and transformation. Humanities, on the other hand, takes the knowledge of science and perform a sort of translation to make it fit within the canons of existent paradigms. Beside the fact that the “digestion” of that scientific knowledge is a slow process, there is always the problem of the religious, ideological, and moral filters, which adapt certain “truths” in order to be adopted by the hegemonic paradigm of each society. But there is something worse that characterize ideologies, religions, and morals. Once the scientific truth has been incorporated into the accepted realm, it may take a long time, generations, to change and accept new paradigms. This whole process of filtering, adaptation, adoption and protection of each new paradigm is perfectly described by Kuhn in *The Structure of Scientific Revolutions* (1982). Taking Kuhn's lessons, I ask and argue to what extent this slow and inaccurate knowledge transfer mechanism—between natural and social sciences—can be unlocked.

All environmental challenges the world faces today; famines, population growth, urban expansion, ecosystems’ destruction, climate change, to name just a few; makes me wonder on how much these problems, and their possible solutions, have a direct and indirect relationship with anthropocentrism as the hegemonic paradigm. Therefore, I concluded that for 21st century political theory, the notion of anthropocentrism draws a line between capturing the essence of humanity’s problems and the real state of the world. Guided by these perceptions, and unsatisfied with some political perspectives to the ecological question, I decided to explore a by-disciplinary approach to political ecology. **Chapter Three** is a challenging one because it implies questioning an already strong and respectful tradition of sociologist, ecologist, political scientist, geographers, economist,

and a large etcetera, already working under the banner of political ecology. The research and presentation of the variety of opinions in this regard is one of my demonstrated objectives: a cornucopia, as I entitled it. But, when reading the so many definitions dropped in the literature review, it comes back to the dialogue between Humpty Dumpty and Alice in Wonderland:

*"When I use a **word**," Humpty Dumpty said in rather a scornful tone, 'it means just what I choose it to **mean**—neither more nor less.'" The question is,' said **Alice**, 'whether you can make **words mean** so many different things.'" The question is,' said Humpty Dumpty, 'which is to be master—that's all.'" (Lewis Carroll)*

Therefore, again, the semiotic element appears as a key issue to understanding what we are talking about. The process of concept building described by Sartori (Chapter III, p.170) proved to be essential in my exercise. I demonstrated that a feasible and coherent method to decipher the nature of what we call political ecology is to uproot the meaning of the political and the ecological, the position each idea occupies as a sign in a phrase, and the semantic relationship with each other, in order to know which word guides which.

Besides this pragmatic exercise which proposes an object and a method for political ecology, I looked into the philosophy of social sciences to find some help. I found in Mario Bunge's work, (Chapter II, p. 140) a systemist philosopher concerned with the debate between anthropocentrism, biocentrism, ecocentrism, and what he calls systemism. With his classification of philosophical categories I adopted and adapted (just like Kuhn explained) them to fit into the political ecology preliminary definition obtained by Sartori's method. The exercise, I believe, shows a great number of characteristics, theoretical properties, and functions of what could be developed as an "ideal"

multiple definition for political ecology. My conclusion is that Political Ecology, though a branch of political theory, ecological sciences and human ecology, must not be treated as a subsidiary of other disciplines. If, for example, we happen to consider political ecology under a theoretical framework of political economy, then, to my understanding it is political economy—with a stroke of ecology—that we should be talking about. Same goes for geography and other disciplines which intend to submit it to their field. My conclusion is that to flourish in all its potential, political ecology must be considered an independent discipline, with its own framework, object and method. In no way does this mean denying its heritage and its ascendancy in the tree of sciences. Therefore, besides an always welcome epistemic and ontological diversity, political ecology must engage in building its own language in order to accurately describe its own view of the world. This means more theory and more philosophical research supported by the large tradition of political theory.

In **Chapter Four**, I arrived in search of that necessary common language that can serve both naturalists and humanists. I found it in System Theory. The General Systems Theory, as described in the research, seems to be exactly that: an abstract language that describes concrete reality with a refined method supported by sensible observation, intuitive skills and imagination. Of course, systemic thinking is much more than that, but this approach gives me enough leverage to connect different dimensions, the social and the ecological, into one understanding. Besides, as it is known, Bertalanffy developed its systemic theories from the study of ecology and the observation of its processes. Therefore, my first conclusion in respect to this chapter is that political ecology is a systemic thinking discipline. This will be of great help in addressing issues inherent both in social systems theory and in systemic ecological theory.

In the search of analog comparative language among disciplines we found that the space as considered by system theory, advances the intuition of transitional “spaces” or instances where different systems collide. That is why I have investigated, albeit superficially, the concept of Parsons on *Interpenetration* based on his systemic view of society, a concept that Luhmann worked on later and tried to adapt to his philosophical thought. It is clear that the concept of interpenetration does advance our research on transition spaces in socio-ecological systems. Two research scenarios open from this concept. On the one hand, interpenetration talks to us about social systems overlapping and penetrating each other at different dimensions and levels—economic, political, and cultural. On the other hand, interpenetration implies different instances of power relationships and vital interdependence. What you would expect from a systemic view of society.

Through the systemic theory, Chapter Four guides us to systemic ecology and the concept of ecosystem. Precisely in there is found the concept of *ecotone* which talks about the concept of interpenetration as a spatial transition between different ecosystems. This transitional character of the ecotone understood as an interface gives us a possibility to approach the issue of space from a systemic point of view. At least theoretically, it demonstrates that these concepts are extendable to work on mixed spaces of human and non-human ecosystems. A mix such as the case of the agroecosystem, peri-urban interfaces and other kind of humanized ecosystems. These thoughts give me bases to make an input to political ecology theory. Recovering the intuitions of researchers as Parsons and Luhmann by establishing analogies among the concepts of interpenetration,

interface, and ecotone on a spatial level, gives leverage to advance the ecological and political reflection on terrestrial socioecological systems.

Chapter Five, thought theoretically, showed the possibilities of discovering and identifying the many possible transitional spaces existing between those three typologies of space I have worked on: urban, rural, and natural. The graphics that accompany the texts expresses the phenomena of urban expansion. The process of urban expansion that takes place in time and space maybe diffused or intangible, since the perception of human depends on the social and ecological context of different generations of the settlers.

I demonstrate that the characterization of transitional spaces, ecotones, and interfaces is not only possible but necessary in order to have a more precise sense of how the occupation of space by settlers impacts the surrounding ecosystems and agrosystems that feed and provide ecological services to urban populations. I give argumentations to consider interfaces and ecotones from a political ecology point of view. Putting together the different theoretical elements of the research, I bring up the questions of borders, boundaries, and edges, coming to the conclusion that there exist not only one (1) but two (2) boundaries between systems. Each of them can be perceived from within each system, according to each system's properties, functions, or particular objectives, as Donella Meadows point out. Though I recognize that this needs to be proven by empirical research, I believe these insights give a clearer view of how to approach the research of intermediary spaces. With this intention, preliminary descriptions of what could be later on conceptualized as double ecotones or double interfaces, can be found in the notions of social-ecotone and eco-interface, presented as an exercise for future research.

My conclusion, supported by graphic images, affirms that ecotones and interfaces can be viewed as economic, juridical, geographic, and ecological dimensions. This means that the concept of ecotone may be used to conceptualize normative urban policies searching for sustainable planning.

Chapter Six comes as a brief unfolding of all the elements of the research. It is what I title a *convergent systemic research*, formed by many different elements that do not seem to fit with each other at the beginning, but gain clarity towards the end of the systemic investigation. I briefly essayed to bring together the main ideas of Henri Lefebvre, the head of the Spatial Turn movement, regarding his ideas about the death of the city and the birth of an urban era. I combine these ideas with the global social phenomenon of urban expansion and the ecological challenges within it. Two scenarios that did not show its real face in the decade of the 60's. I explicitly ascribe many of Lefebvre's insights describing the urban process as part of a global capitalist system, designed to focus on the "production of space" as a metaphor of new hegemonies. Nevertheless, I synthesize my observations on the anthropocentric Marxist character of his analysis, very much in tune with his explanation of first and second nature.

The last part of this chapter consists of a brief description and analysis of *the Intermediate Cities* as an alternative proposal to oppose what seems the most attractive goal for global capitalism: the expansion of conurbation and megapolises. I do not believe it is casual that the CIMES movement, supporting the idea of intermediate cities, medium in size, and medium in population, has been kept under the radar of many urban ecology research. In any case, I conclude that it should become a priority for urban political ecology to research and foster the exchange of

these ideas, which are not only theoretical but are in fact the majority of cities being founded and populated around the globe.

VII.2. Methodological Contribution

In addition to essential design methods, this thesis employed the FLACAM interface methodology (Perez, J. 1995) on which I was trained. This methodology was developed and used in Latin America and looks at participative research as a spatial process. It seeks to renew the study of complex systems and contribute to an understanding of the social and ecological elements of urban peripheries by direct observations and mental mapping that have traditionally been used in geographical and sociological analysis.

VII.3. Theoretical and Practical Contribution

The notions of social-ecotone and eco-interface are liable technical terms that can be operationalized on strategies and policy design for land and urban planning to become part of a legal normative. This proposal of a socio-spatial typology starts from a notion of transitional space, understood as a buffer or interface in geographical terms; as border or frontier in political lexicon; and, as ecotone in ecological vocabulary.

The current dynamics of urban regional space seems to be marked by the aggressive growth of urban establishments, which considerably increase their radius of action by rapidly occupying new spaces. If the pace of growth experienced over the past few decades is maintained, many existing cities—especially those located in geographical regions with spatial limitations—will exhaust their expansion areas in relatively short time periods. As cities' areas of expansion become

exhausted, there will be greater pressures to occupy adjacent spaces. This includes many with high ecological fragility and agricultural vocation that will be seriously threatened, if not eradicated, by urban growth.

Given the competition created by this use of land resources, disorganized and random expansionism can also be expected to occur. In these cases, conflicts and shortages of urban services would be created and subsequently aggravated in some cases by limitations of certain natural resources such as water, or saturation of trunk roads that connect various cities as their main points of access. Another repercussion would be on the budgets and regional resources that would be diverted towards metropolitan areas, which would create an extremely high social and environmental cost for the majority of the population, both in the cities and the rest of the surrounding regions.

From this, questions arise on how to prevent distorted trends of urban growth that follow developers' capitalist logic based on the surplus exchange value of land, overlapped by official planning inertia or 'logic of growth in the points of least resistance. This emphasizes the importance of being able to modify these tendencies or modifying the ways accumulation of capital take advantage of the concentration processes of the economy, and consequently, accelerates the concentrating forces of large cities. We must, therefore, promote eco-regional models to seek specific solutions to specific problems, as well as ecological and cultural factors.

Ecotones and interfaces, understood as a perimeter of the productive Hinterland, must be translated into a jurisdictional component of ecological services, an environmental patrimony, and

a recreational and cultural space of interaction between different biotic communities (i.e., urban, rural and natural). Urban societies can maintain a pragmatic socioecological balance through processes of civic environmental education to foster mutual co-operation. Achieving this, however, depends on recording success in creating a sustainable model of integrated geographic spaces and a democratic societal life within the urban territory.

VII.4. Final Conclusion for Future Research

Considering the diverse disciplinary areas amalgamated in this research, as well as the intended unified analysis of notions of space as a tool to advance the understanding of socioecological systems and political ecology theory, it is fair to argue that political science studies at the university level have a wide scope of opportunities and options to develop interdisciplinary research and deliver a deeper theoretical commitment on political ecology.

Yet, as a science, political ecology has not yet achieved a proper identity. The epistemological approach to a definition of political ecology, built on a parallel input contribution from human ecology and political science, offers an alternative theoretical framework to look at the objectives and possible methodologies of the discipline.

Its multidisciplinary-interdisciplinary character appears to function as an open toolbox where diverse disciplines and scholars take what they need or what suits them best in particular circumstances. Though the academic community attracted by political ecology's challenges has demanded deeper conceptual and theoretical efforts to meet its potential, the discipline itself still lacks a unifying framework that could serve to distill a multidisciplinary, multipurpose, multi-case

researching guideline. In other words, minimum conceptual agreements on theory and method are still required to legitimately conduct research under the banner of so-called political ecology.

This confusing disciplinary state seems to redirect us to the primary fundamental question of what political ecology is. This question, of course, can be posed in different ways. One way to proceed is by matching disciplinary identities on the tree of science. In a deeper sense, is the search for the epistemological DNA of theoretical knowledge inherent to the field? In this case, is political ecology a discipline on its own or is it just a minor field strictly depending on major disciplines? Is there a proportional scientific characterization to be made between the ‘natural’ and ‘social’ part of it? How much biology weighs on its structure as science? How much ecology does it stand for, and how much ecology does it support? Is political ecology essentially a political economy interpretation of nature, or is it a subsidiary of geography, sociology, or anthropology? Finally, where are the politics in all of this and where are the politics of political ecology?

A different approach can be gained by locating political ecology as an expression of a philosophical stream, a world-wide perception or ‘weltanschauung,’ a school of thought, or even an ideology. Though it is not this research study’s concern to recreate the historical philosophical origins of modern political ecology, certain trends and connections must be made within political thought schools. The basic objective here is to delimit, if possible, the historical context in which political ecology emerges as a political notion. Part of the undeniable strength of political ecology proposals is based on a superior advancement of modern science and technology, resulting in a paradigmatic shift to the human approach to nature and the natural world. Simultaneously, this seems to coincide with the evolution and exponential growth of world human demographics, its

interactions with the ecumene, and the impact of economic, social, political, and cultural human activities on the biosphere. In other words, what we know as the global ecological crisis.

In order to gain focus on political thought research in these contexts, we should continue looking within the thresholds of social and natural sciences and connecting philosophical and political linkages to the development and evolution of political ecology.

References

- Acot Pascal. (1988): *Histoire de L'écologie*. Paris: Press Universitaires de France
- Alberti, M. (2008): *Advances in urban ecology : integrating humans and ecological processes in urban ecosystems*. New York: Springer.
- Alberti, M. *et al.* (2003): Integrating Humans into Ecology: Opportunities and Challenges for Studying Urban Ecosystems. *Bioscience*, Vol. 53, No. 12
- Bates, F. (1972): *The community as a social system*. *Social Forces*. 50:3. P. 371
- Allen, A. y Lacabana, M. (eds.) -(2003): Interfase Periurbana: Dossier. En Cuadernos del Cendes 53, Año 20 , Tercera época. Mayo-Agosto 2003. Caracas.
- Amin, A. (2002): *Spatialities of Globalization*. *Environment and Planning*. A 2002, volume 34, pp. 385-399.
- Andermatt-Conley, V. (1997): *Ecopolitics: the environment in poststructuralist thought*. New York : Routledge
- Andermatt-Conley, V. (2012): *Spatial Ecologies. Urban Sites, State and World-Space in French Cultural Theory*. Liverpool University Press. UK**
- Aristóteles. (2003). *Obras Selectas*. Buenos Aires, Argentina. Distal.
- Aristotle. (1973): *Nichomachean Ethics*, edited by John Burnet. New York: Arno Press.
- Ayala, O. (1999): *Pensamiento verde: una antología*. Madrid: Trotta.
- Barry, J. (1999): *Environment and social theory*. London. New York: Routledge.
- Bates, F. (1997): *Sociopolitical Ecology: Human Systems and ecological Fields*. New York: Plenum Press
- Bazant, J. (2001). *Periferias urbanas: expansión urbana incontrolada de bajos ingresos y su impacto en el medio ambiente*, 1o ed. Xochimilco, México D.F.: Trillas.
- Beck U. (1998): *Políticas Ecológicas en la Edad del Riego: Antídotos La Responsabilidad Organizada*. Barcelona: Editorial El Roure.
- Bédard, M. (2009): *Le paysage un projet politique* Québec: Presses de l'Université du Québec.
- Bekowitz, A. et al. (eds.) - (2003): *Understanding Urban Ecosystems*. New York: Springer
- Bellet, C y Llop, J.M. (s/f) *Miradas a otros espacios urbanos: las ciudades intermedias*. Cátedra Unesco UdL – Ciudades Intermedias-Urbanización y Desarrollo. Available at <http://www.ceut.udl.cat/wp-content/uploads/Miradas-a-otros-espacios-urbanos-las-ciudades-intermedias.pdf>
- Benko, G. and Strohmayer, U. (ed.)-(1997): *Space and Social Theory*. UK: Blackwell
- Berkes & Folke (1998): *Social-ecological systems are complex, integrated systems in which humans are part of nature*.
- Bertalanffy, L. (1994): *Teoría General de Los Sistemas*. Fondo de Cultura Económica. Bogotá. Colombia.
- Biersack, A. and Greenberg, J. (2006): *Reimagining Political Ecology*. Durham: Duke University Press.**
- Biro, A. (2002): *Towards a Denaturalized Ecological Politics*. *Polity*, Vol. 35, No. 2 (Winter) pp. 195-212
- Biro, A. (2005): *Denaturalizing Ecological Politics*. University of Toronto Press

- Bobbio, Norberto (1976): *La Teoría de las Formas de Gobierno en la Historia del Pensamiento Político*. México: Fondo de cultura Económica.
- Boff Leonardo (1996): *Ecología: Grito de la Tierra Grito de los Pobres*. Madrid: Editorial Trotta.
- Bolay, J.-C and Rabinovich, A. (2004) *Intermediate cities in Latin America risk and opportunities of coherent urban development*. Cities, Vol. 21, No. 5, p. 407–421, 2004
- Bollnow, O. F. (1969): *Hombre y Espacio. Biblioteca Universitaria Labor*. Barcelona, España.
- Bookchin, M. (1990). *The philosophy of social ecology : essays on dialectical naturalism*. New York: Black Rose.
- Bookchin, M. (2005): *The Ecology of Freedom*. Canada: AK Press
- Botkin, D. (1990): *Discordant Harmonies: A New Ecology for the Twenty-first Century*. USA: Oxford University Press.
- Bourdieu, Pierre (2002) *Habitus* in J. Hillier and E. Rooksby. *Habitus: A Sense of Place* (London: Ashgate): 27-33
- Bourdieu, P. (2012): *Language and Symbolic Power*. (Cambridge: Polity)
- Bozzano, H. (2000): *Territorios reales, territorios pensados, territorios posibles : aportes para una teoría territorial del ambiente*, 1o ed. Buenos Aires: Espacio Editorial.
- Braudel, F. (2005). *El Mediterráneo: el mundo Mediterráneo en la época de Felipe II*. Vol. I. México. Fondo de Cultura Económica.
- Braudel, F. (2009). *History and the Social Sciences: The Long Duration*. Review (Fernand Braudel Center), 2009, Vol. 32, No. 2, (2009), pp. 171-203
- Brenner, N. (2009): *Henri Lefebvre on State, Space and Territory*. International Political Sociology, 3: 353-377
- Briceño Méndez, Manuel (1991) *Fundamentos Teórico- Metodológicos para el Estudio de las Sociedades Rurales*. Instituto de Investigaciones Agropecuarias. Facultad de Ciencias Forestales. Universidad de Los Andes. Mérida, Venezuela.
- Brugmann, (2009): *Welcome to the urban revolution: how cities are changing the world*
- Bryant, R., Paniagua, A. and Kizos, T. (2011): *Conceptualizing 'Shadow Landscape' in Political Ecology and Rural Studies*. Land Use Policy 28. pp. 460-471
- Bunge, M. (1979): *A systems concept of society: Beyond individualism and holism*. [Theory and Decision](http://link.springer.com/journal/11238/10/1/page/1). January, Volume 10, <http://link.springer.com/journal/11238/10/1/page/1>, pp 13-30.
- Burge, M. (1999) *Buscar la Filosofía en las Ciencias Sociales*. Siglo Veintiuno Editores. México
- Bunge, M. (2000): *Systemism: the alternative to individualism and holism*. Journal of Socio-Economics 29 (2000) 147–157.
- Bunge, M. (2004): *Clarifying Some Misunderstandings about Social Systems and Their Mechanisms*. Philosophy of The Social Science. Vol. 34 No. 3, September 2004. 371-381
- Bunting, (2006): *Canadian Cities in Transition: from the local to the global*.
- Butler, C. (eds.) - (2012): *Henri Lefebvre: Spatial Politics, Everyday Life and the Right to the City*. UK: Routledge.

- Camargo, G. (2008): *Ciudad Ecosistema: Introducción a la ecología urbana*. Universidad Piloto de Colombia. Alcaldía Mayor de Bogotá. Colombia.
- Campbell, B. (1985): *Ecología Humana*. Biblioteca Científica Salvat. España
- Cárdenas, M. (1982): *El Enfoque de Sistemas. Estrategias para la implementación*. México: Editorial Limusa.
- Cardozo Da Silva, E. (1998): *Relaciones Internacionales y el Nuevo Espacio Político*. Revista Perfiles Internacionales. No. 1 y 2. Escuela de Estudios Internacionales – Caracas, Venezuela. UCV. Nueva Época.
- Cardozo, L. y Marquez-Fernandez, A. (2003): *Crítica a la razón Productiva de la Modernidad y Discurso Filosófico Ambientalista Postmoderno*. Venezuela: Universidad Católica Cecilio Acosta.
- Carter, A. (1999): *A Radical Green Political Theory*. Routledge
- Castello, L. (1995): *Percepcao*. En Pesci, R. y Pérez, J. (comp). (1995): *Proyección Ambiental. Documentos Ambiente*. No. 2. Serie "Desarrollo Sustentable". Argentina: UNESCO.
- Chapman, G.P. (1977): *Human and Environmental Systems: A Geographer's Appraisal*. Academic Press. New York.
- Clark, S. (2006). The Annales Historians. In Skinner, Q. (Ed.) *The Return of Grand Theory in the Human Sciences*. Cambridge, UK. Cambridge University Press.
- Clark, T. (2001): *Anthropocentrism*. In Mirovitskaya, N. & Ascher, W. (Eds.). *Guide to Sustainable Development and Environmental Policy*. (pp.119). London, UK. Duke University Press.
- Cocks, S. and Simpson, S. (2015): *Anthropocentric and Ecocentric: An Application of Environmental Philosophy to Outdoor Recreation and Environmental Education*. Journal of Experiential Education.
- Collins, S. et al. (2010): *An integrated conceptual framework for long-term social-ecological research*. Front Ecol Environ 2010; doi: 10.1890/100068
- Currie, W. (2010): *Units of nature or processes across scales? The ecosystem concept at age 75*. The New Phytologist (2011) 190; 21-34
- Curry, M. (1996): *On Space and Spatial Practice in Contemporary Geography*. In *Concepts in Human Geography*, (eds.) Earle, C., Mathewson, K. and Kenzer, M. pp: 3-32. USA: Rowman and Littlefield Publishers
- De Certeau, M. (1998): *The Practice of Every Day Life*. USA: University of California Press
- Des Jardins, J. (2001): *Environmental Ethics*. Canada: Wadsworth
- Deutsch, K (ed). (1977): *Eco-Social Systems and Eco-politics*. Switzerland: UNESCO
- Differentiation of Society Author(s) (1977): Niklas Luhmann Source: The Canadian Journal of Sociology / Cahiers canadiens de sociologie.
- Dobson, A. (1997): *Pensamiento Político Verde*, 1o ed. México: Paidós.
- Dobson, A. (ed.) - (1991): *The Green Reader: Essays towards a sustainable society*. San Francisco, USA: Mercury House.
- Dobson, A. (2003): *Citizenship and the Environment*. Great Britain: Oxford University Press
- Dryzek, J. (1997): *The Politics of the Earth: environmental discourses*. Oxford: Oxford University Press.

- Durant, R. (2004): *Environmental governance reconsidered : challenges, choices, and opportunities*. Cambridge Mass.: MIT Press.
- Duverger, Maurice (1968): *Sociología Política*. Barcelona: Ariel.
- Duverger, M. (1970). *Introducción a la Política*. Barcelona, Ediciones Ariel, 3ª Edición, 281 páginas
- Easton, D (1979): *Esquema para el análisis político*. Buenos Aires: Amorrortu Editores
- Eckersley, R. (2004): *The Green State: rethinking democracy and sovereignty*. Cambridge Mass: MIT.
- Eckersley, R. (1995): *Environmentalism and Political Theory: toward an ecocentric approach*, 3o ed. London: UCL Press.
- Economic Commission for Latin America and the Caribbean, ECLAC. (1990) *Our Own Agenda*. by the Commission for the Development and Environment of Latin America and The Caribbean. United Nations Organization.
- Einstein, A. (1947): *The Problems of Space, Ether and the Field in Physics*. In, *The World's Great Thinkers; Man and the Universe*; The Philosophers of Science. New York: Random House. pp. 471-482
- Elden, S., Lebas, E. and Kofman, E. (2006): *Henri Lefebvre: Key Writings*. Great Britain: Continuum. MPG Books
- Elden, Stuart. 2001. "Politics, Philosophy, Geography: Henri Lefebvre in Recent Anglo-
- Engel-Di Mauro, S. (2009): *Seeing the local in the global: political ecologies, world systems, and the question of scale*. *Geoforum* 40 (2009) 116-125
- Entrikin, N. (1991): *The Betweenness of Place: Towards a Geography of Modernity*. Baltimore: John Hopkins University Press.
- Esbjörn-Hargens, S. (2009): *Integral ecology: uniting multiple perspectives on the natural world*. Boston, Mass: Integral.
- Escobar, A. (1999): *After Nature: Steps to an Anti-essentialist Political Ecology*. *Current Anthropology*, Vol. 40, No. 1 (February) pp. 1-30
- Escobar, A. (2008): *Territories of difference place, movements, life, redes*. Durham: Duke University Press.
- Fall, J. (2005): *Drawing the line: nature, hybridity, and politics in transboundary spaces*. Burlington VT: Ashgate Pub.
- Featherstone, D. and Painter, J. (eds.)-(2013): *Spatial Politics. Essays for Doreen Massey*. Malasya: Wiley-Blackwell.
- Ferrater Mora, J. (1982). *Diccionario de Filosofía Abreviado*. Buenos Aires. Argentina. Edit. Suramericana.
- Fisher, J. (2010): *Systems Theory and Structural Functionalism*. Sage. Los Angeles. USA
- Fisher-Kowalski and Haberl (2007) *Socioecological Transitions and Global Change: Trajectories of Social Metabolism and Land Use*. Cheltenham, UK
- Forsyth, T. (2008): *Political Ecology and the Epistemology of Social Justice*. *Geoforum* 39: 756-764

- Foucault, M. (1980) Questions on Geography in C. Gordon *Power/Knowledge: Selected interviews and other writings 1972-1977* (New York: Pantheon): 63-77.
- Foucault, M. (1986): *Of Other Spaces*. Diacritics, Vol. 16, No 1 (Spring): 22-27
- Foucault, M. (2000): Space, Knowledge and Power in J.D. Faubion *Michel Foucault: Power* (New York: New Press): 349-364.
- Gabaldón, A. (2006): *Desarrollo sustentable: La salida de América Latina*. Caracas. Venezuela: Grijalbo.
- García, R. (2006) *Sistemas Complejos*. Gedisa Editorial. España.
- Garrido Peña, F. (1996): *La Ecología política como política del tiempo*. Granada: Comares, 1996.
- Gehl, J. and Svarre, B. (2013): *How to Study Public Life*. USA: Island Press
- Geoforum (Editorial) (2012): *Space, Contestation and the Political*. Geoforum 43. pp. 663-668
- Giddens, A. (1996): *Más allá de la izquierda y la derecha. El futuro de las políticas radicales*. Madrid: Cátedra.
- Giddens, A. (1999): *La Tercer Vía. La renovación de la socialdemocracia*. España: Taurus.
- Glaeser Frontani, H. (2005): *Critical Political Ecology: The Politics of Environmental Science* (Review). Southeastern Geographer, Volumen 45, No. 1, May , pp. 145-147
- Construyendo el Futuro: Tratados alternativos de Río '92: Foro Internacional de ONG's y Movimientos Sociales (Spanish Edition) (Spanish) Unknown Binding – January 1, 1993
- Goldman, M. and Shurman, R. (2000): *Closing the "Great Divide": New Social Theory on Society and Nature*. Annu. Rev. Sociol. No. 26 (563-584)
- Goldman, M. et al. (2011): *Knowing Nature: Conversations at the Intersection of Political Ecology and Science Studies*. University of Chicago Press
- Goodchild, M. and Janelle, D. (2010): *Toward critical spatial thinking in the social sciences and humanities*. Geojournal 75: 3-13
- Gough, S., Scott, W and Stables, A. (2000): *Beyond O'Riordan. Balancing Antropocentrism and Ecocentrim*. International Research in Geography and Environmental Education. Vol. 9, No. 1.
- Greenwood, N. (1973): *Human environments and natural systems: a conflict of dominion*. North Scituate Mass: Duxbury Press.
- Gual, M.A. and Norgaard, R. B. (2008): Bridging ecological and social systems coevolution: A review and proposal. Ecological Economics 69: 707-717
- Guattari, F. (2008): *The Three Ecologies*. London: Continuum.
- Gudynas, E. & Evia, G. (1993). *Ecología Social: manual de metodologías para educadores populares*. Madrid, España. Editorial Popular, Quinto Centenario.
- Gudynas, E. y Evia, G. (1993): *Ecología Social. Manual de Metodología para Educadores Populares*. Madrid España. Editorial Popular O.E.I , Quinto Centenario.
- Guerra, J.M. (2001): Breve Introducción a la Ética ecológica. Madrid: Machado Libros S.A.
- Guimaraes, R. (1991): *The Ecopolitics of Development in the Third World*. London: Rienner

- Guyot, S. (2011): *The Eco-Frontier Paradigm: Rethinking the Links between Space, Nature and Politics*. Geopolitics, 16 675-706
- Harper, C.L. (2001): *Environment and Society: Human Perspectives in Environmental Issues*. New Jersey. Prentice Hall
- Harvey, D. (1990): *Between Space and Time*. Annals of the Association of American Geographers, 80 (3): 418-434
- Hawley, A. (1972): *Ecología Humana*. Madrid: Tecnos.
- Hawley, A. (1999): *Teoría de la Ecología Humana*. Colección de Ciencias Sociales. Madrid. Editorial Tecnos
- Hayward, T. (1998): *Political Theory and Ecological Values*. Great Britain: Polity Press Press.
- Hegel, G. (1974): *A Lecciones sobre la filosofía de la historia universal*. Madrid: Revista de Occidente.
- Helming, J. (2007): *Space, Boundaries, and the Problem of Order: A view from Systems Theory*. International Political Sociology, I: 240-256
- Herzogenrath, B. (2009): *An (un)likely alliance: thinking environment(s) with Deleuze Guattari*. Newcastle: Cambridge Scholars.
- Heynen, (2006): *In the nature of cities: urban political ecology and the politics of urban metabolism*. London; New York: Routledge.
- Hillier, B. and Hanson, J. (2003) *The Social Logic of Space*. USA: Cambridge University Press
- Holland, M. (1988) SCOPE/MAB Technical Consultations on Landscape Boundaries. Workshop on ecotones. Biology International, Special Issue: 17:47-106. *Quoted by Holland, 1991*)
- Holland, M. Risser, P. and Naiman, R. (1991) *Ecotones. The Role of Landscape boundaries in the Management and Restauration of Changing Environments* - Routledge, Chapman & Hall, Inc. 1991. USA. (p.1-7)
- Holmes Rolston, III. (1989): *Philosophy Gone Wild: Environmental Ethics*. New York: Prometheus Books
- Hubbard, P. and Kitchin, R. (eds.) - (2011): *Key Thinkers on Space and Place*. London: SAGE
- Humboldt (1807, 1845-1847)
- Humphrey, M. (ed.)-(2001): *Political theory and the environment : a reassessment*. London: F. Cass.
- Hurrell, A. and Kingsbury, B. (1992): *The International Politics of the Environment*. Great Britain. Clarendon Press. Oxford University Press.
- Huxley, A. (1965): *The Politics of Ecology*. Center for the Study of Democratic Institutions. California, USA.
- Jacobs, J. (1984): *Cities and the Wealth of Nations : principles of economic life*. New York: Random House.
- James, P. (2004): Systemism, Social Mechanisms, and Scientific Progress. Philosophy of Social Sciences, Vol. 34 No. 3, September. Pp 352-370.
- Jammer, M.(1993): *Concepts of Space*. New York: Dover
- Jarosz, L. (2004): *Political Ecology as Ethical Practice*. Political Geography 23. pp. 917-927

- Johnson, P. (2006): *Unraveling Foucault's 'different spaces'*. History of Human Sciences, Vol. 1, No. 4: pp. 75-90
- Jones, M. (2009): *Phase Space: geography, relational thinking, and beyond*. Progress in Human Geography 33 (4) pp. 487-506.
- Jones, M. (2010): *Limits to 'thinking space relationally'*. International Journal of Law in Context, Cambridge University Press, 6, 3 pp. 243-255.
- Kareiva, P. (1994): *Space: The Final Frontier for Ecological Theory* (Special Feature). Ecology, Vol 75, No 1 (Jan): p. 1
- Keil, R. (2003): *Urban Political Ecology*. Urban Geography, 2003, 24, 8, pp. 723-738
- Koensler, A and Papa, C. (2013) Introduction: beyond anthropocentrism, changing practices and the politics of 'nature'. Journal of Political Ecology Vol. 20, 2013 291
- Kormondy, E. (1985) *Concepts of Ecology*. Editorial Englewood Cliff. New Jersey.
- Kortenkamp, K. and Moore, C. (2001) *Ecocentrism and Anthropocentrism: moral reasoning about ecological common dilemmas*. Journal of Environmental Psychology
- Kuehls, T. (1996): *Beyond sovereign territory the space of ecopolitics*. Minneapolis.Min : University of Minnesota Press.
- Kuhn, T. (1982) *La estructura de las revoluciones científicas*. Breviarios fondo de la Cultura Económica. Madrid.
- Lascoutx, A. (1997a): Aproximaciones a una Percepción Ambiental de la Ciudad de Mérida. En *Simposio Ibero Americano sobre Medio Ambiente y Municipio*. 7º Memorias. Mérida, Venezu
- Lascoutx, A. (1997b): *Conceptualización sobre espacios urbanos y rurales. Población y dinámica espacial*. Mérida, Venezuela: Universidad de Los Andes.
- Lascoutx, A. (1997c): *Percepción ambiental del espacio rural periurbano*. Mérida, Venezuela: Universidad de Los Andes.
- Latour, B. (2004) *Politics of Nature*. Harvard University Press. Cambridge
- Lefebvre, H. (1996): *The production of space*, Reprint. Oxford: Basil Blackwell.
- Lefebvre, H. (2013a): *La Produccion del Espacio*. España: Capitan Swing. España
- Lefebvre, H. (2013b): *Rhythmanalysis: Space, Time, and Everyday Life*. India: Bloomsbury Academic Essays. USA: The University of Minnesota Press
- Lefebvre, H. (1978): *De lo Rural a Lo Urbano*. España: Editorial Peninsula.
- Leff, E. (2001): *Ecología y Capital*. México: Siglo XXI
- Leff, E. (2004): *Racionalidad ambiental la reapropiación social de la naturaleza*. México, D.F. : Siglo XXI.
- Leff, E. (2006): *Aventuras de la epistemología ambiental: de la articulación de ciencias al diálogo de saberes* México: Siglo XXI.
- Lemkow, L. (2002): *Sociología ambiental. Pensamiento socio ambiental y ecología social del riesgo*. Barcelona: Icaria.
- Lipietz, A. (2002): *¿Qué es la ecología política?*. Santiago de Chile: LOM

- List, C. and Spiekermann, K. (2013): *Methodological individualism and holism in political science: a reconciliation*. American Political Science Review, 107 (4). pp. 629-643. ISSN 0003-0554.
- Logan, J. (2012): *Making Place for Space: Spatial Thinking in Social Science*. Annual Review of Sociology 38: 507-524.
- Lucretius: On The Nature of Things (Book Five). In The World's Great Thinkers; Man and the Universe; The Philosophers of Science. New York: Random House. 1947. pp. 3-42
- Luhmann (1990) Society and System: The Ambition of Theory
- Machlis, G., Force, J., Burchjr, W. (1997): *The Human Ecosystem as an Organizing Concept in Ecosystem Management*. Society & Natural Resources, 10:347-367. Taylor & Francis.
- Mandelbaum, S. (1985): *Thinking about cities as systems: reflections on the history of an idea*. Journal of Urban History, Vol. 11. No2. February. 139-150
- Margaleff, R. (1978) *Perspectiva de la teoría ecológica* . Editorial Blume. Barcelona España.
- Margaleff, R. (1992): *Ecología*. Editorial Planeta. Colombia.
- Margaleff, R (1996) *Una Ecología Renovada a la Medida de Nuestros Problemas*. Editada por La Fundación Cesar Manrique. Madrid – España.
- Martinez-Alier, J. (1999): *Ecological Economics*. Great Britain: Blackwell**
- Marzluff, J. and others (2008): *Urban ecology*. New York: Springer.
- Massey, D. (2010): *For Space*. Great Britain: SAGE
- McGregor, D., Simon, D. and Thompson, D. (2006) The Peri-Urban Interface: Approaches to Sustainable Natural and Human Resource Use. USA: Earthscan
- Meadows, D. (2008): *Thinking in Systems, A Primer*. USA: Sustainable Institute. Chelsea Green Publishing.
- Meier, H. (1978): *Introducción a la ecología política*. Caracas: Universidad Santa Maria.
- Mellor M. (2000): *Feminismo y Ecología*. México: Siglo veintiuno Editores, S.A. de C.V.
- Merrifield, A. (2006): *Henri Lefebvre: A critical introduction*. USA: Routledge.
- Meyer, J. (1999): *Interpreting Nature and Politics in the History of Western Thought: The Environmentalist Challenge*. Environmental Politics, Vol. 8, No. 2, Summer, pp. 1-23.
- Mihail, R. (2013): *A Re-evaluation of the Holism-Individualism Dispute*. Procedia–Social and Behavioural Sciences 92. 544-550.
- Minkowski, E. (1933): *Le Temps Vecú. Etudes phenomenologiques et psycopathologiques*, Paris.
- Mirovitskaya, N. & Ascher, W. (Eds.). (2001). *Guide to Sustainable Development and Environmental Policy*. London, UK. Duke University Press.
- Montesquieu, C. (2002) *El Espiritu de las Leyes*. Traducción de Demetrio Castro Alfin. Editorial Istmo. España
- Mosterín, J. (1984): *Grandes temas de la filosofía actual*. España: Salvat editores.
- Mosterin, J. (1994): *Diccionario Enciclopédico*. Colombia: Editorial Norma.
- Muir, R. (1994): *Political Geography: A New Introduction*. New York: John Wiley & Sons

Murphy, A. (2012): *Entente territorial: Sack and Raffestin on territoriality*. Environment and Planning D: Society and Space, Vol. 30, pp. 159-172

Naess, A. (1990): *Ecology, community, and lifestyle : outline of an ecosophy*, 1o ed. Cambridge: Cambridge University Press.

Naess, A. and Sessions, G. (1984): *A Deep Ecology Eight Point Platform*. Cited in *Deep Ecology for the 21st Century*, Readings on the Philosophy and Practice of the New Environmentalism, ed. George Sessions, Shambhala, Boston and London, 1995.

Nettle, D (2009): *Beyond nature versus culture: cultural variation as an evolved characteristic*. Journal of the Royal Anthropological Institute (N.S.).

Newell & Paterson. (2010)

Newman, D. (2006): *Borders and Bordering*. In European Journal of Social Theory 9(2): 171-186. London. Sage Publications.

Newman, P. and Jennings, I. (2009): *Cities as Sustainable Ecosystems*. USA: Island Press.

Nygren, A. and Rikoon, S. (2009): *Political Ecology Revisited: Integration of Politics and Ecology Does Matter*. Society & Natural Resources: An International Journal, 21: 767-782

Obadia, G. (1991): *El espacio de los geógrafos*. Universidad Central de Venezuela, Consejo de Desarrollo Científico y Humanístico. Caracas, Venezuela.

O'Connor, J. (1998): *Causas Naturales. Ensayos de marxismo ecológico*. México: Siglo XXI

Odum, E. (1982): *Ecología*. México: Nueva Editorial Interamericana.

Odum, E. (1989): *Ecology and our endangered life-support systems*. Sinauer Associates. Massachusetts, USA.

Odum, E.P. (2000) The Emergence of Ecology as a New Integrative Discipline. P.194. In The Philosophy of Ecology: From science to Synthesis. Keller, D. and Goleey, F (Eds). University of Georgia Press, USA.

Orr, D. (1983): *Mundo y ecología : problemas y perspectivas* México: Fondo de Cultura Económica.

Paehlke, 1990): *Managing Leviathan : environmental politics and the administrative state*.

Parsons Talcott. (1966): *El Sistema Social*. Madrid: Biblioteca de Política y Sociología. Revista de Occidente.

Parsons, T. (1974): *El Sistema de las Sociedades Modernas*. Editorial Trillas, Mexico.

Parsons, T. (1991): *The Social System*. Routledge, London.

Paterson, M. (2001): *Green Politics*. In *Theories of International Relations*. New York: Palgrave. Pp. 277-308

Paulson, S. et al. (2003): *Locating the Political in Political Ecology: An Introduction*. Human Organization, Vol. 62, No. 3: 205-217

R. Pesci, R., Di Castri, F., Folch, R. et al. (2004)

Perez, J. (1995): *Las Interfaces*. En Pesci, R. y Perez, J. (comp.) *Proyeccion Ambiental*. Documentos Ambiente No.2 Serie Desarrollo Sustentable. Argentina. UNESCO.

Pesci R. (2007). *Proyectar la Sustentabilidad*. Buenos Aires, Argentina. Editorial Fundación CEPA.

Peterson, K. 2010: *From Ecological Politics to Intrinsic Value: An Examination of Kovel's Value Theory*. Capitalism Nature Socialism, Vol. 21, No. 3: 81-101

Pickell, A. (Ed.) (2007): *Rethinking Systems Theory: A Programmatic Introduction*. Philosophy of Social Sciences. Vol. 37 – No. 4. December. P. 391-407.

Pickett, S. et al. (2001): *Urban Ecological Systems: Linking terrestrial Ecological, Physical, and Socioeconomic components of Metropolitan Areas*. Annual Revue Ecol. Syst.; 32: 12757.

Pickett, S. et Al. (2011): *Urban Ecological Systems: Scientific foundations and a decade of progress*. Journal of Environmental Management 92: 331-362.

Pickett, S. and Cadenasso, M. (2002 a): *Advancing urban ecological studies: Framework, concepts, and results from Baltimore Ecosystem Study*. Austral Ecology 31, 114-125.

Pickett, S. and Cadenasso, M. (2002 b): *The Ecosystem as a Multidimensional Concept: Meaning, Model, and Metaphor*. Ecosystem. Vol 5: 1-10

Pirages, D. (2004): *Ecological security: an evolutionary perspective on globalization*. USA: Lanham, Rowman & Littlefield.

Plato

Poe, M.; Norman, Karma, C.; Levin, P. (2014): *Cultural Dimensions of Socioecological Systems: Key Connections and Guiding Principles for Conservation in Coastal Environments*. Conservation Letters, Vol. 7(3), pp.166-175

Raffestin, C. (2012): *Space, Territory and Territoriality*. Environment and Planning D: Society and Space, Vol. 30, pp. 121-141.

Rangan, H. and Kull, C. (2009): *What makes ecology 'political'? Rethinking 'scale' in political ecology*. Progress in Human Geography 33, 1 (2009) pp. 28-45

Robbins, P. (2004): *Political ecology : a critical introduction*. Malden MA: Blackwell Pub.

Robbins, P. 2003: *Political Ecology in Political Geography*. Political Geography 22: 641-645

Robbins, P. and Monroe Bishop, K. (2008): *There and Back Again: Epiphany, disillusionment, and rediscovery in Political Ecology*. Geoforum 39: 747-755

Rojas, J. (1995): *El Estudio de la Geografía Rural*. Mérida, Venezuela: Universidad de Los Andes.

Rotenberg, R. (1993): *The Cultural Meaning of Urban Space*. Westport Conn.: Bergin & Garve.

Rotundo, E. (1973): *Introducción a la teoría General de los Sistemas*. Universidad Central de Venezuela. Caracas. Venezuela.

Rumford, C. (2006): *Theorizing Borders*. European Journal of Social Theory 9 (2) pp. 155-169

Rydin, Y. (2010): *Governing for sustainable urban development*, 1o ed. Washington DC: Earthscan.

Sack, R.D. (1980) *Conceptions of Space in Social Thought. A Geographic Perspective*. University of Minesotta Press.

Sack, R.D. (1980): *Espacio y Método*. Cuadernos Críticos de Geografía Humana. Año XII. No. 65 (Septiembre)

Santos, M. (2000): *La Naturaleza del Espacio*. España: Ariel Geografía

Sassen, S. (2000) *Territory and Territoriality in the Global Economy*. International Sociology. June 2000. Vol. 15(2): 372-393. London. Sage Publications.

Sassen, S. (2001) *The Global City*.

Sato, A. (2010): *Los Tiempos del Espacio*. Caracas: Editora El Nacional.

Schandl, H. (2012): *Cities as socio-ecological systems: linking metabolism, wellbeing and human health*. Current Opinion in Environmental Sustainability (October), 4, (4) pp. 375-377.

Schrader-Frechette, K. (1996): *Individualism, Holism, and Environmental Ethics*. Ethics and the Environment, Vol. 1, No. 1 (Spring) pp. 55-69.

Simhony, A. (1991): *Idealist Organicism: Beyond Holism and Individualism*. History of Political Thought, Vol. XII. No. 3. Autumn

Simon, D. (2008): *Political Ecology and Development: Intersections, explorations and challenges arising from the work of Piers Blaikie*. Geoforum 39. pp. 689-707

Simonsen, K. (1996): *What kind of space in what kind of social theory?* Progress in Human Geography, 20, 4: 494-512

Skinner, Q. (Ed.) (2006). *The Return of Grand Theory in the Human Sciences*. Cambridge, UK. Cambridge University Press.

Smith, N. (2008): *Uneven development : nature, capital, and the production of space*, 3o ed. Athens: University of Georgia Press.

Soja, E. W. (1989): *Postmodern Geographies. The Reassertion of Space in Critical Social Theory*. New York: Verso Books

Soja, E.W. (1996): *Third Space: Journey to Los Angeles and Other Real and Imagined Places*. Singapore: Blackwell.

Steinberg, P. 1997: *Political Geography and the Environment*. Journal de Geography, March/April: pp.113-118

Sutton, B. and Harmon, P. (1987) *Fundamentos de Ecología*. Editorial Limusa. México.

Swyngedouw, E. and Heynen, N. (2003): *Urban Political Ecology, Justice and the Politics of Scale*. Special Issue. Antipode.

Sztompka, P. (1966): *Sociología del cambio social*. Alianza Editorial.

Tacoli, C. (2006): *The Earthscan reader in rural-urban linkages* London: Sterling. Earthscan Publications. IIED.

Tally Jr., R. T. (2013): *Spatiality*. New York: Routledge

The Oxford Dictionary of Geography (2009)

Theodorson, A. (1974): *Estudios de Ecología Humana 2*. Barcelona, España. Biblioteca Universitaria Labor.

Tuan (1974) *Topophilia: A study of Environmental Perception, attitudes and values*. Columbia University Press

Tully, J. (Ed.) (1988). *Meaning & Context. Quentin Skinner and his Critics*. Princeton, New Jersey. USA. Princeton University Press.

- UNEP-WCMC (2018). 2018 United Nations List of Protected Areas. Supplement on protected area management effectiveness. UNEP-WCMC: Cambridge, UK.
- United Nations (2014): *World Urbanization Prospects: The 2014 Revision*. Department of Economic and Social Affairs. United Nations, New York.
- Verdnasky, V. (1998) *The Biosphere*. New York: Copernicus, Springer-Verlag.
- Virilio, P (2001) Modernism to hypermodernism and Beyond in J Armitage ed *Virilio Live: Selected Interviews* (London: Sage): 15-47.
- Wagner, C. (1999): *Entender la Ecologia*. Barcelona: Blume.
- Walker, B. (2006): *Resilience thinking sustaining ecosystems and people in a changing world* Washington, DC: Island Press.
- Walker, P. (2005): *Political Ecology: where is the ecology?* Progress in Human Geography 29, 1 (2005) pp. 73-82
- Walker, P. (2006): *Political Ecology: where is the policy?* Progress in Human Geography 30, 3 (2006) pp. 382-395
- Walker, P. (2007): *Political Ecology: where is the politics?* Progress in Human Geography 31, 3 (2007) pp. 363-369
- Whiteside, K. (2002): *Divided Natures: French Contributions to Political Ecology*. The MIT Press.
- Yarrow, M. and Salthe, S. (2008): *Ecological boundaries in the context of hierarchy theory*. BioSystems 92: 233-244.
- Zieleniec, A. (2007): *Space and Social Theory*. India: SAGE
- Zimmerer, K. (1994): *Human Geography and the "New Ecology": The Prospect and Promise of Integration*. Annals of the Association of American Geographers.
- Zimmerer, K. (2003): *Political Ecology: an integrative approach to geography and environment-development studies*. New York: Guilford Press.
- Zi Zimmerer, K. (2010) *Retrospective on Nature-Society Geography: Tracing Trajectories (1911-2010) and Reflections on Translations*. Annals of the Association of American Geographers, Vol. 100 (5). pp.1076-1094