Shifting Scales of Urban Transformation: The emergence of the Marmara Urban Region between 1990 and 2015

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Abstract

Provincial borders and metropolitan theories are insufficient to explain the scale and dynamics of İstanbul's contemporary urban development. The mega projects of the Justice and Development Party (JDP) such as the İzmit Bay Bridge, the Northern Projects, the Marmaray Project and the İstanbul-Ankara High Speed Train point to a scalar shift. Triggered by mega projects, these emerging spatio-temporal relations transcend İstanbul's administrative borders.

In the light of these developments, this study will use the term "region" to explain the emerging scale in and around İstanbul; and therefore will propose a new terminology and method to represent this new scale. The study will begin with an introduction to urban theories and concepts that explain contemporary "planetary urbanization" (Lefebvre, 2003; Brenner 2014) beyond fixed-monocentric models and constructed dichotomies such as urban-rural or built environment-nature. This theoretical framework will be followed by a discussion on the method and will then continue with a summary of the urban governance structure in Turkey and the urban planning history of the Marmara Region. Subsequently, the land-use-based analyses which enabled the researcher to demonstrate the transformation of the Marmara Region between 1990 and 2015 from different angles will be discussed. The dissertation will conclude with an overall evaluation of the findings.

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Glossary

Geographic and Spatial Terms:

Çiftlik: The Turkish word for farm. According to Halil İnalcık's article in Encyclopedia of Islam "in the Ottoman times [*çiftlik*] designated, at first, a certain unit of agricultural land in the land-holding system, and then, later on, a large estate" (2012).

Çatalca Peninsula: The peninsula that stretches out from the eastern Thrace and separates the Black Sea from the Sea of Marmara.

E5 Highway: One of the major highways in Turkey. E5 crosses the provinces of Edirne, Kırklareli, Tekirdağ, İstanbul, Kocaeli and Sakarya in the Marmara Region.

***Gecekondu*:** Turkish word for squatter housing.

the JDP: The Justice and Development Party (AK Parti – Adalet ve Kalkınma Partisi).

IFEA: *L'Institut Français d'Études Anatoliennes*.

Kocaeli Peninsula: Comprised of the north eastern tip of the Anatolia and separates the Black Sea from the Sea of Marmara.

***Mera*:** The word for commons in Turkish.

TOKİ: The Mass Housing Administration (*Toplu Konut İdaresi).*

TUIK: Turkish Statistical Institute (*Türkiye İstatistik Kurumu).*

Thrace: The English word for the Trakya Region in Turkey. A dictionary of World History defines Thrace as follows: "An ancient country lying west of Istanbul and the Black Sea and north of the Aegean, now part of modern Turkey, Greece, and Bulgaria" (2006).

TEM: Trans-European Motorway. One of the major highways in Turkey. TEM crosses the provinces of Edirne, Kırklareli, Tekirdağ, İstanbul, Kocaeli, and Sakarya in the Marmara Region.

Statistical Terms:

CA: Correspondence Analysis (See Section 1.3 on methodology).

MCA: Multiple Correspondence Analysis (See Section 1.3 on methodology).

Overrepresented: If the observed value is higher than the expected value, it is considered as being “overrepresented” (See Section 1.3 on methodology).

Underrepresented: If the observed value is lower than the expected value, it is considered as being “underrepresented” (See Section 1.3 on methodology).

Strata: A Graphical User Interface that is based on R+, developed by Murat Güvenç and Savaş Yıldırım.

GIS: Geographic Information Systems.

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1. Introduction: A Geo-Historical Perspective in Understanding Urban Regions

1.1 The Outline of the Dissertation

This dissertation is a land-cover based study that sheds light on the urban transformation of the Marmara Region between 1990 and 2015. The idea of this research emerged from a methodological applicability problem that became explicit during a research project on the contemporary urban development of İstanbul, which was executed in Bilgi University between 2009 and 2010.[1] Throughout the research process, it was observed that mono-centric approaches—confined to the administrative borders of İstanbul—on İstanbul's urban development in the field of urban studies neglected the 'externalities' generated by the "monstrous city" [2], and therefore failed to develop a comprehensive understanding of the city's urban growth.

Within the course of the 21st century the Marmara Region, and particularly İstanbul, witnessed a series of mega-scale interventions executed by the Justice and Development Party (JDP) that have triggered a series of socio-spatial transformations across a range of scales. These mega-projects and investments on the Marmara Region—including the İzmit Bay Bridge, the Northern Projects, the Marmaray Project, and the İstanbul-Ankara High Speed Train—point to a multi-scalar socio-spatial shift. This rapid and complex transformation cannot solely be explained by İstanbul-centric approaches confined to administrative boundaries; nor it can be explained with constructed dichotomies—such as

[1] İstanbul 1910-2010: City, Built Environment and Architectural Culture Project was executed by the Faculty of Architecture in İstanbul Bilgi University and was sponsored by the Istanbul 2010 European Capital of Culture Agency.

[2] See Chapter 2 Braudel, p. 253.

urban-rural, built environment-nature—and monocentric, one-dimensional growth models. This study proposes to work at the level of the "region" in order to discuss the contemporary condition of the Marmara Region and aims to develop a relational understanding of İstanbul's urban growth. The study will specifically focus on spatial transformation and will introduce a diverse set of tools and data sets to illustrate the urban transformation at the regional scale.

The first chapter will begin with the theoretical framework and will discuss metropolitan and regional models in urban theory. Supplementary to the focus on the "region", a set of additional terms such as "microecology" and "landscape" will be introduced to evaluate urbanization beyond administrative borders. The section on methodology focuses on pattern recognition models based on 'Correspondence Analysis' to evaluate geospatial data. The second chapter begins with the introduction of the primary resources including building census and land-cover data sets. It will be followed by a literature review on the urban studies on the Marmara Region. The subsequent section on the *Longue Durée* geo-history of the Marmara Region aims to construct a historical context, primarily through the lens of the travelers, who journeyed around the Sea of Marmara in the 17^{th}, 18^{th}, and the 19^{th} Centuries. The second chapter will continue with the urban planning history of the Marmara Region and will subsequently elaborate on the contemporary urban government structure in Turkey; aiming to illustrate the agents and actors that are influential in the dynamics of the contemporary urban progress in and around the Marmara Region. The third chapter is the backbone of the study and comprises a set of analyses of the transformation of the urban and rural fabric and gives an account of the centripetal and centrifugal forces that shaped the regional transformation. This chapter begins with the evaluation of the rural structure in the region between 1967 and 1973 in order to illustrate the territorial condition during a critical period in which the region was becoming urban. The third chapter will continue with different data sets based on urban and rural fabric and will discuss regional change through different scales including provincial, district, and one-kilometer grid-levels. The fourth chapter covers the transformation of industry and infrastructure and it will provide a discussion on the accessibility patterns within the region. The fourth chapter will continue with the transformation of the agricultural and forest land-covers with respect to the dynamics of urbanization. The dissertation will conclude with a set of "if-then" scenarios on the future of the Marmara Region.

1.2 Theoretical Framework: Towards an Inclusive Lexicon in Urban Studies

1.2.1 The mono-centric metropolitan model. "Metropolitan area" which broadly, "refer[s] to any large city", is a putative term in the field of urban studies to identify urbanization beyond administrative borders (Brunn et al., 2008, p. 19). The emergence of the term can be traced back to the early 20th century. The term was originally derived from 'metropolis', the 'mother city' of a country, state or empire" (p. 19). One of the earliest and comprehensive definitions of the term can be found in the classical article titled "The Growt0h of the City" written by Ernest W. Burgess (1925):

> In Europe and America the tendency of the great city to expand has been recognized in the term "the metropolitan area of the city" which far overruns its political limits, and in the case of New York and Chicago even state lines. The metropolitan area may be taken to include urban territory that is physically contiguous, but it is coming to be defined by that facility of transportation that enables a business man to live in a suburb of Chicago and to work in the loop, and his wife to shop at Marshall Fields and attend grand opera in the Auditorium. (p. 49)

Burgess (1925) defines the mono-centric expansion as “the tendency of each inner zone to extend its area by the invasion of the next outer zone” (p. 50).

The term is still defined in a similar way in more contemporary resources such as *Cities of the World* (2008) and *The International Encyclopedia of Human Geography* (2009):

> A metropolitan area is anchored by a city large enough to be considered a metropolis. It includes a central city (or cities) plus all surrounding territory —urban or rural— that is integrated with the urban core (usually measured by commuting patterns. (2008, p. 19)

> Extension of the metropolis which tends to combine the problems of internal spatial organization and the functional role of the large town. (Burgel, 2009, Vol. 7, p. 76)

While the definition of the term is subject to slight changes from country to country, it encompasses several common points, as can be seen in the definitions accounted above. Firstly, it is composed of a settlement system hierarchy, solely based on demographic patterns. Therefore, in the urban studies literature based on the metropolitan model, the existence of one big city center is acknowledged by the researchers (Bollens & Schmandt 1975, pp. 8-16). It also anticipates clearly defined interdependent-specialized urban areas such as the city, downtown and suburbs (Danielason, 1966, p. 261). “Functional Urban Area” is frequently used as a term to measure the metropolitan area and therefore to challenge the validity of administrative borders (Dickinson; ESPON, 2007, p. 14; OECD, 2012, p. 14). The term ‘Functional Urban Area’ comprises a set of measures on commerce and infrastructure. These measures are mostly based on the ebb and flow or including such phenomena as the daily circulation of newspapers and the intensity of phone calls; land-use patterns are not taken into consideration. Urban geographer Robert E. Dickinson (1952), who wrote extensively on city-regions, emphasizes the importance of understanding these flows in identifying metropolitan areas:

> But, the circulation unit, clearly defined as to its great city centers and their environs, often vague as to its limits, is the effective *de facto* unit of many most vital aspects of modern life, and has emerged as the natural (unplanned) framework of many activities. This fact is revealed by population distribution, circulation flows, the distribution of economic activities and interests, and of the multifarious private and government organizations of the State. Such groupings, therefore, form the best, units in which to handle many aspects of the scientific study of society, since they have more in common than any other groupings of similar size. (pp. 313, 314)

The Chicago School used a similar methodology but coined the term "mobility" to describe the centripedal and centrifugal accumulations and monitor the expansion of commuting distances including the "trolley cars, electric and steam suburban lines", telephone lines, the delivery of letters etc. (Burgess, 1925, p.60)

The common points referenced above to define the metropolitan area, including the mono-centric explanation and functional area, appears in Dickinson's (1952) definition of the metropolitan area as early as the 1940's:

> Centripetal forces still determine the character of both "town" and city, but centrifugal forces have changed the structure of the urban community. The modern city is consequently no longer a compact settlement unit. It is becoming the headquarters of a group of interrelated towns and satellite settlements which yet form one community centered upon the city. This specialization of function, associated with the close interrelations of widely scattered places to form an integrated functional unit with subordinate centers in the towns but with nerve center in the city, is the essential characteristic of modern society in civilized lands. (p.17)

The most systematic evolution of metropolitan area can be traced in the North American planning history. The term, metropolitan, has been a part of U.S. urban policy beginning as early as the 1920's. Corresponding to rapid urbanization in the 20th century, the term was redefined almost every decade. In "Decoding the Newest 'Metropolitan Regionalism' in the USA: A Critical Overview" Neil Brenner (2002) emphasizes two fundamental historical periods: the early 20th century and the postwar period (pp. 5, 6). According to Brenner, the early 20th century was "the high-point of competitive industrial urbanization in which monocentric urban agglomerations dominated the national economic landscape", therefore the primary objective of the metropolitan regionalism "was to establish a regulatory framework through which urban expansion could be guided outwards from central city cores into surrounding towns, villages and other erstwhile rural zones" (p. 5). According to *The Dictionary of Human Geography* (2009), the US Bureau of the Census first identified the metropolitan districts in 1910 "by grouping together large central cities (i.e. administrative districts) with their contiguous suburbs into a single built-up area to be used for reporting data" (p. 459). After this initiative the United States Bureau of Census continued to search for new definitions that corresponded to the speed and scope of urbanization. A report released in 1927—written by a commission appointed by the Industrial Bureaus of the Chambers of Commerce—perfectly illustrates the efforts of the era to define the urbanization beyond administrative borders:

> The real city today, because of the automobile, the telephone, and other distance diminishing agencies, extends not only beyond existing city boundaries, but beyond the boundaries of any area which might be annexed… A clear definition of such metropolitan regions, capable of application to all applications is still to be worked out. There are, however certain considerations that should be borne in mind when drawing the boundaries of a metropolitan region, i.e. it is an area within which the conditions of manufacturing, trade, transportation, labor, and living, in brief the daily economic and social life, are predominantly influenced by the central city. (Dickinson, 1964, p. 241)

This approach was taken further by the United States Chamber of Commerce, and the Chambers of Commerce of towns of over 50,000 population was asked “to supply maps and data defining a metropolitan district (or region) as determined by certain control factors” (Dickinson, 1964, pp. 241, 242). This “included telephone services, electric power service, retail store delivery, commuting service, water service, gas service, mail delivery, sewer service, residential membership in social and athletic clubs, operation of local real estate companies and soliciting and collecting routes” (p. 242). However, this method did not turn out to be very useful because during the preparations the local organizations had focused on the concept of “an industrial or trade area, rather than of the continuously urbanized area around the central city” (p. 242). For a more comprehensive identification of urban growth, the definition of metropolitan districts was further expanded in the 1930 census as follows:

> ….in addition to the central city or cities, all adjacent, contiguous civil divisions having a density of less than 150 inhabitants per square mile, and also, as a rule, those civil divisions of less density that are directly contiguous to the central cities, or are entirely or nearly surrounded by minor civil divisions that have the required density’. The minimum aggregate population was taken as 100,000. (p. 242)

The postwar era witnessed a new stage of urban restructuring in which “monocentric industrial cities were transformed into polycentric metropolitan agglomerations composed of interlinked nodes, growth corridors, residential clusters and outlying satellite suburbs” (Brenner, 2002, p. 6). Again, this condition yielded to a change in the definition of metropolitan districts in the United States and standard metropolitan areas (S.M.A.) emerged in the 1950 census (Dickinson, 1964, p. 243). The new definition also included similar indicators such as “large volume of daily travel and communication between the central city and the outlying parts of the area” to measure “economic and social integrity "based on daily associations with the central city"[3] (p. 243). Furthermore, another new term, "the urbanized area", was "included in the 1950 census" which encompassed the *urban fringe* that "lies outside the administrative limits of the central city" (p. 243).

With slight adjustments S.M.A. was transformed into Standard Metropolitan Statistical Area (S.M.S.A.) in 1960 which was defined as follows:

> A county or group of contiguous counties which contains at least one city of 50,000 inhabitants or more or 'twin cities' with a combined population of at least 50,000. In addition to the county, or counties, containing such a city or cities, contiguous counties are included in an S.M.S.A. if, according to certain criteria, they are essentially metropolitan in character and are social and economically integrated with the central city. (Dickinson, 1964, p. 306)

The concept of "integrity" was further elaborated in order to comprehend the emerging poly-nuclear urban formations; furthermore the explanation of "several cities of 50,000 or more in an S.M.S.A." was added to the description (Dickinson, 1964, pp. 307, -308).[4] Despite these efforts, the general approach remained highly mono-centric as "the largest city in an S.M.S.A" was always acknowledged as "the central city" (p. 308).

While the definition of the metropolitan area was further expanded to include poly-centric urbanization, demographic data was still used as the primary indicator. The definition continued to be transformed, corresponding with the economic and political

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[3]"The criteria of integration" was elaborated as follows:
(*a*) 15 percent, of the workers in the county work in the central county of the S.M.A., or (*b*) 25 per cent, of those working in the county live in the central county of the S.M.A., or (*c*) telephone calls from the county to the central county average four or more toll calls per subscriber per month (Dickinson, 1964, p. 243).

[4] "A county is regarded as integrated with the county or counties containing the central cities of the area if either the following criteria are met:
(a) If 15 per cent. of the workers living in the given outlying county work in the county or counties containing the central city or cities of the area, or
(b) If 25 per cent. of those working in the given outlying county live in the county or counties containing the central city or cities of the area" (Dickinson, 1964, p. 307, 308).

shifts throughout the 1980s, 1990s and 2000s in the United States. According to United States Census Bureau, S.M.S.A was changed into "metropolitan statistical area" (MSA) in 1983, and subsequently into "metropolitan area" (MA) in 1990, before finally being consolidated as "core based statistical area" (CBSA) that “became effective in 2000 and refers collectively to metropolitan and micropolitan statistical areas” (United States Census Bureau).

Today CBSAs are merely statistical demographic units that “consist of the county or counties or equivalent entities associated with at least one core (urbanized area or urban cluster) of at least 10,000 population, plus adjacent counties having a high degree of social and economic integration with the core as measured through commuting ties with the counties associated with the core” (United States Census Bureau).

Outside the United States, the Organization for Economic Co-operation and Development (OECD) (2012) is using a similar population-based description to define the metropolitan area. According to OECD metropolitan areas are defined as “areas with a population between 500 000 and 1.5 million people”, and the settlements with “a population of 1.5 million or more” are large metropolitan areas (p. 34). In the case of the European Union, the European Observation Network for Territorial Development and Cohesion (ESPON) uses two primary signifiers; Morphological Urban Areas (MUAs), and Functional Urban Areas (FUAs) to comprehend the poly-nuclear urbanization in Europe (ESPON, 2007, Chapter 1 & 2).

In the case of Europe, it is difficult to talk about a unified history of the development of the “metropolitan area”. It can be asserted that the discussions up until today seem to have evolved from comparisons of mono-centric models (i.e. Paris and London) and poly-centric models (i.e. the Randstad in the Netherlands and the Ruhr in Germany).[5]

This study acknowledges the importance of demographic, infrastructural and economic accumulations in shaping contemporary urbanization as mentioned in metropolitan models. However, certain limitations within the definition of metropolitan area demonstrates a fundamental insufficiency to comprehend the complexity of contemporary "planetary urbanization" (Lefebvre, 2003, pp. 17, 113; Brenner, 2014, pp. 160-163). Firstly, within the context of contemporary globalization, the measurability and evaluation of "flows" seems highly questionable. In his article on "polycentricity" in *Encyclopedia of Human Geography*, Peter Hall (2009) points to this issue (Vol. 8, p.264). Hall questions the legibility of commuting patterns as an indicator of the contemporary "space of flows", he also puts emphasis on the difficulty of measuring "the 'actual' flows of information" (p.264) such as "email traffic" as a signifier of the contemporary flows of information between the nodes of polycentric settlement systems. Secondly, the explanations of metropolitan area referred above—either mono-centric or poly-centric—demonstrate that the spatial transformation as an indicator of urbanization is not taken into consideration.

Concomitant to "the spatial turn"[6] (Bell, 2009, Vol. 2, p. 439; Massey, 2005; Soja, 1985, 1989) and "the geographic turn" in particular (Dear et al., 2011) in social sciences,

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[5] See the sections on London, Paris, the Randstad and the Ruhr in the 6th and the 7th chapters *in Urban and Regional Planning* written by Peter Hall (1992, pp. 99-189); Me´ tropole d'e´ quilibre by G. Burgel, (2009, Vol. 7, pp. 76-81). Polycentricity written by Peter Hall in *The Dictionary of Human Geography* (2009, Vol. 8, pp. 260-264).

[6] 'Spatial turn' has been referred by Jameson as follows: "A certain spatial turn has often seemed to offer one of the more productive ways of distinguishing Postmodernism from modernism proper, whose experience of

humanities and even economic theory (Krugman, 1997) the primary focus of this study is to discuss the potentiality of spatial transformation as an indicator of urbanization. At this point, the geographic connotations of the term “region” enables a rich spatial-framework to decipher the complex layers of urbanization within the Marmara Region, and to develop a relational understanding of İstanbul’s urban growth. However, it should be made clear that “region” as a fundamental term in geography has been heavily used in different contexts beginning from the mid-19th century onwards, therefore witnessed stages of popularity and neglect. In order to represent the “region” as a framework, the different manifestations the term gained in time should be addressed.

1.2.2 Regional theories on urbanism. The “region” emerged as a comprehensive notion in human geography and urban planning, shedding light on the interactions of human relations and environment (Vidal de la Blache, 1926; Geddes, 1949). Subsequently, the term was used as the fundamental unit of the “quantitative revolution” (Christaller, 1966; Losch, 1954). With counter-arguments against the “quantitative revolution” at the turn of the 1970’s the term was excluded from debates in geography (Gould, 1979; Harvey, 1973; Hägerstrand, 1970). Through the efforts of the Los Angeles School of Urbanism, the term witnessed a new phase of popularity in the field of urban studies. Since the early 1990’s the “region” has been commonly used to explain the territorial impacts of global urbanization.

1.2.2.1 The evolution of land-use-based models that transcend city-country dichotomy. Before delving into the different manifestations of the “region”, the work of

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temporality —existential time, along with deep memory— it is henceforth conventional to see as a dominant of the high modern” (1991, p. 154).

economist and geographer Johann Heinrich von Thünen should be addressed as a fundamental transitory moment in geography and planning history. In his book, *The Isolated State* (*Der isolierte Staat*), first printed in 1826, von Thünen lays the foundations for a land-use-based economic model to analyze the city's interactions with its hinterland (1966). In von Thünen's model, land-use pattern is used as the primary signifier of economic accumulations. The book begins with the depiction of a highly abstract territory:

> Imagine a very large town, at the center of a fertile plain which is crossed by no navigable river or canal. Throughout the plain the soil is capable of cultivation and of the same fertility. Far from the town, the plain turns into an uncultivated wilderness which cuts of all communication between this State and the outside world.
> There are no other towns on the plain. The central town must therefore supply the rural areas with all manufactured products, and in return it will obtain all its provisions from the surrounding countryside. (1966, p.7)

The spatial arrangement within this abstract territory is primarily based on the spatial distribution of agricultural development including "the land-rent", "transportation costs", and "distance from the market". [7] The model anticipates that land-rent and transportation costs will determine in the location of agricultural products, and therefore "different farming systems and specific crop and farming types compete with each other to use land and serve markets" (Hayter, 2009, Vol. 9, 385). This correlation enables the detection of "what produce would be best grown at different distances from the market" (von Thünen model in a Dictionary of Human Geography, 2013). For instance,

> 'intensive' land uses, defined as land uses that apply relatively high levels of factor inputs (capital, machinery, labor, fertilizer, etc.), that generate high yields and revenues per unit of land will occur close to markets to reduce the transportation costs per unit of land. (Hayter, 2009, Vol. 9, p. 385)

[7] When using the term von Thünen (1966) refers to Adam Smith and explains the land rent as "The portion of the farm revenue that is left after deduction of the interest on the value of the buildings, timber, fences and all other valuable objects separable from the land, that portion which pertains to the land itself (pp. 14, 20).

According to von Thünen's model these different patterns of agricultural production form concentric circles around the city center, organized in such a way that, "the center would be reserved for crops with high costs of transportation and/or crops yielding high value per acre; the outermost ring would consist of either land-intensive or cheaply transported crops" (Krugman,1997, p. 52). In *The Isolated State,* von Thünen exemplifies this spatial distribution with palpable instances:[8]

> Delicate horticultural products such as cauliflower, strawberries, lettuce, etc., would not survive long journeys by wagon. They can, moreover be sold only in small quantities, while still quite fresh. All these products will be grown near the Town.
>
> Gardens will therefore occupy the land immediately around the Town.
>
> Next to fruit and vegetables, milk is a prime necessity for the Town; and as this is a difficult and costly product to transport and is, besides, highly perishable, particularly in warm weather when it quickly becomes unpalatable, milk too will be produced in the first ring.
>
> The price of milk will rise to the point where the land used to produce it cannot be more profitably devoted to any other product. (1966, p. 9)

This approach generates a highly abstract, mono-centric model. It solely explains the centrifugal flows neglecting the centripedal forces that create the city center (Krugman, 1997, p. 53). However, it is important to note the legitimacy of von Thünen's model as it paved the way to "the development of more complex locational analysis models after its rediscovery during the 'quantitative revolution'" (von Thünen model in a Dictionary of Human Geography, 2016). For instance, Walter Christaller, the founder of the central place theory, points to von Thünen's model as the basis of a spatial economic theory (1966, p. 6). Von Thünen's model continues to inspire an important body of contemporary work

[8] These agricultural patterns will be referred in the work of Martin Wagner on İstanbul in Chapter 2 and in the section "Deciphering the Microecologies of the Region: The Evaluation of 2006 Land-Cover Data in Strata" in Chapter 3.

including Paul Krugman's studies in the field of economic geography (1997) and William Cronon's masterpiece *Nature's Metropolis Chicago and the Great West* (1991) in the field of environmental history. In this case, William Cronon benefitted from Von Thünen's model to bring the "region" into urban studies with a historical perspective.

1.2.2.2 The regional turn in geography and urban planning: Vidal de la Blache and Patrick Geddes. The second half of the 19th century witnessed a turn in regional studies through the works of Vidal de la Blache and Sir Patrick Geddes. While the former used the "region" as the fundamental unit of human geography and historical geography, the letter introduced Vidal de la Blache's methodology to the field of urban planning. Vidal de la Blache's revolutionary method "embraced the relations between people and their environments in the past" and combined history and geography (Baker, 2003, p. 25). Traces of contemporary concepts in the field of urban studies and geography such as "self-organizing systems" (De Landa, 1997) and "adaptation" can be found in his pioneering work. Vidal de la Blache's "regional knowledge" (Baker, 2003, p. 157) and "the concept of the social organism" (Winlow, Vol. 6 pp. 104, 105) forged the core of his geographic perception. Vidal de la Blache (1926) explains the "region" as "a domain where many dissimilar beings, artificially brought together, have subsequently adapted themselves to a common existence" (p. 10). In other words, regions are local units that stem from the "interactions of peoples with their physical environments over (usually long) periods of time" (Baker, 2003, p. 157). This relational identification enables a flexibility through which the "region" is not comprehended as a fixed entity (Berdoulay, 2009, Vol.8, p. 314). The indicated relational approach then leads to the emergence of different types of regions such as the natural region, the historical region, and the economic region in Vidal de la

Blache's work (Vol. 8, p. 313). Vidal de la Blache expands the notion of the "region" by using a set of other concepts that he invented such as *pays*, *genre de vie* and *milieu.* (Tomnaney, 2009, p. 137). According to Tomnaney, while *pays* refers to the physical characteristics of earth, *genre de vie* 'regards to human characteristics' (Tomnaney, 2009, p. 137).[9] In *The Dictionary of Human Geography, Genre de vie* is defined as "a range of possible livelihoods developed by geographically bounded, socially distinctive, mainly rural communities" (Gregory et al., 2009, p. 273), and *milieu* is defined as "the geographical environment that provides a community with its resources" (Gregory et al., 2009, p. 273). In *Geography and History: Bridging the Divide* Alan Baker underlines *milieu* as the most important concept Vidal de la Blache developed, he defines it as "embraced not only the physical but also the cultural environment within which such judgements and choices are made" (Baker, 2003, p. 73). According to Baker, "each distinctive locality or pays was for Vidal the resultant of an interaction between a society and its milieu, the product of a process which involved change" (p. 73). This concept of interaction generates "a dialectic between society and nature, with the physical environment offering opportunities or possibilities for human activity and development" (p. 73).

Through these concepts, Vidal de la Blache was able to develop a multi-scalar approach which examines the "earth as a living organism" (Tomnaney, 2009, Vol. 9, p. 137; Winlow, Vol. 6, p. 105). Within this scheme, in which regions constitute "a global

[9] This study will primarily benefit from Blaches methodology for a systematic reading of the interaction between the landscapes as *pays* and modes of inhabitance as *genre de vie* (See the section The Village typologies in the Marmara Region between 1967 and 1973 and the Conclusion).

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geography" (p. 139), Vidal de la Blache also emphasized human agency. In *Encyclopedia of Human Geography* Winlow (2009) explains human agency and interdependency in Vidal de la Blache's work as follows:

> For human societies, the social organism included social, political, and industrial factors. To begin with, social relationships between humans had interdependencies with nature – as illustrated by Vidal's localized genres de vie – but over time the social organism would begin to grow in areal extent (similar to Ratzel's Lebensraum). Transport and communication links would develop and eventually cities would become established. Vidal argued that humans could eventually control the environment – natural features of geography thus influenced, but did not determine, human activities. On a wider scale, these principles could account for the evolution of regional and state organisms. (Vol. 6, p. 105)

Vidal de la Blache compiled these spatial concepts under the rubric of "possibilism", which can be briefly summarized as "a theoretical approach to the study of the human relationships to the environment whereby human initiative is recognized as significant" (Berdoulay, 2009, Vol. 8, p. 312). Possibilism evaluates the human-environment relationship through the lens of "an approach which sets forth human freedom of action vis a` vis the environment" (p. 312). This approach "cuts across, many of the various ideas which have been developed about culture/nature relationships throughout history" (p. 312) and evaluates "people as agents making judgements and exercising choices within a range of possibilities provided by physical environments" (Baker, 2003, p. 73). Vidal de la Blache's methodology integrated "localities as products of the flows (or energy transfers) of people, commodities, capital and ideas" into regional studies (p. 73).

Patrick Geddes was originally a biologist who primarily focused on developing evolutionary theories (Tomaney, 2009, Vol. 9, p. 137). Through the works of the French sociologists Frederic Le Play and Vidal de la Blache, Geddes began to conceive regions as living organisms (p. 137) and his interests shifted "from the natural to the social sciences" (Hall, 2009, p. 146; Miller, 1990, p. 14). Geddes then developed the concept of "'place–work–folk' (*lieu-travail-famille*) as the underpinning of concern with the 'region' as a focus for science and social action" (Tomaney, 2009, Vol. 9, p. 137). This trinity of 'place–work–folk' is crystallized in the "Valley Section" first published in 1909 that was "designed to demonstrate interrelationship of landscape and life" (Tomaney, 2009, Vol. 9, p. 137; Welter, 2002, p. 60). Initially inspired by the fundamental relation between organism and environment, Geddes' biological region gained sociological connotations as he developed the regional survey. Within this multilayered context, Patrick Geddes' conceptualization of the "region" and the valley section provide a rich basis for the analysis of the term. In *Biopolis,* Volker M. Walter (2002) defines the Valley Section as follows:

> Considered against the background of the town-country conflict, the diagram does not oppose the two antagonists but rather unites them in the idea of the valley region. The valley section is a longitudinal section that follows a river from its source in the mountains to its broad entrance to the sea (figure 3.1). It combines physical conditions—represented in the drawing by plants—with so-called natural or basic occupations—represented by tools—and includes various types of settlement that refer to the social organizations arising from the natural occupations best adapted to their environments. Silhouettes of a city, towns, villages, and individual houses represent these social organizations (p. 60).

In the Valley Section, a river basin constructs the natural region and enables the development of the "region-city". According to Walter, the Valley Section is "a universal ideal unit" flexible enough to allow comparative and multi-scalar analysis across "regional and the universal levels" (Walter, 2002, p. 77). Patrick Geddes also developed the notion of "conurbation" that defines a multi-centered urban cluster (Geddes, 1915) in which "a built-up area created through the coalescence of two or more once-separate settlements"

(Gregory et al., 2009, p. 114). Geddes' valley section was crystallized as a result of this multi-centered perception of urbanization. This valley section is not only a longitudinal concept that covers a variety of social organizations in a fixed scale, it is also a historical entity shedding light on the different moments of the evolution of the "region".

The approach to the "region" "as a focus for social action accessible to public influence" as shown in the Valley section precipitated "a regionalist movement in planning in Britain and beyond" (Tomaney, 2009, p. 137). Among the subsequent regional models, Mumford's work exposes close connections to Geddes, in which the intertwined concept of the "region" is mixed with social, economic, historical and ecological concepts. In Mumford's work, the "region" appears as an organic entity that is superior to the imposed boundaries of the state. Mumford defines the "region" as "a natural basis" and "a social fact". In other words, the natural region and the cultural region overlap according to Mumford's narrative.

***1.2.2.2 Contributions of the Chicago School of Sociology*.** While their general focus was *The City* (Park & Burgess, 1925) through a metropolitan perspective, the Chicago School's contributions to the critique of urbanization were confined to administrative boundaries in the first half of the 20th century. According to Howard Odum (1938), the Chicago School laid the foundations for human ecology in the United States through an approach that was based on "regional survey and ecological-geographic spatial concepts" (p. 402). This notion of "human ecology" was defined by the sociologist Robert D. McKenzie (1967) as "a study of the spatial and temporal relations of human beings as affected by the selective, distributive, and accommodative forces of the environment" (pp. 63-64). Manifestations of this approach can be found in McKenzie's (1970) article "The Metropolitan Community".

In the article, McKenzie (1970) introduces the notion of "supercommunity" as an amalgamation of "varying numbers of separate local communities into its economic and cultural organizations in which the territory of one metropolitan center meets and overlaps that of another" (p. 136). According to McKenzie (1970), this pattern yields to the notion of city regionalism and city-regions based on the division of labor, which is different from the traditional concept of regionalism as a solely geographic solution (p. 136). McKenzie (1970) also develops the notion of "city-region" through which he identifies inter-regional and intra-regional competition and autonomy as follows:

> The increasing diversity within the region and the uniformity among the regions result in a higher degree of local autonomy. The regional city tends to grow more self-sufficient and therefore to become a competing unit within the larger inter-regional economy. But this self-sufficiency is limited by the concentration of certain industries and certain raw materials. There is a countertendency toward a closer functional relation among the metropolitan centers of the nation. Just as communities within the metropolitan region preserve a certain degree of independence and local identity, yet are closely bound within the economic and cultural network of the central city: so the regional communities themselves are independent in many things, yet are parts of a national and international economy. (p. 136)

Another remarkable contribution to the critique of urbanization demarcated by administrative boundaries was made by Louis Wirth (1938). As introduced in his famous article "Urbanism as a Way of Life" Wirth (1938) asserts that the demographic data is highly insufficient to evaluate the complexity of urbanization (p.2). He criticizes this approach as follows:

> The characterization of a community as urban on the basis of size is almost arbitrary. It is difficult to defend the present census definition which designates a community of 2,500 and above as urban and all others as rural. The situation would be the same if the criterion were 4,000, 8,000, 10,000, 25,000 or 100,000 population, for although in the latter case we might feel that we were more nearly dealing with an urban aggregate than would be the case in communities of lesser size, no definition of urbanism can hope to be completely satisfying as long as numbers are regarded as the sole

> criterion. Moreover, it is not difficult to demonstrate that communities of less than the arbitrarily set number of inhabitants lying within the range of influence of metropolitan centers have greater claim to recognition as urban communities than do larger ones leading a more isolated existence in a predominantly rural area. Finally, it should be recognized that census definitions are unduly influenced by the fact that the city, statistically speaking, is always an administrative concept in that the corporate limits play a decisive role in delineating the urban area. Nowhere is this more clearly apparent than in the concentrations of population on the peripheries of great metropolitan centers which cross arbitrary administrative boundaries of city, country, state and nation. (1938, p. 4)

Wirth's ideas and criticism have gained popularity among contemporary scholars especially in the "planetary urbanization" debate coined by Neil Brenner and Christian Schmid (2014).

1.2.2.3 The city-region debate. The city-region became a popular concept by the mid-20th century, especially in the writings of Dickinson.[10] For Dickinson (1964), city-region was a middle ground for shedding light on the complex associations between the city and the geographic region, constructing "the town-country symbiosis" in his own words (p. 230-233). Dickinson (1964) then set forth four parameters to evaluate city-regions: the trade relations, social relations, the commuting area and finally the urban-agricultural land-use and recreational land-uses (pp. 228, 232, 233). Dickinson was strictly opposed to the reductionist approach in abstract regional models:

> It needs to be emphasized that the role of the city as a regional service centre in terms of 'central place theory', though important, is only one aspect of the relations between the city and its surroundings, and the evaluation of the city as a geographic structure demands that all aspect of their interconnections be given balanced considerations. (p. 228)

[10] Dickinson wrote extensively on city regions: *City and Region: a Geographical Interpretation* (1964), *City Region and Regionalism a Geographical Contribution to Human Geography* (1952), and the *City Region in Western Europe* (1967) are his major works on city-regions.

Despite Dickinson’s efforts to develop a middle-ground between city and the “region” through the concept of the “city-region”, the term eventually became more closely associated with the regional science and abstract models. Due to this shift in the definition, the sensitivity on land-use, natural environment or “the town-country symbiosis” was later on removed from the concept (Gregory et al., 2009, p. 634).

In contemporary urban studies, definitions of city-region heavily rely on economic functions (Davoudi, 2009, Vol. 2, p. 126) and the term has been associated with the functional urban region also known as FUR (p. 126). City-regions can be calculated by two primary measures: through statistical analysis of actual flows or by an approximation of time-distance from the core (p. 130). The term has been coined as the appropriate political-administrative space for local governance in the United States and the Britain (p. 133). On the other hand, it has been criticized for being “urban-centric”, “economically driven” and reductionist as it examines a very limited set of interactions, disregarding environmental and cultural concerns (pp. 130, 133). Simin Davoudi (2009) summarizes these criticisms as follows:

> Both the urban-centric and economically driven view of the city region have been challenged. The former is under increasing strain by the changing patterns of work, mobility, and lifestyle in rural areas, while the latter is questioned by a rising concern over the environmental footprint of the cities which affect their hinterlands and beyond. Despite this, there remains a key shortcoming in the current city-region agenda; that is, the disconnection between the conceptions of the city-region as an economic space from its conceptualization as an ecological space. (pp. 134,135)

With the rise of debates on globalism and competitiveness in the field of urban studies, the concept witnessed increased attention again in the 1990s (p. 133). Conversely, the outcomes of the reductionist connotations of the term also became more explicit in debates on sustainability.

1.2.2.4 The Megalopolis and American Regionalism. Regional theory before the 1970's had a natural, ecologic emphasis, what Markusen (1980) calls organic regionalism "based on the assumed dominance of natural factors" that has its fundamental usage in the 1930's (p. 252). According to Markusen, organic regionalism theorized by Odum and operationalized by TVA was a successful product of this approach. On the contrary, the increasing abstraction in regional science during the 1960's had a similar sensitivity to "spatiality" and nature that can be seen in the work of geographer Jean Gottmann. In his pioneering book *Megalopolis: The Urbanized Northeastern Seaboard of the United States* (1961) Gottmann focuses on the poly-nuclear urban agglomeration that has come to encompass the primary cities of the United States such as New York, Washington and Boston. Gottmann examines the land-use patterns, economic structures and social interactions of the rapidly developing conurbation, where urban-rural differentiation rapidly dismantled (p. 5). Around 1960, approximately 37 million people were living in the Megalopolis; a territory in which agricultural land, suburbs, rural areas, and industrial zones were highly intertwined (p. 7). In *Megalopolis*, Gottman vibrantly depicts the dismantling of the town-country distinction through land-use patterns:

> Flying this same route one discovers on the other hand, that behind the ribbons of densely occupied land along the principal arteries of traffic, and in between the clusters of suburbs around the old urban centers, there still remain large areas covered with woods and brush altering with some carefully cultivated patches of farmland. These green patches, however, when inspected at closer range appear stuffed with a loose but immense scattering of buildings, most of them are residential but some of industrial character… Thus the old distinctions between rural and urban do not apply here anymore. Even a quick look at the vast area of Megalopolis reveals a revolution in land-use. Most of the people living in the so-called rural areas,

> and still classified as "rural population" by recent censuses, have very little, if anything, to do with agriculture. (p. 5)

A similar approach conceptualizes "the hinterland" as the ecologic source of the "region" which can be seen in the work of landscape architect Ian McHarg. In *Design with Nature* published in 1969, McHarg conceives of city, suburb, and countryside as integral parts of the same ecologic framework (p. 26). According to McHarg nature is a "process" that can be used to solve the urbanization problems of a metropolitan region (p. 26). McHarg's approach influenced many contemporary debates on urbanization including *Landscape Urbanism* (Waldheim, 2006) and Richard's Forman's work on "urban ecology" (1995, 2008) in which the "region" is depicted as a "system, with flows and movements across the mosaic" that "changes over time, especially as human pieces expand and natural pieces shrink" (p. 4).

1.2.2.5 Location theory and quantitative revolution. As mentioned above, after the WWII the concept of the "region" and spatial models were mentioned together, which is highly explicit in the works of pioneers in economic geography and location theory, such as Johann Heinrich von Thünen, Alfred Weber, Walter Christaller, August Lösch, and Walter Isard. When developing the central place theory, the primary focus of Christaller and Lösch was to consider "the trade-off between scale-economies and transportation costs" and to evaluate the settlements as hierarchical systems (Krugman, 1998, p. 93). This would lead to a lattice-like settlement hierarchy "in which activities with larger scale economies or lower transport costs are concentrated in a smaller number of higher-level sites" (p. 93). Christaller's (1966) primary purpose was to decipher the rationale behind these settlement hierarchies as such:

> In the same region we see large and small towns of all categories, one category beside another. Sometimes they agglomerate in certain regions in an improbable and apparently senseless manner. Sometimes there are large regions in which not a single place deserves the designation of town, or even of market. It is usually asserted that the connection between the town and the professional activity of its inhabitants is not accidental, but rather is based upon the nature of both. But why are there, then, large and small towns, and why are they distributed so irregularly? (p. 1)

Within this context Christaller (1966) developed the notion of the "complementary region" which reflects the relationship between town and country (p. 21). Beginning from the mid 1950's, a substantial shift in geography occurred towards "the systematic application of scientific forms of theorizing and rigorous statistical techniques of analysis and description" (Barnes, 2009, Vol. 9, p. 33). These models on settlement system hierarchies gained great validity until 1970. The period between the mid-1950's and 1970 is referred to as "the quantitative revolution", during which geographers benefitted from a diverse set of theories and methods, including models on agricultural land-use, industrial location, rational choice theory, urban factorial ecology, the rank size rule, and gravity models (vol. 9, p. 36). However, these nomothetic approaches failed to comprehend the complexity of the historical and geographical conditions, as they ignored important issues such as spatiality, gender, culture, and identity (Gregory et al., 2009, p. 427; Marcusen, 1980, p. 52). With the political, economic and cultural turn in the 1970s, the positivist approach in geography began to face heavy criticism from distinguished geographers including David Harvey, Doreen B. Massey, Torsten Hägerstrand, and Peter Gould. In his article titled "What about people in Regional Science?" Hägerstrand's (1970) primary critique was centered upon the social-science approach to people (p. 7). Hägerstrand asserted that "Regional Science is about people and not just about locations", drawing attention to the complexity of the relationship between people and environment not considered in the positivist approach (p. 7).

In "Geography 1957-1977: The Augean Period"[11] Peter Gould (1978), approaches the quantitative revolution as a period including both achievements and failures. According to Gould, before the quantitative revolution "geography had stagnated for decades, without tools, without methodological insight and development" (p. 143). Despite the reductionist approach, the quantitative revolution transformed geography in such a way that "Geography was no longer just making maps of land use that no one knew what to do with, or compiling large, and numbingly boring inventories" (p. 144) and the inter-disciplinary debates gained depth (p. 145).

Yet one must acknowledge that the quantitative approach was never completely dismantled. For instance, the prevailing usage of GIS (Geographic Information Systems) beginning in the 1980s, can be interpreted as an outcome of the quantitative revolution. Furthermore, its repercussions can be traced to contemporary debates such as in the "digital humanities" that will be discussed in the method section. Likewise, location theory was re-popularized by Scott in the 1980s (Gregory et al., 2009, p. 427) and inspired by the relational approach of Actor-Network Theory: amplified at a global scale to explain social and economic networks (p. 428).

1.2.2.6 Regions and Regionalism in urban theory after the 1970s. While the positivist approach and quantitative revolution gradually dismantled in the 1970s, philosopher and sociologist Henri Lefebvre's revolutionary book *The Urban Revolution* (*La revolution urbainé*) was printed in 1970. In the book, Lefebvre argues against the city

[11] See Augeas in Greek Myhtology.

as the unit of urban studies, taking Wirth's arguments one step further, asserting that "the critical phase" has been transcended and "society has been completely urbanized" (p. 1). According to Lefebvre (1970), this critical process has been transcended through a process he calls "implosion-explosion", explained as follows:

> the tremendous concentration (of people, activities, wealth, goods, objects, instruments, means, and thought) of urban reality and the immense explosion, the projection of numerous, disjunct fragments (peripheries, suburbs, vacation homes, satellite towns) into space. (p. 14)

Though Lefebvre is often acknowledged for "the Right to the City" argument (published in 1967), he also undermines "city" as the putative base unit of urban studies, asserting that the Right to the City should not be perceived as an effort to reclaim the traditional city life. It should, rather, be taken as a "right to urban life" (1996, p. 158). In doing so, he also develops a sensitivity to the changes in land-use with respect to urbanization:

> A de-urbanized, yet dependent periphery is established around the city. Effectively, these new suburban dwellers are still urban even though they are unaware of it and believe themselves to be close to nature, to the sun and to greenery. One could call it a de-urbanizing and de-urbanized urbanization to emphasize the paradox. (1996, p.78)

From this perspective he draws attention to the vulnerabilities of 'nature' and 'countryside', asking "Are the rights to nature and to the countryside not destroying themselves?" (1996, p.158)

After the 1980s, the Los Angeles School of Urbanism—including urban planners and geographers such as Michael Storper, Allen J. Scott, and Edward Soja—came into prominence with its strong emphasis on 'the spatial turn' in the field of urban studies. Soja elaborated on Lefebvre's debates, as mentioned above and his narratives on the historical geography of capitalism developed the "regional question" to explain "geographic uneven development" (Soja, 1985). The Los Angeles School of urbanism defined regions to explain the networked, multi-nodal, polycentric, and fragmented nature of neoliberal-global urbanization promoted by the contemporary regional formations. Allen J. Scott primarily focused on the multi-nodal network of industrial agglomerations and coined the term the "Global City-Region" to refer to "the post-1980 'large scale metropolitan urbanization' gravitating around key metropolitan sites in the emerging global economic order" (Sit, 2009, Vol.3, p. 697). According to Scott, regions emerged as a result of the demand for national agglomeration economies and succeeded through Keynesian capitalism and Fordist modes of production. After the 1970s, regions integrated with the world economy and became distinguished only by their glocal-geographical features (Scott et al., 2001, p. 21). Today, this formation is in perpetual flux under the sequential phases of decentralization and recentralization which often materialize as processes of expansion, spreading out, intensification, or the concentration and re-concentration of urban activities (Rowe, 2015, Vol. 2). The enforcement of centripetal and centrifugal forces over regions precipitates an urban landscape of facilities, buildings and infrastructural networks under perpetual flux (Rowe, 2015, Vol. 2). These non-linear phases of territorialization and deterritorialization lead to governmental problems and generate a "highly fragmented chess-board of uneven development sprawling ever outward" (Scott, 2001, p. 21). The negative outcomes of these processes become more explicit in the global city-regions of Third World countries as agglomerations become more privileged towards rapid industrialization in comparison to other parts of the country (Scott, 2001, p. 23, 24). The global city-region argument put emphasis on the global city-regions at a diverse set of scales, with most of the research focusing on the largest urban regions, and excluding the rest (Bell & Jayne, 2009, Vol. 12, pp. 74-75). As mentioned above, the city-region also has been heavily accused of being solely focused on industrial and economic development, disregarding ecologic and sustainability concerns (Davoudi, 2009, Vol. 2, p. 135).

1.2.2.7 The definition of the region in this study. This section demonstrated the different connotations the "region" gained diachronically beginning from the mid-19th century onwards. Despite contextual shifts, for the most part the "region" as a geographic term remained associated with spatiality. This study puts the region to the center of its theoretical approach, essentially, by virtue of the term's perpetual association with spatial change. The region also has a comprehensive scope as it embodies the evaluation of human interaction and agency which then yields to cultural and political readings of geographic regions. The poly-centric conceptualization of settlement systems in regional theories enables the comprehension of contemporary complex urbanization processes. These multi-layered and poly-centric perspectives provide a flexibility in the designation of spatial boundaries. In other words, regions are not "fixed" geographic units. Finally, the co-existence of qualitative and quantitative traditions in regional studies facilitates the adoption of multi-disciplinary theoretical and methodological approaches. Through these properties accounted for, this study utilizes the "region" as a middle ground with flexible boundaries, enabling the evaluation of intra-regional and inter-regional dynamics to decipher the complex layers of contemporary urbanization.

1.2.3 Supplementary spatial concepts: Landscape, Hinterland and Microecology. In order to create a multi-scalar and inter-disciplinary lexicon to comprehend the complexity of contemporary urbanization, a set of other spatial concepts including landscape, hinterland and microecology will be used supplementary to the "region". While landscape will refer to the impact of human interaction on earth, hinterland is used to understand the genealogy of the multi-nodal poly-nuclear structure of an urban region, and microecology will point to the inter-regional and intra-regional fragmentation.

Relations between history and geography have been non-linear and bifurcating. However, there have been productive moments of convergence in which these two disciplines focused on "urban" as a shared subject matter, exchanging analytical tools. Fernand Braudel's *The Mediterranean and the Mediterranean World in the Age of Philip II* (1973), William Cronon's *Nature's Metropolis: Chicago and the Great West* (1991), and Purcell and Horden's *The Corrupting Sea: A Study of Mediterranean History* (2000) exemplify this important body of work.

In *The Mediterranean and the Mediterranean World in the Age of Philip II*, while illustrating a dynamic and multi-scalar set of overlapping political, economic, cultural, climatic, and ecologic regions with different boundaries; Braudel (1973) conveys human interaction in these regions with vibrant depictions of historical landscapes. Ecology connects landscape and the "region" by bringing systems thinking to understand the interplay between human interventions and the functioning of nature." The term is derived from "*oikos*" meaning "house". Thus, ecology is literally the study of "houses" or more broadly, "environments" (Odum, 1983, p. 3). This term also comes from the same root as economics. In most historical geography and environmental history narratives, ecologies and natural sources are composed of hinterlands that set up economic linkages with urban agglomerations. Environmental historian William Cronon (1991) successfully manages to intertwine these economic theories with the histories of urban centers and dynamic hinterlands that transcend the conventional narratives of periphery-center relations. Cronon elaborates on the urban history of Chicago by drawing attention to the economical structuring and restructuring behind the territorial organization that shapes human activity in relation to geography. In Cronon's narrative, central place theory emerges as another "hinge" bounded by various academic works that explore the dynamic hinterlands as evidence of more complex settlement models than the "city". McNeill's narrative on the Mediterranean mountains utilizes "landscape" as a hinge, setting up the relations between devastating human activity over fragile mountain economies and ecologies within broader networks of the Mediterranean political economy.

Coined by Purcell and Horden, "microecologies" is a productive term used to discuss the co-existence of fragmentation and unity in urban landscapes (2000). This term derives from the fragmented unity and the mutability that dispersed landscapes of the Mediterranean reveal. Purcell and Horden explain the term by referring to a quote from Levi Strrauss: "It is not the resemblances, but the differences which resemble each other" (2000, the epigraph to Part 2). In the context of this study, the term "microecologies" will be used to evaluate the spatial fragmentation in the Marmara Region, partially stemming from climatic and geographic properties.

Landscape studies have consistently been the common ground of a diverse set of disciplines including geography (Sauer, 1925), critical cartography (Cosgrove, 2008) and urban planning and design (Rowe, 1991). Broadly, landscape refers to discernible patches of human construction. Richard Forman (1995), one of the pioneers in the field of urban ecology, uses the term "landscape" to decipher the patterns that construct regions. According to Forman (1995), general characteristics of regions encompass the local ecologies and land-use patterns of landscapes (p. 13). "Geologic land forms, local faunas, soil types, natural disturbance regimes, land-uses and human aggregation patterns," exemplify landscape patterns in a given region (p. 21). The repetition of spatial patterns (p. 13) at a discernable scale by human perception, distinguish landscapes from regions.

Today, landscape is often regarded "as a text to be read, deconstructed and reread, not a source of hard historical facts and elements". However, deciphering the symbolic meanings of landscapes require multidisciplinary work, field research, and archival work, as well as a historical perspective. Considering the difficulties of situating and analyzing landscapes as objects completely separate from human subjectivity, this study aims to benefit from understanding landscapes as territorial artifacts of human construction.

Aside from debates on regions and regionalism and multi-disciplinary approaches to understand contemporary urbanization discussed above, this study is well aware of the debates on social justice (Fainstein, 2010; Amin, 2004), gentrification (Neil Smith, 1996), Actor-network theory, and assemblage theory (De Landa, 2006). While this study acknowledges the importance of these debates, they are only mentioned if there is a strong correlation between the indicated terms and the empirical findings of this research. This study also will not delve into the theories on neoliberal urbanism (Harvey, 2007; Brenner & Theodore, 2003)—and thus on the neoliberal urban development in İstanbul in particular—as a critical stance, therefore will purposefully limit the usage of the term "neoliberal" for two primary reasons: Firstly, a notable amount of the spatial relations discussed in this study are established in the *Longue Durée*, and the role of the neoliberal project in shaping and restructuring these relations is limited.[12] Secondly, a sizeable body

[12] These relations are thorougly discussed in Chapters 3, Chapter 4 and Chapter 5.

of scholarly work in the field of urban studies in Turkey heavily relies on the theories on neoliberal urbanization to explain the contemporary urban development in and around İstanbul. In doing so, the transformation and the shifts within the neoliberal project as well as the idiosyncrasies of the case of Turkey—and İstanbul in particular—is often neglected in these studies. In this regard, the "exploratory" method discussed in the following section provides new opportunities in understanding these idiosyncrasies by deciphering "what" happened since neoliberalism became the dominating discourse. It is hoped that the combined used of this method with geo-spatial data will also bring "the importance of geography and spatial transformation" into the arguments on neoliberalism, hence provide a fresh perspective on the studies on neoliberal urbanization.

1.3 Methodology: Deciphering the Complex Layers of Urban Landscapes

Due to two concomitant processes: the spatial turn in humanities and social sciences, and the progress in digital cartography and Geographic Information Systems (GIS), the late 20th century and the early 21st century witnessed the convergence of many disciplines under the rubric of 'mapping' or 'critical cartography'. The "agency of mapping" (Corner, 1999) as a common ground that engages people both 'historically and culturally' with place paved the way to the emergence of hybrid fields such as "the Spatial Humanities" (Gregory & Alistair, 2014), "GeoHumanities" (Dear, M.J, 2011) and "Landscape Urbanism" (Mostafavi, 2003; Waldheim, 2006) (Cosgrove, 1999, pp.1, 2). [13]

[13] According to *The Dictionary of Human Geography* "cartography" was coined in the 19th century. The term has derived from *carte* (French for map) and *graphie* Greek for writing (Gregory et al., 2009, p. 66). In this study digital cartography is referred as a more comprehensive turn that encompasses GIS, that is, one mode of evaluating and visualizing digitized spatial data.

As a tool of communication maps generate “a ‘complex architecture of signs’ and ‘a visual architecture’ through which the worlds they construct are selected, translated, organized and shaped” (Cosgrove, 1999, p. 3). The potentiality of maps in conveying “spatial knowledge” as representational tools, and the opportunities GIS enable on data management and spatial analysis, make them the focal point of this study. GIS can broadly be defined as “a collection of practices, software and hardware with the ability to collect, store, display, analyze and print information about the Earth’s surface (or any other scale of geographical data)” (Gregory et al., 2009 p. 280).

The initial developments in GIS started in the 1960’s. With the “overlaying” technique he developed, Ian McHarg laid the foundations for GIS (Gregory et al., 2009, p. 280), which was followed by the establishment of two pioneering GlS firms, ESRI and Landscan, in 1969 (Crapmton, 2010, p. 60). The 1970s witnessed the emergence of ‘scientific cartography’ and during this period substantial progress occurred in the US, particularly in the Harvard Graphics Laboratory (Gregory et al., 2009, p. 281). Today cartography, and particularly GIS became “productive and liberating instrument[s]” (Corner, 1999, p. 213), therefore GIS technology constitutes highly useful set of tools, enabling a diverse range of opportunities for spatial analysis.

However, the tools for spatial analysis in GIS are mostly limited to displaying the density of one variable (i.e. demography or topography) as in “Choropleth Maps”, which is an obstacle in the evaluation of contemporary complex landscape formations.[14] In this

[14] Choropleth Map is used for “depicting statistical data for irregularly shaped reporting zones such as countries, using variations in shading or color” (Goodchild, 2009, Vol 4., p. 500).
A map that portrays a single distribution for census tracts, counties or similar areal units; portrays each areal unit as homogeneous; divides the data into discrete categories; and typically describes spatial variation of intensity data with a darkermeans- more sequence of greytones (Gregory et al., 2009, p. 83).

regard, the combination of GIS with data mining and pattern recognition tools such as Correspondence Analysis and Cluster analysis, in order to evaluate two or more variables simultaneously can lead to highly productive results in deciphering and representing complex landscape patterns, as Anthony C. Gatrell, aptly puts "One of the geographer's prime tasks is to detect spatial pattern" (1982, p. 197).[15]

In *Pattern Recognition: Evolution of Methodologies and Data Mining* Pal & Pal (2001) broadly identify pattern recognition as activities that we repeat effortlessly everyday (p. 2). They exemplify these activities as follows: "… when we read a book, we recognize the letters, words and, ultimately, concepts and notions, from the visual signals received by our brain, which processes them speedily…" (p. 2). According to Pal & Pal:

> The discipline of Pattern Recognition (PR) or Pattern Recognition by machine essentially deals with the problem of developing algorithms and methodologies/ devices that can enable the computer-implementation of many of the recognition tasks that humans normally perform. The motivation is to perform these tasks more accurately, or faster, and perhaps, more economically than humans and, in many cases to release them from drudgery resulting from performing routine recognition tasks repetitively and mechanically. (p. 2)

Pattern recognition is classified into two main groups as supervised and unsupervised. Supervised pattern recognition is based on "*learning*" which is "done by the help of a *teacher*, that is, an external agency" (p. 3). This study is interested in unsupervised pattern recognition as an "exploratory tool" in which "learning essentially means discovery of the

[15] If the land-cover data extensively used in this study was visualized by using chorolopleth maps, for each land-cover layer a new map would have to be produced. The land-cover data used for this study is composed of approximately 40 layers, which would lead to 40 different Choropleth Maps for evaluation.

natural groupings inherent in the training data set" (Pal & Pal, p. 4). This study will benefit from Correspondence Analysis, Multiple Correspondence Analysis and Cluster Analysis as exploratory analytical tools for a more comprehensive evaluation of geo-spatial data.[16] Michael Greenacre (1994) explains the "exploratory" component in CA as follows:

> When we say that correspondence analysis is an exploratory technique we mean that it is primarily intended to reveal futures in the data rather than to confirm or reject hypotheses about the underlying processes which generate the data. In order to explore data we need to make as few assumptions about the data as possible. In correspondence analysis there are no assumptions about the underlying distribution of the data, but there are a few 'structures' imposed on the data which are inherent in the method and which could be viewed as assumptions. (p. VII)

The primary objective of this approach to data is summarized in Jean-Paul Benzécri's famous quotation: "The model must follow the data, not the other way around" (1994, p. VII). In other words, "geometric modelling comes before probabilistic modelling" (Roux & Rouanet, 2010, p. 2). While these methods were originally not created for mapping purposes their adaptation to cartography has enabled productive results.[17]

Before delving into the details of these statistical methods, Jacques Bertin's pioneering work in combining pattern recognition, graphic design and cartography—as a result of his scientific approach towards graphic representation—should be acknowledged. According to Jacques Bertin (2011), "Graphic representation is the transcription, into the graphic sign-system, of 'information' known through the intermediary of any given sign-system", that can be "approached by semiology, a science which deals with all sign-

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[16] For a detailed account of the mapping process used in this study that combines MCA with GIS please see the Appendix.

[17] See Murat Güvenç's work on the electoral geography of *Turkey: Electoral atlas of Turkey, 1950-2009* : continuities and changes in Turkey's politics Attribution: Murat Güvenç, Hasan Kirmanoğlu. İstanbul : [İstanbul Bilgi Üniversitesi], 2009.

systems" (p. 4). This new approach in graphic syntax led to new representational techniques such as "Bertin Graphs" that derived from the idea "of permuting the rows and columns of a matrix for the purpose of revealing hidden structure in a data matrix" (Chauchat & Risson, 1998, p. 37). Bertin Graphs can be referred as an early initiative in pattern recognition, pattern generation and data visualization.

1.3.3 Correspondence Analysis (CA). Correspondence Analysis is a factor analysis applied to categorical data tables.[18] In other words, it is a pattern generator in which the row and column normalization can be done simultaneously. Similar to other "familiar techniques such as histograms, box-plots, star diagrams and various types of scatter grams" the primary purpose of CA is to "communicate numerical information by expressing it in a different form" (Greenacre, 1994, p. 3).

According to Ludovic Lebart and Gilbert Saporta "CA was presented and developed under the French name "*analyse des correspondances"* for the first time by Cordier (1965) and Benzécri (Analyse des Données, 1969)" (Lebart & Saporta, 2014, p. 35). Benzécri was firstly interested "in analyzing large sparse matrices of word counts in

[18] According to *The Dictionary of Human Geography* Factor analysis is "a statistical procedure for transforming a (variables by observations) data matrix into a new matrix whose variables are uncorrelated." In other words it uses "fewer components or factors to represent the original variables, and thus consolidate the data for easy interpretation" (Duckham et al., 2009, Vol. 4, p. 437). Factor Analysis is applied on continuous ratio scale or ordinal scale variables. However there are substantial differences between CA and Factor Analysis that should be acknowledged. Firstly, in Factor Analysis data is processed via linearization, however there is no linearization in Correspondence Analysis. Secondly, Correspondence Analysis depends on relational ontology whereas factor analysis is a variable based technique.
Categorical Data is "data information that is organized according to categories that are mutually exclusive. Respondents to a survey on a new product could be organized by age groups, for example, or by gender or ethnicity
(Oxford Dictionary of Business Research Methods,
http://www.oxfordreference.com/view/10.1093/acref/9780191792236.001.0001/acref-9780191792236-e-64?rskey=FdaJU2&result=3)

linguistics" but he soon discovered that this method was applicable to a diverse set of fields such as "biology, archaeology, physics, and music" (Greenacre, 2015, Vol. 5, p. 1).

CA is a statistical method that, as Bourdieu (1991, p. 277) puts it, "thinks" in relations (as cited in Tarnai and Wuggenig, 1998, p. 177) and approaches the demonstration of a two-way cross tabulation "in a different and unique way" (Greenacre, 1994, p. 3). If conventional methods—i.e. bar charts or three-dimensional histogram—are applied to cross-tabulated data, a series of the applied graphical display has to be generated to visualize the data (Greenacre, 1994, p. 3). However, CA "enables a simultaneous visual display of rows and columns of a contingency table"[19] (Lebart and Saporta, 2014, p. 35). The simultaneous display is reflected in the final product of CA, that is, "a planar map on which each row and each column are depicted by a point" (p. 108). The important concepts in CA, namely profiles, masses, and chi-squared distance (Greenacre, 1994, p. 8, 9) will be briefly introduced here to familiarize the reader with the lexicon which will be used in the following chapters (Greenacre, 1994, p. 8).

Profile: The first step to normalization in CA is "computing percentages relative to the row or column totals" in order to "reduce either the columns or the rows to the same base". (Greenacre, 1994, p. 9). These percentages calculated either for rows or columns are called "profiles" (p. 9). Each profile is composed of, "a certain number of cases or respondents" (p. 10). As a rule of thumb in CA, "columns are used for variables and rows are used for the categories of one or more describing variables" and thus, rows have primary

[19] Contingency table: A table of data for two methods of classification of the same individuals (e.g. hair colour and eye colour). (A Dictionary of Zoology, Allaby, Michael retrieved from http://www.oxfordreference.com.ezp-prod1.hul.harvard.edu/view/10.1093/oi/authority.20110803095635479)

importance. The profiles in CA correspond to mathematical vectors that have, “geometric interpretation since they define points in multidimensional space” (Greenacre, 1994, p.10).

Masses: The total number of respondents in each profile are divided by the grand total in order to calculate the “row masses” and thus, to allocate a weight proportional to the total number of respondents in each profile (Greenacre, 1994, p. 10).

Chi-Squared Distance: Both CA and Multiple Correspondence Analysis use “chi-square metric”. In CA, both rows and columns distributed as “sets of weighted points in a Euclidean space” (Lebart & Sporta, 2014, p. 35). In order to construct a map, a position must be assigned to each profile and “chi-square distance” or “weighted Euclidean distance” is used to calculate these positions. Derived from Pearson’s chi-square test, chi-square distance, broadly, depends on the difference between the observed value and the expected value of the respondent**.** The calculation of the expected respondent is based on the weight of the rows. The general formula for chi-square distance is as follows:

(row total x (observed value-expected value)^2 / expected respondent) (Shennan, 1997, p. 314)

The result is then divided by the grand total (Shennan, 1997, p. 314). The value obtained for each row measures “the distance of each row from the overall row average” and thus it is “known as the chi-squared distance” (p. 315). It should be emphasized that the formula primarily takes the row masses into consideration as explained in *Quantifying Archeology*: “the contribution that each row makes to the total departure from expectation is weighted by its mass; rows containing more of the observations have more influence on the result” (p. 315). The sum of the weighted distances composes the “total inertia” (p.

315). If the row profiles are very similar the inertia is expected to be low and the positions of the profiles in the map will be closer (Greenacre, 1994, p. 13, 14). The chi-squared distances are then converted into straight-line distances in Euclidian space (Shennan 1997, p.316). Finally, the results are projected on a “low dimensional space, [that is,] usually a plane” (Greenacre, 1994, p. 15).

Two important terms that will be frequently used in the land-use and land-cover analysis throughout the text are, “overrepresented” and “underrepresented” that stem from the evaluation of observed tables in comparison to expected tables based on chi-square indexes. If the observed value is lower than the expected value, it is considered as being “underrepresented”, while if the observed value is higher than the expected value, then it is considered as being “overrepresented”.

The map displays the data in each row (or column) compared to the corresponding data for all other rows (or columns). In other words, there is a particular range of differences between two rows, and the map gives a picture of the relative highs and lows within this range. The map enables vague interpretations based on associations (Greenacre, 1994, p. 8).

An early application of CA can be found in sociologist, anthropologist and philosopher Pierre Bourdieu’s famous book, *Distinction: a social critique of the judgement of taste* (*La distinction: critique sociale du jugement*) (1986) in which he evaluates taste, culture and life style through CA. According to Jörg Blasius and Andreas Schmitz (2014) “in La Distinction, Bourdieu was mainly interested in identifying and distinguishing different groups within the French society” (p. 205). In doing so, Bourdieu benefitted from “lifestyle attributes such as preferences for clothes, food, and artists, combining them with elements of traditional stratification research such as age (groups) and educational level" (p. 205). This study contributed to "his concept of the social space, or in French, *l'espace social* (Bourdieu & de Saint Martin, 1976, p. 45), [through which] he visualized the relations between class fractions and their associated lifestyles" (Blasius & Andreas, 2014, pp. 205- 206).

In this study, Strata 7.3—a Graphical User Interface that is based on R+, developed by Murat Güvenç and Savaş Yıldırım—is used to overcome a few of the constraints that CA inherits. Firstly, when the multi-dimensional data is projected to a plane, dissimilar profiles may overlap which can lead to wrong interpretations. Secondly, when CA and MCA are applied to large data sets, the results are very difficult to read and "the configurations of points need further summarizing" (Greenacre, 1994, p. 162, 163). In order overcome these constraints Strata 7.3 uses a model proposed by Ludovic Lebart summarized to operationalize the data analysis and data visualization (Lebart, 1994). Lebart suggests "to perform a preliminary clustering of the observations in order to reduce the complexity of the analysis" (p. 163). In Strata 7.3, the model stipulates combined use of Cluster Analysis—that is an unsupervised pattern recognition technique—and Correspondence Analysis (CA) which provides a macro level exploratory evaluation. In this model, CA is used to derive the weight sensitive positions of row and column points using chi square metric normalization which are then clustered to determine the stratification pattern of large data matrices.

Strata 7.3 is used for two analysis in Chapter 3: The evaluation of 2006 land-cover data (in which 44 land-cover categories were analyzed simultaneously) and the analysis of land-use types and sizes by provinces in 2000 in building census data analysis.

1.3.4 Multiple Correspondence Analysis (MCA). MCA is a procedure—that has derived from CA—applicable to conditions in which "the associations among more than two categorical variables are of interest" (Greenacre, 1994, p. 141). A MCA matrix is composed of an "Individuals x Questions" table which can be identified as follows:

> Questions are categorized variables, that is, with a finite number of categories, also called modalities. If, for each question, each individual "chooses" one and only one response category, the table is said to be in standard format. If not, preliminary phase of coding is necessary. Categories may be qualitative (categorical or nominal), or may result from the splitting of quantitative variables into categories. Individuals may be persons or "statistical individuals" (firms, items, etc.). (Le Roux and Rouanet, 2010, p. 34)

MCA is applied to matrixes in which rows and columns are not additive. MCA processes exclusively codes instead of counting frequencies or percentages. Coding is done by converting data into "incidence matrices". The outcome obtained from MCA is more sensitive to local differentiations in comparison to CA, as MCA detects distinctive spatial associations (co-presences and co-absences). MCA is also capable of demonstrating the direction as well as the magnitude or intensity.

In this study, MCA is used in the evaluation of the village typologies in the Marmara Region between 1967 and 1973, and the evaluation of the land-cover categories at the district-level between 1990 and 2006, and one-kilometer grid cell-level between 1990 and 2012.

The combined use of CA, MCA, Cluster Analysis, and GIS on land-cover data in this study generated productive results by deciphering "in what ways" the spatial transformation occurred during a critical phase of urban development in the Marmara Region. This study then utilized these results as "points of departure"—rather than ultimate conclusions—to elaborate on "why" and "how" this spatial transformation was shaped by financial, political, geographic, and ecologic forces both in the recent history of the Marmara Region and in the *Longue Durée.*[20] In doing so, Chapter 2 provides a basis derived from research on the historical geography and urban history to focus on the impact of these forces on the Marmara Region.

[20] "A term that literally means 'long duration' introduced by the French historian Fernand Braudel. It is used to indicate a perspective on history that extends further into the past than both human memory and the archaeological record so as to incorporate climatology, demography, geology, and oceanology, and chart the effects of events that occur so slowly as to be imperceptible to those who experience them, such as the changing nature of the planet or the steady increase in population in a particular area." (Longue Durée in A Dictionary of Critical Theory, Ian Buchanan, Retrieved from http://www.oxfordreference.com.ezp-prod1.hul.harvard.edu/view/10.1093/acref/9780199532919.001.0001/acref-9780199532919-e-416?rskey=VeX38p&result=416).

2. The Regional İstanbul? Urban History Revisited

Turkey is composed of seven geographic regions: the Marmara Region (*Marmara Bölgesi)*, the Aegean Region (*Ege Bölgesi*), the Central Anatolia Region (*İç Anadolu Bölgesi*), the Black Sea Region (*Karadeniz Bölgesi*), the Mediterranean Region (*Akdeniz Bölgesi*), the Eastern Anatolian Region (*Doğu Anadolu Bölgesi*), and the Southeastern Anatolia Region (*Güneydoğu Anadolu Bölgesi*) (*Figure 2.1*). The Marmara Region comprises eleven provinces—including İstanbul, Edirne, Kırklareli, Tekirdağ, Kocaeli, Sakarya, Yalova, Bilecik, Bursa, Çanakkale, and Balıkesir—with a total area of 67,000 square kilometers. The total population of the Marmara Region is more than 23 millions which is almost equal to one-third of Turkey's population.[21] The cities with the highest populations are İstanbul, Bursa, Kocaeli and Balıkesir respectively.

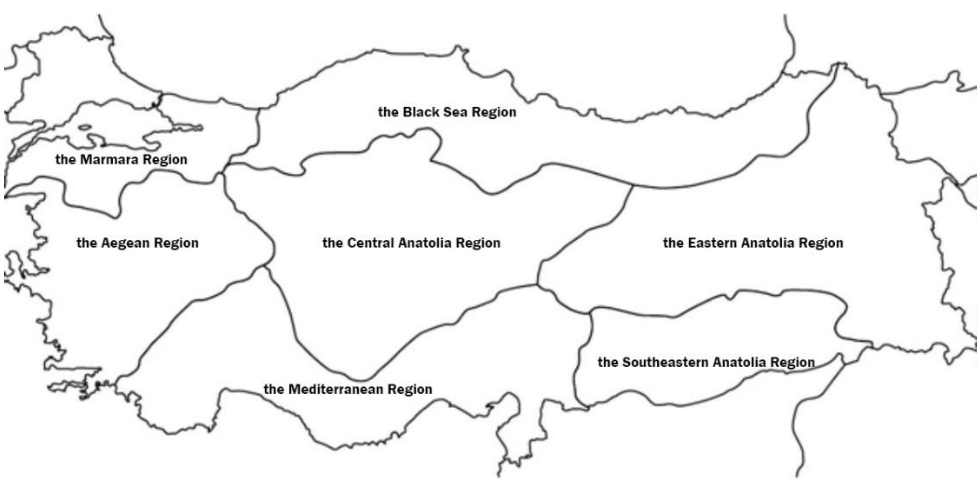

Figure 2.1: The geographic regions of Turkey.

Despite the limited efforts in policy making and urban planning, regions in Turkey have mostly been comprehended as entities of physical geography. Therefore, they have

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[21] Precisely 23,202,727 according to TUIK data retrieved from: http://www.tuik.gov.tr/UstMenu.do?metod=temelist.

been subject to highly simplistic descriptions—hardly more scrutinized than the previous paragraph—to be taught at elementary and secondary schools. That said, by benefiting from the multi-layered approaches to the “region” discussed in the previous chapter, this chapter investigates more comprehensive descriptions of the Marmara Region through the lens of a geo-historical perspective. The second chapter begins with the introduction of the primary resources including building census and land-cover data sets that will be used in the spatial analysis in the third, fourth, and the fifth chapters. These resources, based on geo-spatial data, enables the comprehension of the spatial transformation in the Marmara Region. The subsequent section on the *Longue Durée* geo-history of the Marmara Region aims to construct a historical context, primarily through the lens of the travelers, who journeyed around the Sea of Marmara in the 17th, 18th and the 19th Centuries. The resources visited in this section will reflect in the diversity of the scales, ecologies, and landscapes of the Marmara Region. It will be followed by a literature review that evaluates the former approaches on settlement systems in Turkey. The second chapter will continue with the 20th century planning history of the Marmara Region, it will then focus on the contemporary urban government structure in Turkey, and the shifts in the regulatory framework in order to illustrate the agents and actors that are influential in the dynamics of the contemporary urban progress in and around the Marmara Region.

2.1 Primary Resources

This study asserts that, a spatial understanding is necessary in order to fully comprehend the complexity of the contemporary urbanization. To monitor the spatial change, this study heavily relies on geo-spatial data, hence the primary resources such as maps, land-use, and land-cover data.[22] As discussed in the previous chapter, understanding the temporal change in land-cover and land-use has been "the common ground" connecting a substantial body of scholarly work in the field of urban studies and environmental history. In the case of this study, the research on maps, land-use and land-cover data revealed highly productive results to shed light on the implicit relations between the multi-scalar hinterlands, ecologies and landscapes of the Marmara Region.

The 1980s Soviet Military Maps at the scale of 1: 200.000 from *L'Institut Français d'Études Anatoliennes'* (IFEA) map collection are used for the first analysis in Chapter 3 on the village typologies in the Marmara Region between 1967 and 1973. The data used in the building census analysis for the years of 1984 and 2000 is obtained from Turkish Statistical Institute (*Türkiye İstatistik Kurumu* – TUIK). Until 2000, the scope of the building census encompassed only provincial (*il*) and district (*ilçe*) centers, neighborhoods (*mahalle*), and villages (*köy*). However, by 2000 the scope of the survey was expanded by including adjacent territory (*mücavir alan*)[23], settlement areas (settlement zones indicated in development plans), and non-housing urban zones (i.e. the zones in which the construction of fuel stations, non-polluting factories and workshops are permitted). In terms of the building typologies, only temporary constructions, such as tents and huts were excluded. The 2000 census data also includes comparisons with the building census data of 1984. This broad scope of TUIK data in 2000 makes it an invaluable source to

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[22] The difference between land-use and land-cover can be summarized as follows: "Land-cover" refers to the biophysical condition of the terrestrial surface of the Earth including "forests, grasslands, wetlands, deserts, and settlements" as "broad categories" of land-cover. "Land use" refers to the human management of the biophysical environment. With the recent progress in GIS (Geographical Information Systems) and remote sensing technologies, evaluating land-use and land-cover change (LULC) became a fundamental part of "studies of global environmental change" (Land Use, *The Oxford Companion to Global Change*, Cuff and Goudie, 2009).

[23] See section 2.5 in this chapter.

understand urbanization beyond city-country dichotomy. It also facilitates the monitoring of the territorial persistence and local differentiations. Two primary data sets within the building census data are analyzed to monitor the transformation of the building stock: Distribution of land-use sizes composition by provinces between 1984 and 2000 (TUIK, pp. 16-18) and Distribution of land-use types and sizes by provinces in 2000 (pp. 106-139).

The land-cover data used for the district-level and one-kilometer grid cell analysis for the years of 1990, 2000, 2006, and 2012 is obtained from The Ministry of Forestry and Water Management. The ministry compiled this comprehensive land-cover data for Aris (*Arazi İzleme Sistemleri* – Land Monitoring Systems) project that aims to compose "land-cover maps" at the country level, based on the European Environment Agency criteria. The project uses Corine (coordination of information on the environment) Land-Cover inventory. In Corine classification system, land-cover types are categorized into five primary categories (Artificial Surfaces, Agricultural Land, Forest Areas and Semi-Natural Areas, Wetlands and Waterbodies) and 44 sub-categories.

While land-cover data can be obtained from many different sources via different software, the Aris land-cover data is preferred in this study for several reasons. Firstly, the temporal consistency and high resolution of the data set enables the researcher to track the temporal changes very precisely. The scope of the original Corine data set is very broad as it covers the Europe continent, and thus it is convenient for comparative studies. However, this fine grain resolution of Aris data is also an obstacle as, if observed with the naked eye, it obfuscates the monitoring of patterns and consistencies. The detection of distinctive spatial associations within this data set demands pattern recognition and data mining techniques that were discussed in the first chapter.

2.2 The Literature Review on the Marmara Region

While the literature on urban settlement systems in Anatolia—and particularly the Marmara Region—is highly limited, one must acknowledge the substantial efforts to illustrate the settlement systems in Anatolia. To begin with, Sevgi Aktüre (1978), Suraiya Faroqhi (1980, 1984), Leila Erder (1976, 1980), and İlhan Tekeli's studies on the urban systems in the Ottoman Era, construct the foundations for these efforts. While Sevgi Aktüre illustrates an urban hierarchy based on demography, Tekeli emphasizes the importance of the long distance caravan trade as the structural bases of the Ottoman settlement system (1982, p. 17). According to Tekeli, in the 16th century the regions in Anatolia are shaped through, "…urban agglomerations at the junctures of trade routes that go north south and east west" (Tekeli, 1970). In this regard, the book compiled as *Writings on Settlement Systems and Settlement History in Anatolia* (*Anadolu'da Yerleşme Sistemleri ve Yerleşme Tarihi Yazıları*) that comprises Tekeli's (2011) writings on settlement systems in Anatolia, is an important reference as it engages the theories and methods discussed in the first chapter with empirical data on Anatolia. Surayia Faroqhi's (1984) book *Towns and towns men of Ottoman Anatolia: Trade, Crafts and Food Production in an Urban Setting, 1520-1650* is another comprehensive study that focuses on the urban network in Anatolia in the 16th and 17th centuries. In addition to the location of caravans and trade routes, Faroqhi elaborates on the port cities, maritime trade and the agricultural hinterland.[24] *Constantinople and its Hinterland: Papers from the Twenty-Seventh Spring Symposium of Byzantine Studies,* edited by Cyril Mango, Gilbert Dagron, and Geoffrey Greatrex (1993)

[24] In the chapter "Towns, markets and communications" Faroqhi (1984) elaborates on inter-regional and intra-regional independence and interdependence through food networks: See Food and wood supplies for İstanbul from the Marmara Region, The capital's orchard, deliveries of fruit from the Aegean coast (pp. 78-82); port towns and the volume of maritime trade (pp. 104-121).

is another important contribution, shedding light on İstanbul's relations with its hinterland in the Byzantine era.

Subsequent to the quantitative revolution discussed in the previous chapter the regional and geographic studies spiked between the 1960s and 1970s, and thus a convergence between human geography and planning occurred within a span of twenty years in Turkey. The plans generated on the Marmara Region during this period will be examined at length in the following section, however the important body of work produced by geographers Erol Tümertekin, Necdet Tunçdilek, and Besim Darkot around the 1960s and 1970s should be acknowledged here. While Erol Tümertekin's work primarily focused on urban and industrial geography of Turkey[25], Tunçdilek extensively wrote on the rural geography, settlement systems and land-use development in Turkey.[26] Besim Darkot's writings on the physical geography of İstanbul and the regions in Turkey are important contributions to the field.[27] When discussing the outcomes of the land-use and land-cover based assumptions, this study extensively benefited from the work and insights of these geographers accounted for.

Interestingly, among the literature on the cities in the Marmara Region, the studies on Bursa in particular represent another important body of work. Depending on the availability of the primary resources, there is an important body of research that evaluates

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[25] An Industrial District in İstanbul – Bomonti, a study on applied geography (*İstanbul'da Bir Sanayi Bölgesi--Bomonti : Bir Tatbiki Coğrafya Çalışması*), 1967; Industrial Geography (*Sanayi coğrafyası*), 1960; Heavy Metal Industry and Its Condition in Turkey (*Ağır Demir Sanayii ve Türkiyedeki Durumu*), 1954.

[26] The Evolution of Settlement in Turkey (*Türkiye̓de Yerleşmenin Evrimi*), 1986; The Potentials And Problems of Countryside in Turkey (*Türkiye'nin Kır Potansiyeli Ve Sorunları*), 1978; Relief Shapes and Land-Use in Turkey (*Türkiye'de Relief Şekilleri Ve Arazi Kullanımı*), 1985; Settlement Geography in Turkey (*Türkiye Iskân Coğrafyası*), 1967.

[27] The Geography of İstanbul (*İstanbul̓un Coğrafyası*), 1938; The Marmara Region (*Marmara Bölgesi*), 1981.

Bursa's hinterland relations. Tekeli's article (1999) "The Three Major Transformation Stages of the History of the City of Bursa" exemplifies this tradition in urban history. Tekeli proposes the concept of spatial frame (*mekansal çerçeve*) as a historiographic starting point to understand and monitor the specificity of settlement systems and urban macroforms in Anatolia. This original concept can be conceived of as a paradigm setting contribution for urban and regional history in Anatolia. Tekeli asserts that, the spatial frame of a city is delineated by the radius of spatial extension of the urban macroform, network of main transport arteries which create a threshold for marginal additions to the city, and characteristics of the urban fabric (1999, p. 28). According to Tekeli, Bursa's *raison d'être* can only be explained through its interactions with İstanbul and in this regard the silk trade is the fundamental activity that constituted a relational history between Bursa and İstanbul (p. 68). Therefore, Bursa's distance from İstanbul (100 km) is such a critical distance that might both impede and enable the emergence of an immense urban agglomeration close to İstanbul (p. 61).

According to Tekeli, Bursa's spatial network transformed in three phases: Firstly, in the first half of the 14th century, secondly in the second half of the 19th century and finally after the 1970s. In the 14th century the Ottoman Empire aimed to intensify the long distance trade routes in Bursa. The Ottomans established their control over the Silk Road by imposing new itineraries such as the ones that came from India and were led to Arabia to Adana-Konya-Akşehir-Kütahya-Bursa, and the one which started from Egypt-Antalya-Isparta-Kütahya-Bursa routes. Manisa-Akhisar-İzmir route was also connected to Bursa after the invasion of İzmir in 1391. Edirne-Gelibolu-Bursa connection developed after the invasion of Edirne in 1361 (2007, p. 57). In the 18th century the trade routes shifted towards

İzmir (p. 76). In the 19th century, Bursa's connections with Gemlik and Mudanya in relation to the silk trade were established (p. 77-78). More research on silk trade in Bursa can be found in İnalcık (1960) and Çizakca's (1980a, 1980b) writings. Leila Erder's (1976) dissertation on the industrialization of Bursa is another important resource that sheds light on the industrialization process, beginning from the 19th century to the 1970s.

In *Writings on Settlement Systems and Settlement History in Anatolia*, Tekeli (2011) draws attention to the increasing research interest on individual settlements, however, as he aptly puts it, this interest does not reflect in settlement systems (p. 1). The current academic studies on the Marmara Region are limited to the earthquake risk and the geologic properties. There is a large body of work in the field of urban studies which focuses on contemporary issues like recent policies, neo-liberal urban interventions, and gentrification. However, these studies are highly limited to the provincial boundaries of İstanbul. While this author acknowledges the importance of these topics on revealing the contemporary condition of İstanbul, it should be indicated that they are not within the scope this study. That said, the work of Çağlar Keyder (1999) on theorizing the globalization of İstanbul after the 1980s, Ayda Eraydın's (2011), Vedia Dökmeci and Lale Berköz's (1994) work on regional policy and the city-region of İstanbul, and Murat Güvenç's (2009, 2014) work on the voting geography and migration patterns in Turkey can be counted among the substantial contributions on urbanization in Turkey and particularly in İstanbul.

2.3 A Geo-History of the Marmara Region

Figure 2.2: Veues des Dardanelles de Constantinople, Nicolas de Fer, 1700-1725, Harvard University Map Collection.

Re-situating İstanbul in the "regional" context, exposes a set of new relationships to understand its complex urban development history in the *Longue Durée.* The Marmara Region is a historical agglomeration of urban centers and civilizations with a settlement history of more than 2500 years (Tekeli, 2011, p. 407). Vidal de la Blache (1926) in *Principles of Geography* (*Principes De Géographie Humaine)* illustrates the historical landscapes of the Marmara Region as follows:

> The fragments of chains which rise form the submerged boundary of the ancient lands surrounding the Aegean, furnish classic examples. By virtue of their own influence dense populations have existed since time immemorial at their foot. Ancient Lydia, Bithynia, Thrace and Macedonia, are historic countries with prehistoric roots. At the foot of Mt. Olympus in Bithynia, upon a terrace dissected by torrential streams, the city of Brusa,

> abounding in living waters, has a site whose great fertility has always been sought after by man. (p. 142)

The development of these historical landscapes followed a path intertwined with the geographic properties of the region. The transitory climate and the fragmented geography of the Marmara Region generated a mosaic of ecologies embodied in a geographically delineated area.[28] The geographical significance of the region also encompasses the sea-scapes including the Sea of Marmara and the two straits (Dardanelles and Bosphorus) as the gateways of the Mediterranean and the Black Sea. This interconnectivity made the Sea of Marmara a hinge of political, cultural, economic and climatic transition between Asia and Europe, and particularly between the Mediterranean and the Black Sea Worlds. The intensification of the important urban centers around the Sea of Marmara is best described in the words of Grelot (1683):

> So that there is not hardly to be seen in any other part of the World, so small a spot of Ground, whereon so many fair Cities have been built, as upon the shoar of this round Receptacle of salt Water. The famous Cyzicum, the renown'd Nice, the delightful Apamea, the charming Nicomedia, the unfortunate Chalcedon, and several other Cities of great repute, are sufficient Testimonies, that this celebated part of the World had omitted nothing that might contribute to the Embelishment of her temperate Shoar [*sic*]. (p. 28)

Both in the Byzantine Ottoman and the Republic Era, the consolidation of İstanbul—at the regional and the country levels—as the primary urban center among the urban centers around the Sea of Marmara occurred after phases of trial and error. For instance, while the locations can be speculative, it is known that Constantine tried other urban centers in the Marmara Region before choosing Byzantium. Troy, Sigeum, Alexandria Troas are often cited among the locations tested by Constantine. The intra-

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[28] The contemporary condition of the geographic and climatic fragmentation will be discussed in detail in the following chapters.

regional competition and the consolidation of Constantinople and later on İstanbul have been discussed by different historians and geographers such as Pierre Gilles (1729) and Arnold Toynbee (1973, pp. 207). After a detailed account of the geographic superiorities of Constantinople with respect to the other urban centers around the Sea of Marmara such as Cyzicus, Heraclea and Chalcedon (Kadıköy) (pp. xxxviii, xxxix), Gilles compares Hellespont (Dardanelles) with Bosphorus and criticizes Constantine's early decision on Troy as an alternative urban center to Rome:

> Constantine at first began to build a city upon Sigeum, a promontory hanging over the straits of the Hellespont; but quitting that situation he afterwards pitched upon a promontory of Byzantium. Troy, I acknowledge, is a magnificent city, but they were blind who could not discover the situation of Byzantium; all stark blind, who founded cities within view of it, either on the coast of the Hellespont or the Propontis. (p. xxxix)

In different periods İstanbul, Bursa, Kocaeli, and Edirne competed to be the capitals of the civilizations that ruled the region. Nicea (İznik) was the capital of the Byzantine Empire in the first half of the 13th century, after the fourth Crusade. Nicomedia (İzmit) became the eastern capital of the Roman Empire under the rule of Diocletian. Bursa and Edirne were the capitals of the Ottoman Empire before the conquest of Constantinople. In his article "Nicomedia and Constantinople", Foss evaluates the decline of Nicomedia with respect to the rapid development of Constantinople. Foss (1993) states that, "the success story" of Constantinople "was achieved at the expense of other cities of the region" (p. 181). While Nicomedia and Nicea witnessed stages of decline and restructuring they continued to be important urban centers subordinate to Constantinople.

A similar competition also occurred in the Ottoman Era. Çiğdem Kafesçioğlu draws attention to the primacy of Edirne after the conquest of Constantinople in 1453. Kafesçioğlu asserts that, until 1457 Edirne remained the capital while İstanbul was reconstructed and repopulated (2009, pp. 16, 54). This geographic boundedness created an urban landscape of intensification in which historical landscapes of urban, cultural, economic, and social development overlap with the micro-ecologies and multi-scalar hinterlands of the region. In order to decipher the spatial outcomes of this stratified formation, in which history and geography is deeply intertwined, developing a framework that embraces both disciplines is crucial.

The existence of two straits that surround the Sea of Marmara increased the geopolitical power of the urban centers, and thus the merging waters of the Mediterranean and the Black Sea gave the region a hybrid ecology and climate. As a result of these geopolitical advantages accounted for, perpetual demographic growth and urban development have always remained as the primary characteristics of the urban network around the Sea of Marmara. İstanbul being the most well-known, the other urban centers including Bursa, Kocaeli (İzmit, Nicomedia) and Edirne benefited from this transitory condition. While İstanbul consolidated its position as the primary urban center diachronically; the competition among other urban centers in the region such as Bursa, Kocaeli, Edirne, Tekirdağ, and Çanakkale precipitated a flux of migration routes, goods, food and money with constantly shifting centripetal and centrifugal forces.

The geopolitical properties and the inter-regional competition also laid the foundations for İstanbul's hinterland. According to Braudel (1973), with the consolidation of the empires in the Mediterranean world, city states transformed into territorial cities. At this point the sustainability of the primary urban centers such as İstanbul, Genova and Roma demanded a new scale of hinterland relations that transcend the capacities of the regional hinterlands. Within this framework, Braudel defines İstanbul as an "urban monster" (p. 253). According to Tekeli (1975) the 16th century urbanization of İstanbul was incomparable with any other cities of the Ottoman Empire. Tekeli explains this massive growth with, "the efficient organization of the transfer of surplus to the capital" (p. 657). The ratio of İstanbul's population to Bursa—second largest city—was about 10 (2008, p. 64). Tekeli also draws attention to the role of sea transportation in the establishment of İstanbul's hinterland. Tekeli (2011) asserts that a hinterland limited to the road network—limited to a range of 50 to 70 kilometres—would be insufficient for the growth of a metropolis like İstanbul (p. 52). Likewise, Purcell and Horden (2000), assert that the most significant property of the settlement system within the course of the Ottoman Empire is the perpetual growth of İstanbul. From the 15th century "the Ottoman capital's population was soon absorbing provisions, raw materials and manufactured goods on a scale that affected the structure of trade and production throughout large tracts of Anatolia (and well beyond)" (p. 115).

A relational understanding of urban landscape is often observed in the narratives of travelers who visited the Marmara Region, in which urban centers nested around the gulfs of the Sea of Marmara are mostly depicted with respect to their hinterland relations with İstanbul. This relational understanding becomes most explicit in Grelot's (1683) narrative. For almost each city he visited around the Sea of Marmara, Grelot gives an account of its proximity to İstanbul, in relation to its trade capacity and commercial activity with İstanbul: "Nice (Isnir) fifty leagues, not so distant from İstanbul (p. 32)"; "Apamea (Mudanya) is situated between Bursa and İstanbul controls most of the trade from Bithynia to Constantinople" (p. 33); Nicomedia is the most advantageous one as it is the closest city to Constantinople" (p. 33). Chalcedon (Kadıköy) is depicted as "a miserable village" by

Grelot, its closeness to İstanbul is an absolute disadvantage as the city had been attacked by “Persians, Goths, Saracens, and Turks” simultaneously, which made Kadıköy too weak to compete with İstanbul (p. 42).[29]

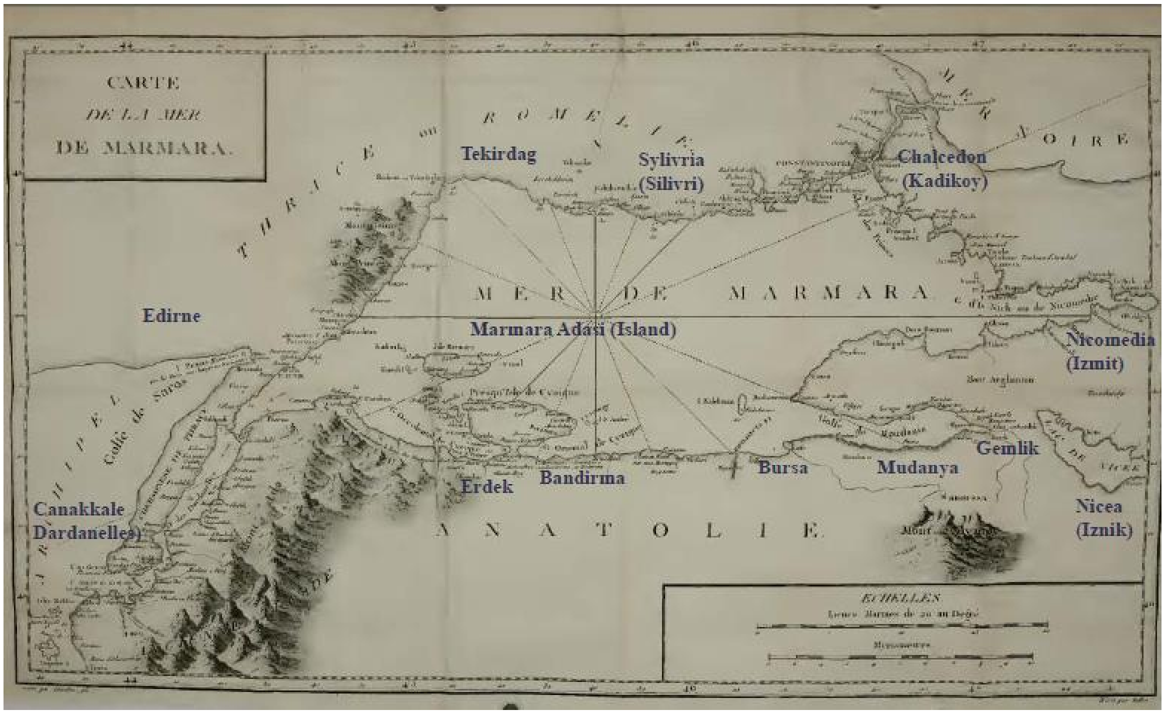

Figure 2.3: The important urban centers around the Sea of Marmara. Voyage de la Propontide et Du Pont-Euxin.

The important urban centers around the Sea of Marmara mentioned in the travelogues’ of Dearborn, Grelot, and Evliya Çelebi are as follows: St. Stephano, Sylivria, Erekli, Rodosto, Ganos, Chalcedon, Gabeziah, Nicomedia (Is-nikmid), Gemlik (Ghemlek), Mudanya (Moudania, Mundania, Aphamea Montagniac), Darıca Kalesi, Dil İskelesi, Mikalitza, St. Peter, Panormo, Cizicus, Caraboa, and Beroumdere, Marmora Island,

[29] *In Grelog’s own words “*the too near Neighbourhood of *Constantinople* has been a Potent Obstacle to its Recovery” (pp. 42-43). These spatial and economic relations that Grelot illustrates can be regarded as an early version of the gravity model and city ranking analysis that are extensively used in regional studies since the second half of the 20th century. These analyses investigate the commercial and hinterland activities with respect to distance relations to measure inter and intra-regional competition.

Kazıklı, Değirmenderesi, Halıdere, Yalove, Mihalic, Edincik, Bandırma, Erdek, Kapıdağı, Boğaz, and Lapseki. Among these urban centers Nicea, Sylivria, Rodosto, Mudania, and Marmora Island are depicted in more detail with respect to their hinterland relations with İstanbul. While "Nice [Nicea] imports Corn, Fruits, Cottons, [and] Linnen to İstanbul", Nicomedia imports "Silks, Cottons, Wool, Linnen, [and] Fruits" (Grelot, 1683, pp. 32, 35). "Sylivria, thirty four miles west of Constantinople, [is] an imperial granary, into which the corn of the province is brought, and from thence shipped to Constantinople" (Dearborn, 1819**,** p. 25). Tekirdağ, also emerges as a prominent port city in these writings. In *Seyahatname* (2013), Tekirdağ is illustrated as a big port that benefits from its proximity to Edirne and dominates the trade between Egypt, the Black Sea and the Mediterranean (Vol. 8, p. 406). Grelot (1683) depicts Tekirdağ as the center that controls the trade between Thrace, the Propontis, and the Black Sea (p. 44).[30] According to Dearborn (1819), the town is famous for its good wine and is also the primary wheat supplier of Constantinople (p. 25). Mudanya is illustrated as another important center that highly benefits from its natural harbor. Both Evliya Çelebi (Vol: 2, p. 3) and Dearborn depict the Mudanya port as a highly protected port.[31] Among the islands in the Sea of Marmara, Marmora Island is distinguished by its natural resources, primarily the marble production that gives the Sea

[30] Seyahatname is a collection of travel diaries written by Evliya Çelebi (b. 1020/1611; d. after 1096/1685). In Encyclopaedia of Islam Seyahatname is defined as follows: "Seyahatname, (Seyāḥatnāme, 'Book of Travels'), [is] the longest and richest travel account in Islamic literature… Evliya's aim in the Seyahatname was to provide a complete description of the Ottoman Empire and its hinterlands." Retrieved from http://referenceworks.brillonline.com.ezp-prod1.hul.harvard.edu/entries/encyclopaedia-of-islam-3/evliya-celebi-COM_26262?s.num=0&s.f.s2_parent=s.f.book.encyclopaedia-of-islam-3&s.q=seyahatname

[31] Dearborn: "The gulf of Moudania, or Mundania, is rather narrow and runs into the land ten leagues, between two ridges of mountains. The anchorage at the head of the gulf is excellent; the anchors hold well every where" (p. 30). Evliya Çelebi: "Mudanya is a natural and protected port in Bursa. As it is situated in an enclave on the southern part of the Gemlik Gulf, it was is a well protected natural harbor in Bursa safe for ships, protected from the main winds except the north wind." (Vol: 2, p. 3). [translated by the author]

of Marmara its name. After a detailed account of the Mediterranean landscape of this Greek Island[32], Dearborn depicts the properties of its marble:

> …a little veined with grey and blueish, which is hence extracted in great quantities. Although the grain of the marble is not fine, nor its colours beautiful and mixed, the Greeks esteemed it, and made frequent use of it: they distinguished it by the name of 'Cizicus' marble. (p. 36)

The Marmora island is also an important point of destination as "the Vessels bound to or from Constantinople often run for this island to seek a shelter from storms, and during adverse winds" (p. 36).

The different names given to the Sea of Marmara in relation to its descriptions in the pre-20th century texts always refer to its transitory state enabling a diverse set of cultural and commercial relations. For instance, while William Smith (1886) in Dictionary of Greek and Roman Geography and Evliya Çelebi (2013) in *Seyahatname* describe the Sea of Marmara as the hinge between the Mediterranean and the Black Sea, travelers like Grelot (1683) and Dearborn (1819) put more emphasis on its geopolitical relations, with the Black Sea referring to its former name Propontis, which means "the sea before the entrance of the Pontus" (Smith, p. 671). [33]

[32] "…ten miles long and three wide; it is lofty, mountainous, and tolerably fertile; contains a town of the same name, and several villages, rather populous. On the south side are two small harbours. Most of the inhabitants are Greek Christians. The vine, the olive-tree, cotton, and various species of grain are cultivated" (p.36).

[33] The Sea of Marmara is described as an intermediate sea between the Aegean and the Euxine in Smith's dictionary (vol. 2, p. 671); and as a very small sea situated between the Black Sea and the Mediterranean in Seyahatname (vol. 3, p. 308) [*translated by the author*]

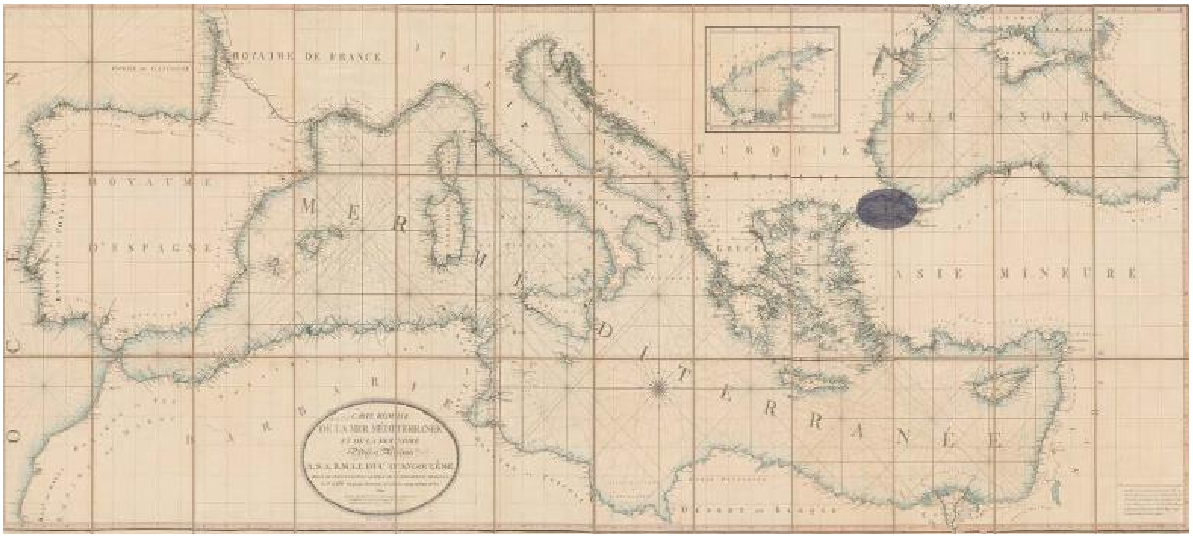

Figure 2.4: Carte réduite de la mer Méditerranée et de la mer Noir, Lapie, M. (Pierre), 1779-1850., Harvard Map Collection.

In "The Mediterranean and the Mediterranean World in the Age of Philip II", Braudel (1973) emphasized the importance of the inland seas in the making of the Mediterranean World:

> The Mediterranean is not a single sea but a succession of small seas that communicate by means of wider or narrower entrances. In the two great east and west basins of the Mediterranean there is a series of highly individual narrow seas between the land masses, each with its own character, types of boat, and its own laws of history; and as a rule the narrowest seas are the richest in significance and historical value, as if man had found it easiest to impose himself on the Mediterranean in a small compass. (p. 72)

In "A Cruise in the Bosphorus and in the Marmora and Aegean Seas" Townsend (1875) emphasizes the land-locked "inland" condition of the Sea of Marmara by illustrating it as follows:

> The Propontis is nearly circular, with the exception of a deep dip into the Bay of Ismed, or Nicomedia, so that on my saying, in the course of the afternoon, to an English sailor …"I suppose you are never quite out of sight

> of land in the sea of Marmora?" he answered "No, sir, never. This sea is like an Ho!" –meaning, I imagine that, in the center of the circle you would see land on every side. And this is so; the sea is from sixty to seventy miles across in every direction and one or other of its shores is generally in shight. (p. 179-180)

Evliya Çelebi measures the length of the Sea of Marmara as 200 miles and its width as 70-80 miles; therefore he counts 105 rivers pouring into the Sea of Marmara both on the European side and the Anatolian side of the region (Çelebi, 2013, vol. 3, p. 308). The perceptional boundaries, or scales of the region that surround these urban centers around the Sea of Marmara, also materialize in Dearborn's and Eremya Çelebi's narratives. Eremya Çelebi describes a valley-like section: "Right across Halkedon [Kadıköy] there is Olkos and Keşiş Mountain [Uludağ], from its peak Nikomedya of Bitinya and islands can be seen" (Pamukciyan, 1988, p. 5). Whereas, Dearborn depicts a panorama: "Those who steer their westward course through the middle of the Propontis, may at once descry the high lands of Thrace and Bithynia, and never lose sight of the lofty summit of Mount Olympus, covered with eternal snows" (Dearborn, 1819, p. 23).

The same condition of hybridity also reflects in the climate of the region. The climate of the Sea of Marmara is described as a moderate one that is an amalgamation of the Mediterranean and the Black Sea climates: "it lies in a most temperate Climate, which neither admits the bitter freezings of the North, nor is subject to the stifling Southern heats" [*sic*] (Grelot, 1683, p. 28). Dearborn (1819) elaborates on this moderate climate in relation to the storms and the dominating winds. Dearborn states that, "the storms are never of long duration" and the dominating winds "are the north-east, in summer, which is the direct course from Caffa to Constantinople. In autumn, winter, and spring, the winds are often southerly and various" (Dearborn, p. 11). Mantran (1986), in "İstanbul in the second half of the 17th century" (*17. Yüzyıl'ın İkinci Yarısında İstanbul*) explains the effects of the primary wind, *Lodos* (southwester) in the everyday life of İstanbulites as follows: "When *Lodos* wind blows, the air becomes heavy almost suffocative... Even today, many people declare that they are not capable of working; and they feel exhausted because of the south winds" (p. 24). [34]

In terms of the microecologies of the region, the intermingling of the different salinity levels of the Mediterranean and the Black Sea waters create a set of currents in the Sea of Marmara that embellish its unique microhabitat. The fish and the fishing histories of the Sea of Marmara signify the microecologies of the water bodies of İstanbul. The local fish such as *Karagöz, İstavrit* (*Trachurus trachurus*), *İzmarit* (Spicara maerna), *Tekir,* and *Barbunya* (Mullet of Mullidae family) don't leave the Sea of Marmara (Somcag, 1993, p. 21). The migratory fish around İstanbul such as *Lüfer* (Bluefish), *Palamut* (Tunny Fish), *Uskumru* (Mackerel), *Sarıkuyruk* (Yellowtail), *İstavrit* (Bluefin Tuna), and *Kılıç Balığı* (Swordfish) benefit from the currents created by the different salinity levels in the Sea of Marmara. The migratory types, migrate from the Black Sea in spring, breed in Bosphorus, and migrate to the Sea of Marmara and the Aegean Sea to spend autumn and winter (pp. 21-23). When winters are mild, some blue fish stay in the Bosphorus and live in and around 50-meter depth hydraulic current which is the extension of the Sea of Marmara (p. 22).

The seismicity of the Sea of Marmara adds another dimension to the fragmented-unity of the region. According the Purcell and Horden (2000), the instability created by activities like seismicity, volcanic eruptions and hot springs is one of the primary

[34] [Translated by the author] "*Lodos estiğinde hava ağır hatta boğucu olmakta… Çok sayıda insan, bugün bile, çalisamayacaklarini açıklamakta veya kendilerini güney rüzgarlarından yorgun düşmüş hissetmektedir*."

characteristics of the Mediterranean, separating it from the other regions (p. 304). The geological characteristics and geographical diversity lie at the basis of the fragmented "topography of the region," adds "chronological dimension", and thereby "underlie[s] the collectivity of microregions" (p. 305). In other words, "it is landscape instability that creates one of the essential features of the microregion: that is not a fixed entity by, but constantly alters the characteristics that are most significant for human perception and occupation" (p. 305).

The historical study on the earthquakes in Asia Minor between the 16th and the 19th century done by Ambraseys and Finkel (1995) reveal the temporal cycles the earthquakes create in the Marmara Region. The 1509 earthquake, 1719 earthquake, 1891 earthquake and 1999 earthquakes in the Sea of Marmara affected the urban centers in the region in the *Longue Durée*. The earthquakes also influenced the intra-regional competition and development. For instance, according to Foss, besides the founding of Constantinople, the major earthquake that happened in the 4th century in Nicomedia is one of the main reasons why the city followed such a drastic decline (1995, p. 181). In addition to the seismic activity, the intensification of underground spring waters in the southern part of the region is another substantial geographic property, composing microecologies in the region. The existence of underground spring waters manifests itself in a set of urban artifacts such as *hamams* and the geothermal complexes in Bursa and Yalova.

In the early days of the Ottoman Empire, expanding around the Sea of Marmara by conquering the urban centers around it was one of the primary geopolitical ambitions. The early arsenals (*tersane*) around the Sea of Marmara—Gelibolu *Tersanesi* as the primary one—were a product of these ambitions (Uzunçarşılı, 1948, pp. 394-395). Among the ships built in these arsenals *Karamürsel,* as the smallest of the galleass (*çektirme, çekdiri*), was a specific type designed for sailing in the Sea of Marmara, it could either be rowed or sailed with the help of the sailing vessels (p. 456). In an article written by Arkan in Hayat Magazine (*Hayat Tarih Mecmuası*) it has also been discussed that the *Karamürsel* ships were built with the effort of Karamürsel Bey, who played a key role in the conquest of the Sea of Marmara by Turks. The transportation around the Sea of Marmara was mostly done by small boats (*kayıks)*. These small boats, mostly used by Turks and *Rum*s (Ottoman Greeks), also participated in the grain trade either by carrying the Thrace grain to Tekirdağ and Ereğli or the West Anatolia grain shipped from Mudanya, Bandırma, and Erdek to İstanbul (Mantran, 1986, v. 2, pp. 90 - 91). While the transportation around the Sea of Marmara had intensified around the coasts, sailing from İstanbul to Çanakkale lasted around 2 to 4 days (v. 2, p. 92). According to Tournefort, *Lodos*—the local name for the southwestern wind—and *Poyraz*—the local name for northeaster wind—as the dominating winds of the Sea of Marmara, operated as the conveyor belts of İstanbul. For instance, while the north wind was strong the south gate (Dardanelles?) was closed (as cited in Mantran, v. 1, p. 25) or vice versa.

As a result of the restructuring of the technological progress and the governmental restructuring, the landscapes of the Marmara Region witnessed drastic changes in the 19^{th} century. In the 19^{th} century the first urban development regularizations emerged: 1848 *Ebniye* (building law); 1864 *Turuk ve Ebniye* (roads and buildings), and *Ebniye* law in 1882 (Aktüre, p. 96). These laws focused both on the city center and the suburban developments (p. 40). Private ownership rights were given to agricultural fields surrounding the cities (Tekeli, 2008, p. 37). The most important investment, with regards to transportation infrastructure, was the railway. İstanbul-İzmit railroad was opened in 1873 with 57.8 miles: İstanbul-Edirne in 1888 with 197 miles, İzmit-Adapazari in 1890 with 30.4 miles (Kolars, Malin, 1970, p. 239). Transportation investments were followed by other infrastructural developments: docks, street lighting (gas), electricity, horse and electric trams, and a piped water supply.

In the 19th century, railways and cotton mills became the predominant and distinctive features of the landscapes and sea-scapes of the Marmara region. The suburbs of İstanbul such as Küçükçekmece, Bakırköy, and Zeytinburnu changed drastically with manufacturing complexes and gunpowder mills. Parallel to the emergence of the railways in the sea-scapes of İstanbul in the 19th century, this period also witnessed the emergence of steamboats. The first steamboat arrived İstanbul in May 20th 1838, some 21 years after its invention. The steamboats in the 19th century took over sea transportation that had been long provided by *kayıks* (boats with shovels) or sailing boats. According to *Takvim-i Vekayi*, on February 19th in1844 regular boat trips were scheduled between Gemlik, İzmit, Bandırma, and Tekirdağ that strengthened the intra-regional connectivity in the Marmara Region (Dünden Bugüne İstanbul, 1993, Vol. 3, p. 31).

2.4 The Planning History of the Marmara Region

Similar to the its evolution elsewhere in the 20th century, "region" as a term of geography and urban planning in Turkey witnessed periods of interest and neglect. This section covers critical stages of İstanbul's urban growth and its urban planning history. During the first half of the 20th century, the urban growth of İstanbul was slow, driven by suburbanization. The residential neighborhoods with high income housing emerged on the eastern and western shores of the Sea of Marmara, as well as along the Bosphorus by leaving undeveloped voids in between. Though the Prost Plan (1936) had aimed to control sprawl by creating a coherent network of road infrastructure, the primary objective of the plan was the beautification of the inner city areas (Daver, et al., 1943).

Simultaneous to the Prost Plan, a preliminary regional planning initiative was released by the German planner, Martin Wagner in 1935-36 (1937). The plan primarily focused on the hinterland relations İstanbul established with other urban centers around the Marmara Region and therefore elaborated on these relations such as agricultural production, natural resource management, population distribution, recreational activities, infrastructural networks, modes of transportation, and industrial development (*Figure 2.5*).[35] Wagner (1935) identified three settlement formations: the city of İstanbul, the narrow hinterland of İstanbul (the area approximately within the administrative borders) and the broader hinterland of İstanbul (the Marmara Region) (p. 1). According to Wagner, the centripedal forces created by the city of İstanbul was leaving the narrow hinterland of İstanbul depopulated, and he proposed a transition area between the inner city and the broader hinterland which would be designed preferably as orchards and vegetable gardens with high agricultural technologies (p. 1). Martin Wagner also emphasized the importance of regional recreational activities. According to Wagner, the *İstanbulites* had just begun to discover "the weekend", and hence he asserted that İstanbul's hinterland would gain prominence with the construction of regional highways that reach out Gelibolu and İzmit (p. 12).

[35] Martin Wagner left Turkey after working in İstanbul for a year then left Turkey and migrated to the US to teach at Harvard GSD (Cansever, 1996, p. 64).

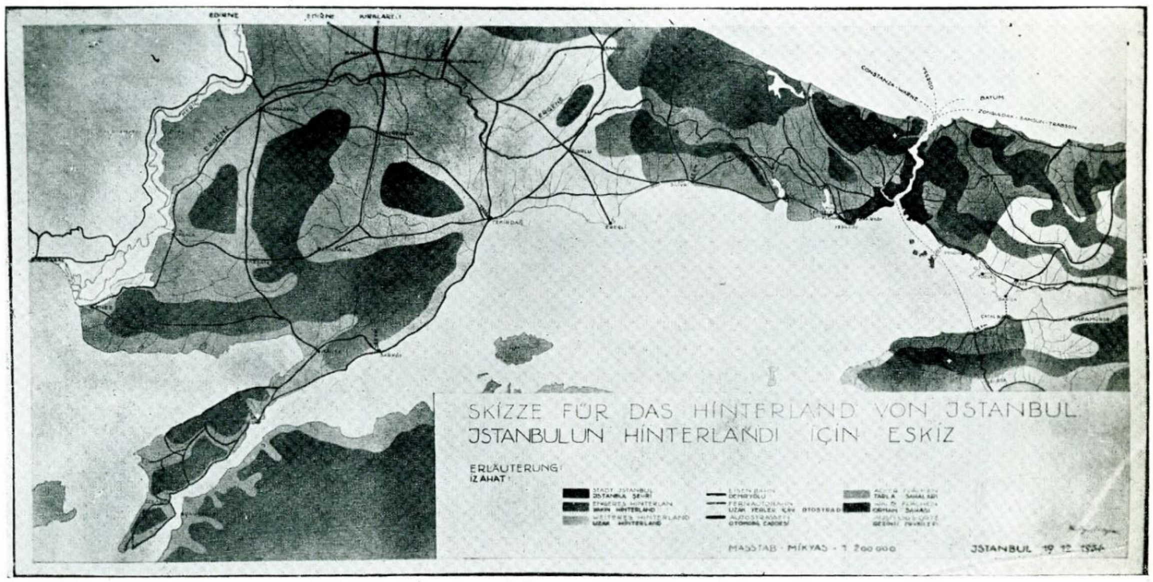

Figure 2.5: The Wagner Plan.

In June 1941, the regional boundaries of Turkey were determined at the First Turkish Geography Congress, held in Ankara during which Turkey was divided into seven regions. A committee was assigned to delineate the regional boundaries which were determined according to their geographic properties.[36] After the WWII, the migration flows to İstanbul precipitated housing shortage and triggered slum (*gecekondu*) formations at the municipal peripheries. As a result of this rapid development, the interventions of the Prost Plan—that had targeted the inner city areas—were thrown away within a decade. The Menderes Operations, implemented primarily between 1951 and 1957, followed a similar short-sighted strategy (*İstanbul Vilâyeti Neşriyat ve Turizm Müdürlüğü*, 1957).[37] The Menderes era witnessed insufficient metropolitan-scale interventions to control the peripheral growth. The road network within the metropolitan area was expanded and in

[36] This comittee included Professor İbrahim Hakkı, Akyol Herbert Louis, Besim Darkot, and Sadi Selen (Coğrafya Kongresi,1941, p. 77).

[37] For instance, after the construction of the Bosphorus Bridge was completed in 1973, the Salı Pazarı Port, built in 1958, became obsolete and the port functions were transferred to the Haydarpaşa Port.

1955, the municipal borders of the city were extended from Florya to Küçükçekmece in the European side and from Üsküdar to Ümraniye in the Asian side (Tekeli, 1994, p.104). In July 1956 Law No. 6785 was enacted. The law enabled, "the implementation of development laws outside of the municipalities" boundaries (Tekeli, 1994, p.106). Subsequently a regional planning unit was founded within the Technical Board of Urban Planning (*Şehircilik Fen Heyeti*) in the Ministry of Public Works (p.107). Tekeli underlines these initiatives as "the first step in the transition from city-scale planning to regional planning (p. 107). In 1959, these transformations were followed by the adoption of a new legislative unit called adjacent areas (*mücavir alan)*, which enhanced the control of municipalities over metropolitan fringes (pp. 129-130). Between 1950 and 1980, the number of peripheral municipalities was increased, which led to a fragmented governmental structure (p. 170). A new law adopted in 1972 transformed the adjacent areas (*mücavir alan*) into adjacent territory (*mücavir saha*), hence extending the municipal control over discontiguous sectors (p. 176).

In 1958 Luigi Piccinato, an architect and urban planner, was invited to İstanbul to generate a master plan. [The] "Master Plan for the Transition Period" was completed under his supervision in 1960 (Tekeli, 1994, pp. 124, 125). After the *coup_d'état* in 1960s, Turkey entered a new phase in urban planning (Tekeli, 2008, p. 2) However the Piccinato plan continued to influence the latter initiatives (Tekeli, 1994, p. 126). The plan—which Piccinato referred as a guideline rather than a master plan—was original in the sense that it attempted to engage the city-scale with the regional level, and thus unlike the previous plans encouraged decentralization (p. 126, 129). Subsequently, Andre Gutton, the director of the Urbanization Committee of the UIA (International Union of Architects) meeting held in İstanbul in 1959, emphasized the importance of resituating İstanbul in a regional context (Tekeli, 1994, p. 129).

The 1960 Constitution transformed planning into a constitutional institution (Tekeli, 2008, p. 2), and the State Planning Organization (*Devlet Planlama Teşkilatı – DPT*) was established (p. 2). Making regional plans was among the State Planning Organization's duties (p. 2). However, this mission was assigned to the Social Planning Agency under the State Planning Organization instead of the Regional Planning Agency under the Development and Housing Ministry which caused a dichotomy from the beginning (pp. 2, 3).

The First Five-Year Development Plan released by the State Planning Organization in 1963 focused on eliminating inter-regional inequalities (Tekeli, 2008 p. 71). The Second Five-Year Development Plan (1968) focused on the settlement hierarchy (p. 72) and the proposed policies encouraged the growth of the regional centers in order to create "growth poles" (p. 73). The plan also gave primary importance to urbanization (p. 73, 74). The Third Five-Year Development Plan completely excluded the notion of region. In the Fourth-Year Development Plan, which encompassed the years between 1979 and 1983, the issue of inter-regional inequalities was put back on the agenda as a result of the growing inter-regional inequality that gained impetus especially after the third plan.

Corresponding to the publication of the First Development Plan and the world wide interest in regional planning, the 1960s witnessed an interest in regional studies in Turkey. A set of regional plans were established on the Marmara Region throughout the 1960s, such as the Eastern Marmara Preliminary Plan (1963), the İstanbul Industrial Master Plan (1965), the İstanbul Metropolitan Settlement Preliminary Plan (1965), the Economic and

Social Development Plan for Thrace (1966), and the Eastern Marmara Tourism Study (1966) (Tekeli, 1994, p. 192).

Among these plans The Eastern Marmara Preliminary Plan (1963) by Tuğrul Akçura, prepared under the authority of Development and Housing Ministry, presents a comprehensive understanding of the urban development dynamics of the Marmara Region (*Figure 2.6*). The plan primarily focuses on the Eastern Marmara Sub-region which forms the industrial corridor along the northeastern shores of the Sea of Marmara including the cities of İstanbul, Kocaeli, and Sakarya. The plan anticipated the rapid development of the industrial corridor in the east and proposed sub-centers around the Eastern Marmara Sub-region to decrease the pressure of this rapid development on İstanbul and its environs. The plan analyses social, economic, and physical characteristics of the region and also subdivides the region into three sub regions:

1. Western Marmara (or Thrace) that encompasses Edirne, Tekirdağ, and Kırklareli. The social and economic properties of this sub-region correspond with the average values of Turkey.

2. South Western Marmara sub-region that encompasses Balıkesir and Çanakkale (Dardanelles) is defined as the underdeveloped part of the region.

3. Eastern Marmara Region that encompasses İstanbul, Kocaeli, Sakarya, Bursa is defined as the most developed sub-region. (p. 4)

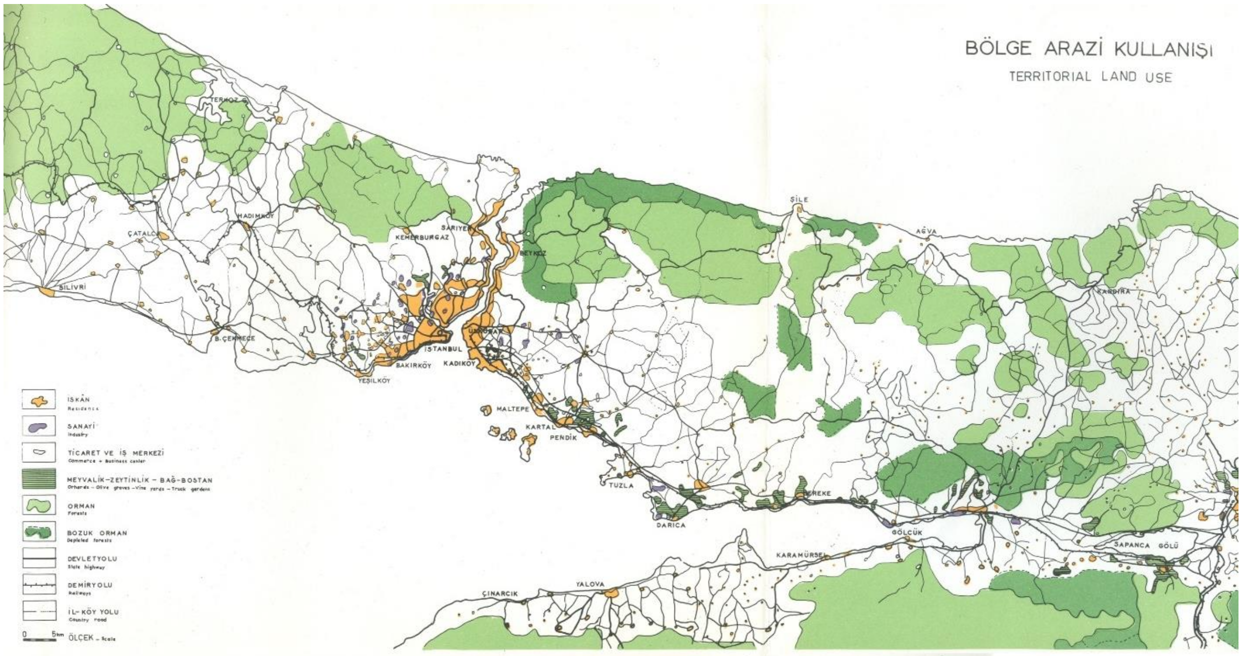

Figure 2.6: The Eastern Marmara Preliminary Plan.

Eastern Marmara Plan proposed the industrial decentralization of İstanbul and the first organized industrial zone in Turkey. Concomitantly in 1966, the construction of this industrial site on Mudanya road was completed and thus an automotive industry developed in the city (Tekeli, p. 90).

According to architect and planner Turgut Cansever (1998), this plan was supported by OECD and the United Nations and benefited from the consultancy with eminent scholars (p. 146). After the plan was completed in 1963, it was presented to the State Planning Organization. However, it was not adopted by any institutions and remained as a guiding source for the successor plans that were in smaller scales (p. 168). The Marmara Plan is identified as a pioneering work by Cansever (1998, p. 169). According to Cansever, after this comprehensive approach there was a shift towards the metropolitan scale in the planning of İstanbul and after 1964 the regional planning was completely neglected (pp.

146, 168). Cansever asserts that, the neglect towards regional planning exacerbated the environmental degradation in the Marmara Region. In 1965, İstanbul Master Plan Office was established (p. 169) and sustained studies within the scope of the metropolitan boundary of İstanbul.

In accordance to the import-substitution policies of the first Development plan the Eastern Marmara Preliminary Plan proposed the minimization public sector investments for collective goods in İstanbul, which unavoidably led to major problems of infrastructure in the rapidly-growing city. An inadequate sewerage system, chronic water cuts, and epidemic illnesses that broke out became an inextricable part of everyday life. In view of worsening public health issues, in 1971 the World Health Organization prepared the first extensive master plan on water management of İstanbul: Damoc Master Plan and Feasibility Report for Water Supply and Sewerage for the İstanbul Region. This plan constituted the basis of the contemporary sewage system.

A metropolitan study sponsored by the World Bank began in 1973 (Cansever, 1998, p. 147). The study was initially directed by Wilhelm Moltke and Turgut Cansever was assigned as the director in 1974. Turgut Cansever evaluated metropolitan planning and its problems from a regional perspective (p. 147).

An important initiative on the settlement system hierarchy in Turkey was started by the State Planning Organization published in 1982 (*Türkiye'de Yerleşme Merkezlerinin Kademelenmesi*). However, this study was never taken into consideration by the planning initiatives (Tekeli, 2011). In 1975 "Union of Marmara and Bosphorus Municipalities" (*Marmara ve Boğazları Belediyeler Birliği*) was established. The institution adopted a sensitivity towards "negative externalities" which can be considered an important step in terms of regional governance, as indicated by Tekeli (1994):

> During the 1970's a remarkable step in terms of regional governance was taken. In 1973 municipalities located on the shores of the Marmara Sea and the Bosphorus united in order to solve problems which they could not handle by themselves. After a two year period of study they finally established the "Marmara ve Boğazları Belediyeler Birliği" (Union of Marmara and Bosphorus Municipalities) in April 1975. The Union which at first emphasized environmental problems, later widened the scope of interest. It should be noted here that İstanbul Municipality which was the largest one, did not lead the establishment of the Union. The role was undertaken by Erol Köse, Mayor of İzmit. The Union became involved more with regional problems than those of the metropolitan area and therefore fell short of solving the existing co-ordination problems. (p. 171)

Likewise, in 1979 Union of İstanbul Municipalities was established (p. 171). However, after the *coup_d'état* in 1980 all municipal councils were cancelled (p. 171).

In the 1980s Turkey embraced a private sector-led liberal policy and left behind the import substitution based economic structure (Tekeli, 2011, p. 215). The dismantling of the Soviet Union at the end of the 1980s (Tekeli, 2013, p. 409) and Turkey's entry to European Customs Union in 1995 facilitated duty-free exports between EU and Turkey. In this context, İstanbul and its city-region could reclaim and reactivate their economic relations with their historical hinterlands in the Balkans and in the Black Sea, thereby facilitate their integration to the global trade networks (p. 409). The decentralization processes associated with and stemming from liberal policies, transformed İstanbul into a financial center, and in doing so substantially changed the landscape in and around the city (Tekeli, 2013, pp. 21, 22).

Concomitant to the changes, the 1980s also witnessed substantial restructuring in local governance. After the *coup* in 1980, Law. No. 3030 titled "the Administration of the

Municipalities of Big Cities" was enacted in 1984 (Tekeli, 1994, p. 173). Through this law İstanbul, Ankara, and İzmir were declared as Metropolitan Provinces by Law No. 3030[38]. This law declared that "Each of the districts in the metropolitan area was to have separate government above which a greater municipality with executive powers would preside" (p. 173). The local governments gained autonomy as the law "introduced new financial resources for the local governments" (Candan, 2008, p. 12). The new law also pointed to a governmental restructuring as the "agencies formerly attached to central ministries in Ankara (for instance, the Master Plan Bureau, and the Water Supply and Sewerage Authority) [were transferred] under the direct control and jurisdiction of the metropolitan mayor" (p. 12). Both Ayfer Bartu Candan (2008) and Ayda Eraydın (2011) posit that, through this law the mayor's office gained more autonomy and "extended the areas of jurisdiction of the local governments" (Eraydın, 2011, p. 821) which "led to the emergence of an entrepreneurial local government acting as a market facilitator, and the privatization of various municipal services such as transportation, housing, and provision of natural gas" (Candan, p. 12). According to Eraydın (2011) this law also consolidated the position of İstanbul "as the core of the national economy" (p. 821) and encouraged "operations in different parts of the urban areas, which had been defined as necessary to attract foreign enterprises and initiate new large scale projects" (Tasan-Kok, 2004, as cited in Eraydın 2011, p. 821).

Both The Planning Law No. 3194 enacted in 1985 and Law. No. 3030 titled "the Administration of the Municipalities of Big Cities" facilitated the transfer of planning rights to local governments (Eraydın, p. 821). The Law No. 3030, passed in 1984 allowed

[38] For further information about laws see: http://www.resmigazete.gov.tr/default.aspx.

the IMM [İstanbul Metropolitan Municipality] to construct "annual investment programs" as a basis for their budget, as well as a master plan for the whole area". The Planning Law No. 3194, (passed in 1985) was complementary to the Law No. 3030: while the Law No. 3030 conditioned the approval of "the lower-level plans prepared by each district", the Law No. 3194 stipulated the accordance of the local plans with the master plan (Eraydın, 2011, p. 827). Specifically, the Law No. 3030 allowed the local authorities to, "manipulate the development of the city under limited control from the Ministry of Reconstruction; enabling the İstanbul Metropolitan Municipalities to modify the existing planning rights of the new and already developed sites" (Duyguluer, 2006, 2008 as cited in Eraydın ,2011, p. 821). The restructuring of the planning rights led to "operations in different parts of the urban areas, which had been defined as necessary to attract foreign enterprises and initiate new large scale projects (Tasan-Kok, 2004, as cited in Eraydın, 2011, p. 821).

However, as developments in the 1990s illustrated that "the pragmatic solutions introduced in the 1980s were not enough to meet the changing conditions in the global market" a series of new laws were enacted in the 2000s (Eraydın, 2011, p. 826). In this context, the 1999 İzmit earthquake is a turning point in urban restructuring. The damage caused by the 1999 İzmit earthquake was used as a political pretext to pass a set of laws on "urban development and building regulations transformation".[39] Under the JDP rule after 2002, a set of new laws were enacted successively. The number of Metropolitan Municipalities was increased to 16, until 2004 the year the Municipal Law No. 5216 was enacted. Through this law, the borders of the Kocaeli and İstanbul metropolitan municipalities were extended to coincide with the provincial borders, in doing so, it

[39] These urban transformation laws will be discussed in relation to regional growth in Chapter 3.

reduced the territorial powers formerly at the discretion of the governor and made the city mayor were responsible for the entire province. In this regard, the Municipal Law No. 5216 can be referred an early appropriation of the conurbation emerging around the eastern border of İstanbul.

This law was followed by a set of other laws that aimed to revitalize the construction sector and housing market in Turkey and particularly in İstanbul. The same year the Municipal Law No. 5216 was enacted, the construction of *gecekondu* was also declared as a "criminal offence, punishable by five years in prison" by the Law No. 5237 (Ünsal and Kuyucu, 2010, p. 54). Therefore, in 2005, the municipalities were allowed to "implement 'transformation projects' in derelict, obsolescent and unsafe parts of cities" by the Law No. 5393 (p. 55). The 'Mortgage Law' No. 5582 was passed in 2007 "which made mortgage-issuing institutions legally operating capital market institutions" (p. 55).

Throughout the 1980s—despite the efforts in conveying more autonomy to local authorities—one can observe an undeniable increase in central government interventions to control urban developments in İstanbul, as it became, "the core of national economic development" (Eraydın, 2011, p. 826). In order to reclaim its former discretionary power and its tutelage over local governments, the central government adopted further regulations that lead to a fragmented planning system (p. 826). This fragmentation was facilitated through "the planning rights given to different authorities" (p. 827) including "the Ministry of Construction, the Ministry of Industry and Trade, the Ministry of Tourism and Culture, the Ministry of Environment, the Administration for Privatization, the State Railways Authority and the Turkish Mass Housing Authority (TOKI)" (p. 827). Eraydın exemplifies these shifts as follows:

> For example, while the rights to plan Industrial Estates and Free Trade Zones within the Istanbul Metropolitan Area were transferred to the Ministry of Industry and Trade and the Provincial Administration, since 2003 the Ministry of Tourism and Culture has held the right to prepare plans for areas designated as Tourism Centers or Cultural and Tourism Protection and Development Zones in the Istanbul Metropolitan Area. The Privatization Agency, which is a department of the Prime Ministry, retains exceptional rights to plan and approve plans for areas previously belonging to state economic enterprises, without having to take the consent of the local government. Especially the rights provided to the Turkish Mass Housing Authority to plan and implement these plans are very important, in that they accelerate the fragmented urban development and sprawl in the Istanbul city region. (Eraydın, 2011, pp. 828,829, last sentence cited from Duyguluer, 2006; Tekinsoy, 2008).

As a promising initiative in regional planning, in 2006, through Law No. 5449 under the coordination of DPT (State Planning Organization) 26 Regional Development Agencies have been established in Turkey for the 26 Statistical Regional Units (*Türkiye İstatistiki Bölge Birimleri Sınıflandırması - nomenclature d'unités territoriales statistiques, NUTS)*. In the law the duties of these agencies are defined as follows:

> To improve the regional development in line with the principles and policies prescribed in national development plan and programs by enabling collaboration between the private sectors and NGO's[;] to provide effective and efficient usage of resources, to activate the local potentials and to ensure sustainability**.**

The reliance of the Regional Development Agencies on exogenously defined Statistical Territorial Units suggests a flawed and fragmented conceptualization of space and geographic regions, which is totally incompatible with the multi-dimensional and multi-scalar approach this study adopts. This approach also reflects in the reports generated by these authorities. The discourse in these reports stem from the inter-regional and intra-regional competition. While the development agencies have generated plans and projects based on common agendas on sustainable urban development, industrialization and tourism, the lack of coordination between these institutions and their conventional approach to spatial planning demonstrate that they are failing to grasp and manage local specificities, externalities, persistence, and interactions beyond administrative boundaries. While the institutionalization of the development agencies reveals an interest in the regional scale, their administrative structure leaves at lot to be desired, as far as the conceptualization of the complexity regional socio-settlement systems, landscapes and economic, and demographic growth dynamics. Eraydın (2011) asserts that these, agencies also facilitated the fragmentation of the planning system as "The recently adopted legislation on Regional Development Agencies has also increased the confusion in the rights and responsibilities of different authorities in the Istanbul city region" (p. 826).

A second promising initiative was the establishment of İstanbul Metropolitan Planning and Urban Design Center in 2004. In 2006, the center released the İstanbul Spatial Development Plan. As opposed to the progressively market-driven interventions of TOKİ and similar institutions, the porposed plan adopted an ecological perspective and aimed to protect the northern forests and water catchment areas of İstanbul. However, the plan was restricted to the provincial borders of the city and ignored the developments transcending the administrative borders. The plan became obsolete with the announcement of the Northern Projects in 2009.

In 2008, through a new the legislation (No. 5747) "the boundaries of the sub-districts were modified, increasing the number of sub-districts…generating new adminisrative units and amalgamating others" in İstanbul's city-region (Eraydin, 2011, p. 820). Two new laws were enacted in 2012 to accelerate the implementation of the urban transformation law and the restructuring of urban governance. The Transformation of

Disaster-Risk Areas Law (No. 6306) facilitated the demolishment of apartments built before the 1999 earth quake by legitimizing the demolishment decision if two-thirds of the property's owners agreed.[40] The Metropolitan Municipality Law (No. 6360), enacted in 2012, enabled further change in the administrative divisions of Turkey. According to the law No. 6360, if a municipality has a population of more than 750,000 people within a radius of 10,000 meters from the city center, it is considered a metropolitan municipality. After the enactment of this law, the number of metropolitan municipalities in Turkey increased to 30 and their administrative borders were extended to provincial borders. More importantly, and concerning many of the issues that will be addressed in this paper, the Metropolitan Municipality Law rendered null and void the legal status of towns, hamlets, and villages within the metropolitan municipalities and transformed them into urban neighborhood units (*mahalle*). In other words, the villages within the borders of metropolitan municipalities were deprived of their statutory rights over their commons. Today there are six metropolitan municipalities in the Marmara Region including Tekirdağ, İstanbul, Kocaeli, Sakarya, Bursa, and Balıkesir.

At the turn of the 21st century İstanbul witnessed the construction of a series of mega-scale infrastructural projects as top-down urban planning interventions. The majority of these projects were situated within the provincial area of İstanbul, including the Third Bridge, the Northern Highway, the Third Airport, the Canal İstanbul Project, and the Marmaray Project. These top-down interventions also included inter-regional infrastructure projects such as the İzmit Bay Bridge and the İstanbul-Ankara Highspeed

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[40] See the section on the Marmaray Project in Chapter 4 for a discussion on the impact of this law.

Train. The İzmit Bay Bridge connects to the İzmir-İstanbul Highway, which substantially decreases the travel time between İzmir (the third biggest city of Turkey located in the Aegean Region) and İstanbul. Likewise, the İstanbul-Ankara Highspeed Train decreases the travel time between İstanbul and Ankara (the capital of Turkey).

The Third Bridge, the Northern Highway, the Third Airport, and the Canal İstanbul projects are the most controversial interventions because they specifically aim to generate land-speculation within İstanbul’s provincial borders. These projects occupy the water catchment and forest areas of İstanbul, encouraging urbanization on these landscapes. In the case of the Canal İstanbul project, the outcomes may even be more complex. The Canal İstanbul project proposes the construction of a new canal as an alternative to the Bosphorus. If released, the project will cause the amalgamation of two separate ecologies: that of the Mediterranean and that of the Black Sea. That said, these projects appropriately exemplify the degree of the short-sightedness that metropolitan and İstanbul-centric approaches can lead to.

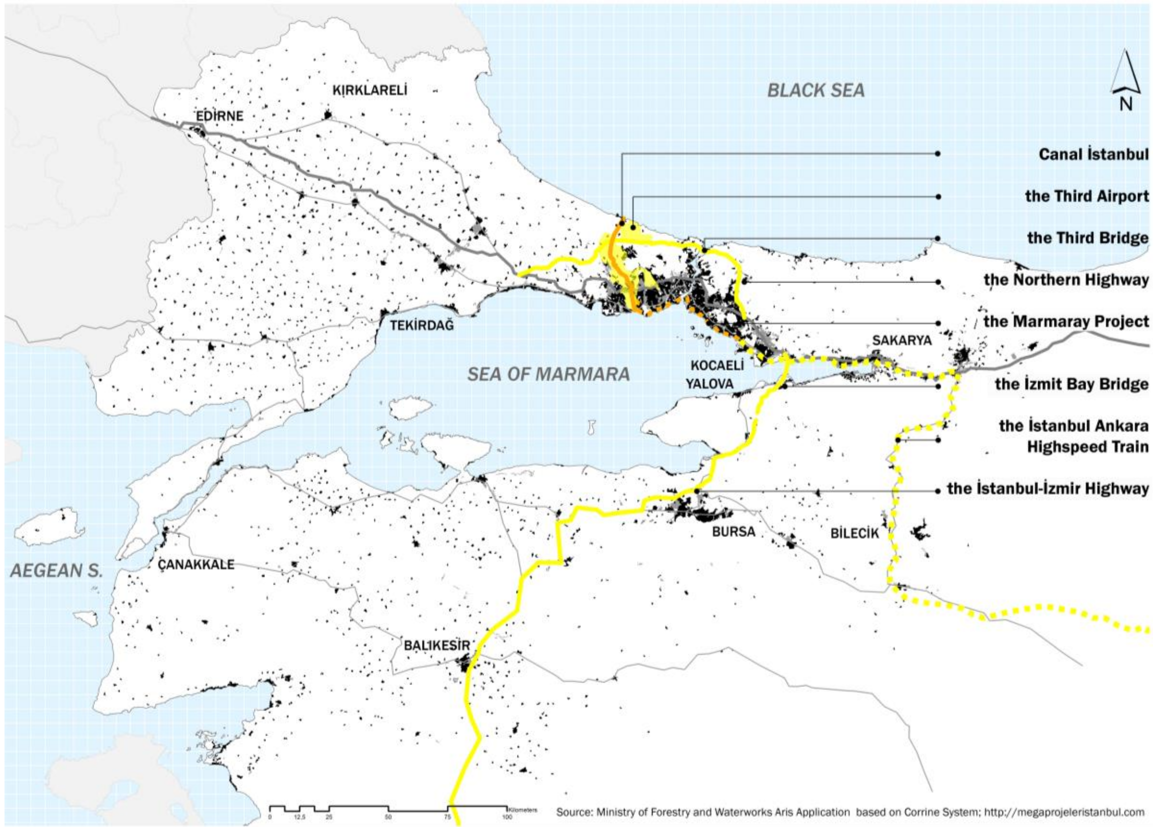

Figure 2.7: The mega infrastructural projects in the Marmara Region.

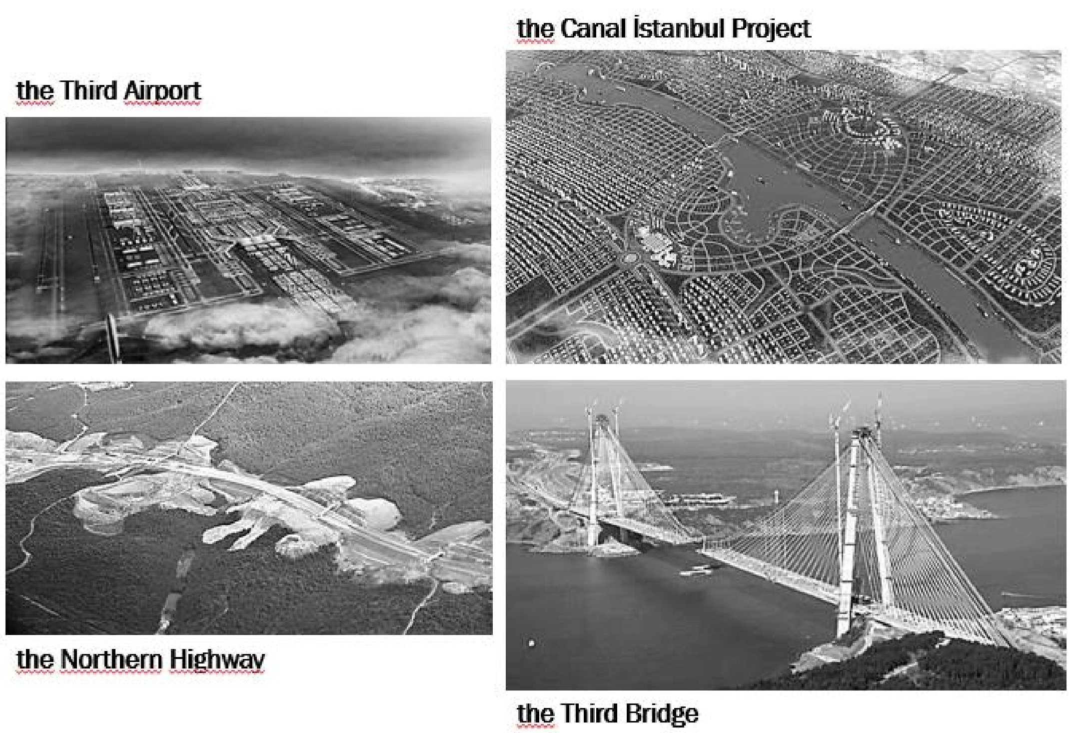

Figure 2.8: the Nothern Projects in İstanbul.

The planning history and the regulations in this chapter suggest undoubtedly a turbulent urban and administrative history, incarcerated urban governance schemes, and strategies throughout the 20th century. What might look endless from a metropolitan perspective gains a different dimension, if observed from a higher vantage point. In terms of its provincial area the “overgrown” İstanbul ranks as the 64th biggest province of Turkey out of 81.[41] In other words, İstanbul is one of the smallest provinces of Turkey, clearly delineated by two water bodies—the Black Sea and the Sea of Marmara—in the north and south, subject to an immense pressure of growth. The administrative interventions and initiatives established to control the growth have always failed to comprehend the speed and the scale of the process and to effectively evaluate the geographical constraints. The Marmara Region’s population reached 23 millions; accounting approximately 28% of Turkey’s population. The deindustrialization of İstanbul’s metropolitan area triggered an industrial decentralization in the region and generated a fragmented landscape in which industrial and agricultural land-uses and urban sprawl coexist with the forests, meadows, vineyards, olive trees, and wetlands of the region. This apparently arbitrary and intractable land-use pattern—especially the industrial sprawl—has paved the way to serious environmental degradation and risked the ecological sustainability of the invaluable Ergene River Basin and that of the Sea of Marmara.

While the scope of the laws and regulations discussed in this chapter might seem city-centric and specifically İstanbul-oriented, the findings discussed in the following chapters demonstrate that they have also had territorial effects. Therefore, the successive

[41] See TUIK (Turkish Statistical Institute): http://www.turkstat.gov.tr/Start.do.

stages of decentralization, fragmentation and re-centralization of the planning system and urban government are impeding the identification of the legislative responsibilities and agencies.

3. Deciphering the Heterogeneous Landscape of the Marmara Region(s); Towards a Relational Understanding of İstanbul's Urban Growth

This chapter focuses on the land-use patterns of the Marmara Region. Different data sets are used to evaluate the diversity of land-use pattern distribution in the region. The chapter will begin with a study of the village typologies of the Marmara Region between 1967 and 1973. The first analysis of the village formations constitutes a starting point to understand the spatial fragmentation based on the geographic constraints of the region. It is followed by an evaluation of all land-cover type clusters in the year of 2006, based on the Corine System at the district-level. This analysis will complement the Village Typologies Analysis; thereby it will hopefully shed light on the contemporary regional land-use patterns. The findings of the land-cover type clusters in the year of 2006 will be supported by the analysis of building census data at the provincial level, to broadly define the land-use transformation with respect to the transformation of building typologies. This will, then, be elaborated by analyses of the Urban Fabric land-cover types both at the district and the one-kilometer grid cell level for three observation years: 1990, 2000, and 2006 (with an addition of 2012 for the one-kilometer grid cell analyses). The analyses of the Urban Fabric land-cover types are the backbones of the overall study as they clearly depict the dynamics of the urban development at the regional scale. Therefore, with the help of the 2012 land-cover data set, even the most recent changes in the urban landscape of the Marmara Region are traced.

3.1 The Village Typologies in the Marmara Region between 1967 and 1973

The Village Law No. 442 enacted in 1924 in Turkey, defines villages as settlements with populations less than 2000.[42] A substantial part of scholars in urban and rural geography conceive villages as complex enitites, rather than demographically defined small settlement units. According to *The Dictionary of Human Geography* beginning from Vidal de la Blache's studies on rural geography, village structures have been a substantial part of regional studies (Gregory et al., 2009, p. 658-660). Vidal de la Blache's efforts to embed rural and agrarian structures in regional studies were carried out by Carl Ortwin Sauer, Christaller and Hägerstrand (p. 658-660).

This study proposes that the evaluation of the village structures is crucial in revealing the continuity between urban and rural settings. Therefore, embedding rural development in regional studies is a fundamental step in analyzing "urbanization without an outside" (Brenner, 2014, pp. 1-14). Villages can be conceived of as socio-spatial formations or agglomerations that consolidate in the *Longue Durée*. Understanding the rationale behind the settlement strategies of villages facilitates the impact of the Anthropocene at a territorial scale. Vidal de la Blache points to the *Longue Durée* consolidation of villages as part of *pays*.

> Necessity for cooperation on the regulation and control of water, driving of wells, upkeep of certain public works and preparation of the environment to make it favorable to crops, —such things mean consolidation. (1926, p. 300)

[42] For further information about laws see: http://www.resmigazete.gov.tr/default.aspx.

Data on social, economic, and technical infrastructure of villages is extracted from surveys in the provincial annuals of 1967 and 1973, which constitute an invaluable source to study the rural geography of Turkey. Up to the early 1970s, Turkey's population was predominantly rural.[43] In the Marmara Region, the ratio of the urban population increases from 48.5% in 1960, to 52.5% in 1970, and finally to 66% in 1975, suggesting an unprecedented rate of urbanization within a short time interval (Darkot & Tuncel, 1981, p. 61, 64). The Second Five-Year Development Plan—released in 1968—acknowledges the strategic importance of this urban transition process and prioritizes urbanization (Tekeli, 2008, p. 73). These developments show that, the period when these surveys were published (1967-1973) was highly critical in terms rapid urbanization. Hence, the urban population was about to exceed the rural population within the Marmara Region.

These village surveys yield consistent information on demography (population and household number), infrastructure (distance from the district center, road, telephone systems, electricity, and seed cleaning machines[44] [*selektör*]), social equipment (elementary schools, reading rooms [*okuma odası*], community centers [*köy odası*], mosques, healthcare centers, and availability of midwives [*ebe*]).[45]

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[43] Rural areas composing 61.5 % and urban areas 38.5 % of Turkey's population. The ratio of urban population exceeded the urban population between 1980 and 1985. (https://tr.wikipedia.org/wiki/T%C3%BCrkiye_demografisi)

[44] Access to seed cleaning machine is evaluated as an indicator of an agriculture based community and a developed mode of agriculture.

[45] The only exceptional case here is İstanbul. Provincial annuals on İstanbul have both been published in 1967 and 1973. However, they do not include village surveys. The demographic information on İstanbul villages is obtained from TUIK. The information on infrastructure and social equipment has been marked as unknown. The information on the areas and the distances from districts of the İstanbul villages are extracted from the digitized Soviet Military Maps.

This data set is enhanced by additional information on geographic properties of the villages. Firstly, the surveys on the Marmara Region villages are digitized and subsequently, enhanced by additional datasets produced between the 1970s and the 1980s. The areas of the villages are calculated from the 1: 200 000 scale Soviet Military Maps from the 1980s obtained from the map collection of *L'Institut Français d'Études Anatoliennes'* (IFEA) in İstanbul. The section covering the Marmara Region is first georeferenced, and areas of the illustrated villages are digitized and geocoded. After this process, the areas of the villages are calculated in Arcmap. Additional information on land-use and land-cover, geographic and physical properties, such as slope and elevation and climatic features, was obtained from other regional studies i.e. *Marmara Region Regional Development and Settlement Organization* (*Marmara Bölgesi Bölgesel Gelişme ve Yerleşme Düzeni*) published by Ministry of Development and Housing (*İmar ve İskan Bakanlığı*) Planning and Development Headquarters Regional Planning Agency (*Planlama ve İmar Genel Müdürlüğü Bölge Planlama Dairesi*) in 1970[46]; *Marmara Region Plant Geography* (*Marmara Bölgesi Bitki Coğrafyası* published in 1999 (Güngördü, M.)[47]; and *The Geography of the Marmara Region* (*Marmara Bölgesi Coğrafyası*) by Besim Darkot and Metin Tuncel published in 1981.[48] In doing so, a matrix of 3903 georeferenced villages and 23 attributes is created and processed in Multiple Correspondence Analysis (MCA);

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[46] Marmara Region Natural Vegetation Map (*Marmara Bölgesi Tabii Bitki Örtüsü, Marmara Bölgesi İmar Müdürlügü*, p. 10), Marmara Region Basins Based on River Flow Directions (*Marmara Bölgesi Akarsuların Akış Yönleri,* p. 6), Marmara Region Climate Map (*Marmara Bölgesi İklim Durumu Haritasi,* p. 8), Marmara Region Land-Use Map (*Marmara Arazi Kullanis Haritasi – Harita VII*).

[47] Marmara Region Soil Types (Marmara Bölgesi Toprak Tipleri, p. 30).

[48] The Geographic Properties of the Marmara Region (Marmara Bölgesi Cografi Özellikler, p. 104).

therefore 11 clusters are created (*Figure 3.1 and Figure 3.2*). The evaluation of the fine-grain resolution of village data with MCA generated very articulate results, thereby enabled the researcher to study the spatial fragmentation at a diverse set of scales. Firstly, the findings revealed the "north-south" cleavage, which will be a repeating theme in the subsequent sections. In terms of geographic distribution, some clusters generated by MCA aggregate in specific areas, whereas the other clusters form dispersed patterns across the region. These geographic specifications facilitate the deciphering of differentiations and structural persistence as well as independence and interdependence.

While the data set does not include any information on the flows of material and money; the patterns generated by MCA points to a deep spatial fragmentation based on ecology and economy of the villages in the Marmara Region. In *The Mountains of The Mediterranean*, McNeill aptly points to the interplay between economy and ecology in village communities:[49]

> Generally speaking, ecological processes have asserted themselves on the local level, whereas economic ones have operated on a far vaster scale. That does not mean, however, that economic processes have been more important than ecological ones. Often it has been the other way around. In each village and landscape the combination has been unique. (1992, p.2)

The rural geography of the Marmara Region stems primarily from and reflects in the specificity of the distributions of population, area, and distance from district, slope and elevation, road infrastructure, and electricity. The results are summarized in 11 clusters and will be examined under two sections:

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[49] While McNeill's book focuses on the fragility of the mountain villages—given the rapid urbanization pressure in the Marmara Region—his remarks can be generalized to encompass the rural settlements in the region.

3.1.1 Developed agricultural villages in the northern Marmara Region (Highly populated, large coastal, and plain villages close to districts, on low elevations, and low slope areas with relatively better access to road infrastructure). Composes 45% of the villages in the data set.

3.1.2 Underdeveloped mountain villages in the southern Marmara Region (Small population size, small mountain villages, far from districts, on high elevation, and high slope areas with poor access to electricity). Composes 54.5% of the villages in the data set.

The first category primarily covers the villages in the northern part of the Marmara Region—Thrace, Çatalca Peninsula, and Kocaeli Peninsula—and the southern shore of the Sea of Marmara including the Bursa and Balıkesir Plains. The second category covers the southern part of the Marmara region, including the Gelibolu and Biga Peninsulas, the southern parts of Balıkesir, Bursa, and Bilecik.

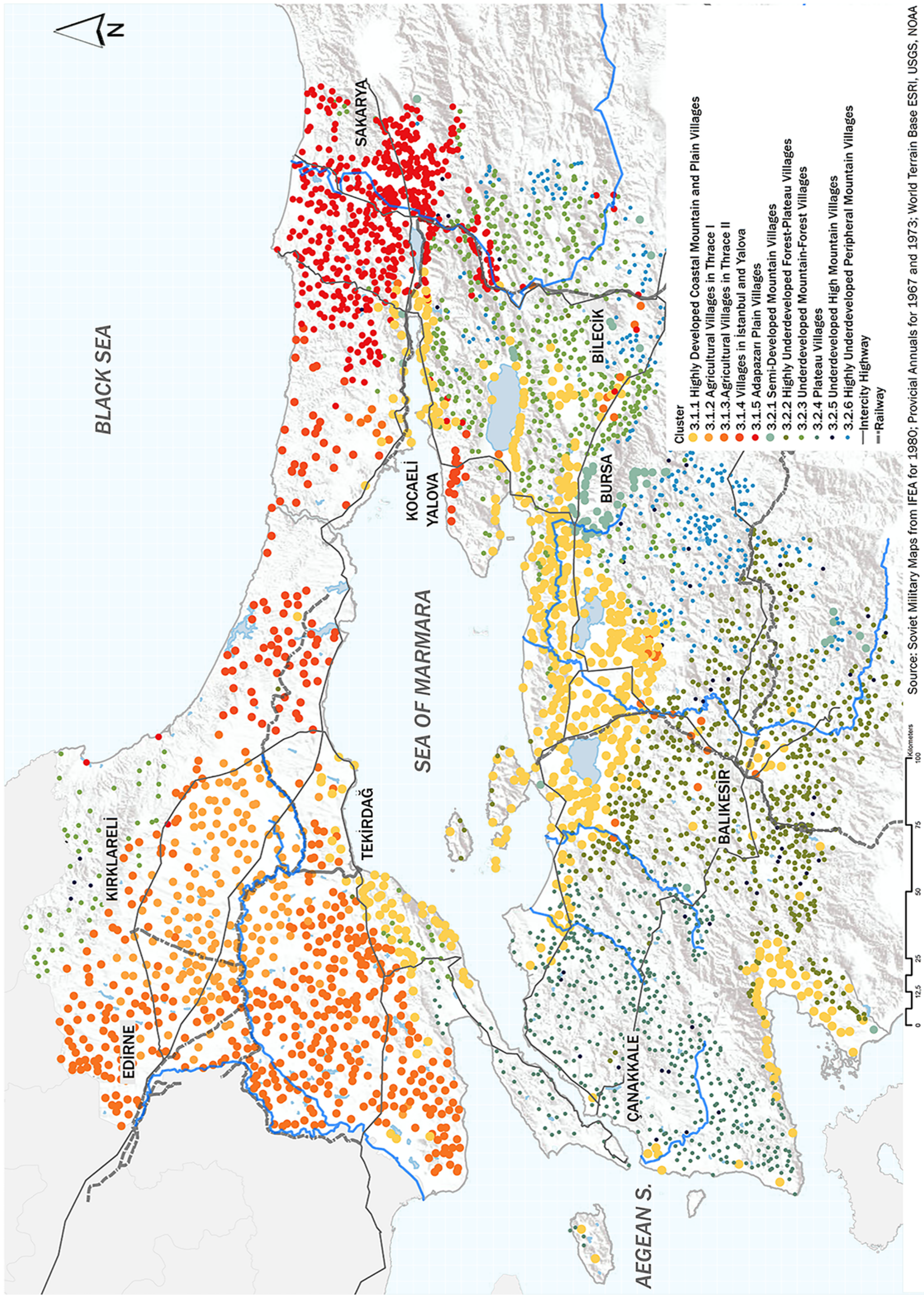

Figure 3.1: The village typologies in the Marmara Region between 1967 and 1973.

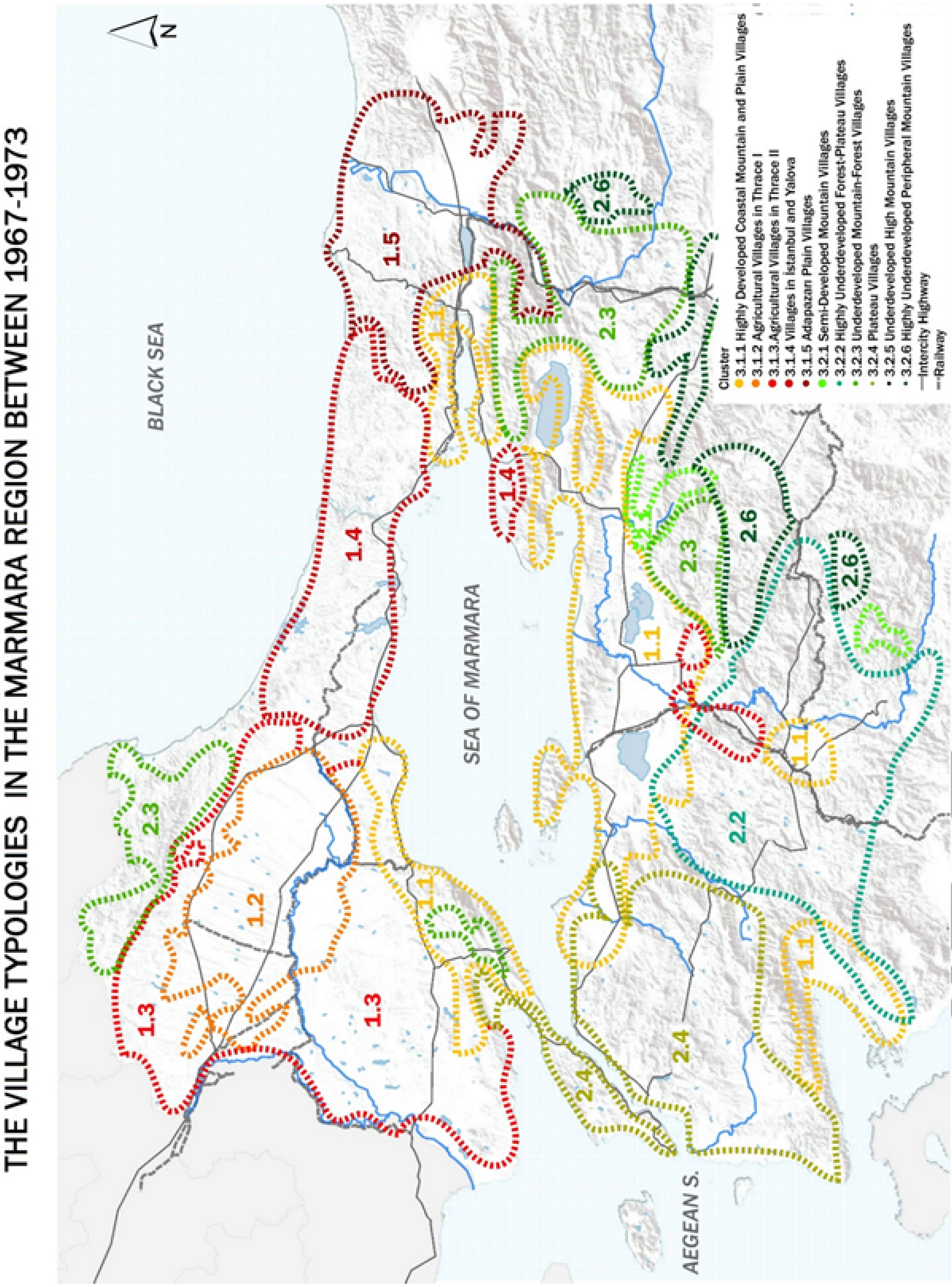

Figure 3.2: The village typologies in the Marmara Region between 1967 and 1973.

3.1.1 The developed agricultural villages in the northern Marmara Region.

3.1.1.1 Highly developed coastal mountain and plain villages. This category primarily covers the coastal villages and those located in the plains of the southern Marmara. Villages located at the littoral at Tekirdağ, the northern and southern part of the Ganos Mountains, and the Gulf of İzmit are significantly overrepresented (*Figure 3.1 and Figure 3.2*). The same holds true for villages on the southern shore of Marmara, between the Gulf of Gemlik and Lapseki, the Erdek Peninsula and Bandırma, and the Balıkesir and Bursa Plains. The developed villages surrounding Balıkesir can be taken as an early sign of the strength of the rural economy in the area which will be discussed in the following sections. This category comprises some 559 villages and accounts for 14.3% the rural settlements of the region. These villages with large population sizes have settled on large—including the largest—and intermediate areas, and the number of households in each village varies in size.

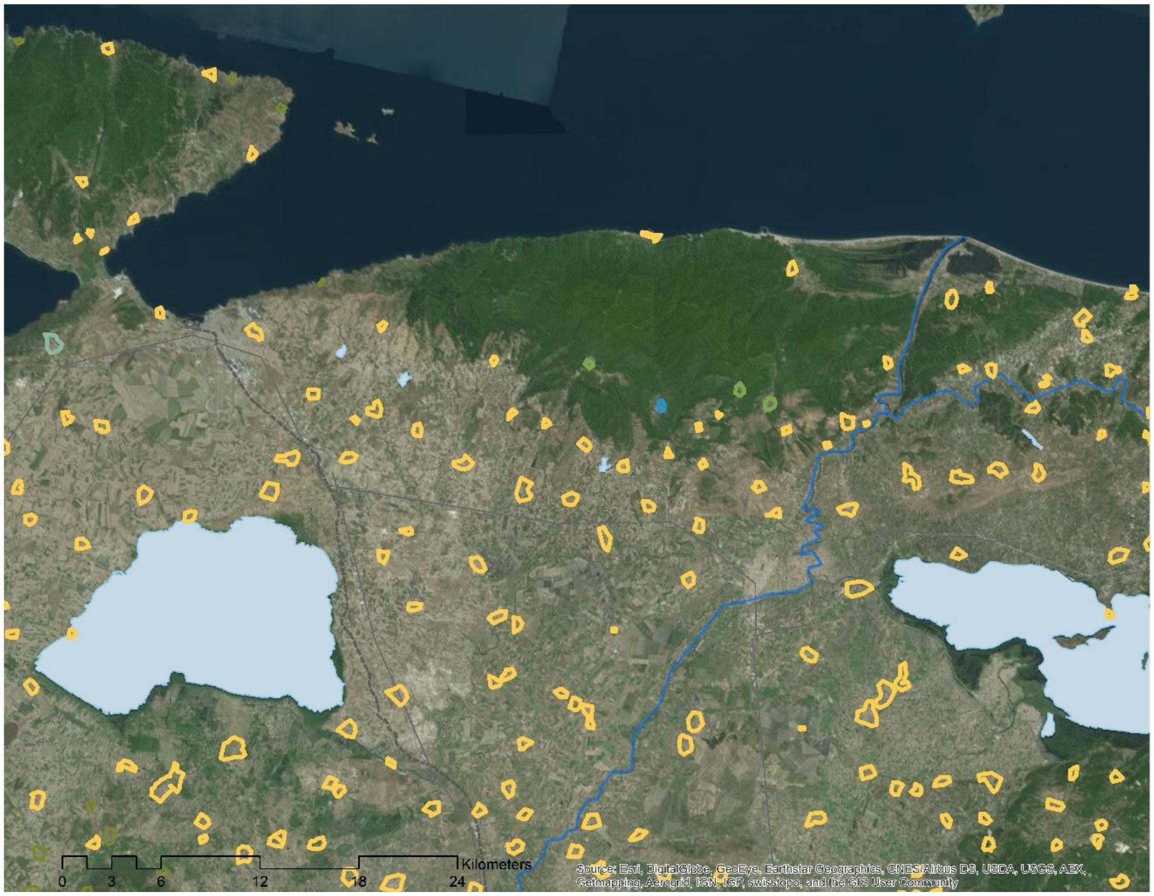

Figure 3.3: Highly developed coastal mountain and plain villages around the district of Bandırma.

Figure 3.4: Ekinli and Ballıkaya villages by the Sea of Marmara in Bursa.

These developed coastal and plain villages are mostly located in flatlands with the lowest slopes and low elevations. They are subject to Mediterranean climate and Mediterranean vegetation is predominant. The rivers flow into the Sea of Marmara; alluvial and Vertisol[50], rendzina[51], and Brown Mediterranean Soil are the predominant soil types. Regarding land-cover, permanent crops—such as vineyards and olive trees—and agriculture are predominant.

[50] "A clayey soil with little organic matter which occurs in regions having distinct wet and dry seasons" (Angus Stevenson, 2010).

[51] A brown earth soil of humid or semi-arid grassland that has developed over calcareous parent material. The term is now obsolete and rendzinas may fall within the orders Inceptisols or Mollisols (Allaby, 2012).

These villages benefit fully from infrastructure as they have electricity; drinking water, telephone systems, and road. Their close proximity to district centers can be taken up as a sign of their integration to the regional settlement system. The lack of seed cleaning machines reflects the weight of permanent crops. These villages are equipped with elementary schools, reading rooms, village rooms, and mosques. They have poor access to healthcare as healthcare centers and midwives are underrepresented. Yet, thanks to their proximity to district centers this would not pose a major problem.

3.1.1.2 Agricultural villages in Thrace I. The villages in this category are mostly situated in central Thrace, and they aggregate around the railway and the main body of the Ergene River, including the primary urban centers in the central Thrace such as Lüleburgaz, Babeski, Pınarhisar, and Saray (*Figure 3.1 and Figure 3.2*). This category comprises of some 185 villages and accounts for 4.7% of the rural settlements of the region. Villages in this category have high populations and large areas with typically small or intermediate household sizes. In *Türkiye İskan Coğrafyası,* Tunçdilek (1967), asserts that the characteristics of this village structure in Thrace is related to the large *çiftliks* (farms), which are specialized in animal husbandry and to a lesser extent cash crops, and had already been established in the area in the 18th and the 19th centuries by well-off farmers from Romania and Bulgaria. These farmers bought large *çiftliks,* subdivided them into large plots, and in doing so led to the distinctive rural settlement system in Thrace (p. 124).

These *Çiftliks* are also mentioned in Vidal de la Blache's book *Principles for Human Geography* as *shifliks,* and they are presented as the fundamental unit of Bulgarian villages. This points to a continuity in settlement structure in Thrace and Balkans across national boundaries (1926, p. 290).

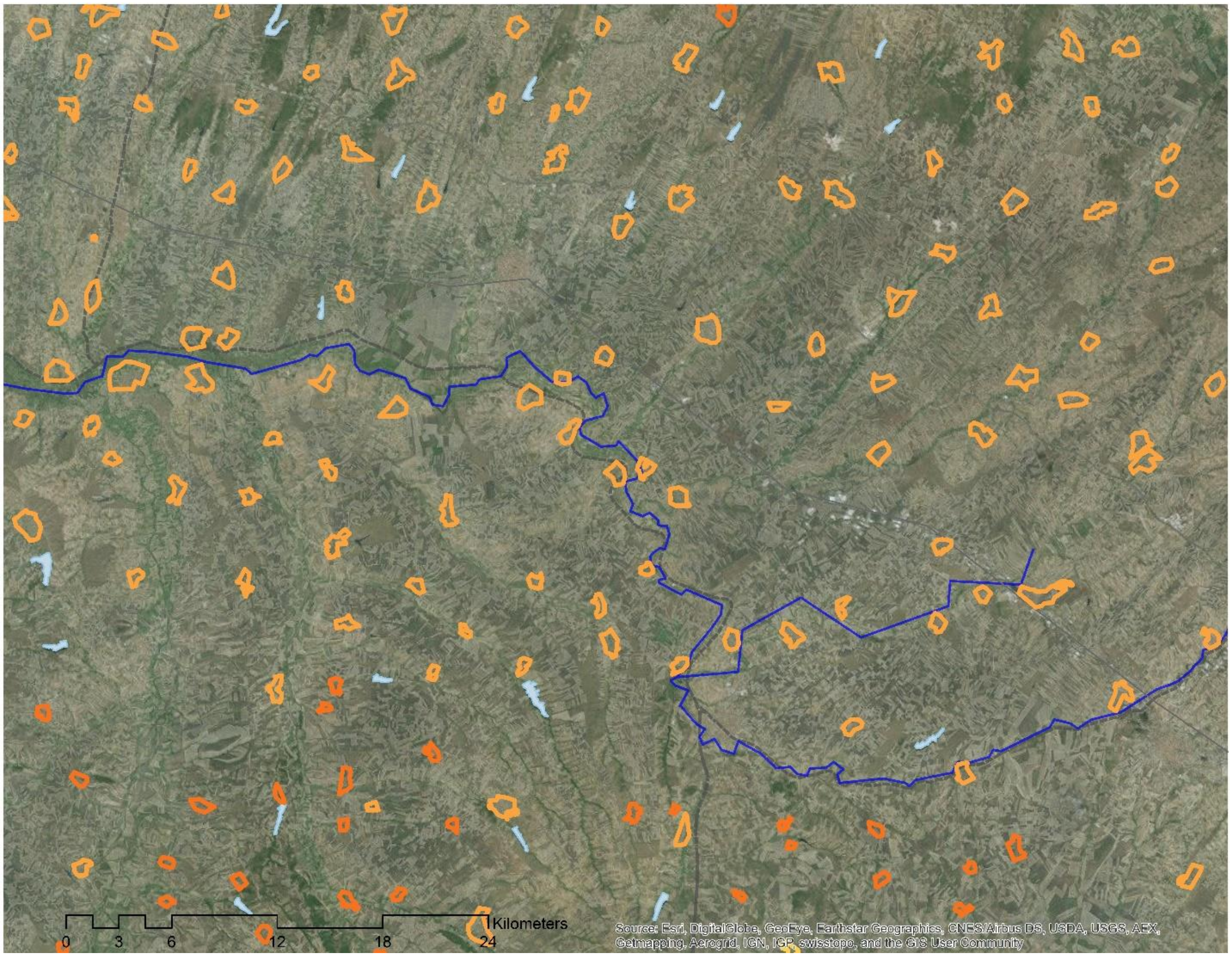

Figure 3.5: Agricultural villages around the Ergene River in Thrace.

Figure 3.6: An agglomeration of agricultural villages in Thrace, namely Kayabeyli, Karamusul, and Çiftlikköy.

The villages in this category are in the Ergene River Basin that flows into the Aegean Sea. They are typically situated in flat and low lands (assigned to the lowest slope and elevation categories). Unlike their counterparts in southern Marmara, they are under the influence of continental climate and steppe vegetation. Brown soil without lime, Grumusol, Vertisol, and alluvial soil are predominant soil types. Agricultural fields and pastures account for a major part of land-cover.

Thanks to their proximity to district centers, these villages have access to regional road network, and utilities such as drinking water and telephone systems. The omnipresence of seed cleaning machines is an indicator of intense agriculture. Surprisingly, as of mid 70's, the villages of inland Thrace did not have access to electricity, which suggests a major handicap for social life and economic development.

According to *Economic and Social Development Plan for Eastern Thrace* (Phlipponneau, 1968, p. 168) published in 1968, the predominant agricultural product was grain (wheat, maize) and forage in Thrace; other alternatives such as sunflower[52] and sugar beet (p. 62, 66) were new agricultural crops in the region.

The villages in this category have good access to social equipment, as elementary schools, reading rooms, and mosques are overrepresented in this category. While the existence of healthcare centers in these villages are unknown, the overrepresentation of midwives is a signifier of access to healthcare.

3.1.1.3 Agricultural Villages in Thrace II. The villages in this category surround the villages of the former category in the northern, the western and the southern Thrace and they remain within the boundary of the Ergene River Basin. In the north they are scattered on the foothills of Istranca Mountains. The villages situated along the Greek and Bulgaria border, including the Meriç Plain, and around the Keşan, Malkara, Hayrabolu, and Uzunköprü districts in the south are in this category (*Figure 3.1 and Figure 3.2*). This category includes 434 villages and comprises 11.1% of the rural settlements in the region. Situated in low and flat lands, villages in this category form small clusters in the southern Marmara: the northern sectors of Gebze, İnegöl, and in Mustafakemalpaşa in Bursa, and at Susurluk, and Gönen in Balıkesir. The villages in this category are assigned to high or

[52] The sunflower [was], introduced in 1935 or so by the migrants from Balkans (*Economic and Social Development Plan for Eastern Thrace*, p. 62).

intermediate population size categories with low household numbers and intermediate size areas.

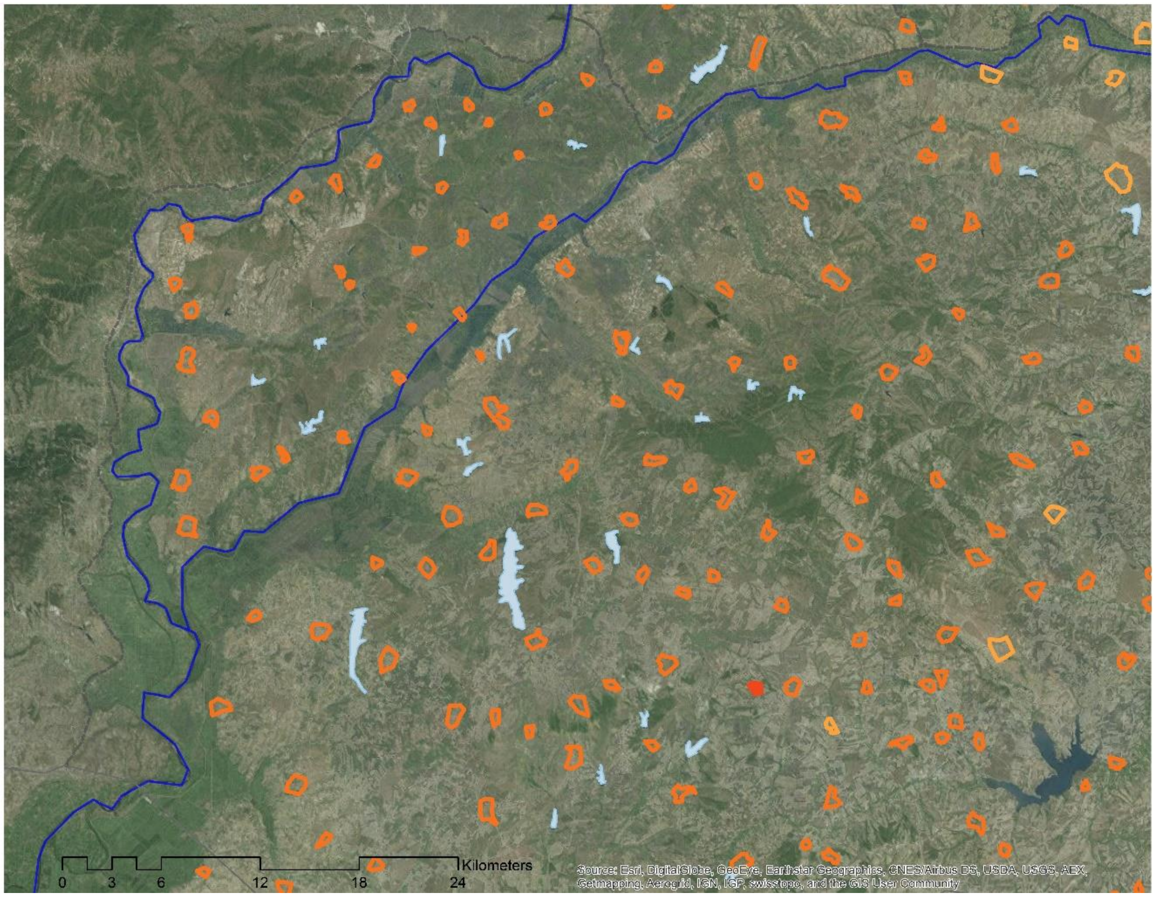

Figure 3.7: Agricultural Villages in Thrace around the Meriç River.

Similar to the former category, these villages are under the effect of continental and semi-continental climate. Identically, the vegetation cover of the areas is steppe and the overrepresented land-covers are agricultural land and pasture. The predominant soil types in this category are brown soil without lime, Grumusol, Vertisol, and Alluvial.

Despite having road infrastructure and being in close proximity to the districts in the area—which would usually be an indicator of well-connectivity and integration—the villages in this category do not have access to electricity or drinking water. They have relatively good access[53] to telephone systems and seed cleaning machines. In *Economic and Social Development Plan for Eastern Thrace* (1968), it is noted that the whole region, "makes little use of the opportunities offered by close proximity to İstanbul market and its favorable situation in relation to Central European Outlets" (p. 64). Hence, relatively well-off and adequately serviced land-locked sectors set aside, Thrace was up until the early 1970s surprisingly underdeveloped, with modest infrastructural equipments. The considerable distance of villages to the northern and southern parts of İstanbul and to the rest of country was another obstacle to integration. The villages in this category have elementary schools, village rooms, mosques, and relatively good access to health care centers.

3.1.1.4 Villages in İstanbul and Yalova. This category includes 105 villages and covers 2.7% of the rural settlements of the region. The villages in this category are within the provincial boundaries of İstanbul and Yalova.[54] They are located on plateaus (Çatalca and Kocaeli), and they are close to districts (including the closest villages) (*Figure 3.1 and Figure 3.2*). These villages have high populations and large—including the largest—and intermediate areas. They are situated on areas with the lowest slope and elevation. The villages in the Çatalca Peninsula are a component of the rural settlement system in Thrace, and they are mostly situated along a valley accommodating the İstanbul-Edirne railroad. Reflecting the climatologically transitory condition of İstanbul, characteristics of the Mediterranean and the Black Sea climates are co-present. Mediterranean vegetation and

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[53] If both positive and negative categories or positive and unknown categories are overrepresented this will be evaluates as a "relatively good access".

[54] Only 106 of villages in İstanbul are georeferenced. Yalova became a province in 1995, until that time it was connected to İstanbul.

hybrid vegetation (forest, scrub, and steppe), degraded forest, and pasture constitute the predominant land-covers. Grumusol, Vertisol, forest soil without lime, Rendzina, and Alluvial soil are the predominant soil types. The rivers around these villages flow into the Sea of Marmara and the Black Sea.

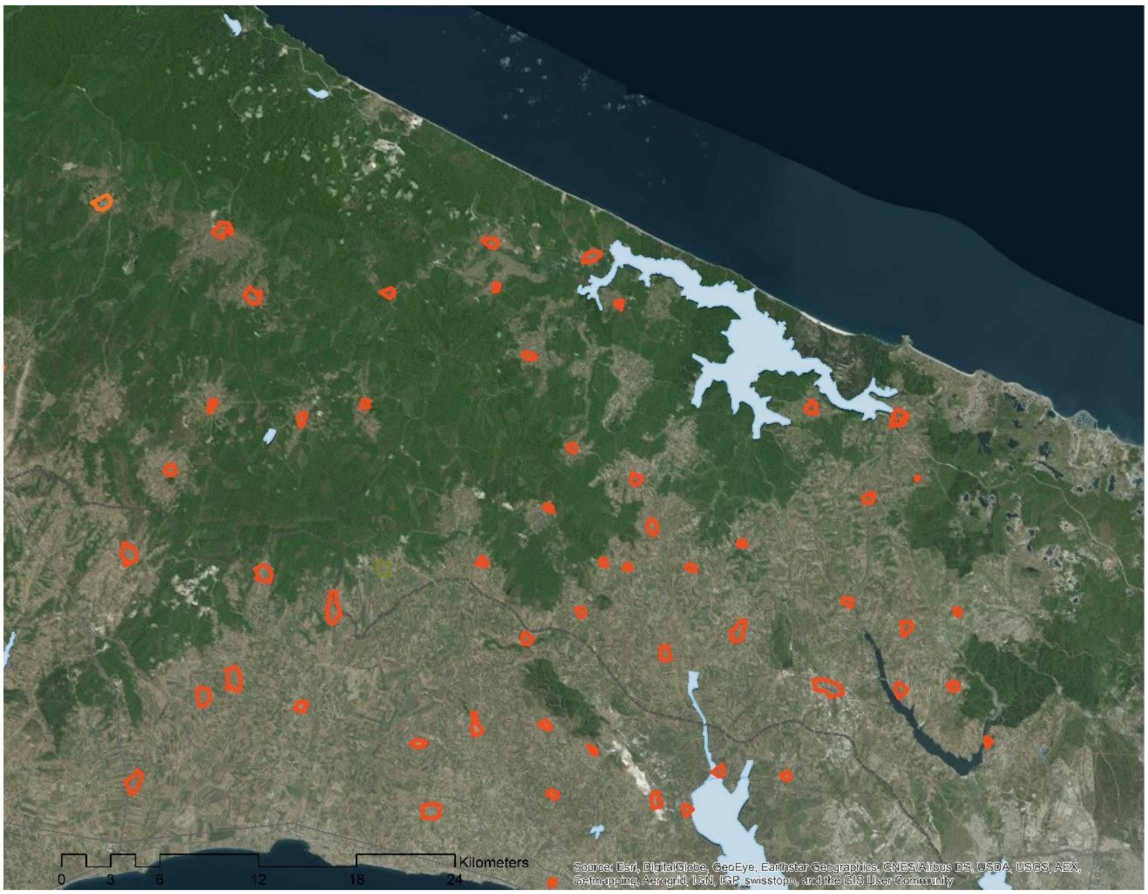

Figure 3.8: The georeferenced villages in the provincial area of İstanbul.

3.1.1.5 Plain Villages in the Kocaeli Peninsula. The villages in this category are located in the northeastern part of the Marmara Region, primarily in the Adapazarı Plain within the provincial borders of Sakarya. While the villages in this category are mostly situated in low slope and elevation areas of the Kocaeli Peninsula and Adapazarı Plain in particular, they also stretch out southward along the Sakarya River towards the Geyve-Pamukova area, and form small groups in Bozüyük area in Bilecik and Yalova (*Figure 3.1* *and Figure 3.2*). This category includes 493 villages and composes 12.6% the rural settlements of the region. The villages in this category distinguish themselves with high population sizes but rather limited built up areas, generating relatively high population densities. In his book on the settlement geography in Turkey, Necdet Tunçdilek associates the specificity of the Adapazarı Villages with an administrative settlement typology called *Divan* (1967, pp. 132-137). According to Tunçdilek, *Divan*s comprise a small number of neighborhood units and they are very different from the typically dispersed Black Sea villages. Unlike the Black Sea Region villages, the neighborhoods in *Divans* are denser and more compact, and in this respect are similar to the villages in the eastern and southeastern regions of Anatolia (pp 135, 136). The agglomeration of *Divans* on slightly hilly areas and fertile land demonstrate that the economic activity in *Divans* are related to agriculture, and to cereal production in particular (p. 136).

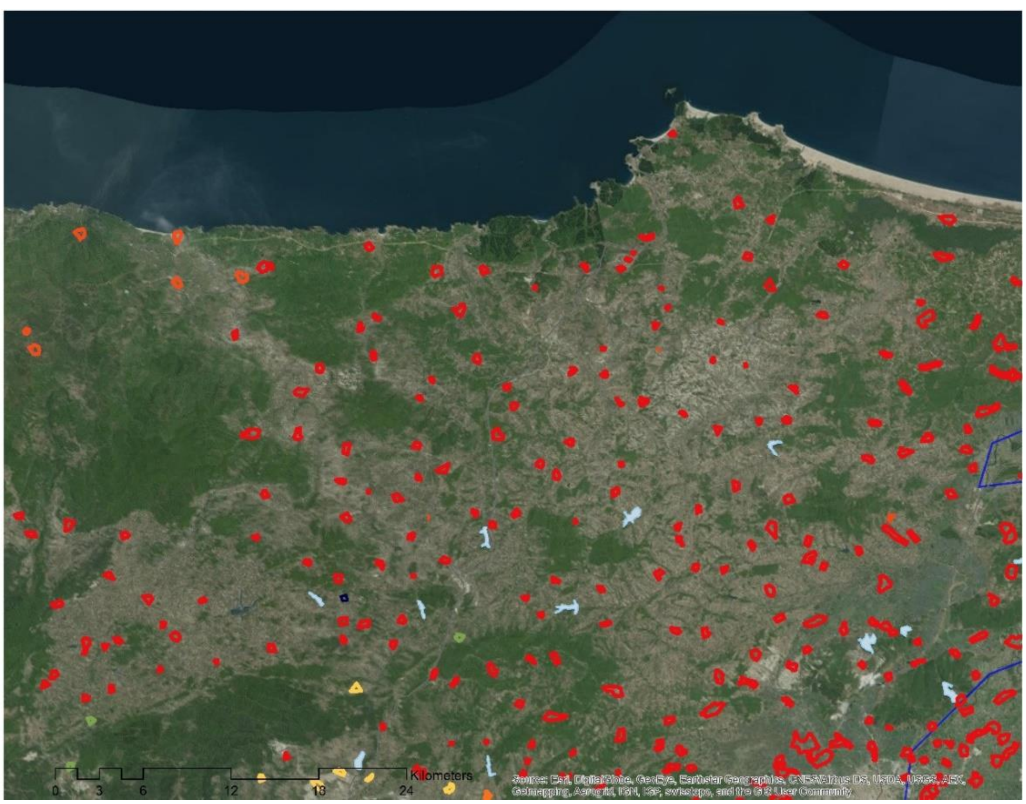

Figure 3.9: Plain villages in the Kocaeli Peninsula.

Figure 3.10: An agglomeration of *Divans*.

This area is subject to the Black Sea climate, and the prominent land-cover types are degraded forest mixed with scrub and steppe, agricultural land, and pasture. The soil types in this category are forest soil without lime, Rendzina, and colluvial[55]. The rivers in this area—the Sakarya River being the prominent one—flow into the Black Sea.

These villages in the Adapazarı Plain have good access to infrastructure as electricity, drinking water and road are the overrepresented infrastructure categories in this

[55] Loosely compacted sediment that has moved downhill and accumulated on the lower slopes and at the bottom of a hill, as a result of weathering, erosion, and mass movement processes (Park, 2007).

cluster. One of the reasons behind this good access to infrastructure is the geographic propinquity of these villages to İstanbul and the heartland of Turkey.

On the other hand, the villages in the Adapazarı Plain lack social equipment: Elementary schools, reading rooms, village rooms, and health care centers are underrepresented. The only overrepresented social equipment are mosques and midwives.

3.1.2 The underdeveloped mountain villages of the southern Marmara Region.

3.1.2.1 Semi-developed mountain villages. The villages in this category mostly aggregate on the foothill of Uludağ Mountain in Bursa. They also form small groups in Bozüyük in Bilecik, İznik in Bursa, and the southern part of Balıkesir (*Figure 3.1 and Figure 3.2*). This is a relatively small category including 73 villages and composes 1.9% of the rural settlements of the region. The semi-developed mountain villages are mostly settled in high mountain areas with low slopes and they have small areas (including villages with the smallest areas). These villages have high or intermediate population, and the household size in this category varies from the highest to the lowest.

Figure 3.11: Küçük Deliler Village in the south of the Uludağ Mountain. Photography by Berat Çokal.

The semi-developed mountain villages are subject to the continental climate. The predominant vegetation is Alpine, forest, and degraded forest. The common soil types in this category are colluvial, forest soil without lime, and Alluvial. The rivers around these villages flow into the Aegean Sea and the the Sea of Marmara.

These high mountain villages have road infrastructure and electricity; they have relatively good access to seed cleaning machines and telephone systems. However, they do not have drinking water. Despite the geographic constraints such as high elevations and long distances from urban centers—including the remotest villages from the districts—the relatively good access to infrastructure and high populations demonstrate that these villages are rural centers.

In terms of social equipment, the high mountain villages have relatively good access to education, health care, and good access to social facilities (mosques and village rooms).

3.1.2.2 Highly underdeveloped forest-plateau villages. This category is located in the southwestern part of the Marmara Region. It is primarily composed of the inland plateau villages of Balıkesir. Small clusters in the Erdek Peninsula and Marmara Island are also included in this category (*Figure 3.1 and Figure 3.2*). There are 649 villages in this cluster; therefore, it covers 16.6% of the rural settlements of the region. These plateau villages have the smallest population size, smallest area and smallest household number and they are settled in areas with intermediate elevation and intermediate slope.[56]

[56] Also includes the highest.

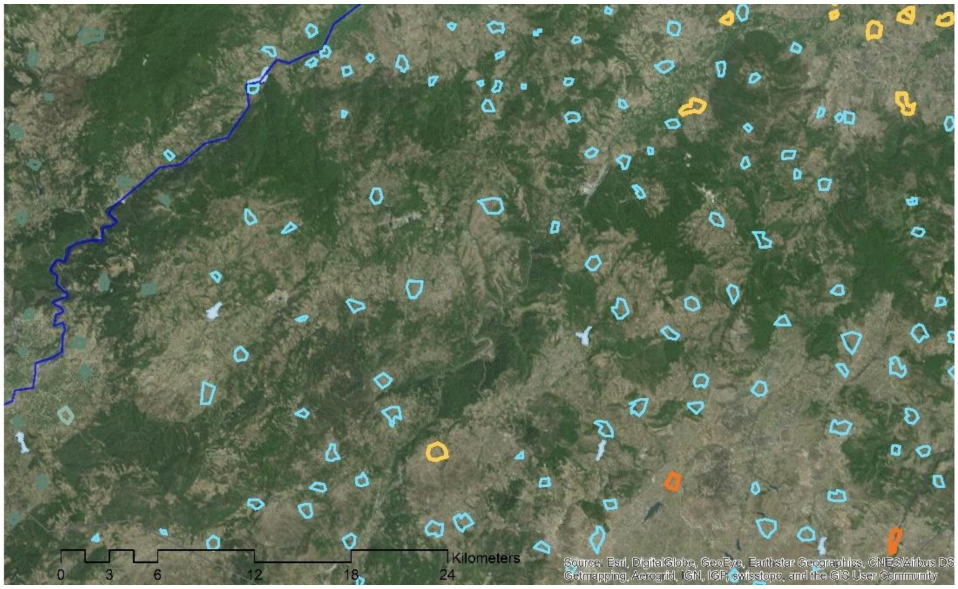

Figure 3.12: Highly underdeveloped forest-plateau villages in the southern Balıkesir.

The villages in this category are subject to continental or semi-continental climates. The primary vegetation and land-covers in this category are forest and degraded forest. Correspondingly, brown forest soil and brown soil without lime, Rendzina, and brown red Mediterranean soil are the predominant soil types. The rivers in inland Balıkesir area flow into the Sea of Marmara.

These forest communities do not have electricity, telephone systems, and road infrastructure, they only have access to drinking water. Though these villages have intermediate distance to districts, the poor access to infrastructure can be explained with the overall underdeveloped condition of the Balıkesir area in the early 1970s. The access to social equipment is also poor as these villages have relatively good access to education, hence reading rooms and mosques remain underrepresented in this category. Village rooms are the only social equipment that are accessible to the highly underdeveloped forest-plateau villages.

3.1.2.3 Underdeveloped mountain-forest villages. This category is geographically dispersed. It is observed in the Istranca Mountains in the northern Thrace; the Ganos Mountains in the southern Thrace in Tekirdağ area; the hinterland of the Gulf of İzmit and the Gulf of Gemlik; in the southern Marmara (in the Bursa, Bilecik, Kocaeli and Sakarya provinces) (*Figure 3.1 and Figure 3.2*). This category includes 527 villages and composes 13.5% of the rural settlements of the region. The villages in this cluster have small size population (including the smallest population size); therefore, they have small areas. The household number is unknown.

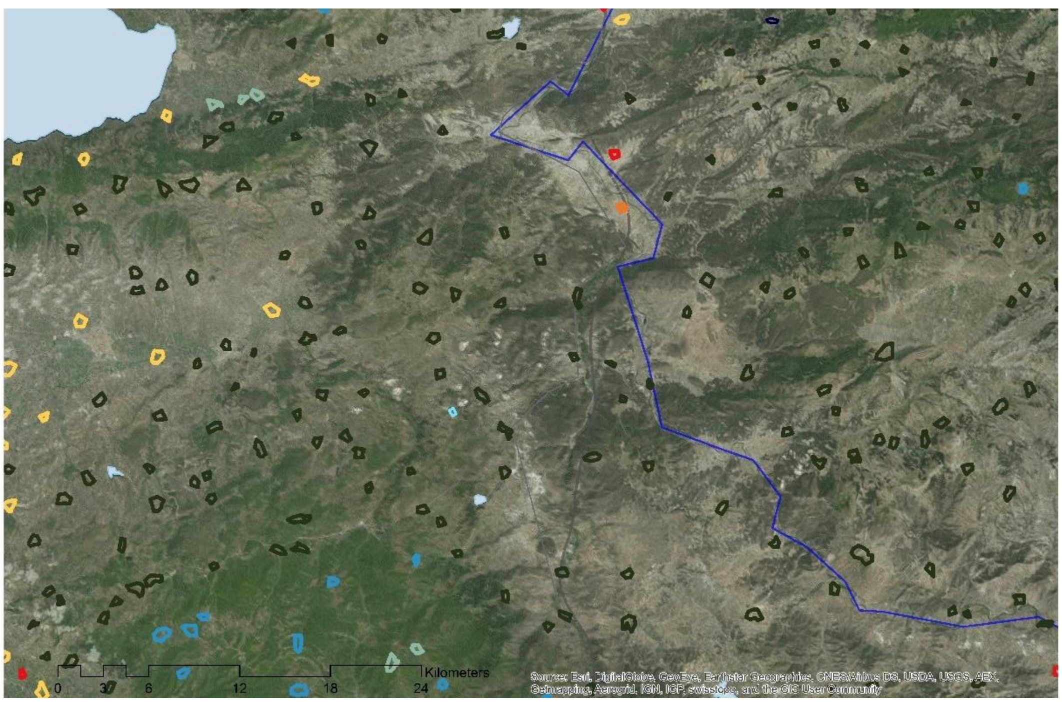

Figure 3.13: Underdeveloped mountain-forest villages in the sourthern part of the İznik Lake.

Figure 3.14: Şişlioba Village at the Bulgaria border in the Istrancalar Mountains.

Figure 3.15: A panorama of the Şişlioba Village.

The dispersed geographic distribution of this category also reflects in the climate and vegetation. The villages in this category are either subject to Mediterranean or the Black Sea climates. These villages are located in mountain areas with intermediate or high slope and intermediate elevation. The overrepresented land-cover and vegetation types also display variety including forest, degraded forest, permanent crops, and pasture land-covers. Forest soil without lime and brown forest soil are the predominant soil types.

Though an important amount of villages in this category are situated between primary clusters of developed villages— such as the coastal and plain villages of Bursa and Sakarya—they have poor access to infrastructure including electricity, drinking water, and seed cleaning machines. On the other hand, the overrepresentation of road infrastructure with intermediate distance to districts and access to telephone systems reveals that they have the potential to remain engaged with the settlement systems.

In terms of social equipment, these villages have access to elementary schools and mosques. However, they do not have access to health care and other social equipment such as village rooms and reading rooms.

3.1.2.4 Plateau villages. The villages in this category are on the southwestern part of the Marmara Region. They are mostly located in Biga and Gelibolu Peninsula's, particularly in areas with low or intermediate slope and elevation (*Figure 3.1 and Figure 3.2*). This category includes 504 villages and composes 12.9% of the rural settlements of the region. These villages have low population, small areas and smallest household number.

This cluster is subject to semi-continental and Mediterranean climate. Mediterranean vegetation and hybrid vegetation composed of forest, scrub, and steppe are the predominant vegetation types. Forest, degraded forest, and pasture are the overrepresented land-covers. The overrepresented soil types in this category are forest soil without lime, brown forest soil, brown red Mediterranean soil, and colluvial soil. The rivers in Gelibolu and Biga Peninsulas flow into the Aegean Sea and the Sea of Marmara.

Figure 3.16: Plateau villages in the Biga Peninsula.

The access of these villages to electricity, seed cleaning machines, and telephone systems are unknown. They do not have drinking water, yet they have access to road infrastructure. However, since they have long—including the longest—and intermediate distance to districts, it can be asserted that their connectivity with the settlement system in the Marmara Region is poor. They have relatively good access to elementary schools, mosques, healthcare centers, and village rooms.

3.1.2.5 Underdeveloped high mountain villages. This small category is composed of 59 villages and covers 1.5% of the rural settlements in the region. In terms of geographic distribution, this category is highly dispersed. The villages in this category are mostly located within other mountain and plateau clusters, with intermediate to high slopes and intermediate to high elevations (including the highest elevations). These villages have the smallest population and small areas; therefore they have low household numbers.

These villages are subject to Mediterranean or the Black Sea climates. The overrepresented land-covers in this category are forest, scrub, and steppe. Forest soil without lime, brown red Mediterranean soil and colluvial soil are the predominant soil types.

These high mountain-forest villages do not have electricity and access to road infrastructure; thereby they are highly distant from the urban centers. However, they have relatively good access to other infrastructure types such as drinking water and telephone systems.

The villages in this category have elementary schools and they have relatively good access to health care; yet they do not fully benefit from social equipment as they do not have reading rooms and mosques.

3.1.2.6 Highly underdeveloped peripheral mountain villages. The villages in this category cover the southeastern periphery of the Marmara Region. A substantial amount of villages in this category are located in the southeastern part of Bursa, they also form clusters in the periphery of Bilecik area and the northeastern tip of the İznik Lake (*Figure 3.1 and Figure 3.2*). This cluster is composed of 317 villages and covers 8.1% of the rural settlements of the region. The villages in this cluster have the smallest population and smallest areas. They are located on mountain areas or plateaus mediating between intermediate to high slope and elevation (including the highest slopes and elevations).

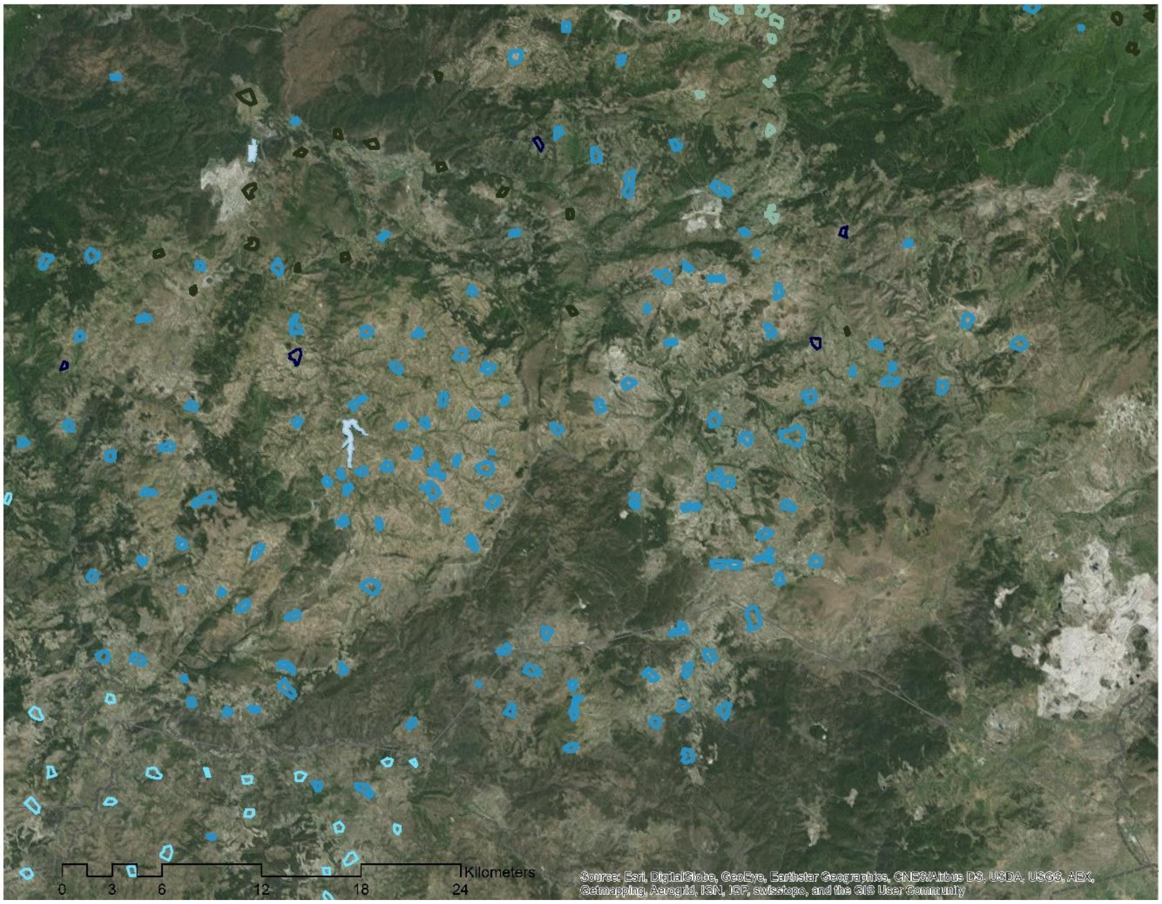

Figure 3.17: Highly underdeveloped peripheral mountain villages in the southern periphery of the province of Bursa.

They are subject to continental or semi-continental climate. The predominant land-cover types are forest and degraded forest. Forest soil without lime is the overrepresented soil category around these villages. The rivers close to the villages in this category flow either into the Black Sea or the Sea of Marmara

The villages in this category do not have access to any kind of infrastructure including electricity, road infrastructure, drinking water, seed cleaning machines, and telephone systems. Thereby, they are the remotest villages from districts. The lack of infrastructure signifies the lack of integration with the settlement system in the Marmara Region.

Likewise, these underdeveloped high mountain-plateau villages have poor access to social equipment. Elementary schools, reading rooms, health care centers, and midwives remain underrepresented. These villages have village rooms and mosques as the only signifiers of social interaction.

3.1.3 The summary of the analysis. This analysis illustrates the condition of village structures in the Marmara Region during a critical period in which the area was becoming rapidly urbanized. By placing ‘village’—as the most dispersed and geographically-bounded unit—to the center of the analysis, this study was able to reveal one fundamental level of spatial fragmentation based on a diverse set of variables. The analysis showed the north and south parts of the Marmara Region are subject to different economic and ecological forces; the agricultural hinterland of İstanbul composed of low-land coastal and plain villages versus the mountain-plateau forest villages interdependent from the metropolitan İstanbul. With the help of the fine-grain data and MCA, the study also detected the continuities and persistence within the region such as the coastal and plain villages surrounding the Sea of Marmara or the mountain village typology repeated both in the Istrancalar Mountains and the Bilecik area.

In this regard, Vidal de la Blache’s methodology on “*genre de vie*” and “*pays*” has turned out to be a highly useful method to interpret this study, as the results revealed a strong correlation between the ecology and economy of the village communities in the Marmara Region. Interestingly, in his article titled “Rural Structures: Sub-village Formations” geographer Necdet Tunçdilek uses a similar methodology and evaluates the rural settlement system in Anatolia as a structure established in the *Longue Durée.* Tunçdilek elaborates on the tensions between the plain and plateau-mountain villages

(1971, pp. 17-55) and asserts that the Anatolian settlement system has never been completely rural, hence large urban centers always dominated Anatolia (p. 18). The port cities in Anatolia as the final destinations of "caravan routes" [57] were highly developed urban structures; yet the developed cities also facilitated the development of the rural structures that surrounded them. Therefore, the economic activity in Anatolia continued to depend on rural settlements (p. 18). However, the rural settlement system in Anatolia was relatively weaker in the 16th century as it comprised settlement units with small populations, hence these rural settlements were distant from each other (p. 20). As their economies depended on animal husbandry, these villages were surrounded by a very narrow zone of agricultural land and the rest of the territory was used as pasture land (p. 20). As a result of the long distances and the difficulty of the transportation of the produced goods to the external markets, these rural settlements were isolated from the surrounding towns and cities (p. 20). Another distinguishing property of these rural settlements was that they were primarily situated on plateaus and mountainous areas (p. 20). Plains were not preferred for settlement for several reasons, including social factors such as safety concerns, flood, and malaria risks. However, in recent history, during migration flows[58], the newcomers preferred pasture land for settlement (p.23), and thus pasture land substantially decreased while agricultural products gained value (p.23). Concomitant to the changes in rural land-use, the plateau and mountain villages became insufficient in Anatolia as the soil surrounding them was not suitable for agriculture and they were also located on high slopes obstructing agricultural development (p. 23). The peasants living in

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[57] Caravan Routes is translated from "*kervan yolları*" by the author.

[58] See the conclusion for a more comprehensive debate on migration flows in Anatolia.

plateau and mountain villages, who were formerly engaged in animal husbandry, could not adapt themselves to the new conditions which left the rural communities in plateaus and mountains devastated (p. 23). According to Tunçdilek, by the time the article was printed, there were seven million people in Anatolia inhabiting in or around forests, surviving the economically poor conditions. On the contrary the plains were settled by migrants and the villages they established transformed into densely-populated large rural structures in time (p. 23).

Necdet Tunçdilek's narrative displays interesting parallels to McNeill's narrative in the Mountains of the Mediterranean. While the settlement structure discussed in this chapter was established in the *Longue Durée*, McNeill asserts that the rapid changes that took place in the last two hundred years had a substantial negative impact on the fragile mountain communities in the Mediterranean in general (1992, p. 2). According to McNeill:

> … in the mountains the changes of the past two hundred years—in some places the past one hundred—have normally been greater than the slower, more modest ecological shifts of earlier times. The recent ones will, I suspect, also prove more decisive: not mere fluctuations within a broad and resilient equilibrium, but a sea of change. (p. 2)

In addition to the mountain-plateau cleavage, this study yielded other unexpected socio-spatial results such as the highly underdeveloped condition of Thrace at the time the village surveys were conducted. Despite its propinquity to rapidly urbanizing İstanbul and the hinterlands of Greece and Bulgaria around the turn of the 1970s, Thrace was a collection of rural communities, deprived of basic infrastructure such as electricity and drinking water. By displaying the vulnerabilities of the village communities—mountain communities in particular—of the Marmara Region that stem from geographic conditions, infrastructural and social equipment distribution, this study sets the stage for future studies to discuss the urban transformation in the Marmara Region at a territorial scale.

3.2 Deciphering the Microecologies of the Region: The Evaluation of 2006 Land-Cover Data in Strata

In this chapter the 44 land-cover subcategories for the year of 2006, in the Corine System[59] at the district-level, were retrieved from the Ministry of Forestry and Water Management's website[60], compressed into 18 categories by Strata[61], and mapped under 4 primary titles (*Figure 3.18*). The stratification done by Strata enables the researcher to create hybrid legends, shedding light on associations between different land-cover assemblages. In doing so, conventional over-generalized and reductionist legend categories are replaced with land-cover assemblages in which different land-cover types co-exist. This categorization deciphers the fundamental spatial fragmentation in the region that stemmed both from geographic properties established in the *Longue Durée* and the impact of Anthropocene. The primary categories that will be discussed are as follows:

3.2.1 Agriculture and Forests (Perpetually Irrigated Mixed Agricultural Land, Agricultural Land with Significant Areas of Natural Vegetation, Permanent Crops, Coniferous Forest and Mixed Forest, Natural Grasslands, and Transitional Woodland-Shrub)

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[59] The 2012 land-cover data have not been released at the district-level by the Ministry of Forestry and Water Management. The land-cover categorization of the Corine System can be found at http://uls.eionet.europa.eu/CLC2000/classes. The headings, sub-headings and land-cover classes referring to the Corine System are capitalized in the text.

[60] See Chapter 2.

[61] See Chapter 1.

3.2.2 Wetlands (Water Bodies, Waterways, Wetlands, Rice Fields, Permanently Irrigated Land, Discontinuous rural fabric, Non-irrigated Arable Land, Non-Irrigated Mixed Agricultural Land, Pastures, and Broad-Leaved Forest)

3.2.3 Rural Fringe Development Formation (Discontinuous Rural Fabric, Non-Irrigated Arable Land, Non-Irrigated Mixed Agricultural Land, Pastures and Broad-Leaved Forest, Non-Irrigated Fruit Fields, Industrial or Commercial Units and Road and Rail Networks and Associated Land)

3.2.4 Densely Urbanized Metropolitan Districts (Urban Fabric, Industrial, Commercial and Transport Units)

The Agriculture and Forests (41.5%) and the Rural Fringe Development Formation (38%) comprise the majority of the Marmara Region. Both categories are primarily composed of agricultural and forest land-covers. However, when zoomed in, fundamental differentiations can be observed in spatial distribution of land-cover types. Firstly, the spatial distribution of the Agriculture and Forests category and the Rural Fringe Development Formation points to a geographic fragmentation, highly similar to the one discussed in the previous section on village typologies. The Agriculture and Forests Category is overrepresented in the southern part of the Marmara Region[62] and the Rural Fringe Development Formation is overrepresented in the northern parts[63]. Secondly Coniferous Forest, Mixed Forest, and Perpetually Irrigated Mixed Agricultural Land land-covers are overrepresented in the Agriculture and Forests category, whereas Broad-Leaved

[62] Except for Pınarhisar and Karasu.

[63] Except for Osmangazi, Nilüfer, and İnegol in Bursa, and Çan in Çanakkale.

Forest and Non-Irrigated Agricultural land-covers are overrepresented in the Rural Fringe Development Formation. Before delving into the spatial fragmentation precipitated by urban land-use patterns, acknowledging this profound north-south divide is highly beneficial as it sheds light on the hybrid condition of the region consolidated in the *Longue Durée*.

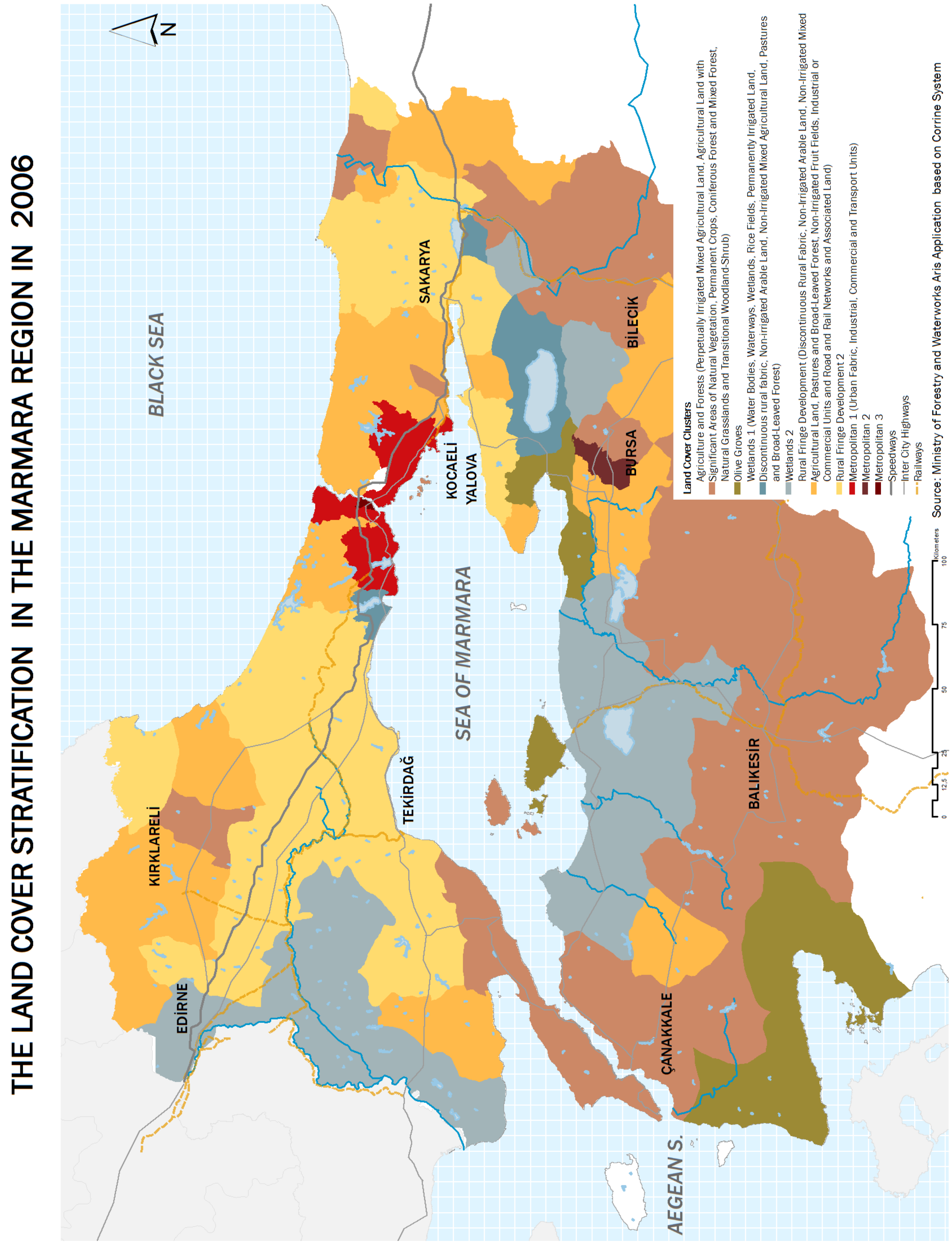

Figure 3.18: The land-cover stratification in the Marmara Region in 2006.

The identified differentiations primarily stem from the encounter of two different climatic systems: The Mediterranean and the Black Sea. The areas under the effect of the Mediterranean climate in the south, such as the Biga peninsula or the Aegean shores of Thrace, have *Sclerophyllous* vegetation that composes of evergreen scrub, maquis, and red pine forests (Darkot & Tuncel, 1981, p. 38). The Black Sea coast—the northern shores of Çatalca, Kocaeli, and especially the Istranca Mountains—with the Black Sea climate comprise *Hygrophyte*[64] plants and beech forests. There are also hybrid segments in the region such as the northern ridges of the southern Marmara mountains with the Black Sea vegetation patterns (especially after a certain altitude). Deciduous oak tree clusters in areas with moderate precipitation and black pines in high altitudes are other hybrid zones (p. 38). These hybrid patches correspond to the Mixed Forest land-cover overrepresented in the Agriculture and Forests category.

Figure 3.19: Beech forest land-cover in the Istrancalar Mountains.

[64] A plant living under conditions of plentiful moisture
http://www.merriamwebster.com/dictionary/hygrophyte.

Another major differentiation can be monitored among the distribution of agricultural land-covers in the region. Irrigated and Non-Irrigated agricultural land-covers are concentrated in different parts of the region which reflects in the formation of land-cover assemblages. Permanently Irrigated Land (7%), Rice Fields (1.5%), and Perpetually Irrigated Mixed Agricultural Land (1.3%)—overrepresented in the Agriculture and Forests, and Wetlands categories—are clustered around the Ergene and Meriç Rivers' basins and the southern Marmara and Sakarya Plains. Non-irrigated agriculture is still the prominent agricultural type in the region. Non-irrigated Arable Land (21.5%) and Non-Irrigated Mixed Agricultural Land (4.4%) are concentrated around Thrace and the Sakarya Plain, hence they are overrepresented in the Rural Fringe Development Formation and in the Wetland categories.

The distribution of the Artificial Surfaces is another factor in the spatial fragmentation of the Marmara Region. The Artificial Surfaces land-covers—underrepresented in the southern Marmara Region—are overrepresented in Rural Fringe Development Formation (surrounding İstanbul), in the Wetlands, and in İstanbul's metropolitan area (with the highest overrepresentation).

3.2.1 Agriculture and Forests. The Agricultural and Forests category can be examined under two primary categories: the southern agricultural and forest area, and the Olive Groves around the Gulf of Erdek and the Gulf of Gemlik. The agricultural and forest areas correspond to the mountain villages of Balıkesir, Bursa, and Bilecik. Transitional Woodland-Shrub land-cover—overrepresented in this category—is defined to "represent either woodland degradation or forest regeneration" in the Corine System. Transitional Woodland-Shrubs also cover a substantial portion of the Marmara Region (11.2%) in 2006.

This land-cover overlaps with the degraded forest areas mentioned in Besim Darkot and Metin Tuncel's comprehensive book on the Marmara Region (1981, p.72). A substantial amount of Vineyards—another characteristic of the Mediterranean vegetation—is overrepresented in the Agriculture and Forests category.

Between 1990 and 2006, the distribution of land-cover types in Büyükorhan, Harmancık, Keleş, Orhaneli, Dilovası, Karapürçek, the central Çanakkale, Bayramiç, Osmaneli, Balya, Dursunbey, and Adalar districts remained stable. However, substantial changes occurred within the rest of the districts in Agriculture and Forests category. The agricultural land-covers, forests, and grassland witnessed major losses and yielded to the Rural Fringe Development Formation and the Artificial Surface clusters[65], demonstrating that the southern Marmara Region witnessed a rapid urbanization in 2006.

[65] In this section changes are calculated between 1990 and 2006. Irrigated agricultural, Coniferous Forest and Mixed Forest land-cover cluster decreased from 57.2% to 54.4%. Non-Irrigated Mixed Agricultural Land, Pastures and Broad-Leaved Forest land-cover cluster increased from 30.5% to 32.9%; Industrial or Commercial Units and Road and Rail Networks and Associated Land-Cover cluster increased from 0.07% to 0.1%.

Figure 3.20: Olive groves around the Gulf of Gemlik.

In addition to the predominance of Olive Groves, the Gulf of Erdek, and the Gulf of Gemlik are distinguished from the rest of the agricultural categories with the overrepresentation of Sports and Leisure Facilities as a result of the vibrant touristic activity in these areas. These gulfs embody an important number of historical settlements such as Ayvalık and Tirilye that operate as the tourism centers of İstanbul and İzmir. Bozcaada and Gökçeada can also be included in this category as the Mediterranean vegetation land-covers are overrepresented in these islands.

3.2.2 Wetlands. These areas form the plains of the Marmara Region around primary waterbodies: surrounding the upper Ergene River Basin and along the Greek border, the İznik Lake Basin, and the Balıkesir and Bursa Plains. Due to the overrepresentation of land-cover categories related to water and irrigation—such as Water Courses, Permanently Irrigated Land, Inland Marshes, Salt Marshes, Coastal Lagoons, Water Bodies, and specifically Rice Fields—these areas are easily distinguished from the rest of the agricultural areas in the southern Marmara Region. Similar to the Agriculture and Forests category discussed above, agricultural land-covers, forest and grassland are losing their share in this category.[66] However, the increase in the share of Rice Fields in Biga, the central Edirne, Enez, İpsala, Meriç, Pehlivanköy, and Gönen shows that rice cultivation has partially taken over the traditional agricultural pattern.[67] The rice cultivation demands large scale landscape operations—such as the levelling of soil and permanent irrigation—and large scale enterprises (Darkot & Tuncel, 1981, p.76). According to the Economic and Social Development Plan for Eastern Thrace (1968), rice, by the time the plan was published, was "still a highly speculative crop not yet part and parcel of the traditional system and is grown chiefly by specialized farm enterprises" in Thrace (p. 62).

Figure 3.21: Rice fields in the Bulgaria and Greek border and the preservation area around the Lake Manyas.

The area this cluster covers, signify a shift towards a more technologically advanced mode of agricultural production which is related to improvements in irrigation

[66] From 27% to 25.8% in Biga, Central Edirne, Enez, İpsala, Meriç, Pehlivanköy, and Gönen; from 22.6% to 22.3% in Karacabey, Yenişehir, Pamukova, Uzunköprü, Hayrabolu, Bandırma, and Susurluk.

[67] From 14.5% to 15%.

in the Ergene River Basin.[68] The subtle increase in the cluster of Permanently Irrigated Land, Inland Marshes, Salt Marshes, and Coastal Lagoons is related to the increase in the Rice Fields.[69] The overrepresentation of Rural Fringe Development Formation in this category can be explained by the geographic propinquity to İstanbul and the dense Discontinuous Rural Fabric in Thrace. Darkot and Tuncel state that *Hygrophila* forests are seen in wetlands and in areas with high water table, which also explains the existence of the Black Sea vegetation—corresponding to Broad-Leaved Forest land-cover in the Corine System—in this category (p. 42).

Despite the overrepresentation of land-covers related to water in İznik, Orhangazi, Sapanca and Büyükçekmece (shown as Wetlands 2 in *Figure 3.18*); these districts have different characteristics from the Bursa-Balıkesir Plains and the northern Ergene-Meriç Plains. Both the Permanent Crops and the Artificial Surfaces are overrepresented in these districts, which signifies that this area is a transitory zone. The share of the Artificial Surfaces in İznik, Orhangazi, Sapanca, and Büyükçekmece has increased between 1990 and 2006 due to the increasing pressure of urbanization.[70]

3.2.3 Rural Fringe Development Formation. This category surrounds the central districts of İstanbul, stretches out to inner Thrace in the west, and Sakarya's provincial border in the east with a leapfrog to Bursa. The amalgamation of the peripheral districts of İstanbul with that of the surrounding provinces in this category perfectly exemplifies

[68] Darkot and Tuncel mention the construction of sets and canals to discharge the surplus water in the basin (p. 110).

[69] From 11.4% to 11.7% in Biga, the central Edirne, Enez, İpsala, Meriç, Pehlivanköy, and Gönen; from 33% to 33.5% in Karacabey, Yenişehir, Pamukova, Uzunköprü, Hayrabolu, Bandırma and Susurluk.

[70] Industrial or Commercial Units and Road and Rail Networks and Associated Land from 0.1% to 0.6%). Discontinuous Urban Fabric from 0.3% to 1.2%).

İstanbul's urbanization that transcends administrative borders. The Rural Fringe Development Formation is a hybrid zone that embodies both Agricultural Land and Artificial Surface land-covers. Furthermore, both non-artificial surfaces such as Non-Irrigated Agricultural Land, Pastures, and Broad-Leaved Forest; and Artificial Surfaces such as Discontinuous Rural Fabric, Industrial or Commercial Units and Road and Rail Networks and Associated Land are overrepresented in the Rural Fringe Development Formation. The overrepresentation of the Artificial Surfaces are the result of urban sprawl, the primary transit corridors—the E-5 Highway, the TEM, and the major railway line—that crosses Thrace, Çatalca, and Kocaeli, and the major industrial zones in the region.

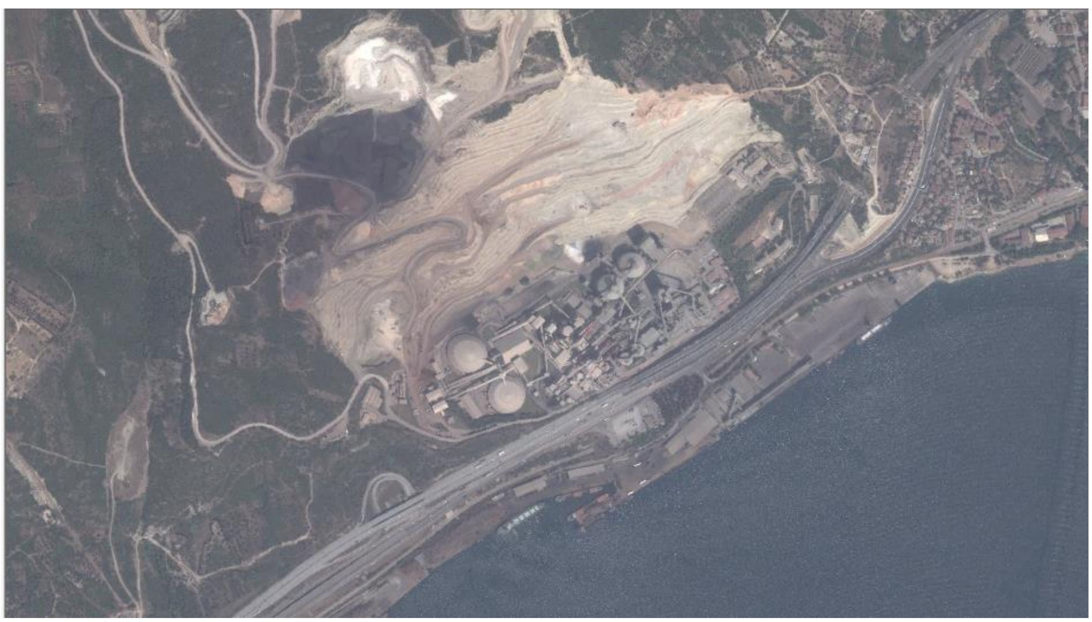

Figure 3.22: A cement factory in the Gulf of İzmit.

Figure 3.23: Factories in Dilovası.

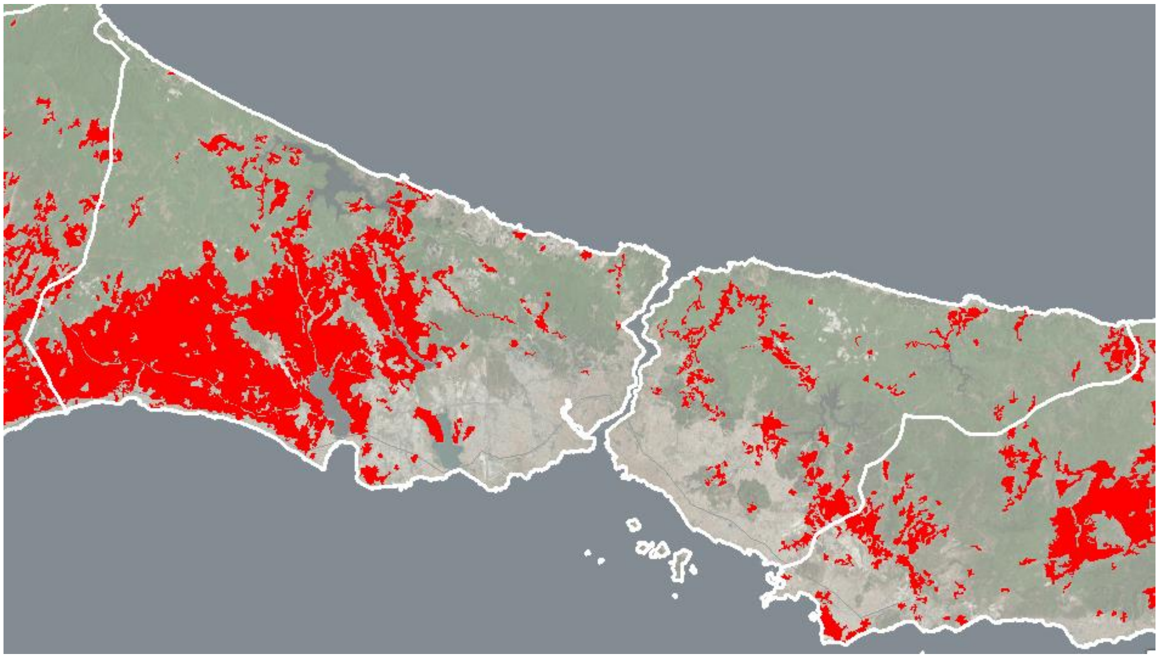

Figure 3.24: The agricultural areas within the provincial borders of İstanbul.

Figure 3.25: The northern hinterland of İstanbul.

Despite the indicated common points, a fundamental bifurcation among the districts of this category should to be underlined. Rural Fringe Development 1[71] (*Figure 3.18*) is a hybrid

[71] Rural Fringe Development 1 category encompasses Osmangazi, Nilüfer, İnegol, Pazaryeri, Çan, Keşan, Lalapaşa, Arnavutköy, Beykoz, Çekmeköy, Eyüp, Şile, Armutlu, the central Kırklareli, Kofçaz, Vize, Derince, Gebze, Körfez, Karamürsel, Akyazı, Ferizli, Hendek, and Taraklı districts.

sub-category in which the Discontinuous Urban Fabric is overrepresented with the highest share in the region (25.8%). Continuous Urban Fabric (18%), Irrigated Agricultural Land, Forests, and Pastures land-covers (18%)—representative of the Agriculture and Forests category—are at expected values. Interestingly, while the cluster of Irrigated Agricultural Land, Coniferous and Mixed Forests, and Pastures land-covers substantially decreased in the Forests and Agricultural Areas, it remained stable in Rural Fringe Development between 1990 and 2006. At this point, the existence of the substantial amount of İstanbul districts adjacent to the metropolitan area of İstanbul in this sub-category should be addressed. A similar trend observed in agricultural labor in population data points to a socio-spatial persistence. People working in the agricultural sector in İstanbul ascended between 1990 and 2000.[72] The intense agricultural activity within the provincial area of İstanbul evokes the von Thünen model[73] on the land-use competition to serve the market, thereby deserves a closer study including the transportation costs, product and labor costs. The increase in the number of Water Bodies within the same districts is another sign of the intensive hinterland activity.[74] The Türkmenli Pond, Kayalıköy Dam, Kula Regulator, Pabucdere, and Kazandere Dams, Değirmenköy Irrigation Pond, Sazlıdere Dam, and Darlık Dam are the primary drinking and irrigation plants constructed in Thrace and Çatalca Peninsula between 1990 and 2006.

[72] From 1.8% to 2.8% (TUIK).

[73] See Chapter1.

[74] From 0.6% to 0.8%.

The transformation of the overall Rural Fringe Development Formation between 1990 and 2006—with a significant increase in the Artificial Surfaces—indicates that it became more integrated into İstanbul's metropolitan area. Sports and Leisure Facilities, Industrial or Commercial Units, Road and Rail Networks and Associated Land, Discontinuous Urban Fabric, and Continuous Urban Fabric substantially increased. The leapfrog of this category towards the southern part of the Gulf of İzmit and the Bursa metropolitan area also corresponds to the macroform of the emerging urban region that will be discussed in the following section.

3.2.4 Densely urbanized metropolitan districts. This category is predominantly composed of the metropolitan districts of İstanbul. It also encompasses the Çayırova and Darıca distrcits of Kocaeli, and the Gürsu and Yıldırım districts of Bursa. The Artificial Surfaces are overrepresented in these districts. The land-cover composition of these highly urbanized districts deciphers the idiosyncrasies and vulnerabilities of İstanbul's metropolitan area; thereby sheds light on İstanbul's recent urban history. Firstly, the Densely Urbanized Metropolitan Districts category covers a very small portion of the Marmara Region and İstanbul's provincial area, demonstrating that, İstanbul—the so-called 'endless city'—is actually confined to a very small area. The overrepresentation of Artificial Surfaces in the Çayırova and Darıca districts of Kocaeli exemplify the amalgamation on the eastern border of İstanbul. The metropolitan districts in this category lack the natural land-cover diversity—that is observed in the rest of the region—due to contiguous urban growth. While Discontinuous and Continuous Urban Fabric predominantly cover the districts in this category, very little space is left for recreational areas.[75]

Figure 3.26: The urban fabric of the metropolitan İstanbul.

Gürsu, Yıldırım (Metropolitan 2 in *Figure 3.18*), and Beşiktaş (Metropolitan 3 in *Figure 3.18*) are outliers within the Densely Urbanized Metropolitan Districts category. Continuous Urban Fabric is underrepresented in Gürsu and Yıldırım. If evaluated together with the Bursa districts in category Metropolitan 2, [76] the total area of these districts show Bursa's metropolitan area is predominantly composed of Discontinuous Urban Fabric. Discontinuous Urban Fabric also comprises of an important amount of the Beşiktaş district (63%) because of the gated communities that occupy the areas demarcated by the eastern Büyükdere Street in the west, and Fatih Sultan Mehmet Bridges in the north and south. In terms of urban land-covers, Beşiktaş was already over-saturated[77] by 2000.[78] The large-scale, monumental buildings like Dolmabahçe and Çırağan Palaces; urban parks such as

[75] Represented by Green Urban Areas and Sports and Leisure Facilities in the Corine System.

[76] Osmangazi, Nilüfer and İnegöl.

[77] In this study "over-saturated" is used as a term to indicate the densely urbanized areas with the highest Continuous Urban Fabric,that are no longer able to expand. The "flexible" zoning laws, populist policies, rapid migration, and land speculation are among the factors that precipitated this very dense mode of urbanization in city centers.

[78] Discontinuous Urban Fabric (63.05% / 63%) Continuous Urban Fabric (21.33% / 21.3%).

Yıldız Woods; and infrastructures like Barbaros Street or the Bosphorus Bridge as thresholds in Beşiktaş facilitated the saturation. These results demonstrate that Beşiktaş is the earliest district which witnessed the shortcomings of rapid implosion or urban *hyperplasia.*[79] İstanbul witnessed the massive implosion process, beginning as early as the post-WWII period that precipitated over-saturation in many İstanbul districts in the early 2000s. For instance, in the Population Decentralization Map of İstanbul (*Figure 3.27*)*,* the distribution of the population percentages between 1990 and 2011 reveal the urban *hyperplasia* in İstanbul; while the population of İstanbul province doubled between these years, the same settlement structure was maintained.

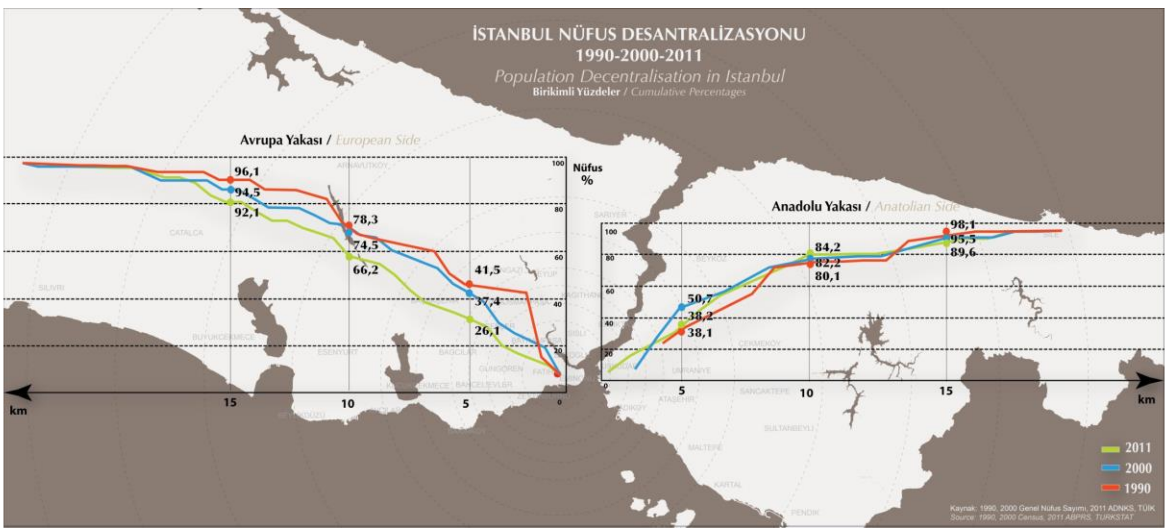

Figure 3.27: Güvenç, M. (2013). Population decentralization in İstanbul, cumulative percentages. Unpublished work.

Combined with the Justice and Development Party's (JDP) global city ambitions, from a real estate market point of view, this saturation precipitated the rent gap[80] in

[79] Hyperplasia is a medical term which is used to explain the excessive increase of cells in an organic tissue (https://en.wikipedia.org/wiki/Hyperplasia).

[80] "Developed by Smith (1979c) …, rent gap theory is a crucial element of the analysis of gentrification. It suggests that disinvestment in inner-city neighborhoods reduces capitalized ground rent. When this rent is

İstanbul's central districts. The urban *hyperplasia* explains the assertiveness of the successive urban transformation laws and why the first implications of these laws primarily targeted the inner city areas of İstanbul. While the recent studies on gentrification in İstanbul focused on particular streets and neighborhoods, this analysis shows that gentrification is happening at a territorial scale; thereby the impact of the urban transformation law should be evaluated at a diverse set of scales including the regional scale.

The non-linear dynamics of the Artificial Surfaces fluctuate between 1990 and 2006, revealing another aspect of the peculiarities of İstanbul's urban development. For instance, the Industrial or Commercial Units and Road and Rail Networks and Associated Land land-covers skyrocketed in all districts within the Densely Urbanized Metropolitan Districts category between 1990 and 2000. This process was then followed by phases of deceleration, stagnancy or decrease which corresponds to the decentralization of İstanbul after 2000, triggered again by the JDP's global city ambitions. A similar fluctuation is observed in the Ataşehir, Büyükevler, Bayrampaşa, Güngören, and Sultanbeyli districts of İstanbul, demonstrating how the contiguous urban growth materialized.[81] Discontinuous Urban Fabric tremendously increased in these districts between 1990 and 2000 and

sufficiently lower than potential ground rent, opportunities for profit-making through reinvestment occur, leading to residential change" (Gregory et al., 2009, p.645).

[81] In Turkish this mode of growth has been defined as "*yağ lekesi büyüme*" which can be translated as oil-spill growth in order to address the exclusion of public space and infrastructure.

declined between 2000 and 2006.[82] In the meantime, Continuous Urban Fabric continued to increase its share, filling up the voids within the Discontinuous Urban Fabric.[83]

3.2.5 The summary of the analysis. This study demonstrates the interplay of centripetal and centrifugal forces shaping the territory of the Marmara Region. Three major trends in the transformation of land-cover clusters across all districts in the Marmara Region between 1990 and 2006 are detected:

1. The Irrigated Agricultural Land, Coniferous Forest, Mixed Forest, and Pastures land-cover cluster overrepresented in the southern Marmara Region has been in decline in all district profiles beginning from the 1990's onwards.

2. Non-irrigated Agricultural Land and Broad-Leaved Forest land-cover cluster overrepresented in the northern Marmara region displayed a fluctuating progress in terms of push and pull. Its overall share within the land-cover distribution remained stagnant. However, in the metropolitan districts of İstanbul its ratio substantially decreased between 1990 and 2006, yielding to the Artificial Surfaces.

3. The land-cover categories of "Discontinuous Urban Fabric, Continuous Urban Fabric, and Industrial or Commercial Units and Road and Rail Networks and Associated Land" under the Artificial Surfaces heading in the Corine System doubled their shares within the overall distribution.

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[82] From 5.6% to 20% and to 11.2% respectively.

[83] From 36.1% to 50.8% and to 61.6% respectively.

This study demonstrated the primary fragmentations and transformations in the region beyond the built environment-nature differentiation which cannot be extracted from unprocessed satellite imagery or land-cover data. It revealed the co-dependencies, co-existences and competition between the Artificial Surfaces, Agricultural Land, Forest Areas, and Semi-Natural Areas, which yields to a diverse range of microecologies in the Marmara Region. In addition to deciphering the land-cover clusters in the region this study demonstrated other interesting results such as the resistive agricultural structure and the increasing agricultural labor force within the metropolitan area of İstanbul. Surprisingly, this socio-spatial condition coincides with the rising interest of İstanbulites in access to organic food and preserving urban agricultural areas (*Bostans*) in İstanbul. Essentially after the Gezi Events in 2013, urban agriculture became a very popular topic in İstanbul and a number of NGOs—such as *Yedikule Bostanları*, *Ek Biç Ye İç,* and *Dürtük*—focusing on urban agriculture has been established. These NGOs are working actively to keep sustainable urban agriculture on the public agenda by organizing events and protests such as the "the Lettuce Festival of İstanbul" (*İstanbul'un Marul Bayramı*) which is organized to bring attention to a lettuce type that specifically grows in the *Bostans* around the Historical Peninsula. Despite the rapid urbanization in the region, the increase in Water Bodies, particularly in these resistive agricultural areas, reveals the clash of claims between agriculture and urbanization.

Aside from revealing a diverse range of regional dynamics this analysis demonstrated the idiosyncrasies of the metropolitan İstanbul: the "endless İstanbul" is actually confined to a very small area within the provincial boundaries of the city. The analysis also demonstrated that gentrification precipitated by over-saturation has a territorial impact in İstanbul, hence a multi-scalar perspective transcending the street and neighborhood scales is necessary to understand how the gentrification phenomenon is shaping the city. This topic will also be discussed in Chapter 4.

It should be noted that this analysis has its limitations. For a more thorough study of urban landscape formation, this chapter will continue with the evaluation of building census data for the 1984 and 2000 published by Turkish Statistical Institute (TUIK).

3.3 The Building Census Data Analysis

Building census surveys were compiled by TUIK by the years 1965, 1970, 1984, and 2000. Until 2000, the scope of the building census encompassed only provincial and district centers, neighborhoods, and villages. However, by 2000 the scope of the survey was expanded by including adjacent territory, settlement areas (the settlement zones indicated in the development plan), and non-housing urban zones (i.e. the zones in which the construction of fuel stations, non-polluting factories, and workshops are permitted). In terms of the building typologies, only temporary constructions such as tents and huts were excluded. The 2000 census data also includes comparisons with the 1984 census data. The broad scope of building census data published in 2000 makes it a very valuable source to understand urbanization beyond the city-country dichotomy. It also facilitates the tracking of the territorial persistence and local differentiations. Two primary data sets within the building census data are analyzed to understand the transformation of the building stock:

3.3.1 Distribution of land-use sizes composition by provinces between 1984 and 2000 (pp. 16-18).

3.3.2 Distribution of land-use types and sizes by provinces in 2000 (pp. 106-139).

3.3.1 Distribution of Land-use sizes composition by provinces between 1984 and 2000. Between the years of 1984 and 2000, the numbers of buildings increased substantially in all provinces in the Marmara Region with a total increase of 82.3% [84] (*Figure 3.28*). During this period, the region's population increased by 65.5%.[85] İstanbul continued to rank the first province with the highest share of the building stock. Despite the broader scope of the 2000 data, a slight decrease occurred in İstanbul's share in the building stock from 50% to 46.8% (*Figure 3.29*). In the meantime, İstanbul's population share in the Marmara Region increased from 54.8% to 57.7%.[86] This condition reveals the simultaneous interplay of centrifugal—the building sprawl around İstanbul—and centripetal—the population concentration in İstanbul—forces in the region. From 1984 to 2000, Bursa and Balıkesir—the second and third ranking provinces of the building stocks—remained almost stagnant in terms of their rankings and shares in the overall composition.[87] The buildings in the Thracian provinces continued to compose a very small amount of the total number of the Marmara Region's building stock between 1984 and 2000.[88] If the data is further studied, it will become explicit that this stagnant condition is

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[84] From 1,022,355 in 1984 to 1,858,917 in 2000. While comparing the 1984 and 2000 TUIK, data, the change in the geographical scope should be taken into consideration. The broader scope of 2000 data is obviously increasing the change. However, this goes parallel to the rate of urbanization increasing in the uncontrolled areas. Hence the drastic shift is still meaningful.

[85] The Marmara Region's population shifted from 10,493,119 to 17,365,027 (information retrieved from http://tuikapp.tuik.gov.tr/nufusmenuapp/menu.zul).

[86] Retrived from https://biruni.tuik.gov.tr/nufus85app/idari.zul.

[87] Bursa continued to rank the second city with a slight increase from 14.4% to 14.5% in the overall share of the total number of buildings in the region. It was followed by Balıkesir with a slight increase from 9.2% to 9.5%.

[88] 13.6% with Çanakkale 10% without Çanakkale in 1984; 14.4% with Çanakkale 10.9% without Çanakkale in 2000.

misleading. Between 1984 and 2000, the shares of Çanakkale, Edirne and Kırklareli in the west[89], and Sakarya and Bilecik in the east[90] in the total number of buildings in the Marmara Region slightly decreased. However, a steep incline occurred in the shares of the two provinces adjacent to İstanbul: Tekirdağ and Kocaeli (*Figure 3.29*). In the meantime, their shares within the population of the Marmara Region remained stagnant.[91] İstanbul's decline in the share of the building stock with respect to the increase in the adjacent provinces in the east and west signify the emergence of İstanbul's city-region. However, the concentration in Tekirdağ and Kocaeli, despite the stagnancy in other provinces, demonstrates that the urban development at the regional scale follows an uneven development pattern.

[89] Çanakkale from 3.6% to 3.5%; Edirne from 3.5% to 3.2% and Kırklareli from 2.9% to 2.4%.

[90] Sakarya from 3.7% to 2.7%; Bilecik from 1.4% to 1.4%.

[91] Tekirdağ's share in total number of buildings in the region increased from 3.6% to 5.4% and Kocaeli's share in total number of buildings increased from 6.1% to 7.6%. The shift in Tekirdağ is remains highly significant. The total number of buildings skyrocketed from 36,191 to 99,408 174.6 in Tekirdağ per se. However, in terms of population the shares of Tekirdağ and Kocaeli remained around 3.7% and 7% respectively.

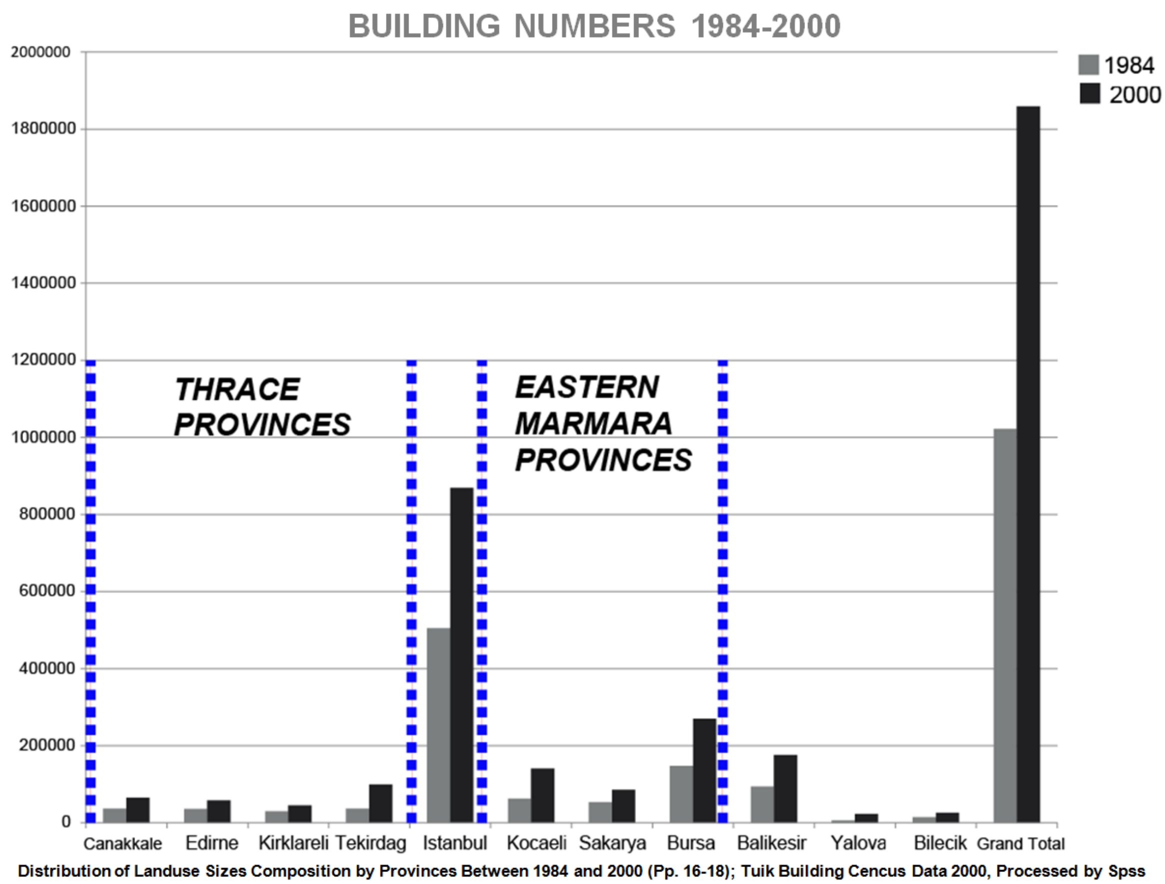

Figure 3.28: The increase in building numbers between 1984 and 2000.

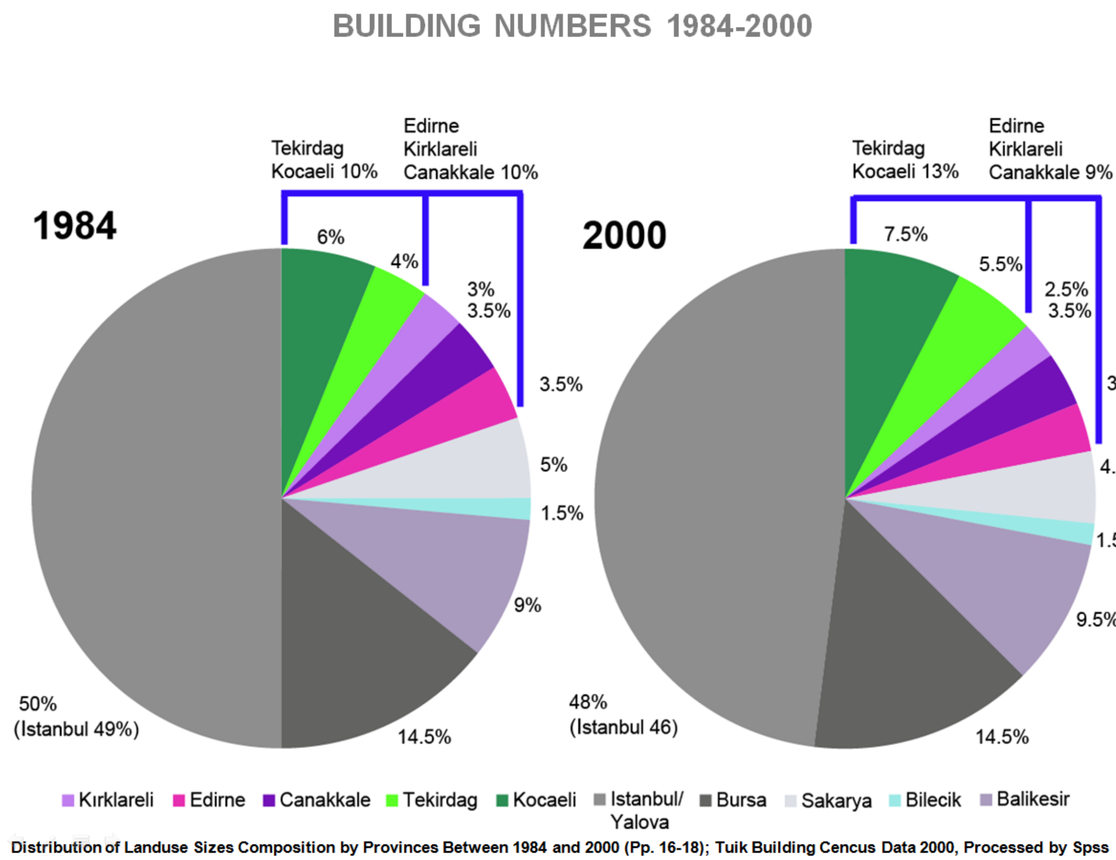

Figure 3.29: The increase in building numbers between 1984 and 2000.

A detailed analysis of the shifts in the land-use sizes points to more drastic changes in the urban landscape of the Marmara Region. Both in 1984 and 2000, the buildings from small to mid-size floor areas—up to 200 sq. m—continued to comprise the highest share of the Marmara Region's land-use sizes, however a shift towards medium scale occurred in time.[92] The most explicit form of this shift occurred in İstanbul by 2000; the ratio of the buildings with floor areas smaller than 45 sq. m decreased from 41.7% to 29.5% (*Figure 3.30*). Despite the trend towards larger land-use sizes in the region per se, the share accounted for buildings smaller than 75 sq. m increased in the Thracian provinces,

[92] Between 1984 and 2000 the number of the smallest sizes (< 75 sq. m) declined from 44.2% to 24.1%; the buildings with floor areas between the range of 100-149 sq. m inclined from 14.9% to 25.8%.

Balıkesir, Çanakkale, and Tekirdağ, and remained stagnant in Kırklareli, Edirne, and Bilecik.[93] This condition signifies that the traditional hinterland structure of Thrace, discussed above, with the south Marmara Region persisted to change between 1984 and 2000. The case of Balıkesir reveals an extreme condition with a jump from 15% to 26.2% of the land-use sizes smaller than 50 sq. m.

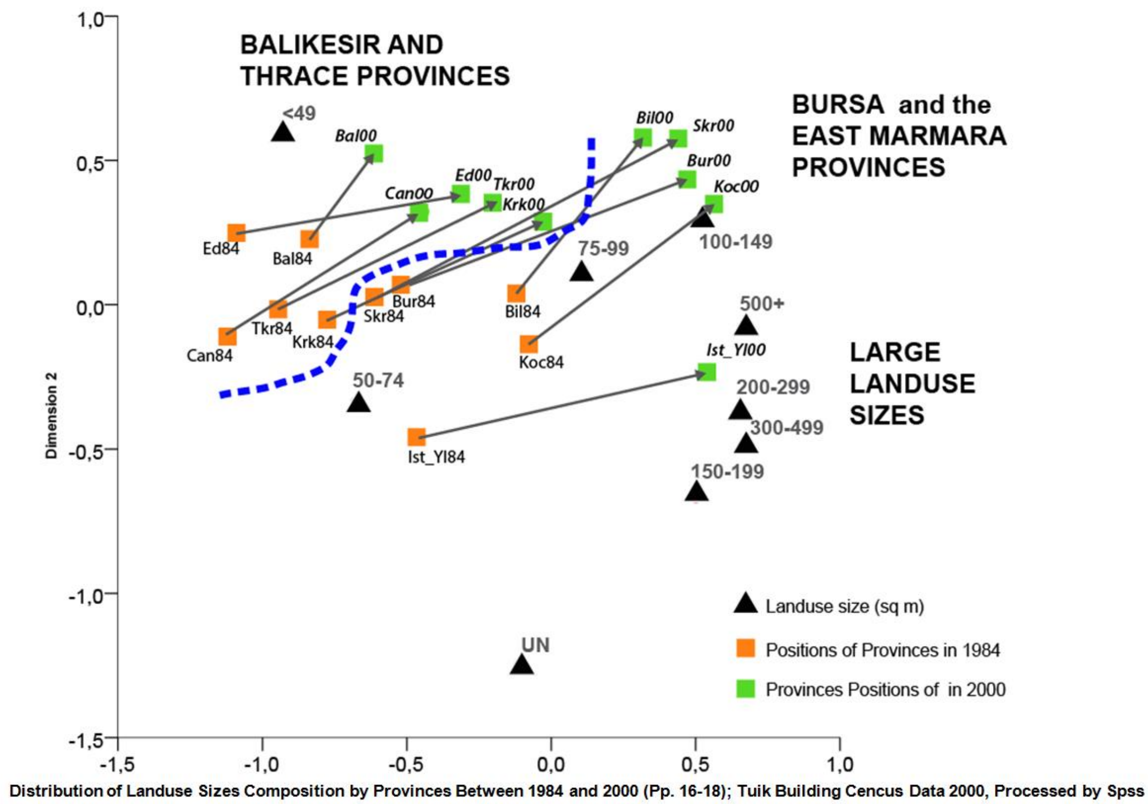

Figure 3.30: The visualization of changes in land-use sizes through CA.

Drastic changes also occurred in the distribution of large land-use sizes within the region. İstanbul's share within land-use types larger than 500 sq. m also significantly decreased and diffused to other provinces such as Kırklareli, Bilecik, Bursa, Kocaeli, and

[93] Between 1984 and 2000 the buildings with floor areas smaller than 75 sq. m increased from 23.9% to 39.9 in Balıkesir, form 9.9% to 12.3% in Çanakkale and from 9.4% to 17.2% in Tekirdağ.

Sakarya.[94] The number of buildings with unknown floor areas in İstanbul increased substantially with an overall increase from 55.5% to 74.4% which signifies that despite the amnesty for unlawful construction in 1984 an intense informal construction activity persisted in the region.

3.3.2 Distribution of land-use types and sizes by provinces in 2000. The 99 x 12 matrix of this data set was processed by Strata. Despite the gravity that the residential land-uses created, Strata was able to detect twelve clusters assigned to specific land-use sizes and land-use types (*Figure 3.31*). This clustering deciphers the "land-use typologies" specific to the region. As residential land-uses have the highest share in the overall building stock by 2000, their distribution among the clusters are highly determinative.

[94] From 64.9% to 48% in İstanbul; from 1.7% to 2.4% in Kırklareli; from 1.4% to 1.9% in Bilecik; from 8.5% to 16.6% in Bursa; from 4.6% to 9.5% in Kocaeli; from 4% to 6.7% in Sakarya.

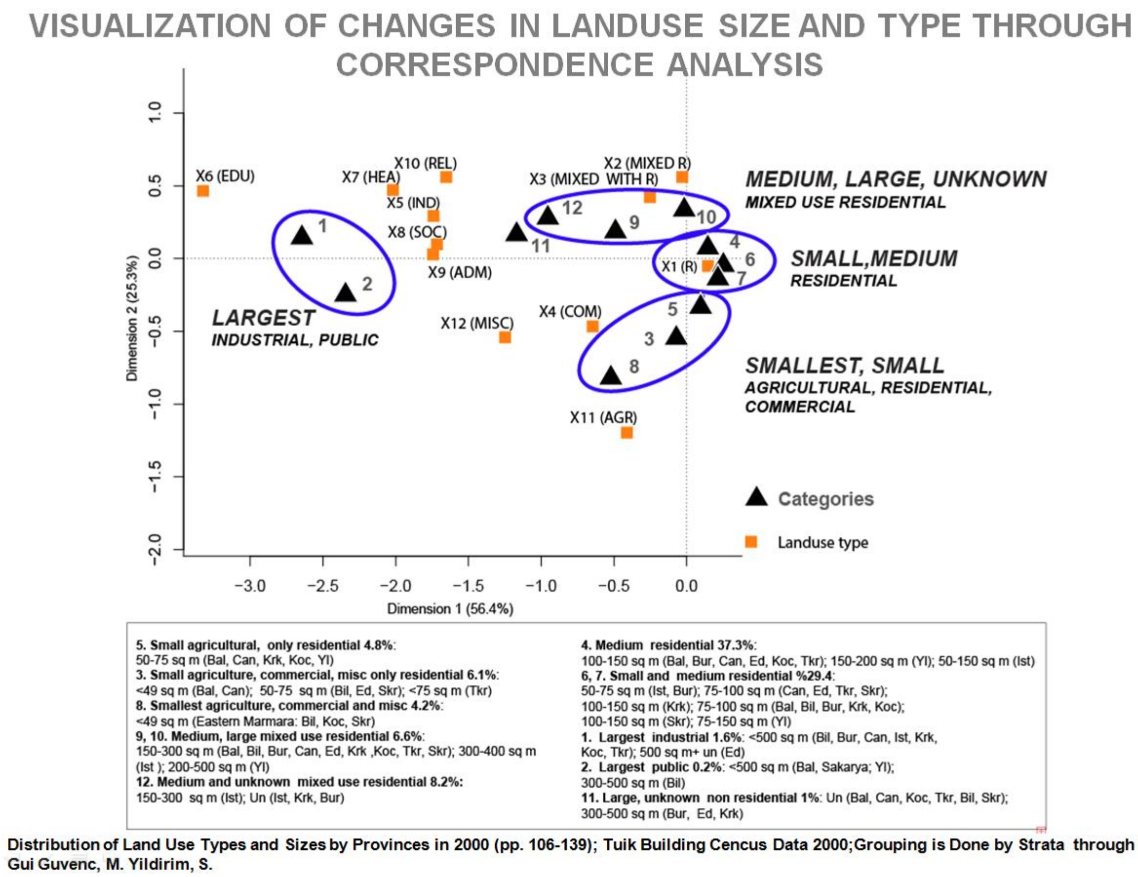

Figure 3.31: The visualization of changes in land-use size and type through CA.

Among the 11 groups, a significant differentiation occurs in the distribution of the residential land-use types. Only residential land-use matches with small to medium land-use sizes between 50 and 150 sq. m and composes the 6th and 7th categories. Whereas mixed residential land-use is clustered with medium size units ranging between 150 and 300 sq. m and comprises the 9th, 10th, and the 12th categories. The residential and mixed residential units are usually represented in different categories except for the 4th category called “the Medium Sized Predominantly Residential Units”. This category has the biggest share in the overall building stock (37.3%) with the highest shares of only residential (38.3%) and mixed-use residential buildings (46.8% and 41%). In terms of spatial distribution, land-use sizes between 100-150 sq. m in Balıkesir, Bursa, Çanakkale, Edirne, Kocaeli, and Tekirdağ; land-use sizes between 150-200 sq. m in Yalova and 75-150 sq. m in İstanbul fall under this category.

The 8th category of "Smallest Land-Use Sizes" is predominantly represented with agricultural functions. These units are also represented with commercial and miscellaneous land-uses in the eastern Marmara Region (Bilecik, Kocaeli, and Sakarya). Social and administrative functions are added to this mix in the 3rd category. The highest ratio of agricultural functions (27.6%) is in the 3rd category. The small units, with floor areas smaller than 75 sq. m in Balıkesir, Çanakkale, and Tekirdağ, between 50 and 75 sq. m in Kırklareli, Kocaeli, Yalova, Bilecik, Edirne, and Sakarya, are represented with agricultural and only residential land-uses.

The largest units compose two different clusters and match with specific units. The first category in which floor areas larger than 500 sq. m in Bilecik, Balıkesir, Bursa, Çanakkale, İstanbul, Kırklareli, Kocaeli, and Tekirdağ has a higher share of 1.6% within the overall building stock. The industrial and educational land-uses are overrepresented in this category with high shares of 23.8% and 40.2% respectively. The second category of largest land-use sizes has a smaller share of (0.2%) of the building stock. This category is represented with public buildings (social, cultural, educational, and administrative). The land-use sizes larger than 500 sq. m in Balıkesir, Sakarya and Yalova; and between 300 and 500 sq. m in Bilecik are in this group.

3.3.3 The summary of the analysis. Though the low resolution of this data set based on the provincial level prevents a detailed discussion, the outcomes of the analyses based on building census data generated results similar to the findings of the of 2006 land-cover data processed in Strata, such as the stagnant agricultural Thrace and the southwestern Marmara Region. It also illustrated how the urban landscape of the region is shaped by the regional dynamics and policy implications.

To begin with, in the building census analyses, mixed-use residential land-use emerges as a type specific to İstanbul which is probably the outcome of the land speculation and congestion in the city. Most of the residential buildings in highly congested areas of İstanbul reserve their first floors to commercial functions. The decrease of the smallest land-use size (<49 sq. m) in İstanbul from 41.7% to 29.5% is related to the *gecekondu* demolitions and the amnesty for unlawful construction released in 1984 after the *coup d'état* on September 12th 1980. After the amnesty, *gecekondu's* economic value switched from use value to exchange value, and *gecekondus* were probably replaced by larger units.

The proportional difference between the increase of the number of buildings from 1984 to 2000 (82.3%) and the population increase (65.5%) points to a building inflation related to a real-estate-dependent economy. Bursa and Balıkesir—the second and third ranking provinces that follow İstanbul by year 2000 in terms of building numbers—represent two different hinterland formations. Bursa is associated with large industrial land-use types. By year 2000, residential, commercial, and agricultural land-uses smaller than 49 sq. m composed 19.6% of Balıkesir's building stock. The significantly high number of villages in the Balıkesir area (906) is the reason of the predominance of small residential, commercial, and agricultural buildings, indicating a traditional agriculture-dependent hinterland formation. Balıkesir also holds an important number of touristic spots scattered around the Agean Sea and the Sea of Marmara. The summer home sprawl around the shores of Balıkesir is another factor that precipitates the surprisingly high number of residential buildings with very small areas. Finally, the rapid urban development in Tekirdağ and

Kocaeli demonstrates that a city-region formation was emerging around İstanbul as of 2000.

3.4 The Development of Urban Fabric between 1990 and 2006 at the District-Level

This analysis should also be evaluated as an introduction to the evaluation of the Urban Fabric as classified in the Corine System.[95] This category includes Continuous Urban Fabric, Discontinuous Urban Fabric, and Discontinuous Rural Fabric. These land-covers are the primary signifiers of the urban development and facilitate the monitoring of urban growth at the regional scale. These Urban Fabric land-covers for the year of 1990, 2000, and 2006 are processed in MCA for a more profound analyses of the urban growth patterns in the Marmara Region.

3.4.1 The overall transformation between 1990 and 2006. The transformation of the urban region between 1990 and 2006 is better understood if compared with the overall regional change. Ministry of Forestry and Water Management's data on general land-cover change between 1990 and 2000 and 2000 and 2006, reveals two different phases of urbanization.[96] The change between 1990 and 2000 is homogenously distributed (*Figure 3.32*). The only concentration is observed within İstanbul's provincial borders, which is a minor spread towards Kocaeli along the south. The transformation between 2000 and 2006 is less intense, thereby concentrated in specific areas, i.e. the Istranca part of Thrace, İstanbul's northern border with Kocaeli, and the provincial borders of Bursa and Bilecik (*Figure 3.33*). A similar pattern is observed in urban land-cover transformation. A higher

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[95] See http://uls.eionet.europa.eu/CLC2000/classes.

[96] The 1990-2000 and 2000-2006 land-cover transformation layers are available online. See: http://aris.ormansu.gov.tr/crn/.

rate of urbanization occurred between 1990 and 2000 than between 2000 and 2006.[97] Essentially, Discontinuous Urban Fabric skyrocketed until 2000 and remained stable after. Combined with the previous findings, it shows that the territorial change observed between 1990 and 2000 occurred in the manner of urban sprawl on the other hand, the change between 2000 and 2006 formed clusters in the region.

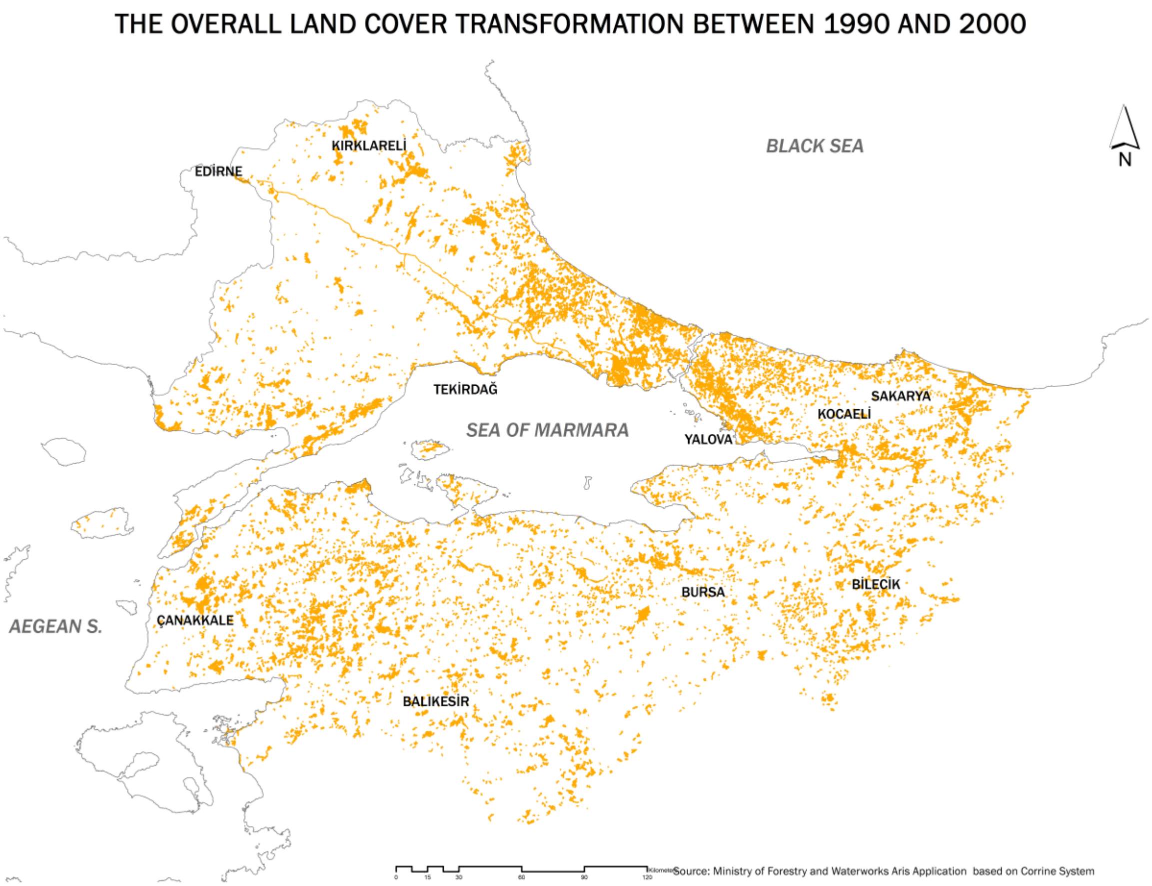

Figure 3.32: The overall land-cover transformation between 1990 and 2000.

[97] Continuous Urban Fabric 0.46% / 0.57% / 0.61%; Discontinuous Urban Fabric 0.33% / 0.61% / 0.62%; Discontinuous Rural Fabric 1.17%/ 1.40%/ 1.44%.

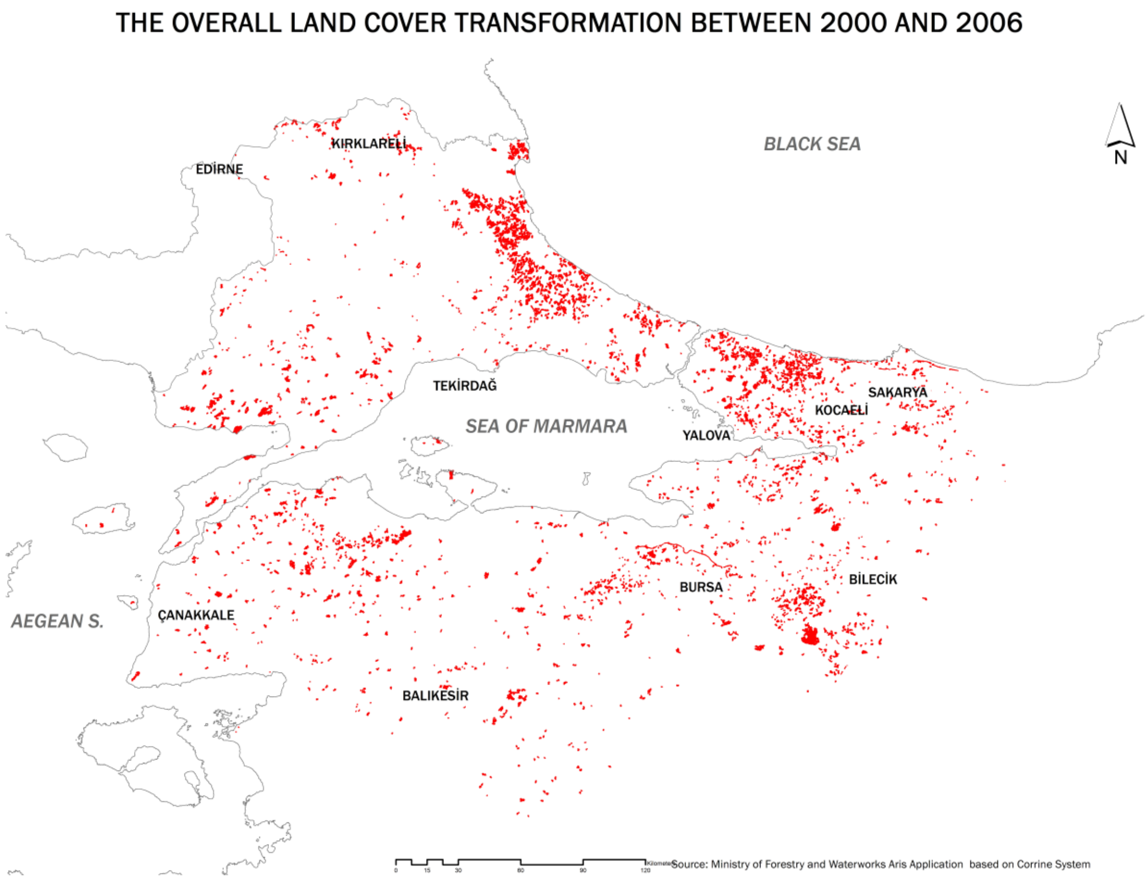

Figure 3.33: The overall land-cover transformation between 2000 and 2006.

Different modes of housing such as cooperatives and gated communities acted as agents in this territorial change. Though they are shaped by different social and economic demands, cooperatives and gated communities as "enclaves" can be regarded as important agents of urban sprawl between 1990 and 2000. The high inflation rates obstructed the establishment of the Mortgage system in Turkey in the 1990s. Cooperative housing was used to circumvent the high land prices in city centers and enabled the investors to have access to state funds. By the 1950s, cooperative was already a very popular mode of housing in Turkey (Tekeli, 2010, p. 182). According to Tekeli, beginning from "1960 onwards Social Security Organization funds were channeled into housing construction through the Real Estate and Credit Bank. This resource along with the 'Credit for Housing

Construction' system motivated the supply of housing through housing cooperatives" (Tekeli, 1994, p. 160). The location of the cooperatives was obliged to remain within the scope of master plans for urban areas "in order to get the necessary credit." The cooperatives usually chose "new development areas", which "were subdivided according to the dictates of the existing planning regulations and had relatively cheap land values" (p. 161).

Sprawl of these cooperatives corresponds to the emergence of gated communities in the late 1980s and early 1990s. The earliest examples of gated communities emerged in the late 1980s in the adjacent area of Eyüp, Sariyer, and Zekeriyaköy in İstanbul and gained impetus in the 1990s (Danış & Pérause, 2005, p. 96). The gated communities in İstanbul mushroomed in the areas that had opened to development after the upscaling of many villages to town municipalities (*belde belediyeleri*) in İstanbul's metropolitan area (p. 96). The town municipalities facilitated the circumvention of legal restrictions in the construction of gated communities by easily enabling construction permits (p. 97).

Another important agent in urban sprawl can be identified in the housing institutions owned by The Mass Housing Administration (*Toplu Konut İdaresi* [*TOKİ*]). The TOKİ was initially established in 1990, and was initially conceived as supplementary to undersecretary of housing. The institution witnessed a fundamental phase of restructuring between 2002 and 2008 (Kuyucu & Ünsal, 2010, p. 55). In 2004, the institution became directly subsidiary to the premiership. Through other legal changes, "the TOKİ became the sole agency to regulate the zoning and sale of all state-owned urban land" (p. 55). With this new agenda, the TOKİ transformed itself from a social housing institution into one of the fundamental actors in land speculation in Turkey. Within the context of the contemporary urbanization dynamics in Turkey—with a substantial amount of ongoing large-scale, medium and low-income housing projects in the provinces of the Marmara Region and İstanbul in particular—the TOKİ can be regarded as one of the primary agents of urban sprawl and expansion in the Marmara Region. [98]

The different distributions of land-cover patterns before and after 2000 create a cleavage, which can clearly be read through the land-cover data, pointing to a spatial restructuring in the Marmara Region. The rationale behind this restructuring can be traced through the economic and political context of the era. Before the rule of the JDP and its neo-liberal regulations, real estate was still a very attractive mode of investment due to hyperinflation. Before the ban on *gecekondu* construction in 2004, informal building activity was very high especially in İstanbul.[99] The millennium began with two remarkable events in Turkey; the 1999 İzmit Earthquake and the 2001 Financial Crisis followed by stagnation. The land-cover data reveals that, this restructuring immediately reflected in the production of urban space on a territorial level until the JDP began to enact urban transformation laws beginning from 2005 onward.

3.4.2 The urban land-cover transformation between 1990 and 2006 at the district-level. The urban land-cover analysis at the district-level perfectly illustrates the overall macroform of the urban region and its development patterns. The urban land-cover analyses—both at the district-level and at the level of a one-kilometer grid cell—will

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[98] The projects are listed on the website http://www.toki.gov.tr/.

[99] See the previous section.

comprise three primary land-covers: Continuous Urban Fabric, Discontinuous Urban Fabric, and Discontinuous Rural Fabric. Broadly,

- Continuous Urban Fabric will be considered as an indicator of high concentration of urbanization and over-saturated urban environments not suitable for further development.

Figure 3.34: An example of Continuous Urban Fabric on the Anatolian side of İstanbul**.**

- Discontinuous Urban Fabric will be referred to as a signifier of urban sprawl and unsaturated urban areas with a potential for further development.

Figure 3.35: An example of Discontinuous Urban Fabric on the European side of İstanbul.

- Discontinuous Rural Fabric will be referred to as a signifier of rural development and highly unsaturated areas.

Figure 3.36: An example of Discontinuous Rural Fabric in the provincial area of İstanbul.

- In the Urban Fabric land-cover maps (*Figure 3.37* to *Figure 3.49*) at the district-level and the one-kilometer grid cell level the shades of red to brown are used to represent areas in which Continuous Urban Fabric is primarily overrepresented, the shades of orange to yellow are used to represent areas in which Discontinuous Urban Fabric is primarily overrepresented, and the shades of green are used to represent areas in which Discontinuous Rural Fabric is primarily overrepresented. For the district-level analyses it should be noted that—though the data is normalized by considering the aerial differences between districts—it still depends on administrative borders and does not reveal the patterns and agglomerations within the districts.

3.4.2.1 The overall macroform in 1990. The Urban and Rural land-cover stratification map for the year of 1990 (*Figure 3.37*) at the district-level illustrates a spatial fragmentation that is quite different from the one discussed in the land-cover stratification map of 2006. In this instance, an asymmetry between the eastern and the western parts of the region, along the Bosphorus axis is observed: a departure from the typical north-south divide. Thrace and the southwestern Marmara is composed of large swaths of rural land.[100] On the Kocaeli Peninsula a set of urbanized districts with hybrid compositions of the Urban Fabric land-covers stretch out from the eastern border of İstanbul, surround the Gulf of İzmit, with a rupture on the southern end, continue towards south, to the Gulf of Gemlik and pass through the Bursa Metropolitan area, following the Bursa-İzmir Highway.

[100] Only the provincial centers Balıkesir, Edremit, Çanakkale, Tekirdağ, Kırklareli, and Edirne differentiate with different mixtures of Continuous Urban Fabric and Discontinuous Urban Fabric.

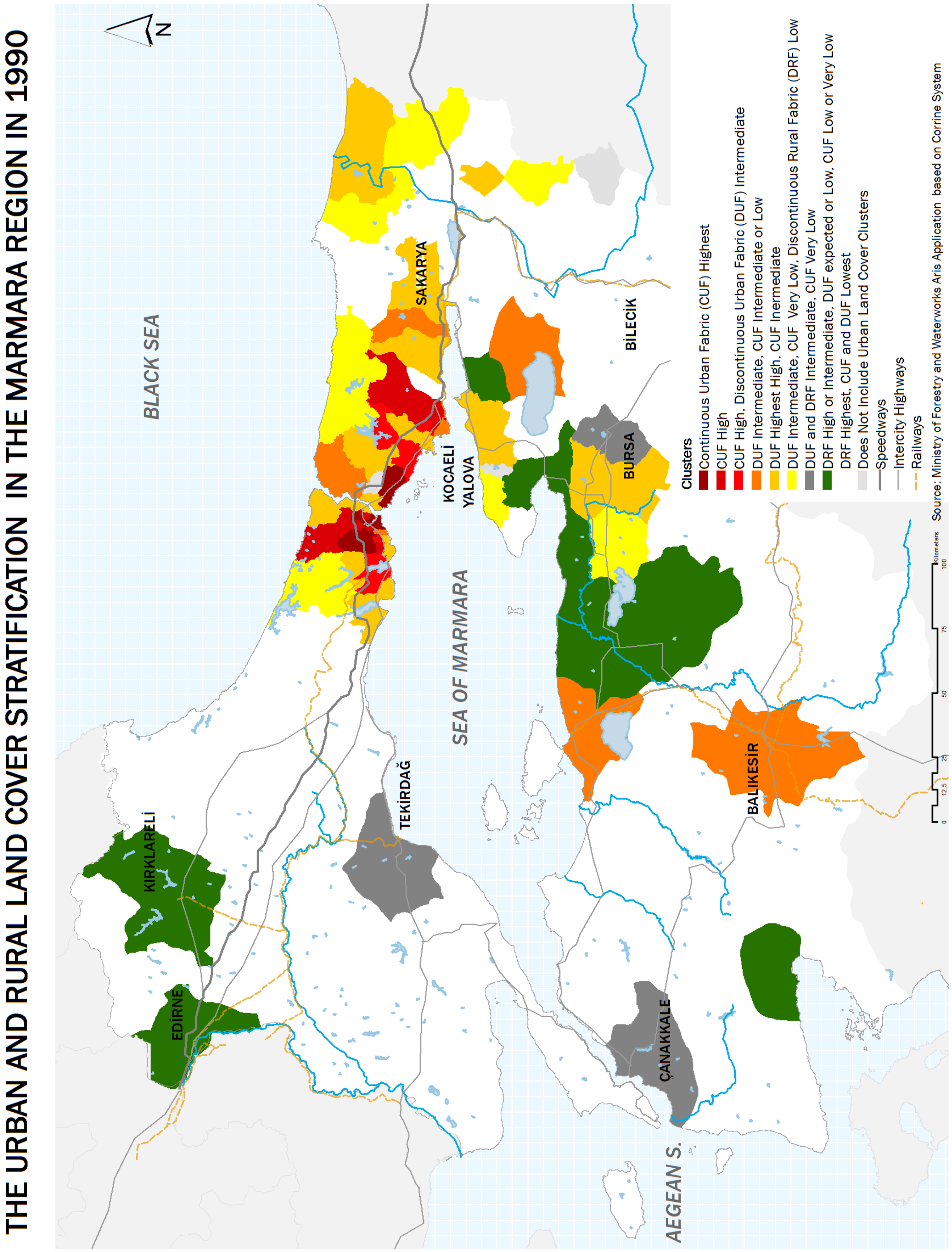

Figure 3.37: The urban and rural land-cover stratification in the Marmara Region in 1990.

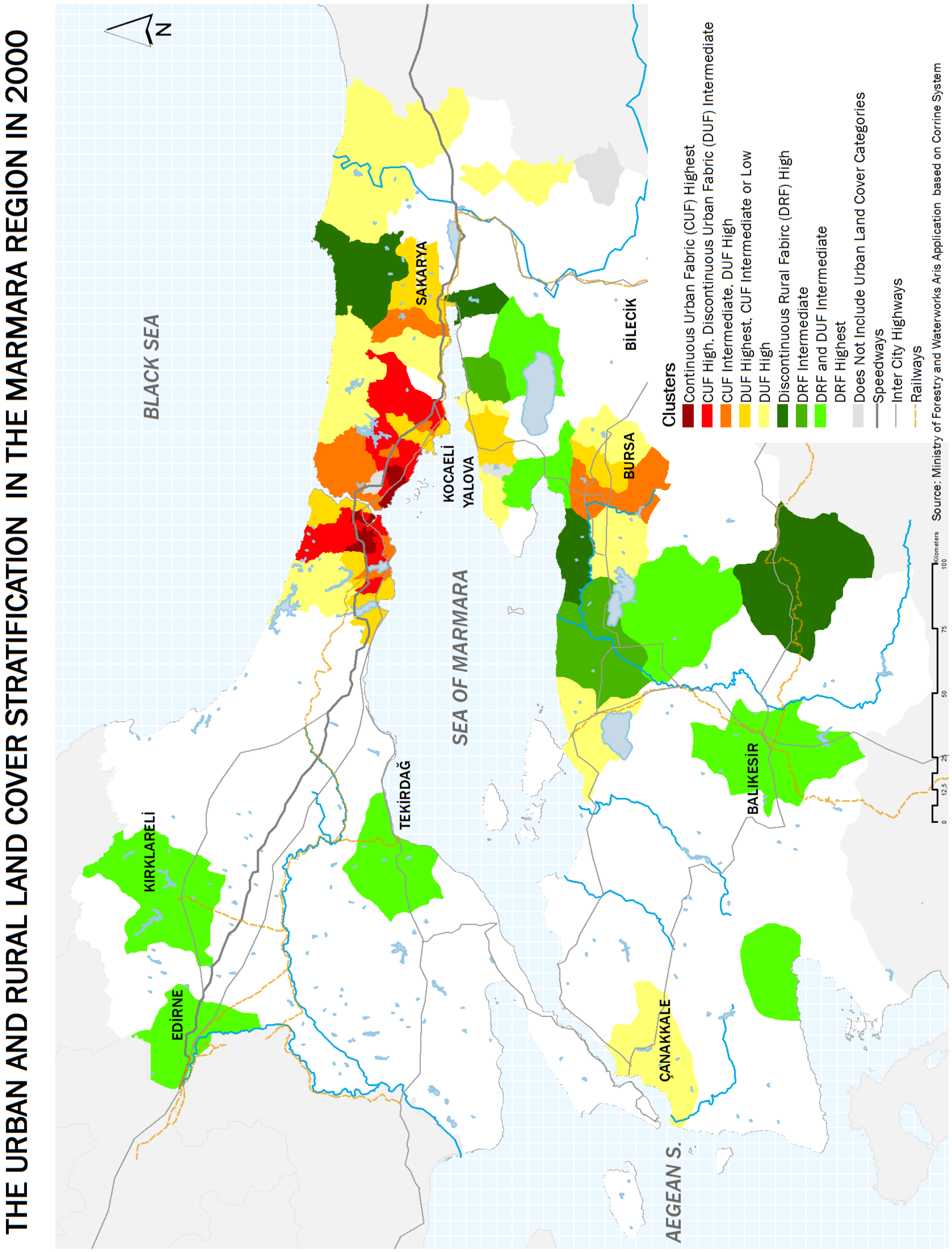

Figure 3.38: The urban and rural land-cover stratification in the Marmara Region in 2000.

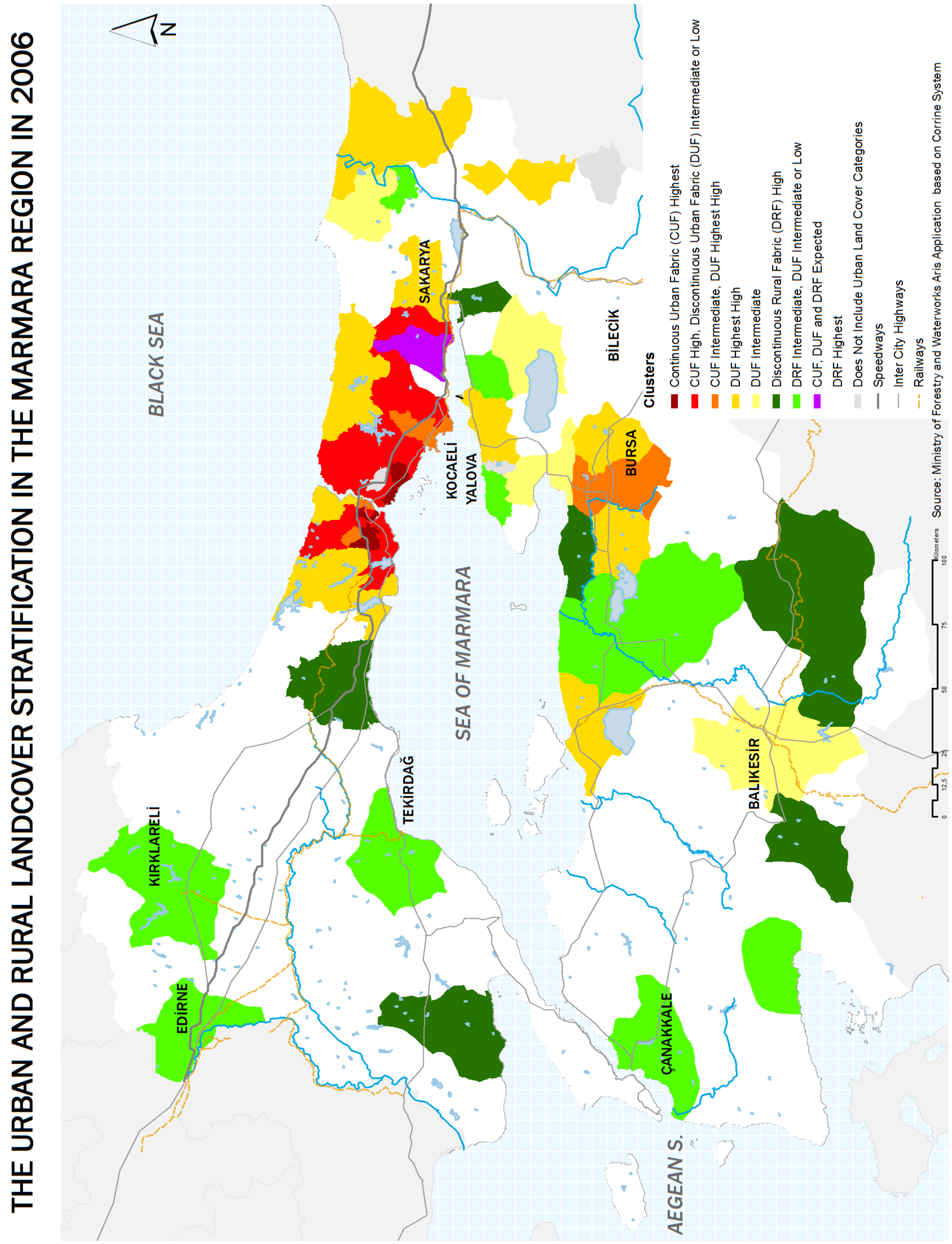

Figure 3.39: The urban and rural land-cover stratification in the Marmara Region in 2006.

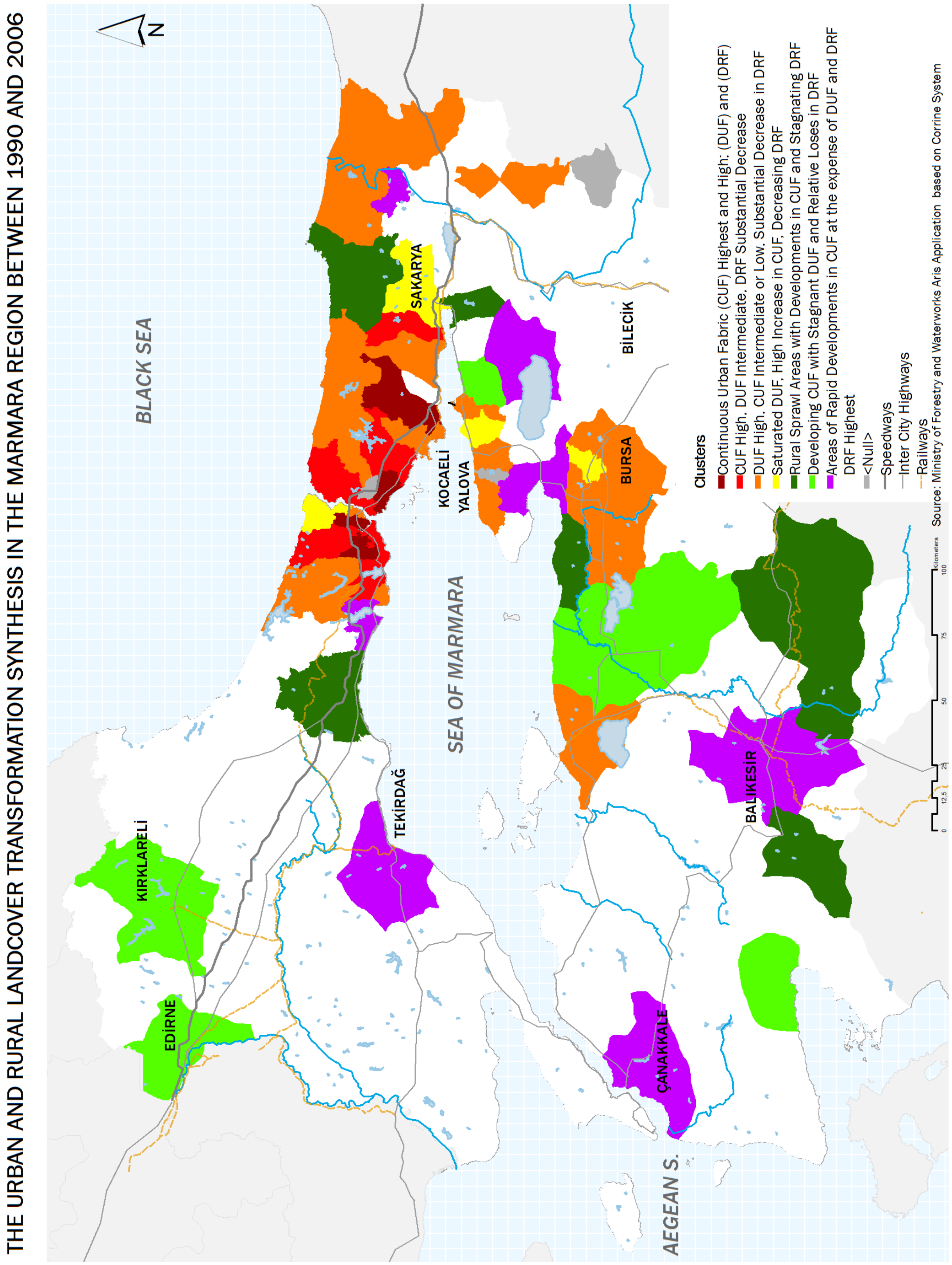

Figure 3.40: The urban and rural land-cover synthesis in the Marmara Region between 1990 and 2006.

Bandırma and Mustafakemalpaşa compose the southern tip of this chain of "deconcentrated concentration[s]" (Hall, 1992, 186). The northern districts of Sakarya, overrepresented with Discontinuous Urban Fabric and Discontinuous Rural Fabric compose another cluster in the eastern part of the region.

3.4.2.2 The development of Continuous Urban Fabric between 1990 and 2006 at the district-level. The economic and political turbulence of the era is reflected in the maps and makes it very difficult to read continuities within the span of 15 years. The categories overrepresented by Continuous Urban Fabric are usually situated within İstanbul's metropolitan area. Fatih, Beyoğlu, Kağıthane, Bayrampaşa, Gaziosmanpaşa, Bağcılar, Sultangazi, Esenler, Kadıköy, Maltepe, and Ataşehir are the districts with the highest overrepresentation of Continuous Urban Fabric in 1990. Between 1990 and 2000, in İstanbul the over-saturated districts which were only overrepresented by Continuous Urban Fabric such as Eminönü, Sultangazi, Ataşehir, Eyüp, Şişli, Bahçelievler, and Kocaeli lost share. In 2000 (*Figure 3.38*) these districts were overrepresented by high Continuous Urban Fabric and intermediate Discontinuous Urban Fabric. Between 2000 and 2006 this category further expanded within İstanbul's metropolitan area. In Bakırköy, Avcılar, Sultanbeyli, Üsküdar, Beykoz Continuous Urban Fabric increased its share.

3.4.2.2 The development of Discontinuous Urban Fabric between 1990 and 2006 at the district-level. In 1990, Beykoz in İstanbul, Derince, and Darıca in Kocaeli, İznik in Bursa and Bandırma in Balıkesir and the central Balıkesir were unsaturated urban areas in which Discontinuous Urban Fabric was intermediate and Continuous Urban Fabric was intermediate or low. In 2006, Beykoz and Derince became part of the metropolitan İstanbul

(*Figure 3.39*). İznik and Bandırma remained as regional nodes and became overrepresented with high—including the highest—Discontinuous Urban Fabric in 2006.

In 1990 the high—including the highest—overrepresentations of Discontinuous Urban Fabric were observed in the peripheral districts on the European side of İstanbul: the districts on the eastern and the western end of İstanbul such as Arnavutköy Büyükçekmece, Başakşehir, Beylikdüzü, and Bakırköy and in the Bosphorus districts such as Beşiktaş, Sarıyer, and Üsküdar. The high overrepresentation of Discontinuous Urban Fabric in 1990, composed a substantial part of the eastern Marmara Region including the inner districts of İstanbul such as Çekmeköy, Sancaktepe, and Sultanbeyli, Tuzla and Şile as the coastal districts; the Körfez and İzmit districts in Kocaeli; the Karasu, Ferizli, Kaynarca, Söğütlü, Hendek, Karapürçek, and Taraklı districts in Sakarya; the Altınova, Çiftlikköy, Yalova, and Çınarcık districts composing the southern part of the Gulf of İzmit, the Yıldırım, Gürsu, Osmangazi, and Nilüfer districts composing an important part of metropolitan Bursa.

Between 1990 and 2000, in the Çatalca Peninsula, Continuous Urban Fabric increased in Bakırköy. However, the rest of the districts with high overrepresentation of Discontinuous Urban Fabric in Çatalca Peninsula and on the European part of the Bosphorus remained stagnant. On the Anatolian side in Üsküdar, Çekmeköy, Sancaktepe, and Sultanbeyli Continuous Urban Fabric increased its share and became integrated into the central districts of İstanbul.

Between 1990 and 2000 the metropolitan area of Bursa emerged with a denser city center. Hence, Bursa consolidated its place as the second densest metropolitan center in the region, following İstanbul.

Between 2000 and 2006 the share of Discontinuous Urban Fabric increased in Arnavutköy and Şile as a result of sprawl towards the northern part of İstanbul. A similar increase occurred in the Karasu, Kocaali, Hendek, Karapürçek, and Taraklı districts of Sakarya. In the southern part of the Gulf of İzmit Discontinuous Urban Fabric lost its share in Çınarcık but became overrepresented along the Gulf of Gemlik corresponding with industrial sprawl. In the Bursa area, the central Bursa became denser as Continuous Urban Fabric also became overrepresented in Yıldırım. Discontinuous Urban Fabric increased its share in Nilüfer, Gürsu, and Kestel, in the central Bursa and Bandırma.

3.4.2.2 The development of Discontinuous Rural Fabric between 1990 and 2006 at the district-level. A substantial amount of the region is composed of the districts overrepresented with Discontinuous Rural Fabric. In 1990, the provincial centers of Edirne and Kırklareli in Thrace, Edremit in Balıkesir, Karamürsel in Kocaeli, and the districts surrounding the Gulf of Gemlik—Gemlik, Mudanya, Karcabey, and Mustafakemalpaşa—were overrepresented with high Discontinuous Rural Fabric. These places signify underdeveloped emerging sub-centers. Çanakkale and Tekirdağ's provincial centers and Kestel in Bursa were relatively more developed as both Discontinuous Rural Fabric and Discontinuous Urban Fabric were overrepresented in these districts in intermediate level. By 2000 in Edirne, Kırklareli, Edremit, Mustafakemalpaşa, Karcabey, Gemlik, and Karamürsel Discontinuous Rural Fabric lost share and Discontinuous Urban Fabric became overrepresented. A minor expansion occurred in the macroform as the southern tip of the Marmara Urban Region became overrepresented by Discontinuous Urban Fabric and Continuous Urban Fabric as a result of the push from the central Bursa. Until 2006 Discontinuous Rural Fabric lost share in Silivri and and Keşan in Thrace, Karamürsel and

İznik in Bursa, in the districts surrounding the Gulf of Gemlik—except for Mudanya—and in Dursunbey, Bigadiç, İvrindi, and the central Balıkesir in the Balıkesir area. These shifts in Discontinuous Rural Fabric signify that the districts accounted for became more integrated into the regional system.

3.4.2.3 The overall change between 1990 and 2006 at the district-level. In order to clearly illustrate the urban transformation within a span of 15 years the urban land-cover distributions in all districts for the years of 1990, 2000, and 2006 are evaluated together (*Figure 3.40*). Between 1990 and 2006 some of the densest districts of İstanbul such as Esenler, Bağcılar, Bayrampaşa, Gaziosmanpaşa, Kağıthane, Beyoğlu, Kadıköy, and Maltepe kept their shares of Continuous Urban Fabric. Bahçelievler, Şişli, Ataşehir, and Gebze were either stagnant or grew parallel to regional dynamics. In the metropolitan area of İstanbul, a dense urban development pattern is observed as Continuous Urban Fabric kept its share at the highest level, followed by relative losses in Discontinuous Urban Fabric and Discontinuous Rural Fabric. This metropolitan area includes the oldest *gecekondu* districts of İstanbul such as Esenler, Bağcılar, Bayrampaşa, Gaziosmanpaşa, and Kağıthane; the oldest middle income and central districts of İstanbul such as Beyoğlu, Kadıköy, and Şişli; and new developing areas on the Anatolian side such as Ataşehir and Maltepe. This map also reveals the importance of Gebze as the node that connects İstanbul and Kocaeli.

The second category reveals a unique dimension of the urban growth dynamics of İstanbul. The areas included in this category are mostly the peripheral districts of İstanbul—such as Beylikdüzü, Arnavutköy, Bakırköy, Eyüp, Esenyurt, Avcılar, Küçükçekmece, Zeytinburnu, Güngören, Beykoz, Üsküdar, Pendik, Kartal, and

Sancaktepe—that developed after the 1950's and became rapidly urbanized after the 1990's. The reason Fatih is included in this category is the relative stagnancy of the district; a phenomenon that can be attributed to the population loss and the strict building codes in the Eminönü area. In addition to Gebze in the first category Derince emerges as the second highly urbanized district in Kocaeli as a part of the north eastern Marmara conurbation.

The third category signifies regional sprawl, in which Discontinuous Urban Fabric has the highest overrepresentation, followed by Continuous Urban Fabric at the intermediate level and Discontinuous Rural Fabric with low overrepresentation. The areas with the highest overrepresentation of Discontinuous Urban Fabric emerged as the developing nodes of the region. The fringe development districts of İstanbul such as Arnavutköy, Beylikdüzü, Çekmeköy, Tuzla, and Şile; the developing areas around the Gulf of İzmit such as Darıca, Çayırova, Körfez, Yalova, Altınova, and Çınarcık; the northern part of Sakarya such as Kaynarca, Ferizli, Karasu, Kocaali, Hendek, Karpürçek, and Taraklı; and Bursa's metropolitan area including Kestel, Osmangazi, Nilüfer, and Bandırma.

The fourth category points to expanding former sprawl districts: such as Sarıyer—a former suburb in proximity to the CBD of İstanbul rapidly urbanized between 1990 and 2006—and İzmit, the center of Kocaeli Province composing the last link in the northeastern Marmara conurbation. Çiftlikköy, Gürsu, Silivri, Kandıra, Başiskele, Mudanya, Dursunbey, Bigadiç, and İvrindi are urbanizing rural sprawl areas in this category. While Continuous Urban Fabric increased its share in the indicated districts, the rural fabric also persisted and Discontinuous Rural Fabric kept its share. However, in other developing rural areas such as Karamürsel, Karacabey, Mustafakemalpaşa, Edremit, and the provincial centers of Kırklareli and Edirne while Continuous Urban Fabric was developing Discontinuous Rural Fabric lost share.

The real progressive areas in this analysis compose a different category: Büyükçekmece, Söğütlü, İznik, and Gemlik are the erstwhile missing pieces of the emerging urban region. Therefore, between 1990 and 2006 in the central Balıkesir, Tekirdağ, and Çanakkale Continuous Urban Fabric rapidly increased at the expense of Discontinuous Urban Fabric and Discontinuous Rural Fabric.

3.4.3 The summary of the analyses. Monitoring the urban land-cover clusters as an interplay of centripedal and centrifugal forces facilitates the deciphering of the complexity of the temporal change. Firstly, the district-level analyses illustrated the shifting dynamics between İstanbul and Bursa. In this analysis, in 1990, the central İstanbul and Bursa emerge as two imploding highly dense urban areas. The centrifugal forces of over-saturated Bursa and İstanbul create a third urbanized node around Yalova and Çiftlikköy.

Most importantly, the analyses at the district level provided important findings on the inter-regional dynamics. For instance, in the 2006 map the districts of Edremit and the central Balıkesir (*Figure 3.40*) emerge as the nodes in which the Aegean Regional system—and İzmir's hinterland—amalgamated with the Marmara Region and, as mentioned in the building census analysis, these areas are also important tourism centers. The collision of two regional systems around Balıkesir area and the pressure of tourism facilitates the emergence of a sub-center formation. Interestingly, the 2006 map (*Figure 3.40*) reveals that regional development along the Bursa-İzmir highway has consolidated. The center of Balıkesir emerges as an unsaturated expanding area spreading towards the surrounding districts such as İvrindi, Bigadiç, and Dursunbey. As these districts became a part of the regional formation Continuous Urban Fabric lost share in the central Balıkesir. Corresponding with the findings of the previous analysis of building census data, the rapid development of Balıkesir signifies that the dormant southwestern Marmara Region has begun to change, therefore the east-west cleavage has become blurry.

Despite the industrialization efforts in Çerkezköy and Çorlu, in the year of 2006 Thrace and the southern Marmara were still rural and underdeveloped areas with a resistive background in agriculture. The exceptional case here is Edirne. Similar to the Balıkesir-Aegean Region relationship, Edirne interacts as a part of the Thracian hinterland of Greece and disassociates from Thrace.

Surprisingly, the analysis of urban land-cover data at the district-level exposed that İstanbul's eastern and western parts were subject to different urbanization dynamics until 2006. While the eastern part of İstanbul has the ability to decentralize itself, the western part of İstanbul imploded. The Urban Transformation Laws enacted under the rule of the JDP—that allow a substantial increase in density—will lead to a new phase of implosion, especially in the over-saturated districts of İstanbul.

3.5 The Development of the Urban Fabric between 1990 and 2012 at the One-Kilometer Grid Cell Level

3.5.1 The difference between the one-kilometer grid cell level and the district-level analysis. This analysis adds more depth to the district-level analysis and it reveals the dynamics of the rural and urban settlement patterns beyond administrative borders. The resolution of the one-kilometer grid cell analysis is so high that, even neighborhood-level changes can be monitored in detail. But more importantly, the 2012 data—as an invaluable resource—reveals the most substantial change that took place in the light of the recent financial and governmental restructuring. The first striking outcomes of the one-kilometer grid cell analysis are: the enduring rural structure of Thrace as an assemblage of villages —until 2012—the similarity of the growth patterns of Bursa and İstanbul, and the high density urbanization around the Gulf of İzmit.

3.5.2 The urban and rural land-cover stratification in 1990 at the one-kilometer grid cell level. In 1990 Continuous Urban Fabric has the highest overrepresentation on the south of the TEM Highway in İstanbul—except for some splintering in Sultangazi, Beykoz, and Ümraniye—with stagnant Discontinuous Urban Fabric and Discontinuous Rural Fabric (*Figure 3.41*). This category has an asymmetrical distribution within İstanbul on the northern and southern part of the Inner Beltway (E-5). Before delving into the reasons of this asymmetry, it should be noted that, "All settlements located on the edge/around and north of the Inner Beltway (E-5) [in İstanbul] fall into the category of 'newly opened to settlement' and, to a great extent, are initial *gecekondu* areas." (İstanbul 1910-2010, exhibition text).

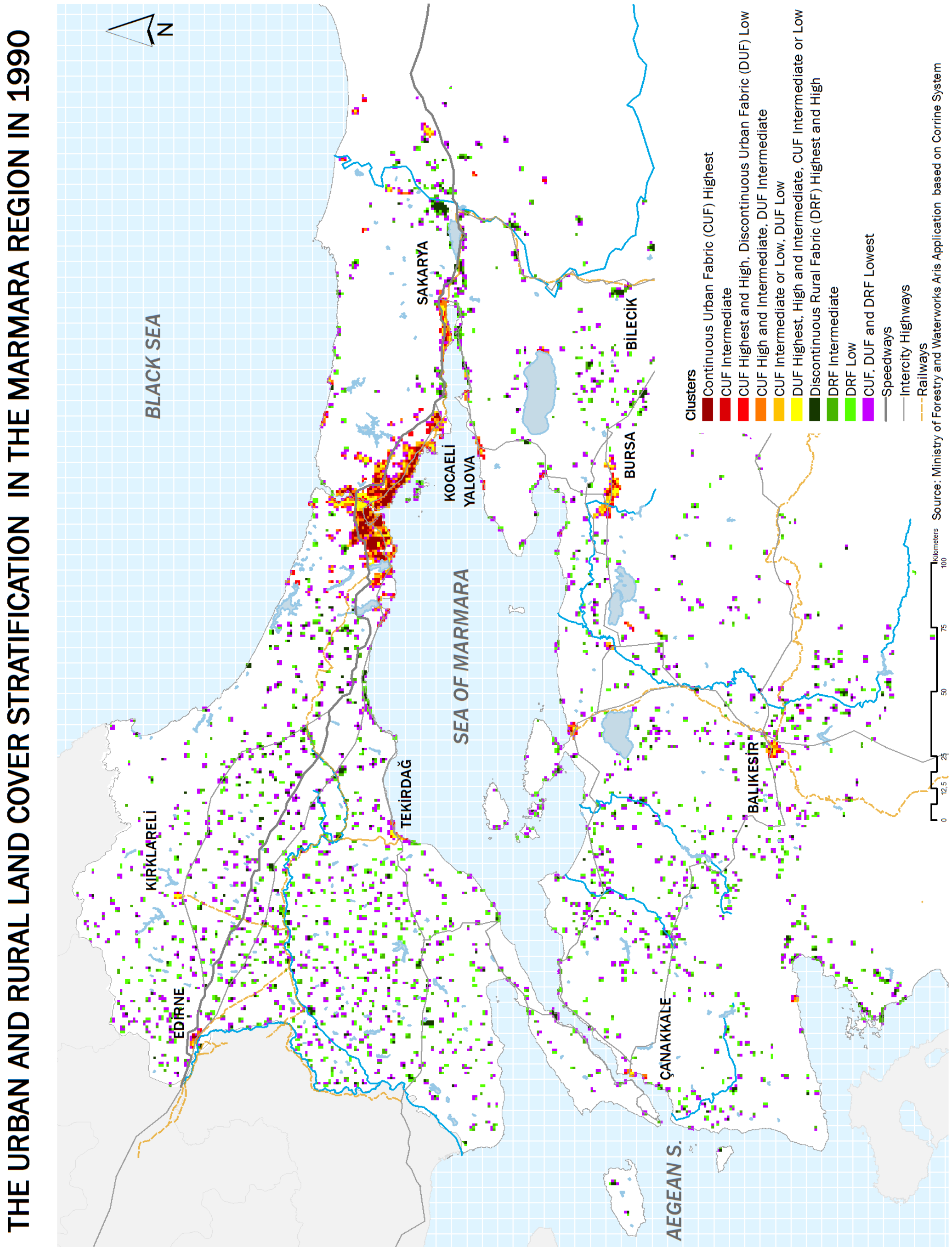

Figure 3.41: The urban and rural land-cover stratification in 1990 at the one-kilometer grid cell level.

That said, in 1990, the erstwhile *gecekondu* areas on the European side between the E5 Highway and the TEM (Trans-European Motorway) Highway have the highest overrepresentation of Continuous Urban Fabric. This category is also observed in the districts of İstanbul on the European side such as Eminönü, Beyoğlu, and Beşiktaş.

On the Anatolian side, all districts on the south of the E5 are overrepresented with Continuous Urban Fabric. The aggregation between the E5 Highway and the TEM Highway on the European side stems from the industrial geography of İstanbul. Most of the *gecekondu* settlements on the European side aggregated around the labor-intensive factories located the European side. The highest overrepresentation of Continuous Urban Fabric is also observed in the provincial centers of Edirne, Kocaeli, Bursa, and Balıkesir, as well as in the Gebze, Bandırma, and Karacabey districts as sub-district formations.

The urban centers following İstanbul such as Bursa and Kocaeli are composed of more unsaturated urban fabric. In other words, in 1990 "the over-saturated urban center" was one of the idiosyncrasies of İstanbul in relation to the Marmara Region. At the edges of the metropolitan İstanbul Continuous Urban Fabric rarefies and mixes with Discontinuous Urban Fabric. The same unsaturated composition, forms the provincial centers of Edirne and Tekirdağ provinces, and also gives the hints of the future development areas such as the southern part of Bursa. In 1990 within the metropolitan İstanbul the settlements along the Bosphorus such as Sarıyer, Yeniköy, İstinye, and Kuruçeşme in the European side; and Çengelköy, Küçüksu, and Anadoluhisarı on the Anatolian Side are separated from the city center. In these districts Discontinuous Urban Fabric has high overrepresentation (including the highest and intermediate levels) and Continuous Urban Fabric has intermediate or low overrepresentation. This intra-urban sprawl around the Bosphorus reveals another idiosyncratic aspect of the development in İstanbul that emerged as a gated community boom after the *Boğaziçi* (Bosphorus) Law No. 2960 was enacted in 1983—soon after the Fatih Sultan Mehmet Bridge began to operate—regulating the construction along the Bosphorus. In 1990 the satellite towns of İstanbul—signifying the expansion towards the north—such as Mimarsinan, Göktürk, Bahçeköy, Kilyos, Arnavutköy, Terkos, Karaburun were already explicit.

In 1990, the metropolitan area of Bursa has a linear macroform composed of an amalgamation of Continuous Urban Fabric and Discontinuous Urban Fabric. The center of Sakarya (Adapazarı) has the highest Discontinuous Rural Fabric, this is then followed by the center of Bilecik, with the rest of the province remaining rural. Interestingly, Sakarya has a unique settlement pattern in which Adapazarı—that has the highest overrepresentation of Discontinuous Rural Fabric—is surrounded by satellite towns overrepresented by Continuous Urban Fabric and Discontinuous Urban Fabric.

In 1990, Discontinuous Rural Fabric covers an important amount of the region therefore, the settlement distribution of Discontinuous Rural Fabric composes distinctive patterns at the regional scale. This category is overrepresented in districts, sub-districts, and villages. The areas with the highest concentration of Discontinuous Rural Fabric are mostly situated in Thrace, along important routes such as the E5 Highway, the European Route E84—that is the extension of the E5 Highway in the southern Thrace—and the Ergene River. Lüleburgaz, Çorlu, Uzunköprü, Keşan, Silivri, Fevzipaşa, Çorlu, Büyükkarıştıran, Lüleburgaz, Babaeski, Pınarhisar, Vize, Saray, Çerkezköy, Muratlı, Pehivanköy, Uzunköprü, İpsala, Keşan, and Malkara are the districts overrepresented by Discontinuous Rural Fabric along these routes. Yenikarpuzlu, Paşaköy, Sarıcaali, and

Adasarhanlı are the villages in the Meriç Plain along the Greece border with the highest overrepresentation of Discontinuous Rural Fabric. The overgrown villages along the Greece border are the result of vibrant commercial activity established in the *Longue Durée*. The technologically established agricultural activity taking place in the Meriç Plain can be another facilitator of the developed villages along the border with Greece. The rural concentrations of İstanbul are overrepresented mostly on the Çatalca Peninsula as an extension of the rural development in Thrace. Interestingly, these rural concentrations are situated along the railway such as Beyciler, Akören, Çatalca, and Sultangazi. The suburban linear sprawl in Silivri is composed of Discontinuous Rural Fabric.

In the Kocaeli province, Gölcük emerges as a linear formation along the Gulf of İzmit with the highest overrepresentation of Discontinuous Rural Fabric. This rural concentration splinters towards the Sapanca Lake—encompassing Kartepe and Maşukiye—and ends with Adapazarı. Geyve, Pamukova, Osmaneli, and the center of Bilecik are the rural concentrations along the Adapazar-Bilecik Highway.

In 1990, the districts of Bursa such as Mustafakemalpaşa, Karacabey, and Gemlik were already urbanized. In Çanakkale and Balıkesir the rural concentrations are scarce. Edremit, Ezine, Çan, Gelibolu, and Gönen are the districts with the highest concentration of Discontinuous Rural Fabric in Çanakkale and Balıkesir. The high concentrations of Discontinuous Rural Fabric compose a belt in the south of Balıkesir in Bigadiç, Sındırgı, İstikal, Ayvalık, and Akçapınar.

Discontinuous Rural Fabric is overrepresented in Kocaeli on the northern part of the İzmit Bay, Dilovası, and Tavşancıl. Discontinuous Rural Fabric forms a line that stretches out towards Adapazarı and continues along the southern shore of Bay of İzmit in

Karamürsel and Gölcük. Discontinuous Rural Fabric is also concentrated around the Adapazarı-Gölcük Highway, Bursa-Balıkesir Highway—intensifying towards the south around Balıkesir—around water bodies such as in the Gulf of Edremit, and along the Biga, Gönen, and Küçükmenderes Rivers, Manyas, and Ulubat Lakes. The areas with the lowest Continuous Urban Fabric, Discontinuous Urban Fabric and Discontinuous Rural Fabric coexist with different levels of Discontinuous Rural Fabric following the same spatial distribution. While Thrace is a mosaic of rural settlements; Discontinuous Rural Fabric is mostly underrepresented in the Kocaeli Peninsula because of the dispersed villages with small areas, resembling the rural areas in the Black Sea Region.[101]

3.5.3 The transformation between 1990 and 2000 at the one-kilometer grid cell level. Between 1990 and 2000, in the cases in which Continuous Urban Fabric and Discontinuous Urban Fabric increased Discontinuous Rural Fabric lost share (*Figure 3.42*). In Thrace, change occurred in the form of Discontinuous Urban Fabric and Discontinuous Rural Fabric. Discontinuous Rural Fabric significantly increased its share around Çorlu and Çerkezköy. Between 1990 and 2000 spread, sprawl, and infill occurred simultaneously in the Marmara Region. The whole metropolitan area of İstanbul on the southern part of the TEM Highway remained stagnant. In other words, the central districts of İstanbul which were already over-saturated with Continuous Urban Fabric by the year of 1990 pushed the urbanization outwards from the center between 1990 and 2000. The only increase in the shares of Continuous Urban Fabric and Discontinuous Urban Fabric occurred in the southern part of the TEM Highway—at the two eastern and western edges of İstanbul—between Büyükçekmece and Küçükçekmece Lakes in the west, and between the E5

[101] See the section on village typologies in this chapter.

Highway and the TEM Highway in the east around Ataşehir, Ümraniye, Sultanbeyli, and Çekmeköy.

It is also possible to extract a detailed account of the morphology of the peripheral growth in İstanbul from the transformation map that illustrates the period between 1990 and 2000. On the northern part of the TEM Highway on the Anatolian side in Ataşehir, Çekmeköy, and Sultanbeyli districts—specifically in Tatlısu, Parseller, Huzur, Mehmet Akif Ersoy, Taşdelen, Yunusemre, and Safa neighborhoods—Continuous Urban Fabric skyrocketed. On the northern part of the TEM Highway on the European side Göktürk, Sultangazi, Başakşehir, Güvercintepe, and Arnavutköy expanded. Between 1990 and 2000 Beylikdüzü and Esenyurt on the European side, Ataşehir, Aşağıdudullu, Sultanbeyli, the northern Çayırova, and Gebze on the Anatolian side are the other peripheral areas in İstanbul and Kocaeli in which Continuous Urban Fabric sharply increased.

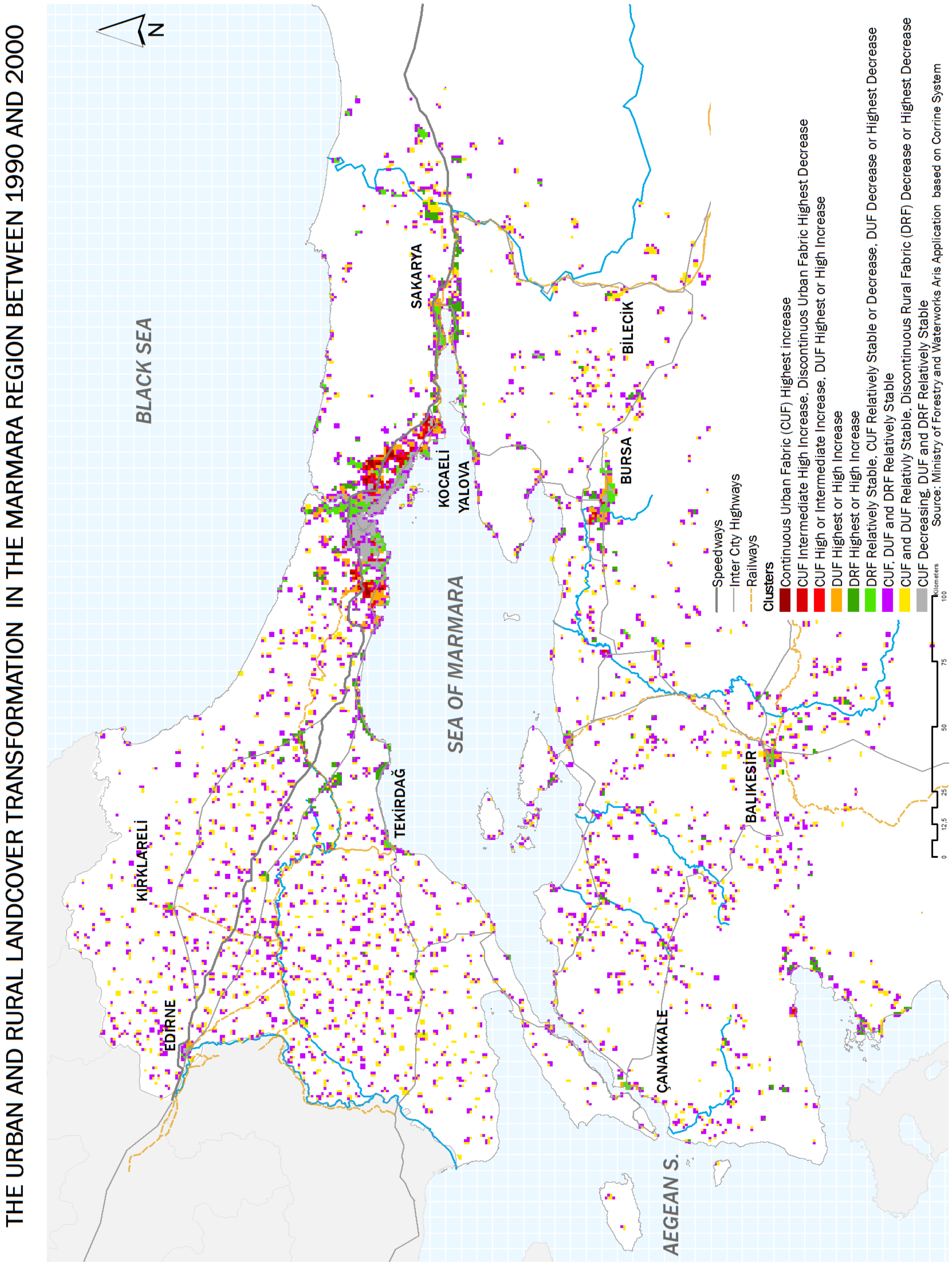

Figure 3.42: The transformation between 1990 and 2000 at the one-kilometer grid cell level.

This was then followed by an intermediate increase in Continuous Urban Fabric and relative losses in Discontinuous Urban Fabric in the areas surrounding these districts. In other words, in the unsaturated peripheral areas of İstanbul the urban growth occurred in the form of infill. The intermediate increase in Continuous Urban Fabric is also observed in a limited number of areas in the central İstanbul on the south of the TEM Highway: such as Bakırköy, Bağcılar, Merter, Beylikdüzü, and Başıbüyük on the European side and, the area between upper Pendik and lower Sultanbeyli on the Anatolian side, and in Tuzla. The intermediate increase in Continuous Urban Fabric is also observed in the Nilüfer and Karacabey districts of Bursa, demonstrating the urbanization towards the western Bursa. The rest of the development in the peripheral İstanbul occurred as a mixture of high and intermediate increase in Continuous Urban Fabric and high—including the highest—increase in Discontinuous Urban Fabric. The intermediate increase in Continuous Urban Fabric with decrease in Discontinuous Urban Fabric is also observed in Edremit and Karacabey in the southern Marmara Region.

Between 1990 and 2000 a substantial part of urban expansion occurred in the form of Discontinuous Urban Fabric. Discontinuous Urban Fabric skyrocketed at the two edges of İstanbul (Beylikdüzü and Büyükçekmece on the European side and the southern part of Sultanbeyli, the northern Pendik and Tuzla on the Anatolian side). A substantial increase in Discontinuous Urban Fabric occurred in Zekeriyaköy and Göktürk. These satellite towns or suburbs point to another fundamental difference between the urban development on the European and Anatolian sides of İstanbul. A significant amount of expansion and sprawl towards the north in İstanbul also took place in the form of Discontinuous Urban Fabric in

Bahçeşehir[102], Başakşehir, Arnavutköy, and Zekeriyaköy on the European Side, and in Beykoz—in Acarlar and Çubuklu as large swaths of gated communities—in the northern Ümraniye, Ataşehir, and Sultanbeyli on the Anatolian Side. Discontinuous Urban Fabric also substantially increased in the other important urban centers in the region such as Bursa and the northern part of the Gulf of İzmit. In Bursa, the increase in Discontinuous Urban Fabric—corresponding with the transformation of Continuous Urban Fabric—defined the growth in the east and the west, in Nilüfer, Osmangazi, and Yıldırım. Discontinuous Urban Fabric also increased in rapidly growing areas in the southwestern part of the Marmara Region such as Bandırma and Edremit.

Figure 3.43: Urban sprawl around Zekeriyaköy. Photography by Serkan Taycan.

The increase in the share of Discontinuous Rural Fabric followed specific axis, pointing to a centralization in the rural structure. In the linear conurbation on the European side of İstanbul along the Sea of Marmara in Silivri and Marmara Ereğlisi Discontinuous Rural Fabric spiked. In the emerging industrial centers such as Çerkezköy and Çorlu Discontinuous Rural Fabric skyrocketed, composing a rural-industrial formation different

[102] Ironically, meaning Garden City in English.

from the urban- industrial structure in the eastern Marmara Region (in Bursa and Kocaeli). The rural increase in Çorlu and Çerkezköy splintered towards inner Thrace and subsequently Kırklareli; increasing in Babaeski, Lüleburgaz, Büyükkarıştıran, and Ulaş along the E5 Highway, Kapaklı and Saray along the D567 Highway towards Kırklareli, and along the European Route E84 in Malkara.

Discontinuous Rural Fabric increased in sprawl areas such as Arnavutköy, Sultangazi, Zekeriyaköy, and Beykoz as the frontiers of urbanization isolated from the integrated foot print of the central İstanbul. Discontinuous Rural Fabric also increased in the southern part of the Gulf of İzmit stretching out to Adapazarı. In the southern Marmara Region Discontinuous Rural Fabric increased in a more dispersed pattern, in the fringes of metropolitan Bursa and Balıkesir, along the Biga and Gönen Rivers, the Gulf of Edremit, Ayvalık, and Altınova.

Discontinuous Rural Fabric remained stable along the Bosphorus both on the European Coast—in Ortaköy, Kuruçeşme, Arnavutköy, Etiler, Bebek, Rumelihisarı, İstinye, Yeniköy, Sarıyer, and Rumelikavağı—and the Anatolian Coast—Kuzguncuk, Beylerbeyi, and Çengelköy—demonstrating that the gated community sprawl along the Bosphorus either remained stagnant or occurred at a rate parallel to Discontinuous Rural Fabric's increase at the regional scale. The rest of the areas with stagnant Discontinuous Rural Fabric are as follows: the central Tekirdağ in Thrace, Avcılar, Zeytinburnu, and Küçükçekmece in Çatalca, Tuzla, Alemdağ, the northern part of the Gulf of İzmit, Derince, Söğütlü, Ferizli, Hendek, Karasu, the central Bursa, Balıkesir, and Bandırma. Within these stagnant areas Continuous Urban Fabric either lost its share or remained stable, Discontinuous Urban Fabric decreased substantially. The central İstanbul districts on the south of the TEM Highway signify a different mode of stagnancy than the districts accounted for, in which the decrease in Continuous Urban Fabric is related to the over-saturated urban condition.

The relatively stable areas in which Continuous Urban Fabric and Discontinuous Urban Fabric are relatively stable and Discontinuous Rural Fabric is either stable or decreases, are dispersed over the region and mostly concentrate in rural areas which points to a slow change at the territorial scale.

3.5.4 The urban and rural land-cover stratification in 2000 at the one-kilometer grid cell level. The pressure created by the urban development of Tekirdağ, İstanbul, Bursa, Çanakkale, and Balıkesir facilitated the development of regional nodes such as Marmaraereğlisi, the linear developments along the Gulf of İzmit and the Gulf of Gemlik, the Gulf of Bandırma, the Gulf of Edremit, and Çorlu (*Figure 3.44*). The Metropolitan Kocaeli and Bursa, the central Çanakkale, Edremit and Bandırma as the nodes of the developing regional system expanded. While Bursa's metropolitan area expanded drastically, a nascent rural expansion towards the north of Osmangazi and Yenibağlar areas emerged.

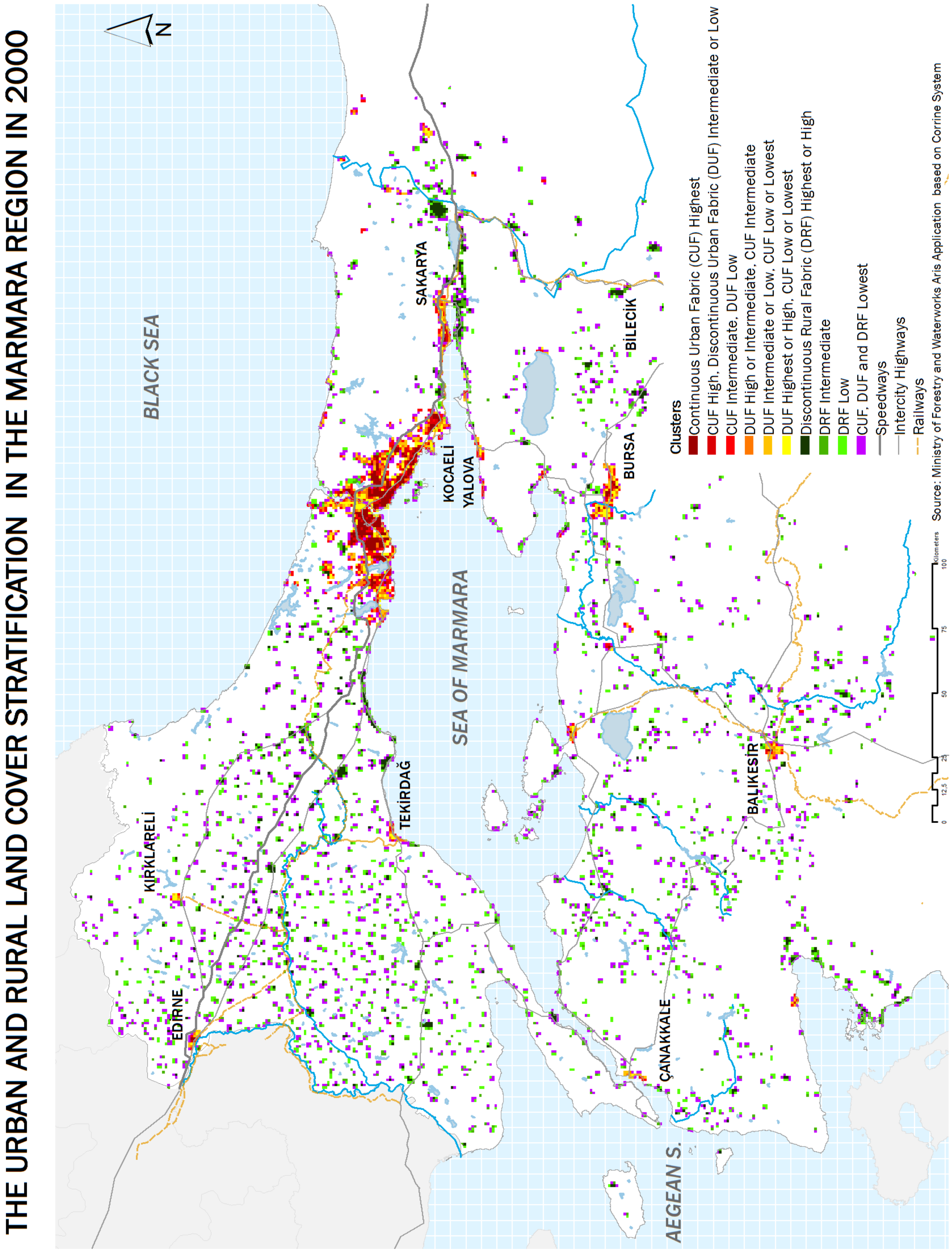

Figure 3.44: The urban and rural land-cover stratification in 2000 at the one-kilometer grid cell level.

The conurbation in the Marmara shores of Thrace stretching out from Silivri to Tekirdağ and the linear industrial formation along the Gulf of İzmit became more explicit. The bifurcated condition of the urban north versus the rural south around the Gulf of İzmit continued in 2000. The regional network in the southeastern Marmara became more integrated. The provincial centers in Thrace remained stagnant as Thrace continued to resist urbanization. The rapidly urbanizing fringe developments in İstanbul—Beylikdüzü, Avcılar, and Büyükçekmece on the European side, and Gebze on the Anatolian side—were becoming urban nodes within the Marmara Region. Urbanization also splintered towards the north of the TEM Highway in İstanbul: Bahçeşehir, the northern Küçükçekmece, Başakşehir, and Sultangazi on the European side, and the eastern Beykoz, Ümraniye, Çekmeköy, Alemdağ, and Sultangazi on the Anatolian side are among the expanded areas.

In 2000, the European side and the Anatolian side of İstanbul demonstrated different growth patterns. While urban sprawl continued on the European side; on the Anatolian Side it contiguously expanded towards the northern part of the E5 Highway and the TEM Highway. The increase in Continuous Urban Fabric is more significant on the Anatolian side than the European side: Areas overrepresented by the highest Continuous Urban Fabric significantly increased in the Ümraniye district between the E5 Highway and the TEM Highway with an expansion towards the north in Çekmeköy, Ataşehir, Pendik, and Sultanbeyli, and in Çayırova and Gebze in Kocaeli. Continuous Urban Fabric increased substantially in Başakşehir, Sultangazi, along the Bosphorus on the European side and in Beykoz. The satellite towns of İstanbul on the European side, Arnavutköy and Göktürk, expanded, therefore with the expansion of Zekeriyaköy the urban footprint along the European side of Bosphorus reached the northern tip of the Bosphorus.

In 2000, corresponding with the increase in Discontinuous Urban Fabric between 1990 and 2000[103], Discontinuous Urban Fabric became the primary category to define the overall urban growth in the region. To begin with the European side of İstanbul, in Avcılar and Beylikdüzü Discontinuous Urban Fabric—mixed with low and intermediate Continuous Urban Fabric—increased. Around Esenyurt and Başakşehir Discontinuous Urban Fabric expanded towards the TEM Highway in the north. In addition to the satellite towns such as Göktürk, Arnavutköy, and Zekeriyaköy on the European side, Sultanbeyli, Pendik, and Tuzla on the Anatolian side, and the Bosphorus area were represented by Discontinuous Urban Fabric. Discontinuous Urban Fabric also increased substantially in the other metropolitan centers in the region such as Kocaeli, Bursa, Balıkesir, Edremit, Bandırma, and Çanakkale.

The rural centers discussed in the previous section also expanded, strengthening the rural network in Thrace and the southern part of the Gulf of İzmit to Sakarya. The rural boom occurred around industrial sprawl areas in Thrace such as Marmara Ereğlisi Çorlu, Lüleburgaz, and Çerkezköy. Discontinuous Rural Fabric also increased its share around the Gulf of Edremit (probably due to a summer home boom). Stagnant areas with the lowest Continuous Urban Fabric, Discontinuous Urban Fabric, and Discontinuous Rural Fabric also persisted in 2000.

3.5.5 The transformation between 2000 and 2006 at the one-kilometer grid cell level. The change between 2000 and 2006 is very limited and should be evaluated carefully (*Figure 3.45*). Urbanization dynamics reversed at the regional scale. This transformation

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[103] From 0.3% to 0.6%.

can be explained by losses or stability in the shares of Urban Fabric land-covers rather than significant increases. Between 2000 and 2006, Continuous Urban Fabric’s share did not increase in any part of the region. The metropolitan centers of the region such as İstanbul, Bursa, and Kocaeli remained stagnant or lost share in Continuous Urban Fabric and Discontinuous Urban Fabric. Especially in the districts that expanded between 1990 and 2000 around the TEM Highway in İstanbul, the northern part of the Gulf of İzmit and central Bursa, and Balıkesir Continuous Urban Fabric lost share drastically. In other words, these over-saturated urban centers pushed urbanization toward the rural centers. The stagnancy around the Gulf of İzmit is related to the 1999 earthquake. The only increase in Urban Fabric is observed in a limited number of areas in which the share of Discontinuous Urban Fabric increased: Büyükçekmece, Beylikdüzü, Bahçeşehir, Atakent, Başakşehir, Kumköy, Ataşehir, and Büyükbakkalköy in İstanbul; Derince in Kocaeli; the central Bursa; and the northern part of the central Balıkesir.

In the rural areas, Continuous Urban Fabric, Discontinuous Urban Fabric, and Discontinuous Rural Fabric remained stagnant or increased at the same pace with regional development. In the settlements surrounding the rural centers Discontinuous Rural Fabric lost its share substantially, and Continuous Urban Fabric and Discontinuous Urban Fabric kept their shares, either by remaining or increasing at the same pace with the region. Between 2000 and 2006, Discontinuous Rural Fabric lost share drastically in the rural agglomerations in the northern Thrace including Keşan, Malkara, Uzunköprü, Hayrabolu, Muratlı, Pehlivanköy, Babeski, Lüleburgaz, Çorlu, Çerkezköy, and Marmaraereğlisi; in the rural agglomeration on the southern part of the Gulf of İzmit, including Gölcük, Sakarya, and Adapazarı; in İnegöl, Bilecik, Yenişehir, and Söğüt in the southeastern part; and in the southern part of the Gulf of Edremit, Çan, Gönen, and Bigadiç.

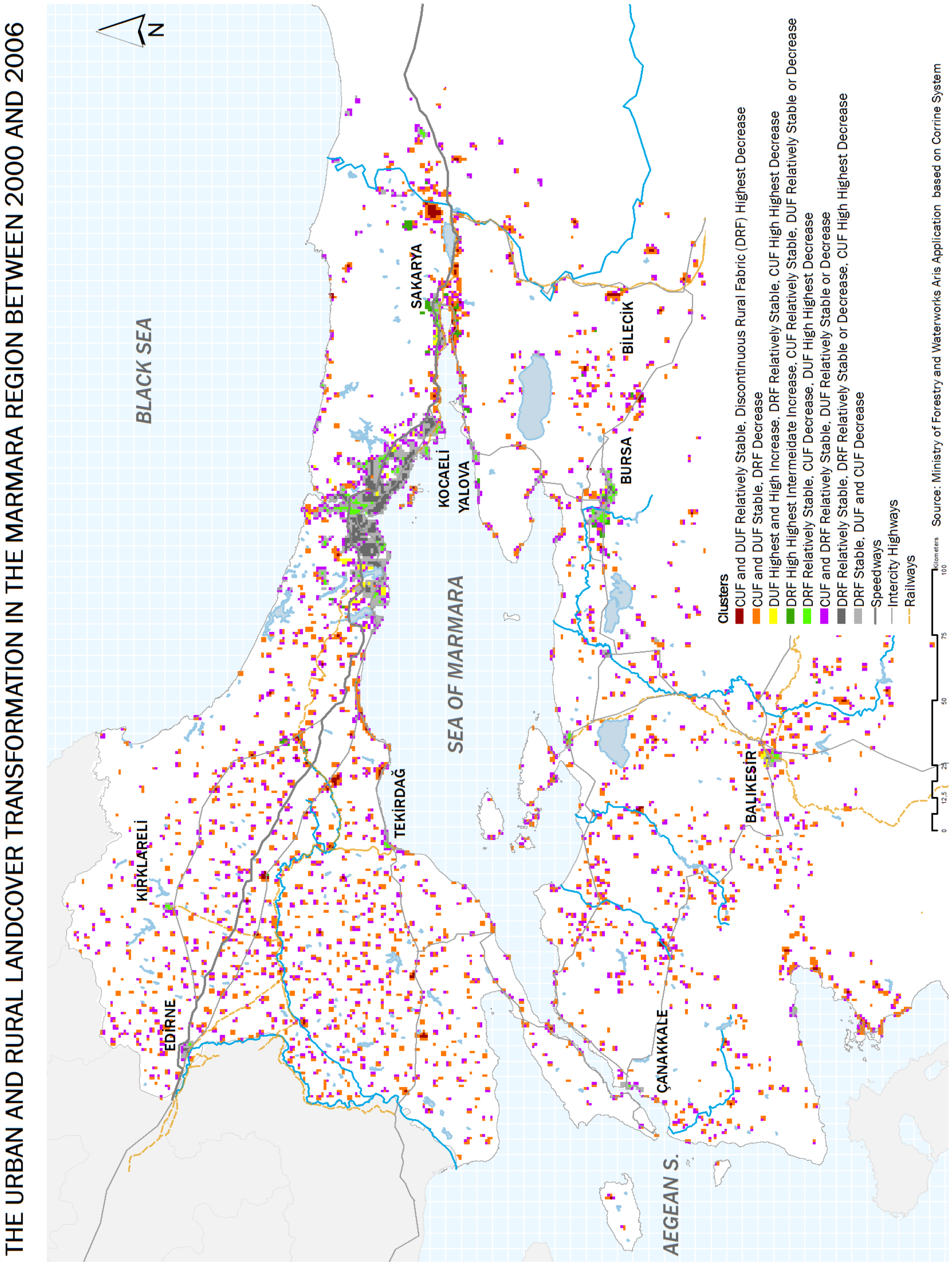

Figure 3.45: The transformation between 2000 and 2006 at the one-kilometer grid cell level.

However, Continuous Urban Fabric and Discontinuous Urban Fabric's share remained stable in these areas. This result is reflected in the 2006 map as a new rural typology in which the highest representation of Discontinuous Urban Fabric and Discontinuous Rural Fabric coexist simultaneously. The increase in Discontinuous Rural Fabric was limited to the southern coast of the Gulf of İzmit including the north of Adapazarı, Çorlu, and the northern frontier of Bursa's metropolitan area in the Nilüfer district. Between 2000 and 2006 Nilüfer and the Osmangazi area continued to be the frontier of the developing Bursa (with stable Continuous Urban Fabric and Discontinuous Urban Fabric).

Between 2000 and 2006 within the areas in which Discontinuous Rural Fabric kept its share substantial decreases were observed in Discontinuous Urban Fabric and Continuous Urban Fabric. These areas usually point to the over-saturated urban areas such as the northern part of the Gulf of İzmit, the central Bursa, Balıkesir, Bandırma, and the central İstanbul.

3.5.6 The urban and Rural Land-Cover Stratification in 2006 at the one-kilometer grid cell level. While the change between 2000 and 2006 was implicit it began to transform the resistive structures such as the rural Thrace, and thus changed the DNA of the region (*Figure 3.46*). İstanbul's urban footprint remained stagnant but Continuous Urban Fabric lost its share especially around Büyükçekmece and Avcılar on the European side. The satellite towns of İstanbul such as Arnavutköy, Göktürk, Zekeriyaköy, and Alemdağ—formerly overrepresented by Discontinuous Rural Fabric—transformed into hybrid formations composed of both Discontinuous Urban Fabric and Discontinuous Rural Fabric. This condition can also be interpreted within the, scope of push and pull relations.

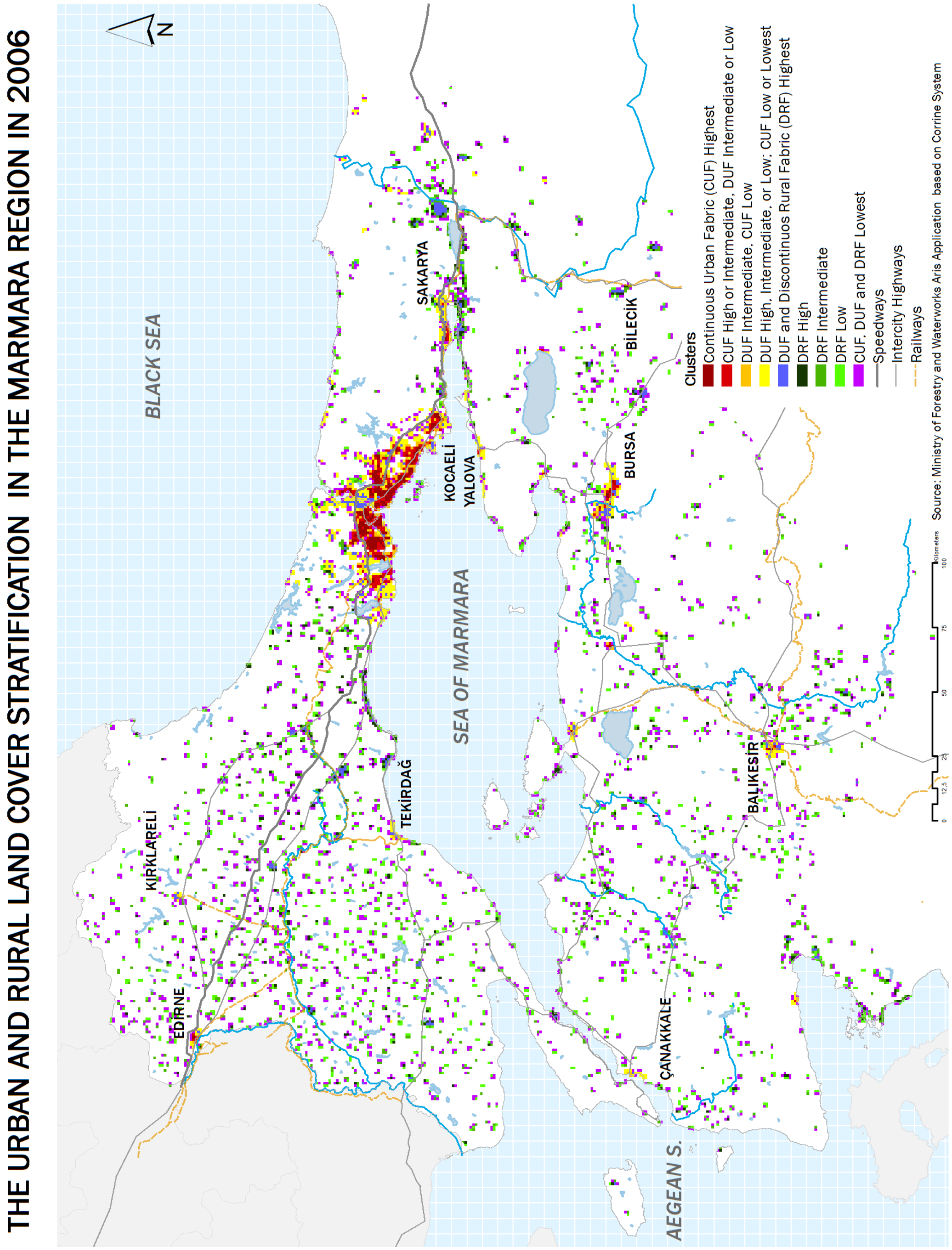

Figure 3.46: The urban and rural land-cover stratification in 2006 at the one-kilometer grid. cell level.

The centrifugal forces created by the over-saturated urban centers in 2000, such as İstanbul, Bursa, and Kocaeli transformed the rural centers including Çorlu, Çerkezköy, and Adapazarı, the southern part of the Gulf of İzmit, İnegöl, and Bilecik. In 2006, the fringe developments of İstanbul such as Büyükçekmece, Tuzla and Gebze—that had developed very rapidly until 2000—became overrepresented with Discontinuous Urban Fabric and Continuous Urban Fabric. The same condition is observed in the primary metropolitan centers, such as the peripheries of Bursa and Balıkesir, the central Kocaeli, and Tekirdağ. Bursa's development—which had continued towards the north until 2000—changed direction, and expanded towards the west between 2000 and 2006. In 2006, in this nascent urban formation Continuous Urban Fabric, Discontinuous Urban Fabric, and Discontinuous Rural Fabric were underrepresented.

3.5.7 The transformation between 2006 and 2012 at the one-kilometer grid cell level. The dynamics of the change between 2006 and 2012 is significantly different from the change between 2000 and 2006 (*Figure 3.47).* Despite the recession between 2008 and 2010—within a span of six years—urbanization prevailed at the regional scale. The share of Continuous Urban Fabric increased from 0.59% to 0.62%, Discontinuous Urban Fabric increased from 0.6% to 0.8%, Discontinuous Rural Fabric decreased from 1.4% to 1.1%. The efforts of the JDP for a construction-based economy, which had started as soon as the party came to power, demonstrated clearly legible results[104] in 2012 which transformed the whole settlement system in the region.

[104] See Figure 20. and 21.

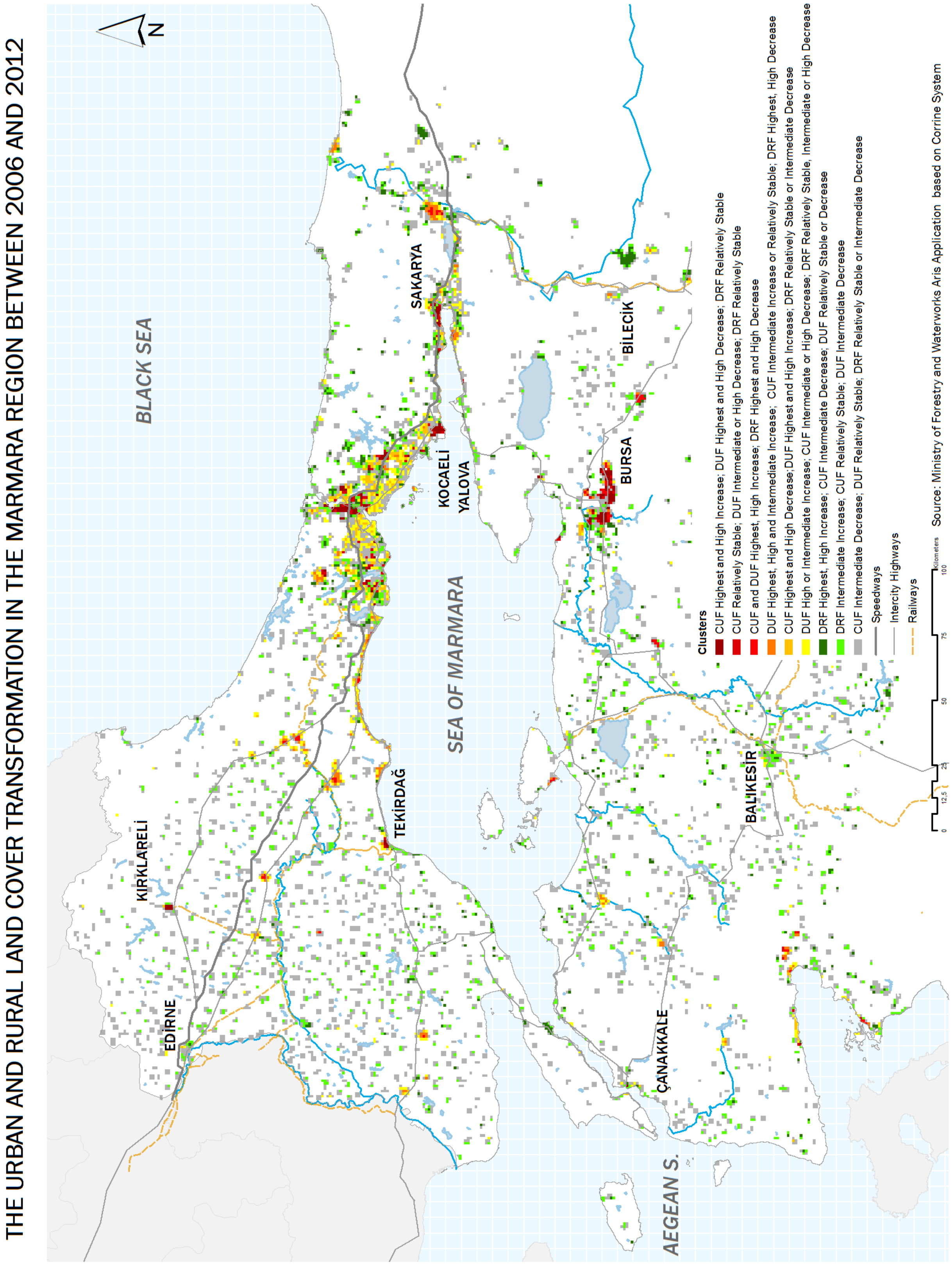

Figure 3.47: The transformation between 2006 and 2012 at the one-kilometer grid cell level.

To begin with, Bursa and İstanbul witnessed a new stage of urbanization precipitated as a result of the construction boom. The highest increase in Continuous Urban Fabric occurred in the central Kırklareli and Tekirdağ, the western coast of the Bosphorus (between Beşiktaş and Sarıyer), Esenyurt, Küçükçekmece, Arnavutköy, and Bahçelievler on the European Side. On the Anatolian side, the highest increase in Continuous Urban Fabric took place in Acarlar in Beykoz area in the north, in the Bosphorus villages such as Çengelköy and Kuzguncuk, and in Taşdelen in Çekmeköy. In Kocaeli, Gebze, Derince, and İzmit districts in the northern part of the Gulf of İzmit expanded. However, between 2006 and 2012 the highest rate of urbanization took place in Bursa. Continuous Urban Fabric spiked in all the metropolitan area of Bursa including Kestel, Yıldırım, Osmangazi, and Nilüfer. Continuous Urban Fabric also increased in Bandırma and Edremit in the southern Marmara Region.

Figure 3.48: Arnavutköy in 2012. Photography by Serkan Taycan.

In many of the nascent urban areas in the region Continuous Urban Fabric and Discontinuous Urban Fabric increased simultaneously: in the emerging nodes in Thrace (Çorlu, Çerkezköy, Marmaraereğlisi, Babaeski, Lüleburgaz, Çorlu, Hayrabolu, Keşan, and

İpsala); in İstanbul (along the western Marmara Shore and in the Arnvutköy district on the northern European side); in Adapazarı, Sapanca, and Gölcük in the northeastern Marmara Region (with a leapfrog to Karasu in the northen part of Sakarya); and in the periphery of the metropolitan Bursa. This fabric also shaped the emerging regional nodes in the southern Marmara Region, such as İnegöl and the central Bilecik, Mustafakemalpaşa, Erdek, Çan, Edremit, Ayvalık, and Havran.

Between 2006 and 2012 Discontinuous Rural Fabric also expanded at the regional level. In Thrace Discontinuous Rural Fabric increased its share primarily around the European Route E84 and Gelibolu Peninsula. In İstanbul, Discontinuous Rural Fabric significantly increased in the northern periphery, both on the European side (including the Büyükçekmece, Başakşehir, and Küçükçekmece, Sarıyer, Arnavutköy, and Göktürk districts) and the Anatolian side (Beykoz, Çekmeköy, Sultanbeyli, Ömerli, and Şile). Therefore, it acted as the frontier of the expansion towards the north. Discontinuous Rural Fabric also increased along the canal İstanbul path, proving that JDP's efforts on land speculation worked. Discontinuous Rural Fabric increased around the Gulf of İzmit, and along the highway that stretches out from the Gulf of İzmit to Adapazarı (especially in the southern part of Adapazarı, Hendek and Akyazı). Substantial increases in Discontinuous Rural Fabric occurred along the Sakarya River between Adapazarı and Karasu and in the eastern part of Bilecik (precisely in Küre). In Bursa Discontinuous Rural Fabric increased in Orhangazi, İnegöl, Nilüfer, and Mustafakemalpaşa. It also increased in the northern and southeastern periphery of Bursa's metropolitan area. In Balıkesir, significant increases in Discontinuous Rural Fabric are observed in almost all districts including Edremit, Gönen, Bandırma, and Biga. Intermediate increase in Discontinuous Rural Fabric at a territorial scale in the Marmara Region is a signifier of the construction boom between 2006 and 2012.

3.5.8 The urban and Rural Land-Cover Stratification in 2012 at the one-kilometer grid cell level. Due to the rapid urbanization between 2006 and 2012, the Marmara Region in 2012 illustrates a different picture from that of 2006 (*Figure 3.49*). Firstly, the strong rural structure in Thrace dismantled. Çorlu and Çerkezköy around the western periphery of İstanbul and the districts along the major highway junctures in Thrace —such as Lüleburgaz, Babaeski, Keşan, and İpsala—emerged as urbanized regional nodes with substantial increases in Continuous Urban Fabric. While İstanbul remained as an imploding city, the new regulations paved the way to a massive expansion towards the north. The erstwhile satellite towns such as Arnavutköy and Göktürk became urbanized, almost amalgamating with the macroform of the metropolitan İstanbul. The metropolitan area of Bursa became an over-saturated urban center—resembling İstanbul—with the highest overrepresentation of Continuous Urban Fabric. The northern part of the Gulf of İzmit and Adapazarı also became significant urban centers, primarily overrepresented with Continuous Urban Fabric.

Discontinuous Urban Fabric surrounds the periphery of the urban centers accounted for. In addition to this, in 2012 Discontinuous Urban Fabric was overrepresented along the southwestern Marmara Shore of İstanbul as well as the Black Sea shores (in Eyüp and Sarıyer on the European side and Şile on the Anatolian side). Discontinuous Urban Fabric further expanded toward the north in İstanbul; for instance, Esenyurt and Başakşehir stretched out towards the Sazlıdere Dam on the European side and Beykoz, Sancaktepe, and Sultanbeyli districts—surrounding the Ömerli Dam—expanded towards the north on the Anatolian side. The invasion of the fresh water basins by Urban Fabric land-covers reveals the shortcomings of the construction boom and land speculation.

Within this scheme Karasu in Sakarya, Gölcük in Kocaeli, the center of Yalova, Bandırma, Edremit, the center of Balıkesir, Çan, Biga, and Çanakkale compose the unsaturated emerging urban centers—overrepresented by Discontinuous Urban Fabric—in 2012.

Concomitant to the urbanization in Thrace, Discontinuous Rural Fabric decreased significantly, which demonstrates that the expanding urban centers in Thrace are generating centripetal forces and a substantial centralization is taking place in the area. A similar trend is observed in the north on the European side of İstanbul, the implosion of Arnavutköy and Göktürk is followed by a substantial decrease in Discontinuous Rural Fabric. Conversely, on the Anatolian side of İstanbul, new areas overrepresented with Discontinuous Rural Fabric emerged in the northern parts of Beykoz and Çekmeköy including Ömerli, Anadolufeneri, Cumhuriyet, and Riva. Discontinuous Rural Fabric also decreased in the southern part of the Gulf of İzmit, the Sapanca Lake and the southern Marmara Region. The only exceptional areas, in which the Discontinuous Rural Fabric increased, are Hendek and the eastern Bilecik.

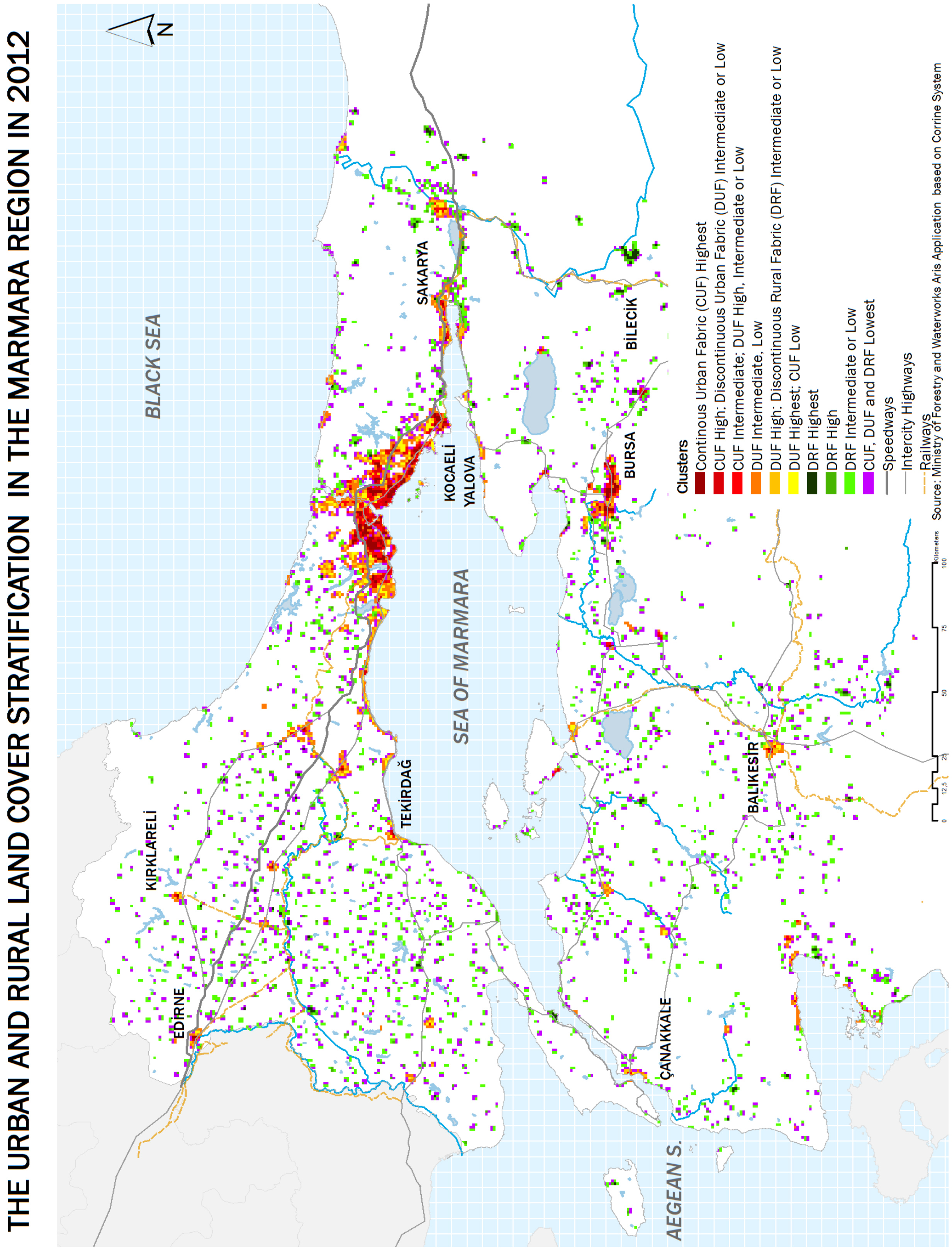

Figure 3.49: The urban and rural land-cover stratification in 2012 at the one-kilometer grid cell level.

3.5.9 The summary of the analysis. The one-kilometer grid cell analyses covered a span of 22 years beginning from 1990 and revealed different dimensions of regional development that had remained implicit at the district-level analysis. The up-to-date land-cover data provided by the Ministry of Forestry Water Management processed by MCA generated high resolution results that facilitate the monitoring of spatial change in the Marmara Region across scales. The findings of the two analyses can be summarized as follows:

1. The development within the Marmara Region was highly fragmented until 2006: rural Thrace and the southwestern Marmara showed very different urbanization dynamics than the urbanized southeastern Marmara Region. However, the most important result 2012 land-cover data demonstrates is that this condition has reversed. Thrace witnessed a rapid urbanization process, and its rural structure concomitantly dismantled. Therefore, it became more interdependent with İstanbul. The most explicit expansion occurred in Çerkezköy and Çorlu due to the efforts to decentralize İstanbul. Additionally, provincial centers of Kırklareli, Tekirdağ and Edirne expanded. This situation is open to multiple explanations: The rapid urbanization in Thrace can be regarded as an indicator of intra-regional integrity as the emerging urban areas in Thrace are acting as nodes and thus, creating accumulative forces. It can also be considered as a separation, as the nascent urban nodes in Thrace are becoming interdependent with İstanbul. While Çerkezköy and Çorlu are more likely to act as nodes in the multi-nodal regional network due to their proximity to İstanbul and their industrial character, the rest of the expanding areas in Thrace are composed of isolated provincial centers. These expanding provincial centers seem to be repeating the existing urban government structure and acting as autonomous formations.

2. The significant development areas also overlap with the developing industrial zones and infrastructural investments: i.e. the Bursa-İzmir highway, the port development around the Gulf of İzmit, and the development around Çorlu and Çerkezköy. This condition will be discussed in detail in the following chapter.

3. This interplay of centripetal and centrifugal forces—i.e. the push created by the over-saturated urban centers such as İstanbul and Bursa or the pull created by unsaturated areas such as the central Balıkesir or Edremit—are other fundamental mechanisms affecting the regional development.

4. The district-level analyses enabled the researcher to clearly detect the direction of regional development: The urban region formation in the Marmara Region stretches out from the eastern part of the İstanbul, surrounds the Gulf of İzmit and Gulf of Gemlik, follows the Bursa-İzmir Highway direction towards the south as it encompasses the metropolitan Bursa, and continues towards the south in the Balıkesir area. This growth pattern is not so explicit at the one-kilometer grid cell analyses. However, the one-kilometer grid cell analyses revealed the sharp difference between the rural western Marmara Region and the urbanized eastern Marmara Region. It also facilitated the monitoring of growth patterns in higher resolution.

5. In all analyses, İstanbul emerged as an imploding urban formation unable to decentralize. However, the pressure created by this massive agglomeration is affecting regional development at a diverse set of scales, precipitating intra-regional explosions such as the development around Çorlu and Çerkezköy in Thrace or the rapid development of the Gulf of İzmit area. Distance plays an important role in this spatial distribution. The

developing peripheral areas such as Balıkesir or Edirne act as inter-regional nodes; and thus these nodes are interdependent of İstanbul's centripetal forces.

6. Surprisingly, the spatial analyses discussed in this chapter illustrated that İstanbul is not a unified entity, and thus the European Side and the Anatolian Side of the city operate in different ways, demonstrating different growth patterns. This spatial differentiation within İstanbul shows that the researcher has to be very careful in making generalizations for the case of İstanbul.

4. The Evaluation of Industrial, Agricultural and Forest Land-Covers

This chapter is about the transformation of the industrial land-covers between 1990 and 2012, and agricultural and forest land-covers between 1990 and 2006. By integrating the changes in these land-covers into regional analysis this study aims to discuss more profound manifestations of urbanization. In the section titled "Deciphering the Microecologies of the Region: The Evaluation of 2006 Land-Cover Data in Strata" all land-covers observed in the Marmara Region are simultaneously evaluated in Strata 7.3. While this analysis is helpful to see the land-cover aggregates, a more scrutinized study of each land-cover category—based on the Corine System—through Multiple Correspondence Analysis (MCA) will reveal the clash of claims between different land-uses and therefore will give a better understanding of the region's rapidly changing landscape with respect to the contemporary sustainability problems.[105]

The chapter will begin with an analysis on Industrial, Commercial and Transport Units including Industrial or Commercial Units, Road and Rail Networks and Associated Land, Port Areas, Airports, and Construction Sites land-covers. It will then continue with analyses of intra-regional accessibility patterns that comprises choropleth maps based on the highway distances. The section on industrial, commercial and transport units will also include a discussion on the Marmaray project and the recent developments in the ports that surround the Sea of Marmara. The following analysis on the transformation of Agricultural and Forest land-covers will demonstrate the impact of the of expansion urban and industrial land-covers on the ecology of the Marmara Region.

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[105] The differences between Strata 7.3 and Multiple Correspondence Analysis, are explained in the section on Methodology in Chapter 3 and in the appendix.

4.1 The development of industrial, commercial and transport units between 1990 and 2012.

4.1.1 Development between 1990 and 2000. By 1990 industrial and commercial areas were primarily agglomerated within İstanbul and the northern part of the Gulf of İzmit (*Figure 4.1*).[106] The areas in which the port functions were overrepresented were Haydarpaşa and Tuzla. Between 1990 and 2000 the industrial and commercial agglomeration within İstanbul's provincial borders decentralized (*Figure 4.2*).

This period also witnessed the emergence of the Çorlu-Çerkezköy industrial area in Tekirdağ which begins right outside of İstanbul's European border. The story of Çorlu-Çerkezköy area dates back to the 1970's when Çerkezköy was chosen as a priority development area, and a 15 million square-meter land was allocated to industrial land-use (Yurt Ansiklopedisi, Vol. 10, p. 7013). In so doing, the primary purpose was to decentralize the industrial areas within İstanbul's provincial borders (p. 7013). By 1983, there were already more than twenty prominent industrial cooperation in the Çorlu-Çerkezköy area (p. 7013).

Between 1990 and 2000, the industrial and commercial areas explicitly increased in the north of Tekirdağ in Thrace, the northern part of Tuzla and Çayırova around the Gulf of İzmit (in Orhanlı Organized Industrial Zone), the İzmit district, the eastern part of the Lake Sapanca, the central Bursa, the central Balıkesir, and Bandırma. Despite the decentralization efforts the industrial and commercial areas within İstanbul's provincial borders also substantially expanded (in Beylikdüzü, Küçükçekmece, Başakşehir in the

[106] Industrial and commercial areas are compiled in the same land-cover category in the Corine System.

European side, and in Sancaktepe in the Asian side). The port-related functions primarily increased along the Sea of Marmara shores of İstanbul (Bakırköy, Zeytinburnu, Kadıköy, and Tuzla) and the northern shore of the Gulf of İzmit (Dilovası, Körfez, Derince, and Başiskele). The shares of the Industrial or Commercial Units, Road and Rail Networks and Associated Land, Port Areas, Airports, and Construction Sites increased from 0,3% to 0.8% between 1990 and 2000. This rapid increase in artificial surfaces yielded to a landscape transformation at the regional scale (*Figure 4.3*). Notably, the increase in industrial and commercial land-use, particularly in İstanbul, corresponds to the findings of the analysis on building census data discussed in the previous chapter, which demonstrated that the buildings with large foot prints increased substantially in İstanbul between 1984 and 2000.

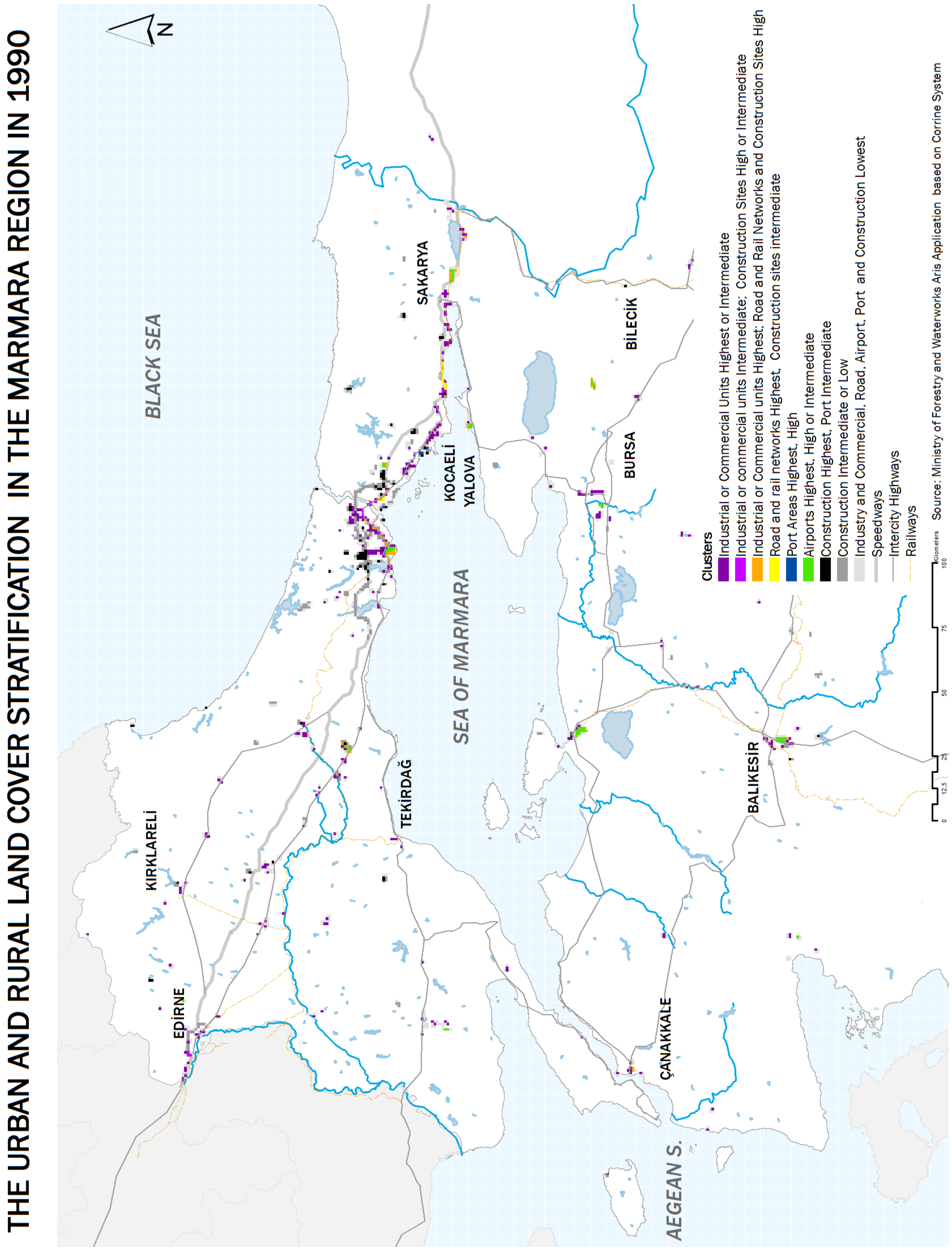

Figure 4.1: The industrial, commercial and transportation land-cover stratification in the Marmara Region in 1990.

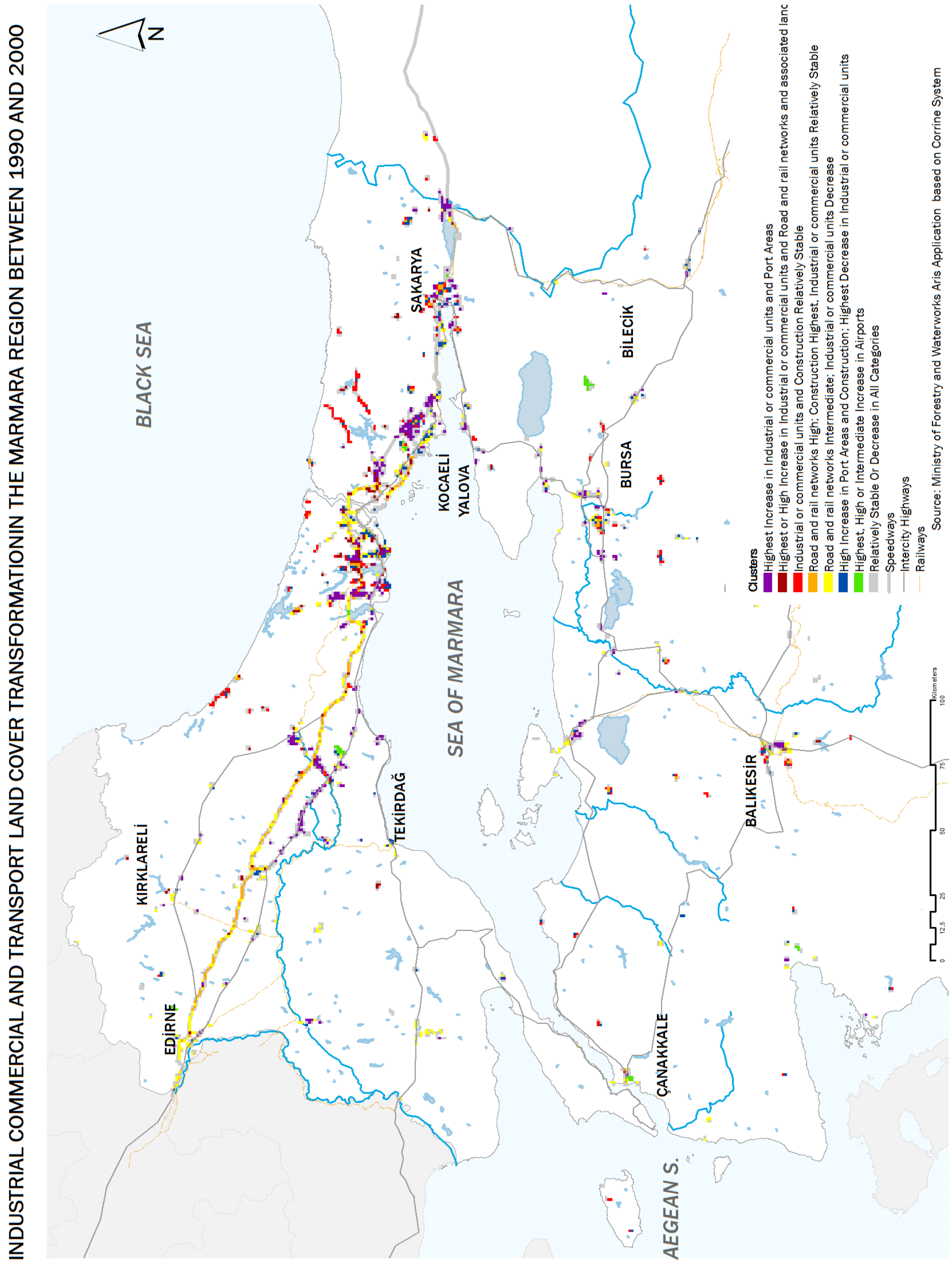

Figure 4.2: The industrial, commercial and transportation land-cover transformation in the Marmara Region between 1990 and 2000.

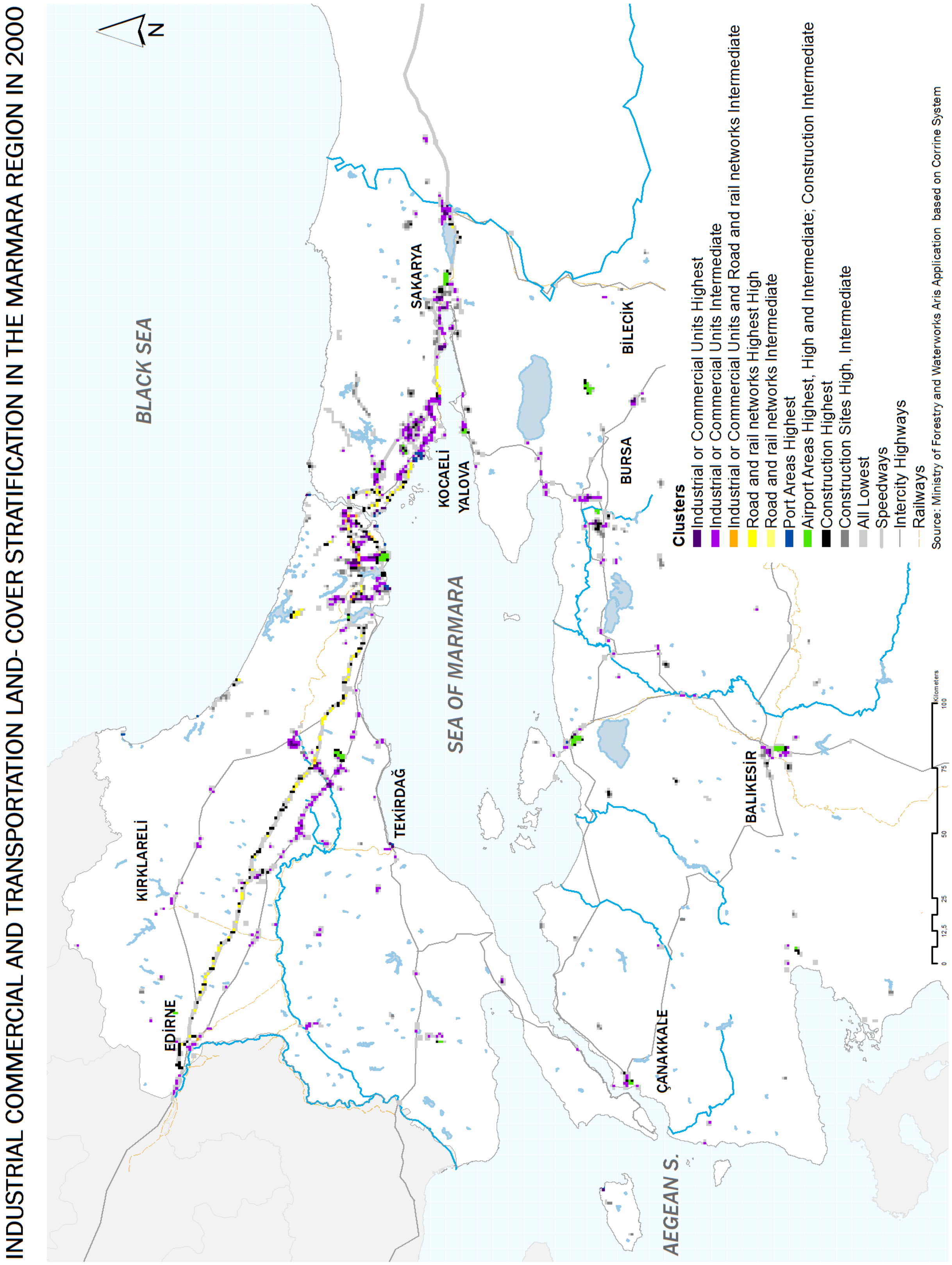

Figure 4.3: The industrial, commercial and transportation land-cover stratification in the Marmara Region in 2000.

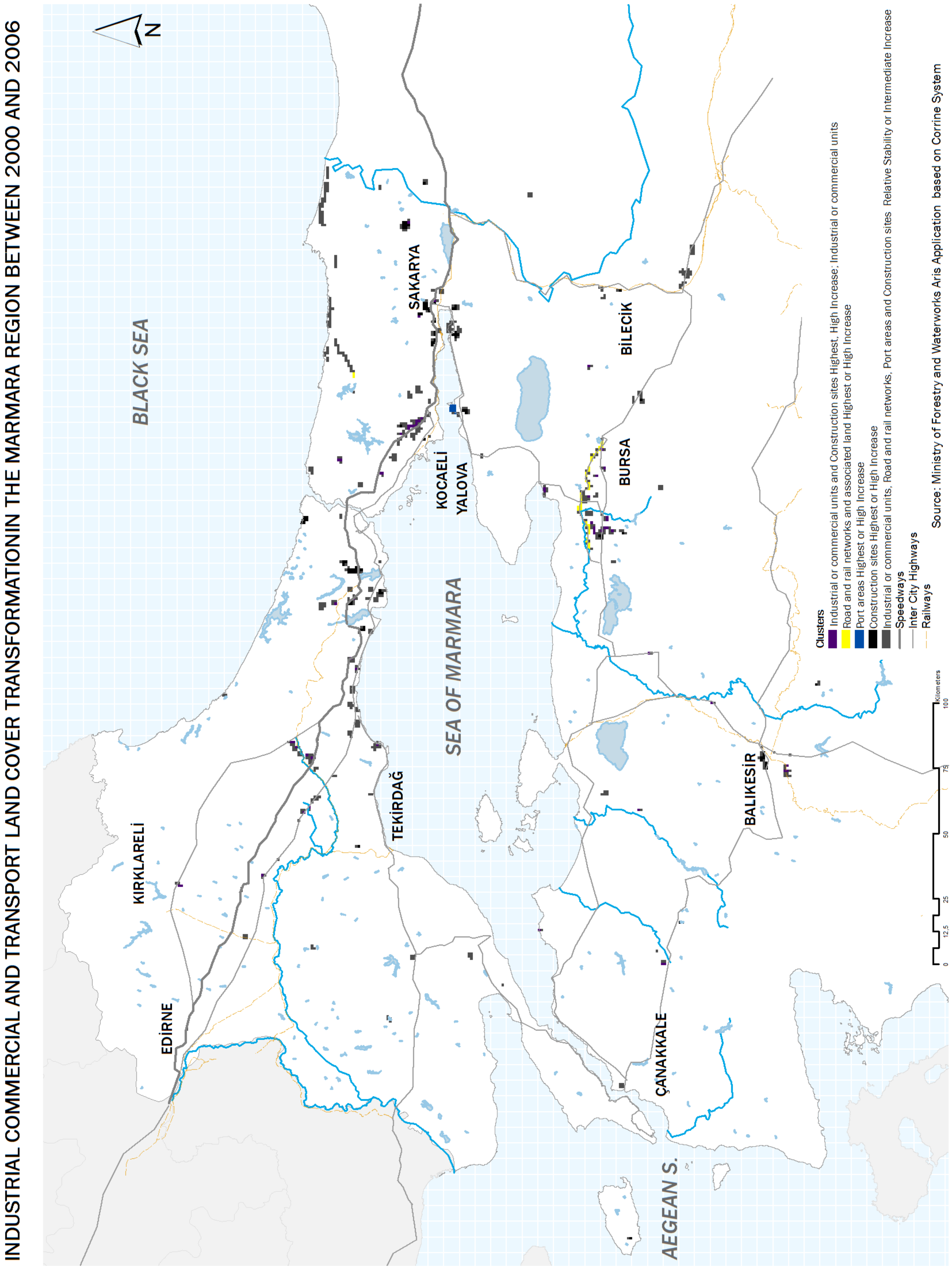

Figure 4.4: The industrial, commercial and transportation land-cover transformation in the Marmara Region between 2000 and 2006.

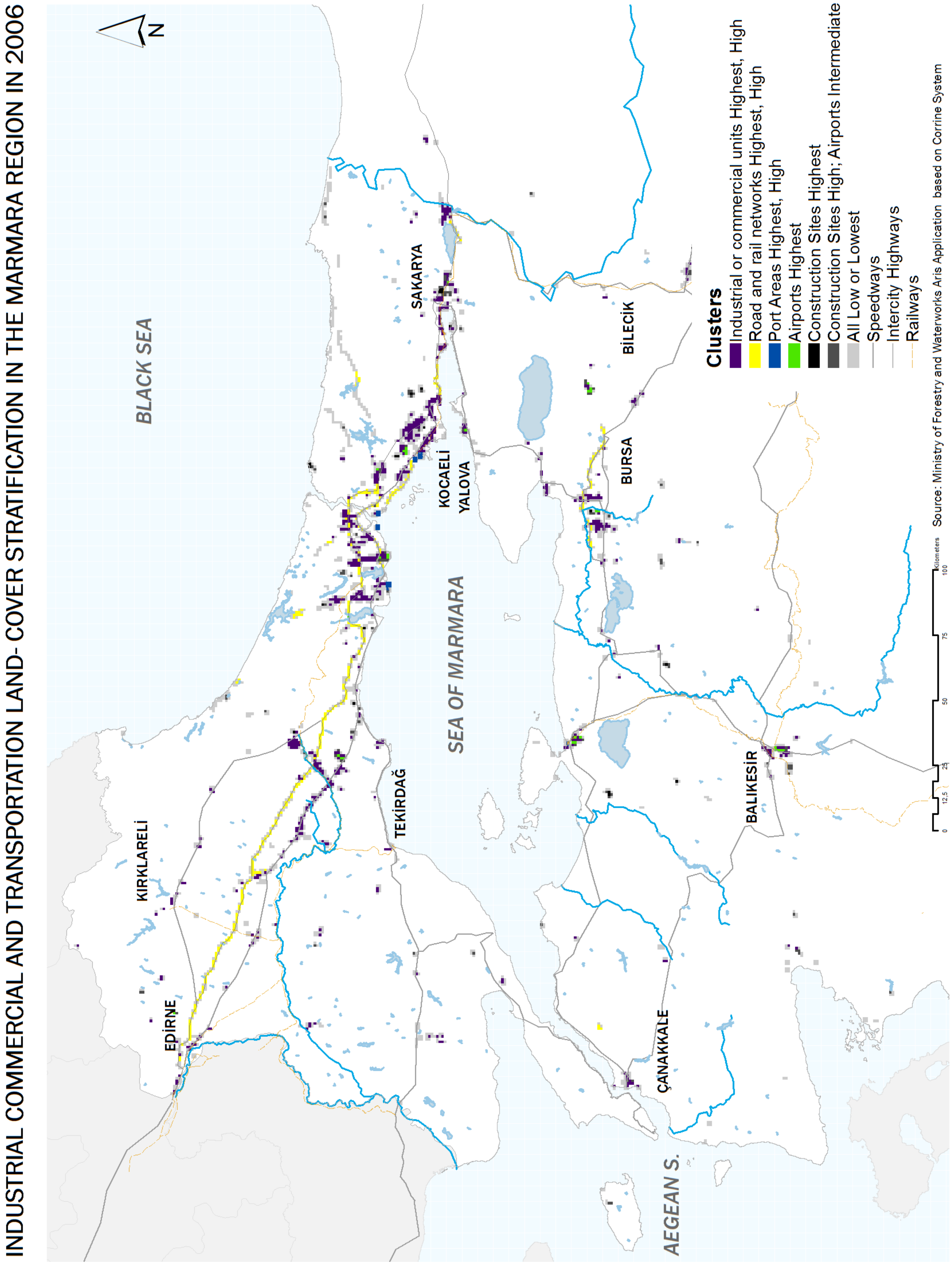

Figure 4.5: The industrial, commercial and transportation land-cover stratification in the Marmara Region in 2006.

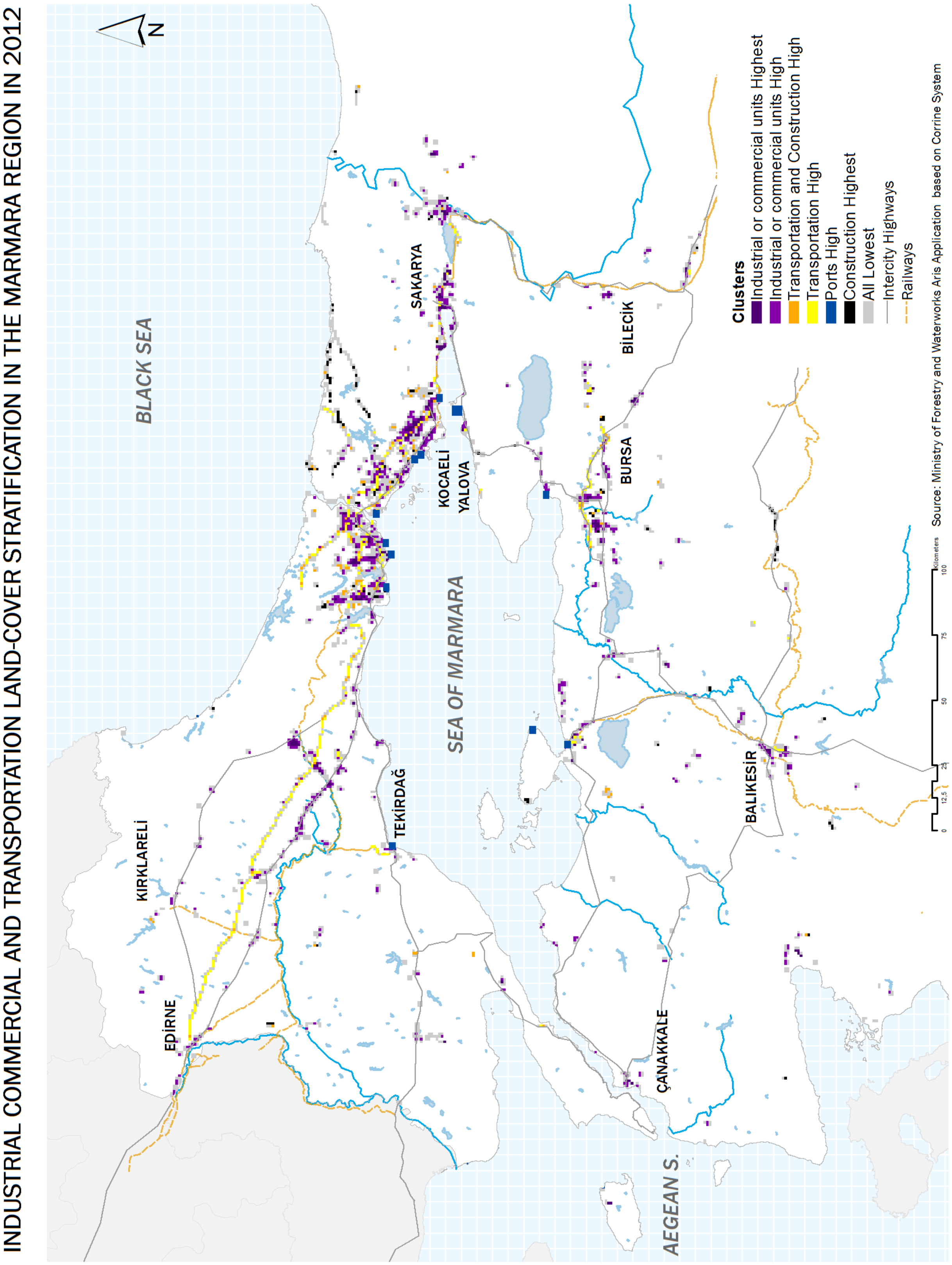

Figure 4.6: The industrial, commercial and transportation land-cover stratification in the Marmara Region in 2012.

4.1.2 Development between 2000 and 2006. Concomitant to the transformation in Urban Fabric land-covers, the change of Industrial, Commercial and Transport Units land-covers was very limited between 2000 and 2006 (*Figure 4.4 and Figure 4.5*). The industrial development followed a pattern similar to the transformation between 1990 and 2000: the industrial areas skyrocketed in the northern periphery of the Gulf of İzmit (precisely in the Gebze district in Kocaeli), in the southwestern part of Bursa, and in the central Balıkesir. Despite the stagnant condition at the regional scale the significant increase in industrial and commercial land in Bursa demonstrates that between 2000 and 2006 the city gained autonomy. Another significant difference is the increase in the port-related land-covers around Hersek as a signifier of the spread of the port functions towards the southern part of the Gulf of İzmit. However, unlike the period between 1990 and 2000, these local changes did not change the industrial and the commercial landscape at the regional scale (*Figure 4.5*).

4.1.3 Development between 2006 and 2012. If the urbanization dynamics between 2006 and 2012 are compared with the development of industrial and commercial land-use, it is observed that the urban development in Thrace—specifically in Çorlu and Çerkezköy—is independent from the industrial and commercial sprawl. In this regard it can be asserted that—similar to the previous periods—industrial and commercial sprawl between 2006 and 2012 is related to the general industrialization processes of Turkey. Between 2006 and 2012, the most significant increase is monitored within the provincial borders of İstanbul (*Figure 4.6*) which is due to the boom of mixed use complexes and shopping malls in the city. The second significant change is the increase in the construction and transportation activities in the northern part of İstanbul that are related to the Northern

Projects. The rapid urban and commercial development between 2006 and 2012 within the provincial area of İstanbul demonstrates that the limited natural resources of the city are at stake.

Between 2006 and 2012, while the industrial and commercial land-covers remained stagnant in Thrace, they expanded around Sakarya, the eastern part of the Sapanca Lake, in the central Bursa, central Balıkesir, and Bandırma. A significant increase in ports is monitored around the shores of the Sea of Marmara, in Tekirdağ, Hersek, and Diliskelesi.

4.2 Primary Changes in Transportation between 1990 and 2015

4.2.1 The inter-regional accessibility patterns based on road infrastructure. In these series of analyses, the information on distances based on highways are retrieved from Google Maps and subsequently classified in Arcmap. In three analyses based on the distances of the districts in the Marmara Region from the centers of İstanbul, İzmir, and Ankara similar accessibility patterns are observed, shedding light on the intra-regional independence and interdependence.[107] Firstly, in the three cases Thrace emerges as an autonomous entity, hence it can be asserted that a substantial part of the peculiarities of the Thrace region—as discussed so far—stem from the geographic constraints based on accessibility (*Figure 4.7, Figure 4.8 and Figure 4.9*). A similar argument can be made for the southwestern Marmara Region. The accessibility patterns demonstrate that distance is still an important geographic obstruct, impeding the integrity of the southwestern Marmara Region to İstanbul. The dynamics of the eastern border of the Marmara Region including the peripheral districts of, Bilecik, Sakarya, and Kocaeli seem to depend on inter-regional

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[107] The distances are based on the major highways connecting the districts to the urban centers and normalized by a fixed speed of 120 km/hour.

push and pull between İstanbul, İzmir, and Ankara. However, the role of these peripheral districts in transforming the urbanization dynamics of the Marmara Region is very limited. Interestingly, Accessibility Analysis 4 (*Figure 4.10*) demonstrates that the role of the Kocaeli Bridge in changing the existing accessibility patterns is very limited. While the Kocaeli Bridge increases the accessibility between İstanbul and the southeastern Marmara Region including the southern part of the Gulf of İzmit, Gulf of Gemlik, and Bursa, it has little effect on increasing the accessibility to the southwestern Marmara Region. Therefore, it can be asserted that the southeastern Marmara Region will become more interdependent to İstanbul but the southwestern Marmara Region will continue to be an autonomous entity.

The findings of the analysis discussed in this section correspond to the findings of a study on the functional urban area of İstanbul published by Melih Bulu, Abdülmecit Karataş, and Hüseyin Kaya (2009). According to this article, while the functional area of İstanbul based on labor flows is limited to Gebze, the functional area of İstanbul based on workflows is limited to Kocaeli and Tekirdağ (p. 325). The article refers to Bursa as a rapidly organizing autonomous metropolitan entity that creates its own centripedal forces, and thus the lack of efficient transportation systems limits the relation between Bursa and İstanbul (pp. 325-326).

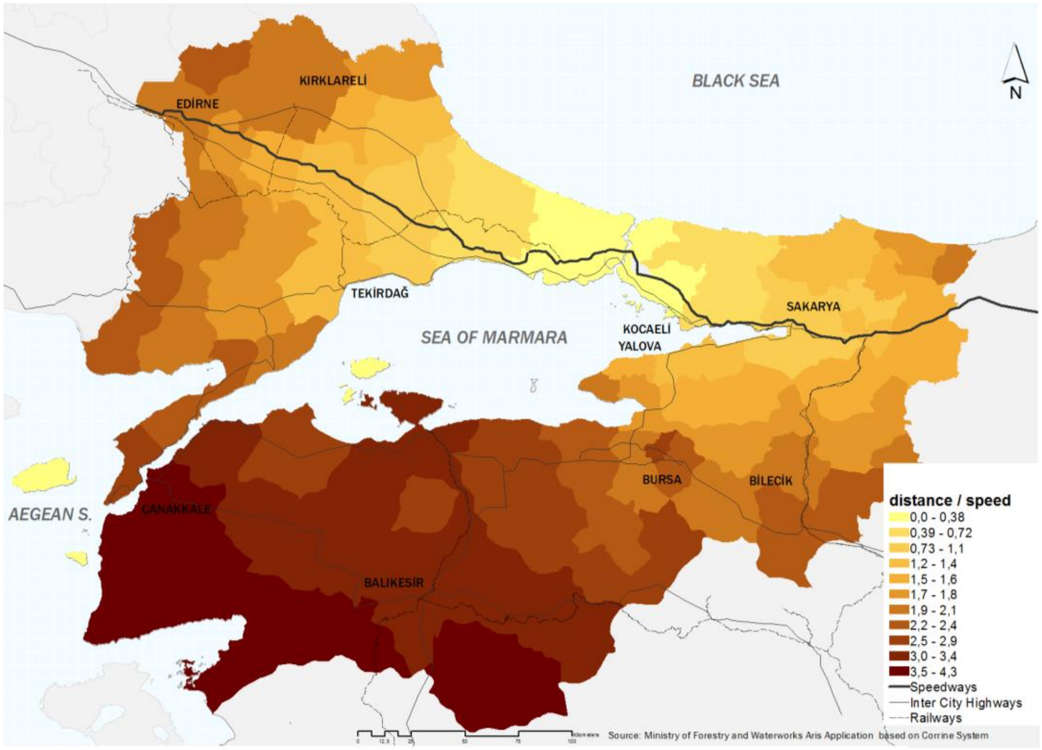

Figure 4.7: Accessibility Analysis 1- the distances of the Marmara Region districts from the center of İstanbul.

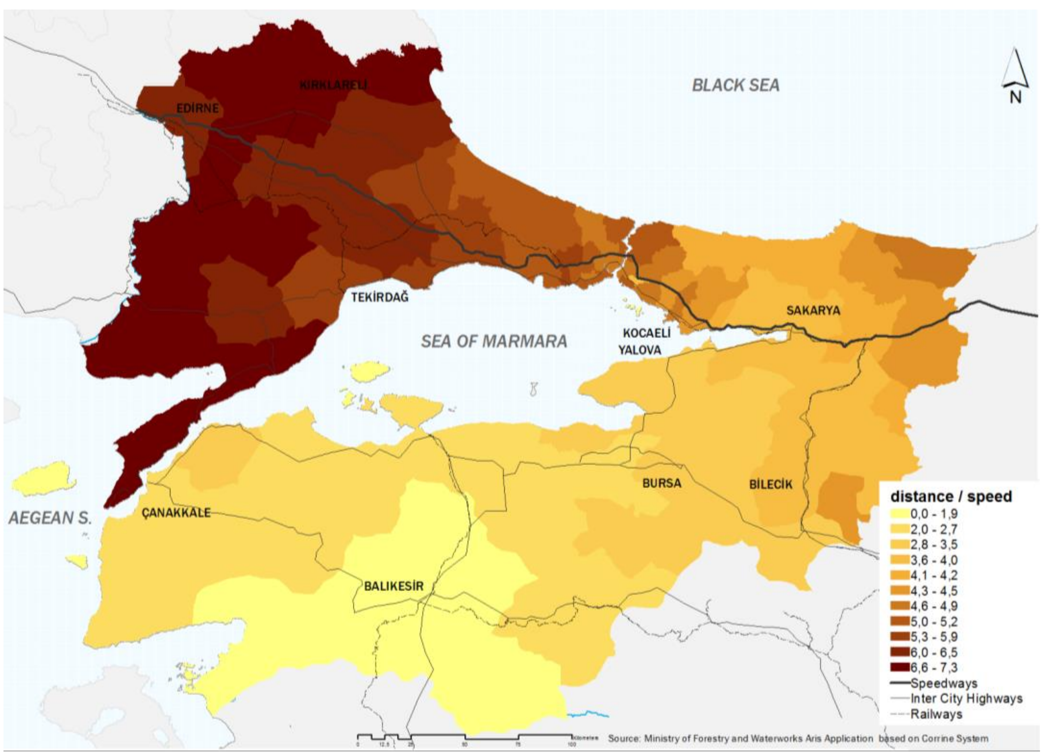

Figure 4.8: Accessibility Analysis 2- the distances of the Marmara Region districts from the center of İzmir.

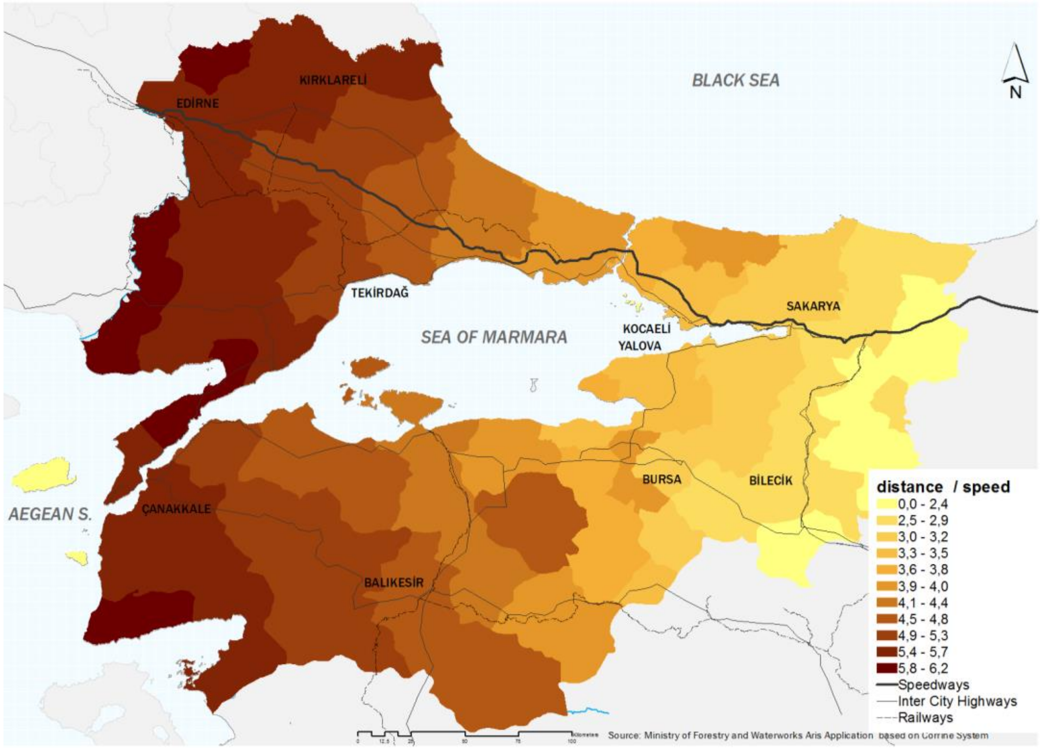

Figure 4.9: Accessibility Analysis 3- the distances of the Marmara Region districts from the center of Ankara.

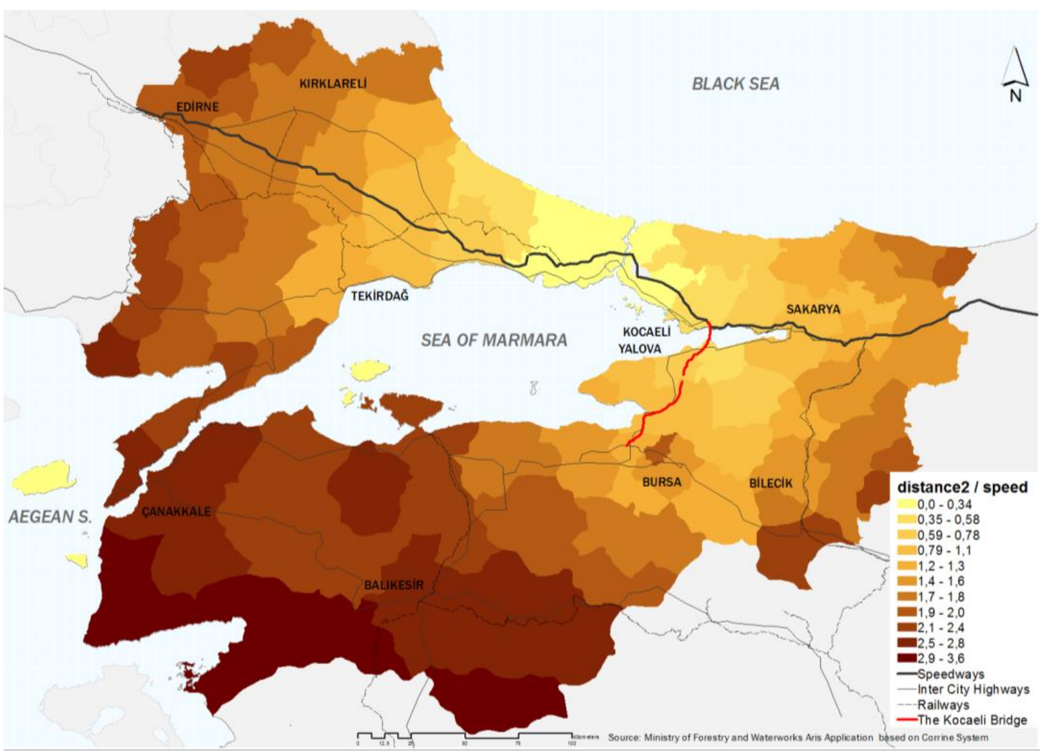

Figure 4.10: Accessibility Analysis 4- the impact of the Kocaeli Bridge on the distances of the Marmara Region districts from the center of İstanbul.

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4.2.1 The Marmaray project and the decentralization of the port of İstanbul around the Sea of Marmara. The Marmaray Project is a 76.5 km long railway system that passes under the Bosphorus through an underground tunnel. The railway line follows the existing commuter line and links it with the regional railway. The idea of the project was derived from the 2006 İstanbul Environmental Regulation Plan, executed by İstanbul Metropolitan Planning and Urban Design Center. The project will connect two peripheral districts of İstanbul, Halkalı and Gebze, situated on the European and the Anatolian parts of the city. Therefore, it will decrease the transportation period to 105 minutes between these nodes. Until 2016, only a very small part of the project has been completed, namely the underground tunnel that connects Üsküdar and Yenikapı, however, the impact of the project on the urban landscape of İstanbul has been substantial. Combined with the Transformation of Disaster-Risk Areas Law (No. 6306) enacted in 2012—that encourages land speculation by facilitating the demolishment of "disaster-prone buildings" for the sake of higher constructions—the Marmaray Project precipitated land speculation in İstanbul. For instance, after the enactment of the law No. 6306, a vibrant "demolishing and rebuilding" activity began in the Kadıköy district that embodies an important number of Marmaray Stops—Feneryolu, Göztepe, Erenköy, Suadiye, and Bostancı—on the Anatolian side (

Figure 4.11). The change in the fair values (*rayic bedeli*) of the streets around the Marmaray station in Kadikoy spiked both in 2009 and 2013 (*Figure 4.12*).[108] Therefore, this process triggered a rapid increase in rents and intra-city migrations.

Despite the delays in the construction and the speculation precipitated by the Marmaray Project in the central İstanbul, the project also embodies a set of potentials for intra-regional integration (*Figure 4.13*). The primary hubs of Marmaray not only strengthen connectivity via railway infrastructure but also open up a new range of transportation possibilities. For instance, the Yenikapi Station is also a ferry port with fast ferry trips to Bursa, Bandirma and Yalova with trip durations fluctuating from 75 to 130 minutes. The Akport Port in Tekirdağ for Ro-Ro transportation integrates the Marmaray System with the ports around the Sea of Marmara including Gemlik, Bandırma, Karabiga, Biga, and Derince. In other words, the Marmaray project is facilitating the decentralization of the Port of İstanbul, a process that had started as early as the 1960s when the port functions were moved to the Haydarpaşa Port in Kadıköy (Güvenç, 2015). The decentralization of the Port of İstanbul gained impetus after the 1990s when the Black Sea trade was reactivated. Therefore "small piers and private ports numbering in the hundreds on the Marmara shores" rapidly transformed the Sea of Marmara into the Port of İstanbul (Güvenç 2015). Ambarlı Madraş, Gemport, Limaş, Ambarlı Kumport, Ambarlı Shipowners Marport, Zeyport, Yılport (Gemlik Gübre, Malta Freeport, and Rotaport), Çanakkale Liman İşletmeciliği, Un Roro Saffet Ulusoy Terminali, Gemlik Rodaport, Akport, Çelebi Bandırma Limani, and Asyaport are among the ports opened after 1990 in

[108] Fair values of the streets can be tracked on municipalities' websites. For Kadıköy, see https://ebelediye.kadikoy.bel.tr/ebelediye/rayicdegerler.aspx. The prices are normalized by the inflation calculator:
http://www3.tcmb.gov.tr/enflasyoncalc/enflasyon_anayeni.php.

the Sea of Marmara (*Figure 4.14*).[109] However, it should be noted that a majority of these private ports forms clusters with the organized industrial zones and agregate close to the earth quake-prone areas (*Figure 4.14*). Nevertheless, the rapid environmental degradation of the Sea of Marmara, raises sustainability questions and demonstrates the importance of intra-regional coordination in local governance.

[109] The information is retrieved from the websites of the ports.

Figure 4.11: The multi-storey buildings demolished in the Kadıköy district.

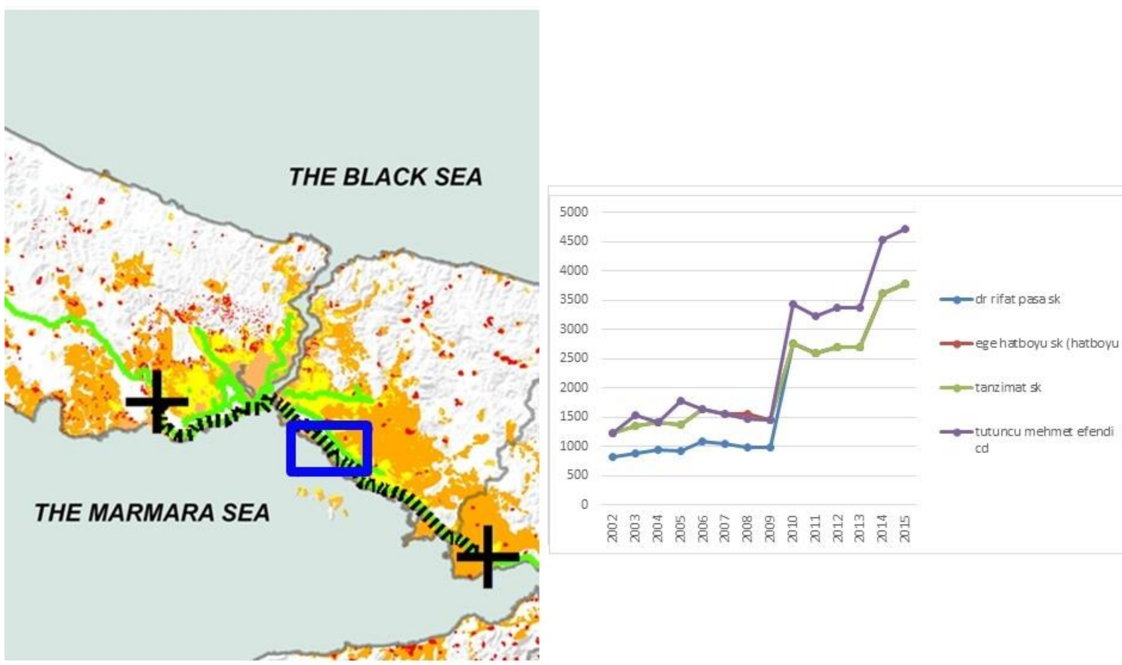

Figure 4.12: The changes in the fair values of the streets around the Göztepe Station.

Figure 4.13: The current condition of the Marmaray Railway. The construction has been delayed due to disputes related to the tender.

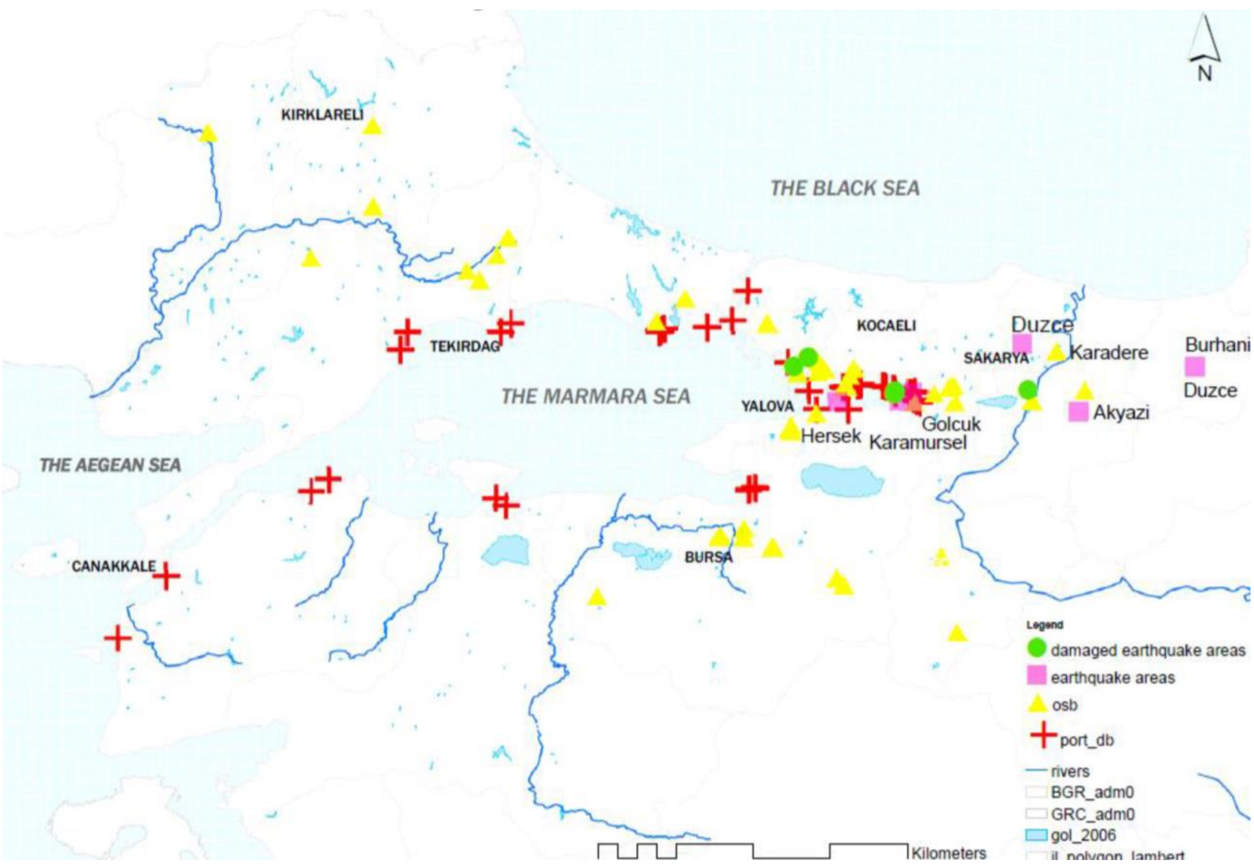

Figure 4.14: The ports and the organized industrial zones around the Sea of Marmara.

Figure 4.15: The Sea of Marmara becoming the port of İstanbul despite the earthquake risk.

4.3 The Transformation of the Agricultural Areas between 1990 and 2006

4.3.1 The arable land-cover stratification in the Marmara Region between 1990 and 2006. The Arable Land category comprises Non-Irrigated Arable Land, Permanently Irrigated Land, Rice Fields, and Greenhouses land-covers within Non-irrigated Arable Land category. Non-Irrigated Arable Land comprises the majority of the Thrace region (*Figure 4.16-Figure 4.20*). The irrigation problems of the Marmara Region always reflected in the literature on the area. For instance, in a book on Thrace published in 1948 Abidin Özmen points to the irrigation problem in Thrace. According to Abidin Özmen, at the turn of the second half of the 20th century the agricultural production in Thrace benefited very little from the Ergene and Meriç Rivers, conversely these rivers caused more harm than benefit. Özmen asserts that, in the 1940's there were no irrigation systems around the Ergene River, and the water of the river substantially decreased in summer as the creeks flowing into the river had different regimes (p. 11). In addition to the irregularities in the regimes of the rivers Özmen also depicts large swaths of swamps in Thrace by the 1940's which probably hampered the infrastructural development (p. 12).

In 1990, Non-Irrigated Arable Land clusters are observed in the Adapazarı Plain, Bilecik and Bursa Areas. While Permanently Irrigated Land has a more dispersed representation in comparison to the Non-Irrigated Arable Land, it is agglomerated in the southern part of the Marmara Region, primarily in the Balıkesir Plain and the Lake Manyas.[110] On the other hand, the Rice Fields precisely cover the southern part of the border of Greece and the Biga and Gönen Rivers' deltas in the southern part of the Marmara Region. Despite the local transformations, this agricultural pattern persisted in the Marmara Region until 2006. Between 1990 and 2000 an intermediate increase occurred in Permanently Irrigated Land in the areas in which it was already overrepresented. While the Rice Field land-cover's overall share increased, this land-cover lost share in the areas in which it was overrepresented by 1990. These developments between in 1990 and 2000 in Arable Land demonstrates that there is a shift towards a more technologically-advanced mode of agriculture. The construction of Çakmakköy and Hamzadere dams in Thrace to increase the irrigated agriculture in the area can be counted as concomitant efforts in this respect.

[110] See the section "Deciphering the Microecologies of the Region: The Evaluation of 2006 Land-Cover Data in Strata"

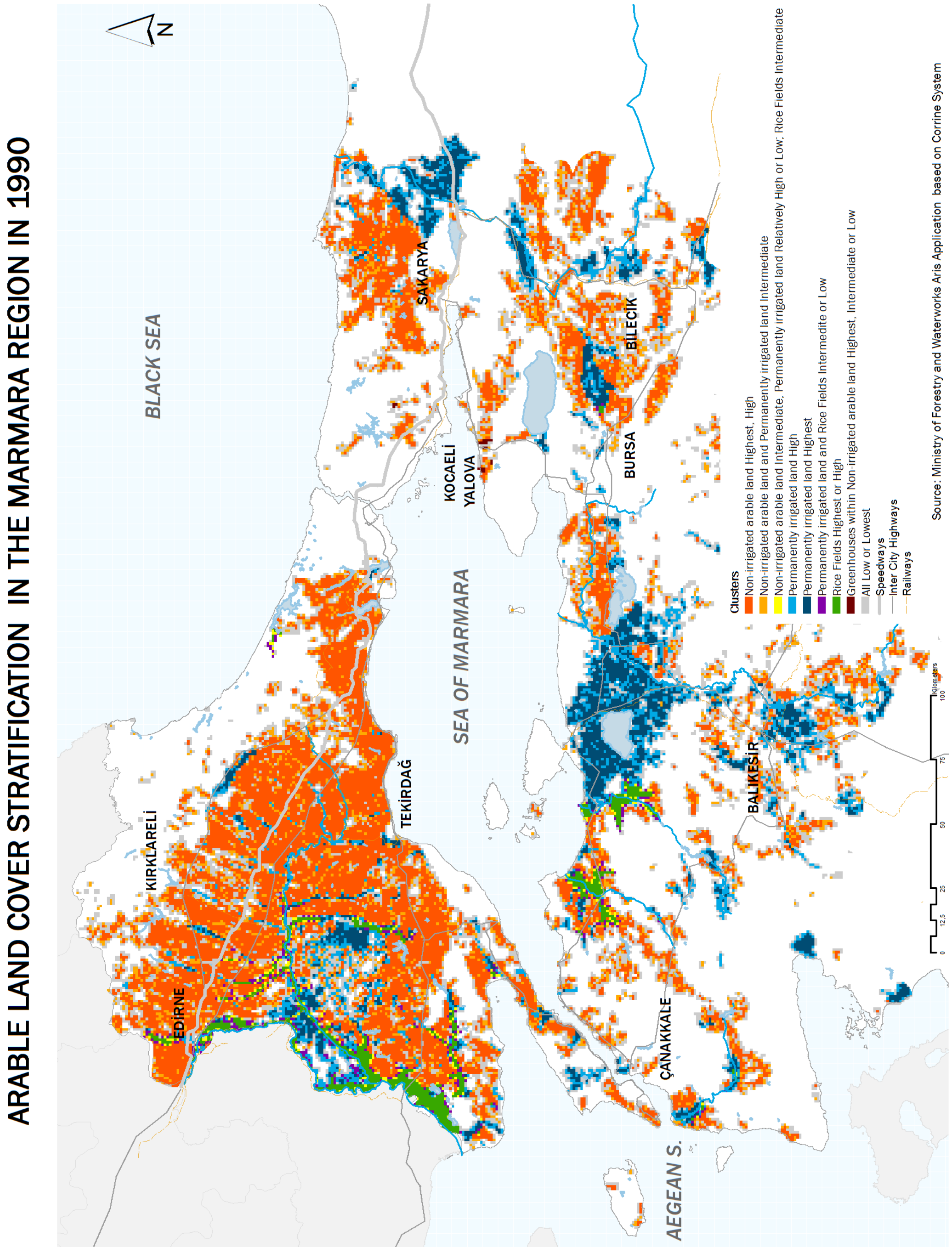

Figure 4.16: Arable land-cover stratification in the Marmara Region in 1990.

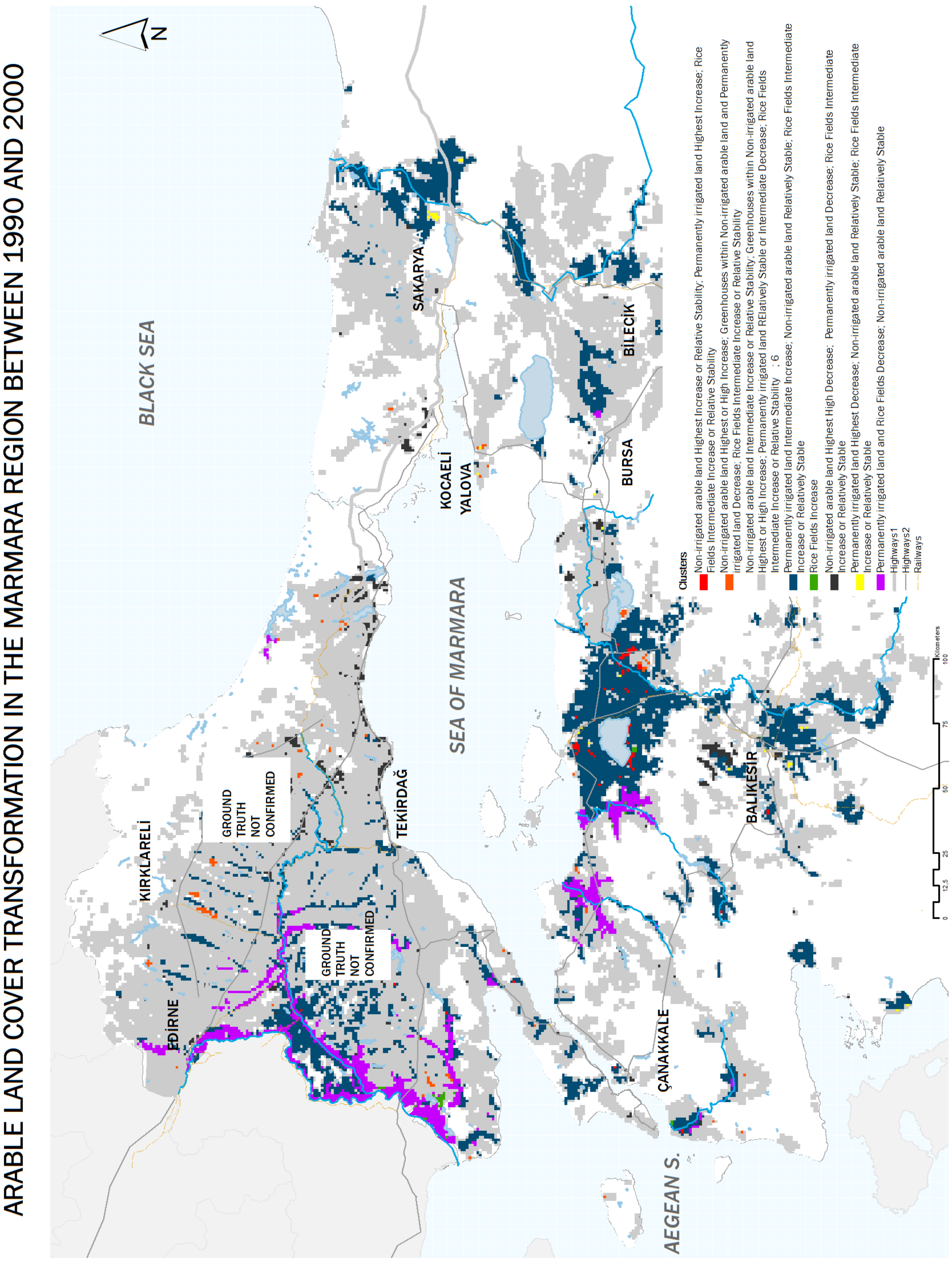

Figure 4.17: Arable land-cover transformation in the Marmara Region between 1990 and 2000.

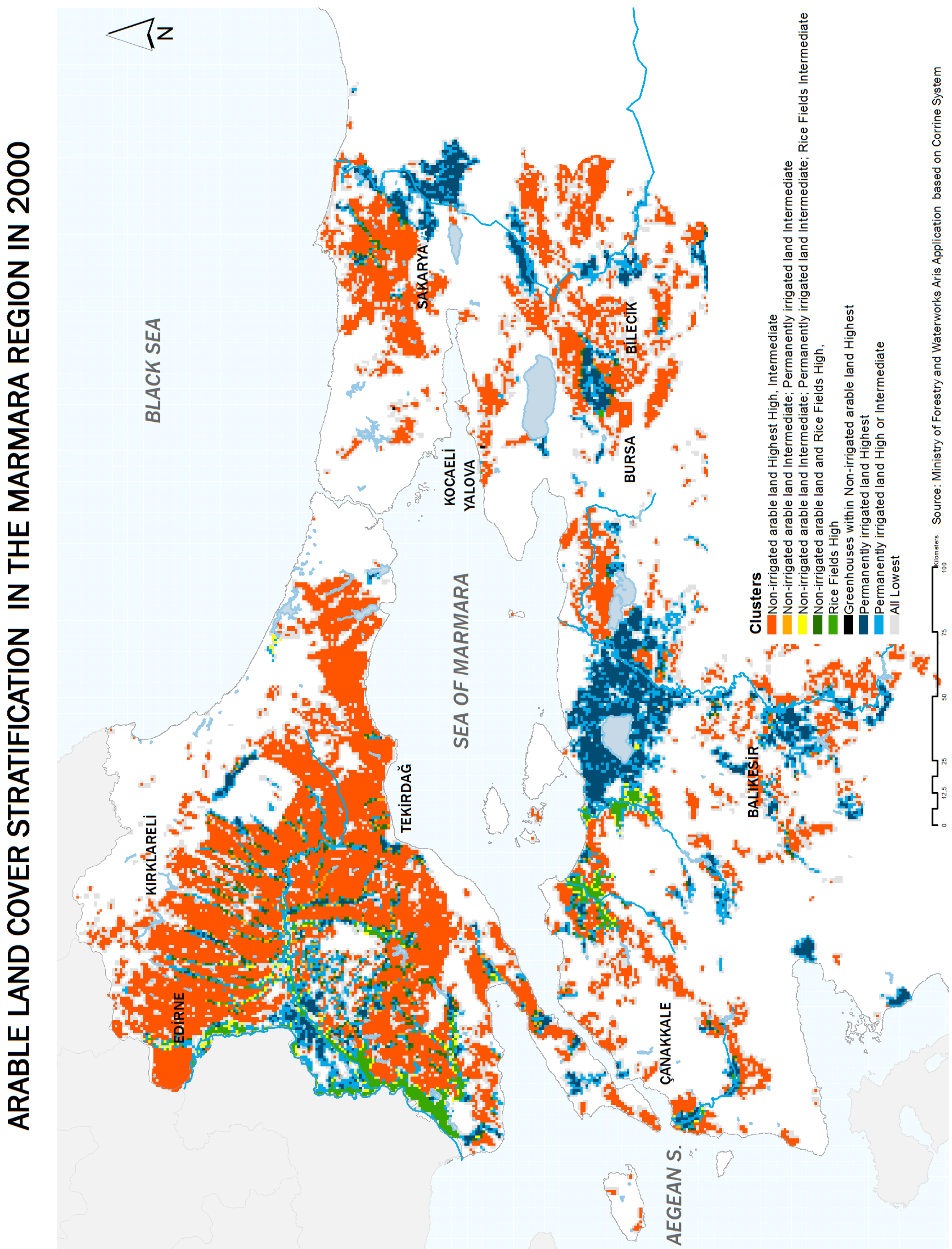

Figure 4.18: Arable land-cover stratification in the Marmara Region in 2000.

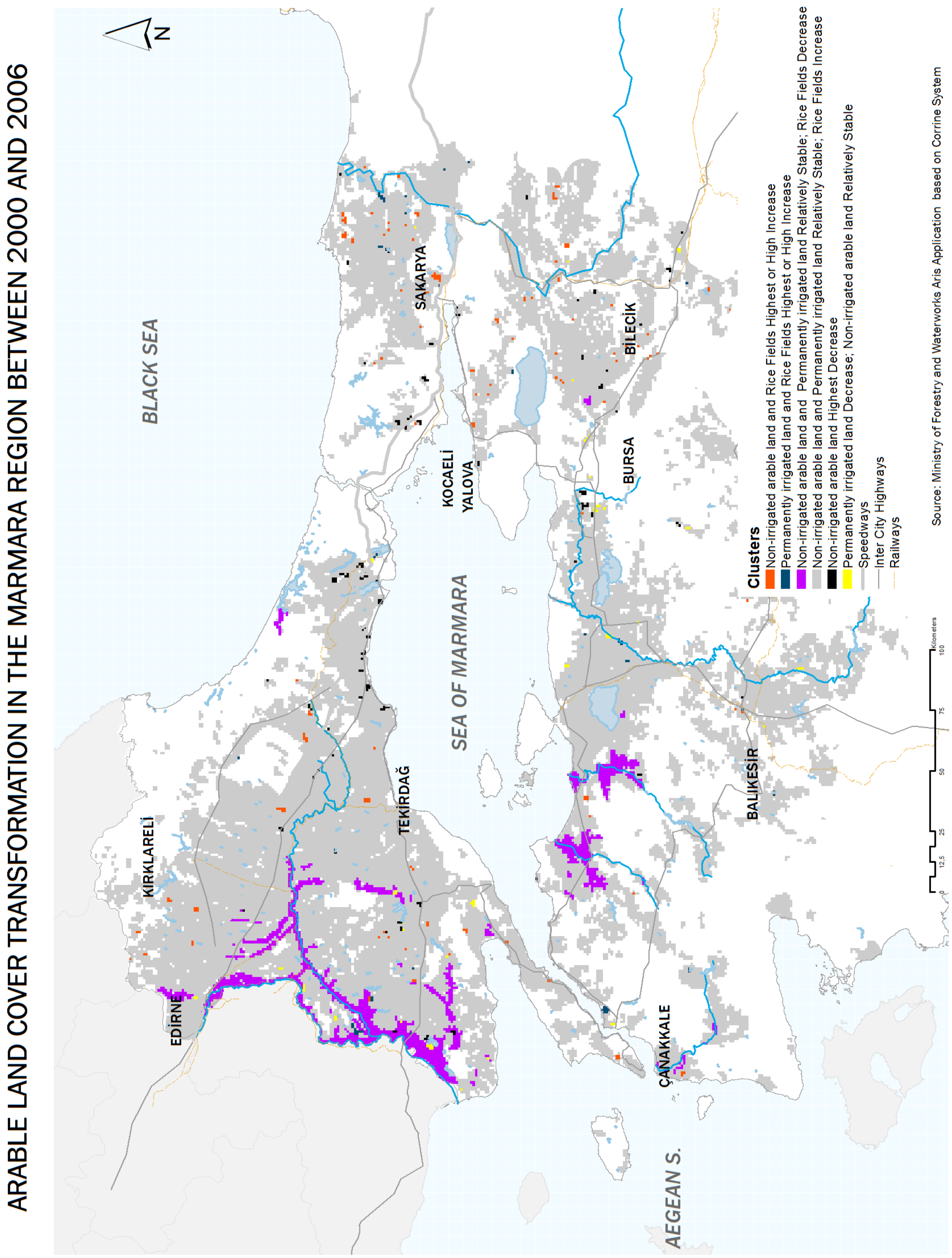

Figure 4.19: Arable land-cover transformation in the Marmara Region between 2000 and 2006.

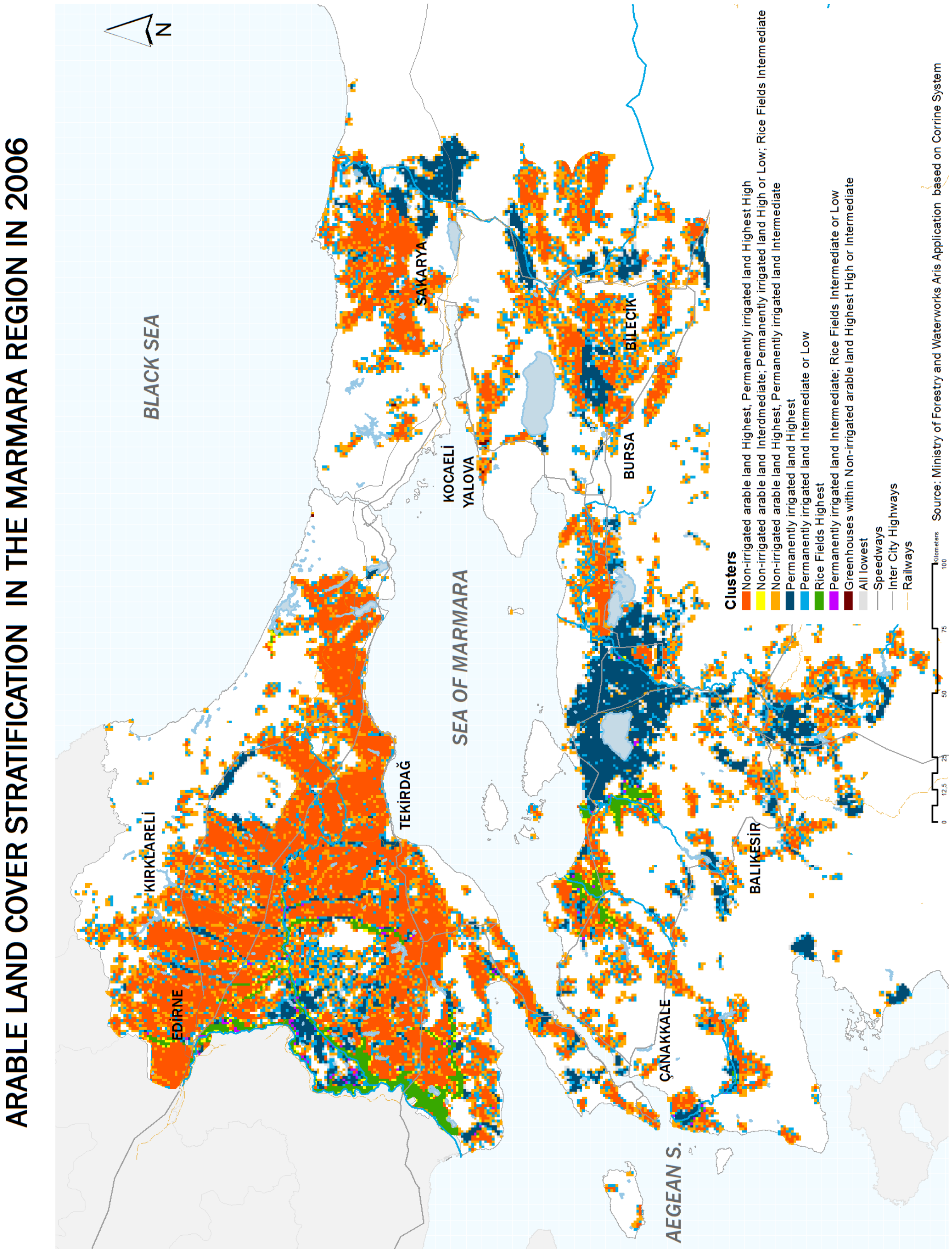

Figure 4.20: Arable land-cover stratification in the Marmara Region in 2006.

4.3.2 The permanent crops land-cover stratification in the Marmara Region between 1990 and 2006. The Permanent Crops category includes the Mediterranean vegetation land-covers such as Vineyards, Non-Irrigated Fruit Fields, Irrigated Fruit Fields and Olive Groves. Corresponding with the climatic properties of the region, the areas overrepresented by permanent crops are located in the southern part of the region. This spatial organization of the Permanent Crops in the Marmara Region resonates Vidal de la Blaches' argument on agriculture and arboriculture in the Mediterranean (*Figure 4.21–Figure 4.25*). Vidal de la Blache classifies the agricultural land-use into two primary categories in the Mediterranean Region: "seeded land" used for agriculture and "planted land" used for arboriculture (p. 134). Blahce evaluates vine, figs, olive, and almond under the arboriculture category and asserts that these plants grow up in areas with dry surface and moist subsurface, not requiring irrigation (p. 138). According to Vidal de la Blache, these plants "have been under cultivation since antiquity", hence "the regions with a dry surface and humid subsoil are those where the most ancient Mediterranean type of intensive agriculture and dense population originated" (p. 138). Likewise, the areas in which Permanent Crops are overrepresented signify "the Mediterranean" in the Marmara Region. While Vineyards are overrepresented in Thrace and the southeastern periphery of the region, Olive Groves are overrepresented around the Gulf of Gemlik and the Gulf of Erdek, Non-Irrigated Fruit Fields are observed in the northern part of Sakarya and Bursa, and Irrigated Fruit Fields aggregate in Bursa. Supporting Vidal de la Blache's argument on the relation between dense population and arboriculture, an important part of the areas accounted for, overlap with the Highly Developed Coastal Mountain and Plain Villages category in the Village Typologies in the Marmara Region Between 1967 and 1973 map in Chapter 3. This condition demonstrates the intertwinement of the microecologies of the region and its history. Between 1990 and 2006, the Permanent Crops remained mostly stagnant, the only significant change is the expansion of the Olive Groves around the gulfs. Considering the rapid urbanization of the region and the historical value of the olive groves, this persistence can be regarded as a positive progress.

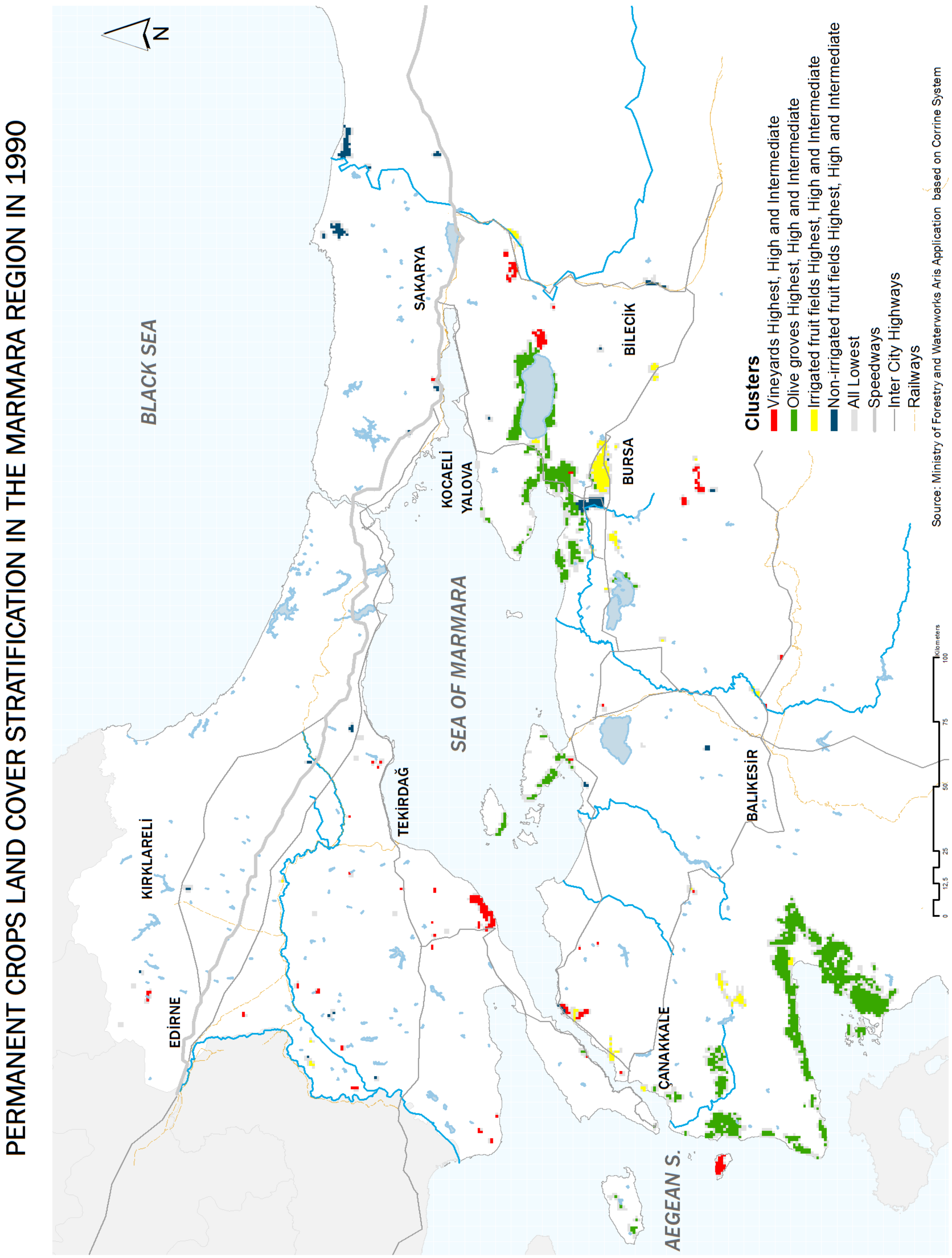

Figure 4.21: Permanent Crops land-cover stratification in the Marmara Region in 1990

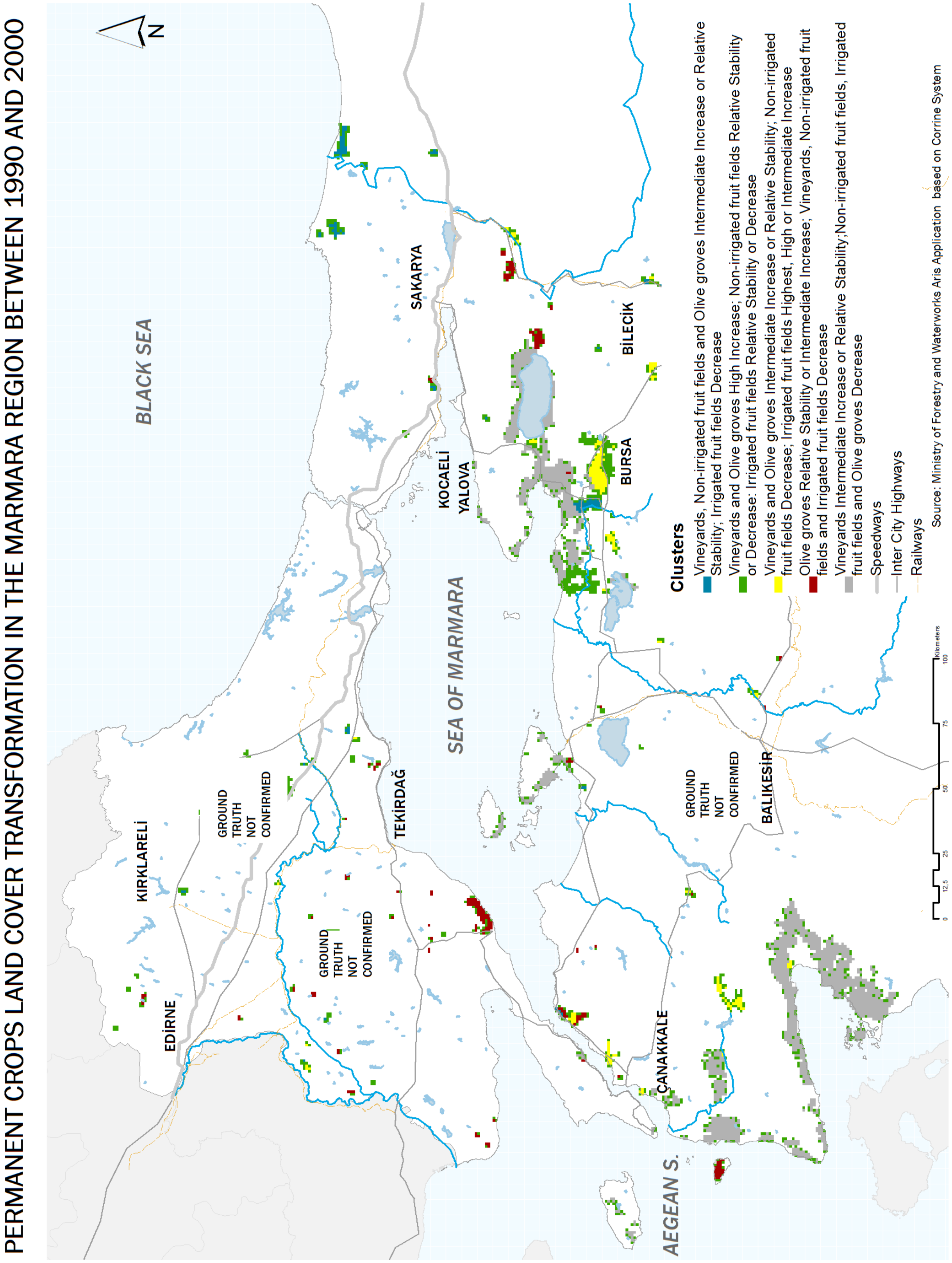

Figure 4.22: Permanent Crops land-cover transformation in the Marmara Region between 1990 and 2000.

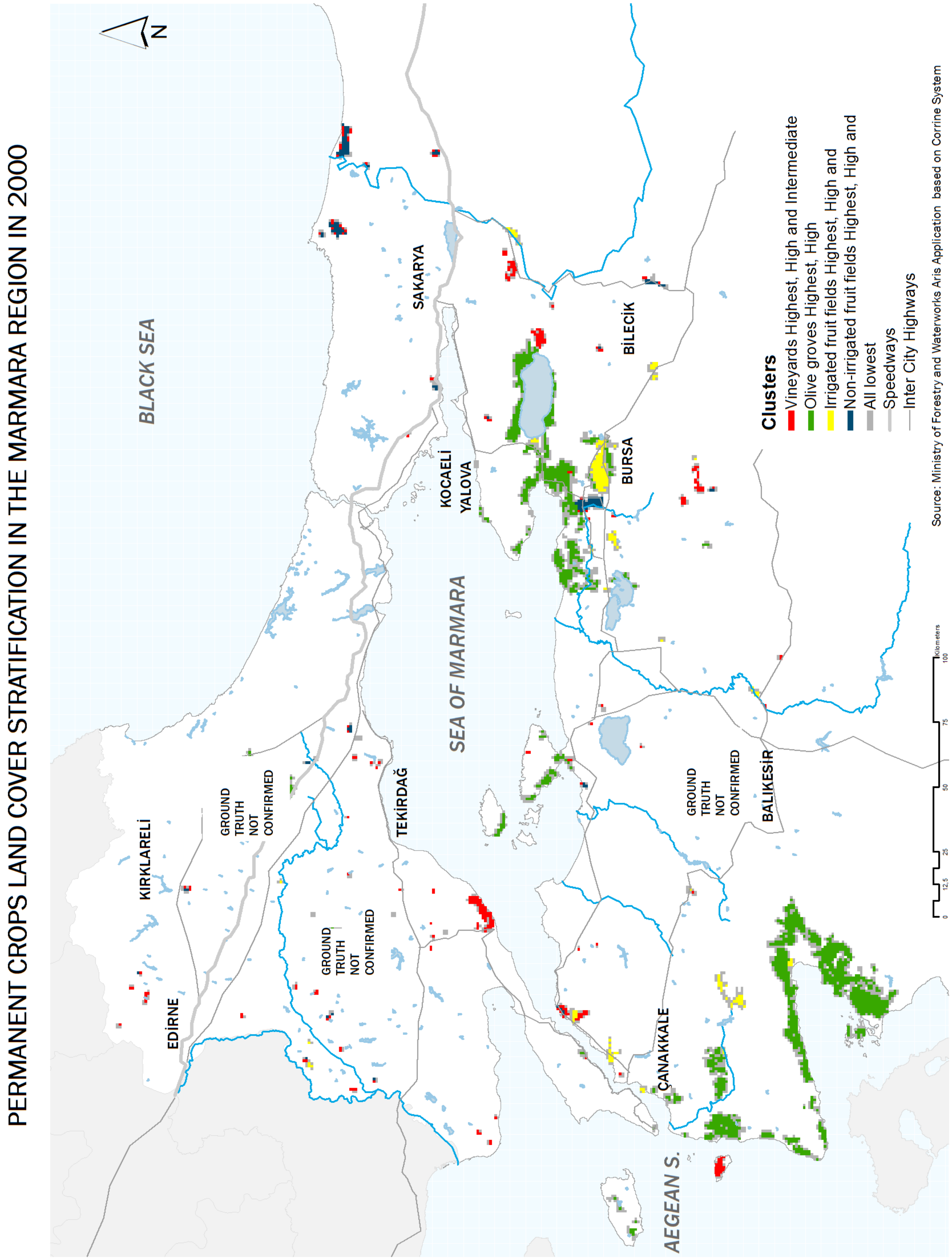

Figure 4.23: Permanent Crops land-cover stratification in the Marmara Region in 2000.

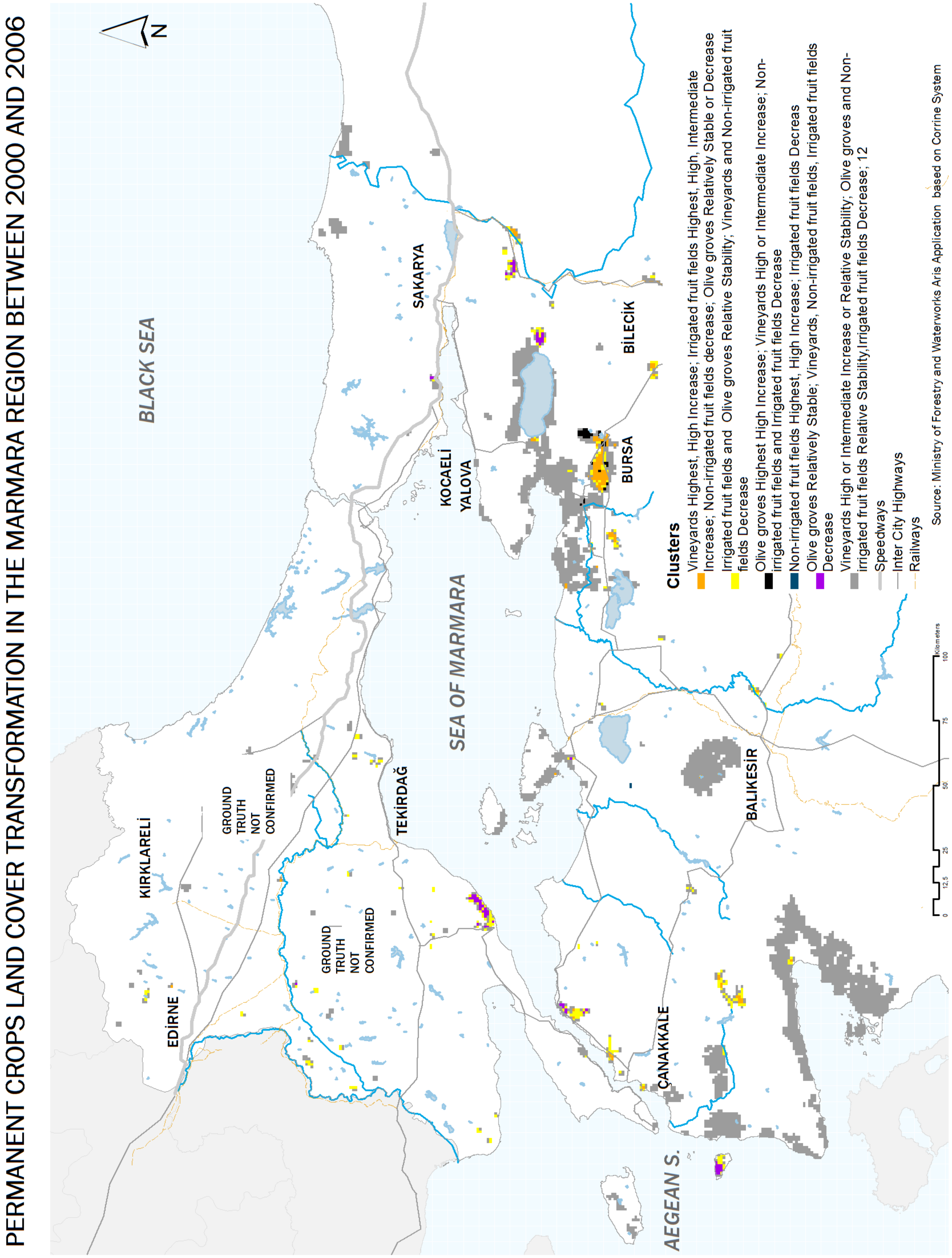

Figure 4.24: Permanent Crops land-cover transformation in the Marmara Region between 2000 and 2006.

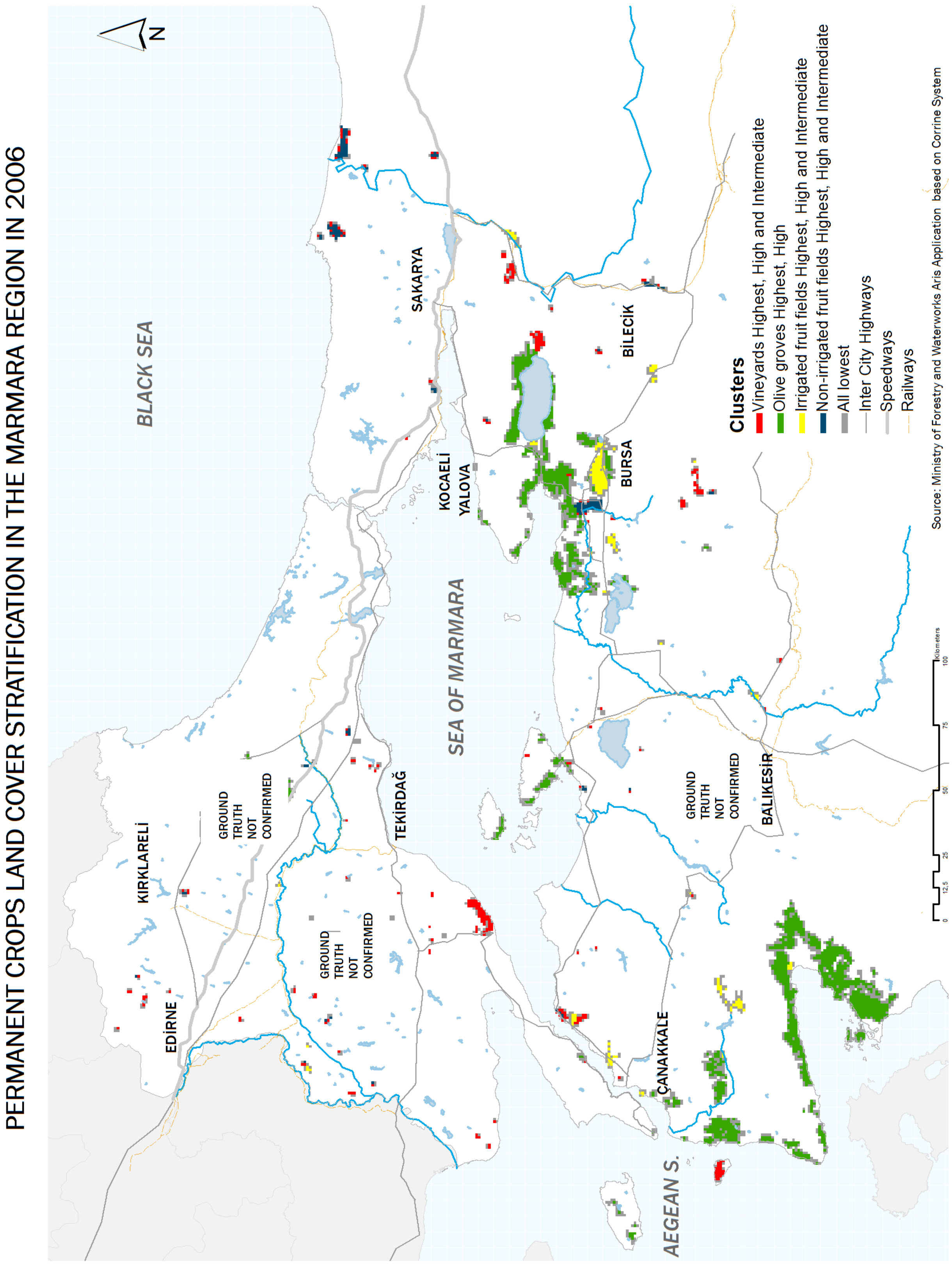

Figure 4.25: Permanent Crops land-cover stratification in the Marmara Region in 2006.

4.3.3 The heterogeneous agricultural area land-cover stratification in the Marmara Region between 1990 and 2006. The "Heterogeneous Agricultural Area" category comprises "Non-Irrigated Mixed Agricultural Land", "Perpetually Irrigated Mixed Agricultural Land", and "Land Principally Occupied by Agriculture, with Significant Areas of Natural Vegetation" land-covers (*Figure 4.26-Figure 4.30*). Non-Irrigated Mixed Agricultural Land and Perpetually Irrigated Mixed Agricultural Land are the subsets of "Complex Cultivation Patterns" category which is identified as "juxtaposition of small parcels of, annual crops, city gardens pastures, fallow lands and/or permanent crops somewhere with scattered houses" (European Topic Centre on Urban, Land and Soil systems [EIONET], EEA, ETC/TE, 2004).[111] Land Principally Occupied by Agriculture, with Significant Areas of Natural Vegetation refers to the discernable natural land within agricultural areas. For instance, the significant striped pattern of Land Principally Occupied by Agriculture, with Significant Areas of Natural Vegetation in the north of the Ergene River in Thrace signifies the arms of the Ergene River crossing the agricultural areas. Likewise, the patches of Land Principally Occupied by Agriculture, with Significant Areas of Natural Vegetation around the Istrancalar Mountains are the agricultural areas mixed with forest land.

The distribution of this category within the Marmara Region is very different from the Arable Land Category. While Arable Land forms significant clusters—in Thrace at the

[111] The code of Complex Cultivation Patterns in the Corine System is 2.4.2. See EIONET: http://uls.eionet.europa.eu/CLC2000/classes/Pictures?CLCcategory=2/2.4/2.4.2&CLCtitle=Complex%20cultivation%20patterns.

very first place—Heterogeneous Agricultural Area category is dispersed. Considering the fact that the agricultural areas within this category are composed of small agricultural parcels, it can be asserted that this category is pointing to a less-advanced, small-scale mode of agriculture. Unlike the Arable Land Category, Heterogeneous Agricultural Area witnessed significant changes between 1990 and 2006. This category has been in constant decline beginning from the 1990’s onwards.[112] Specifically, between 1990 and 2000 Non-Irrigated Mixed Agricultural Land significantly decreased, in rapidly developing areas including İstanbul, the Bursa Plain and the Gulf of İzmit, and yielded to urbanized land.

[112] 15% in 1990, 14,5% in 2000 and 14,1% in 2006.

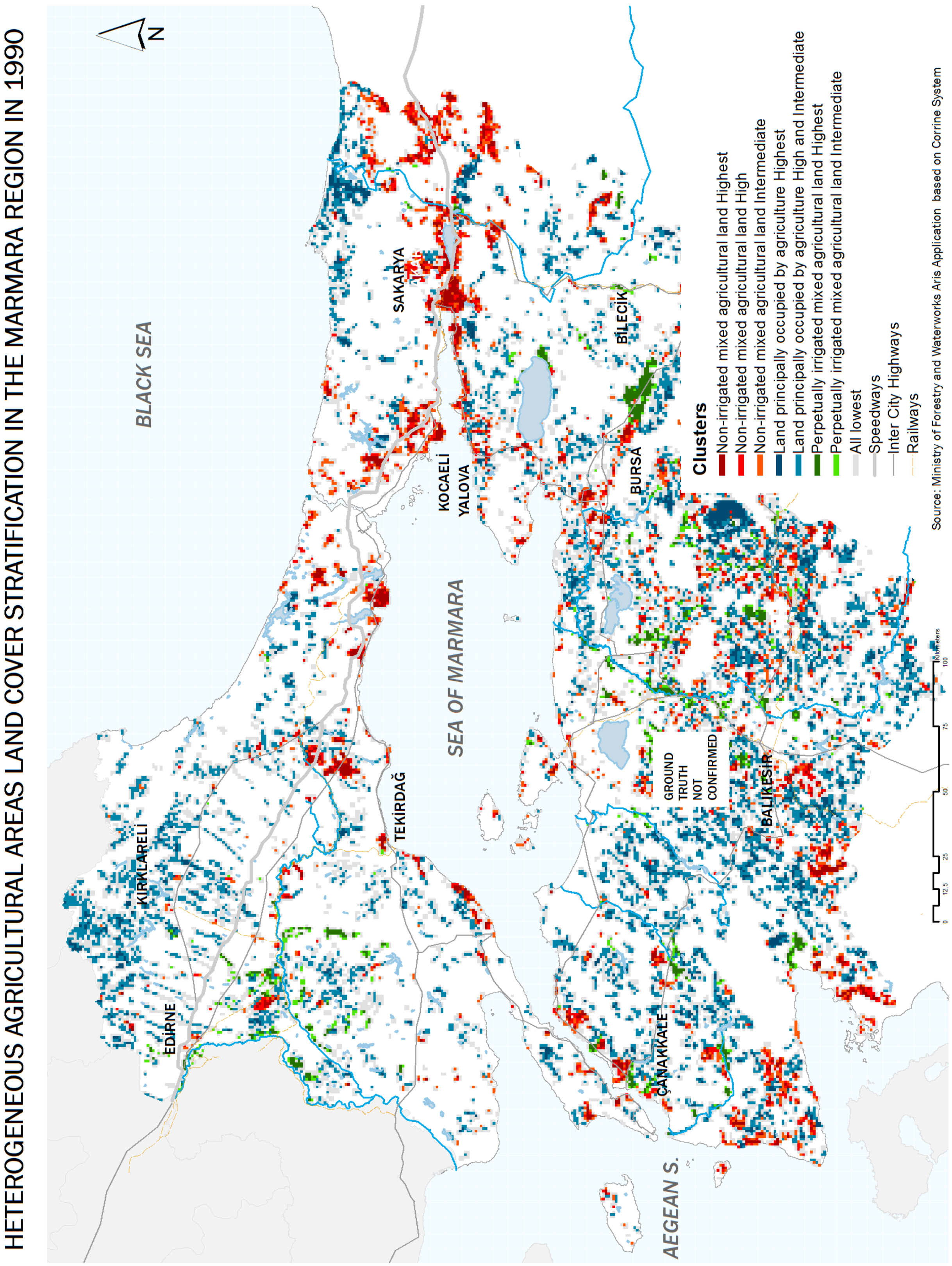

Figure 4.26: Heterogeneous Agricultural Areas land-cover stratification in the Marmara Region in 1990.

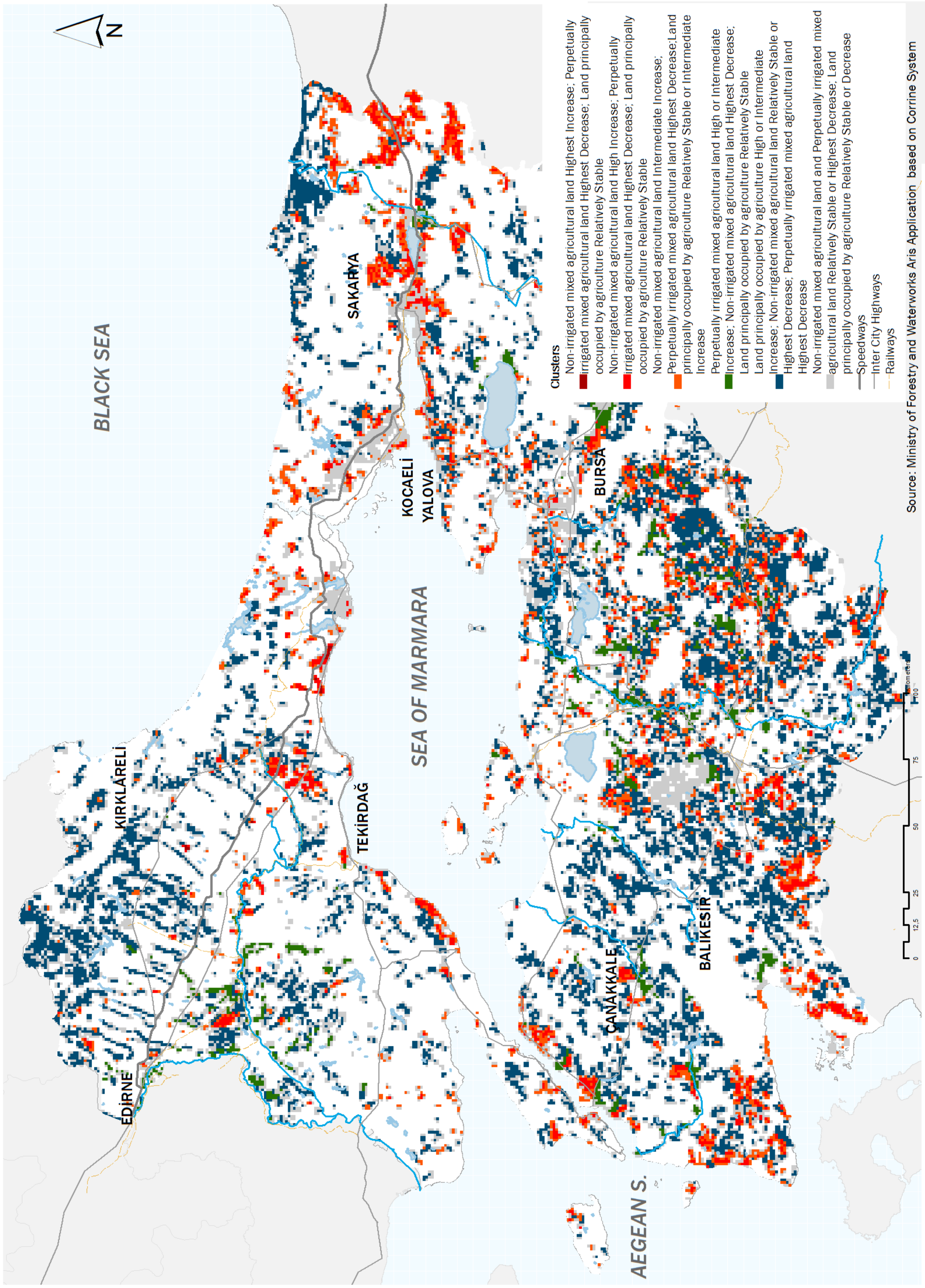

Figure 4.27: Heterogeneous Agricultural Areas land-cover transformation in the Marmara Region between 1990 and 2000

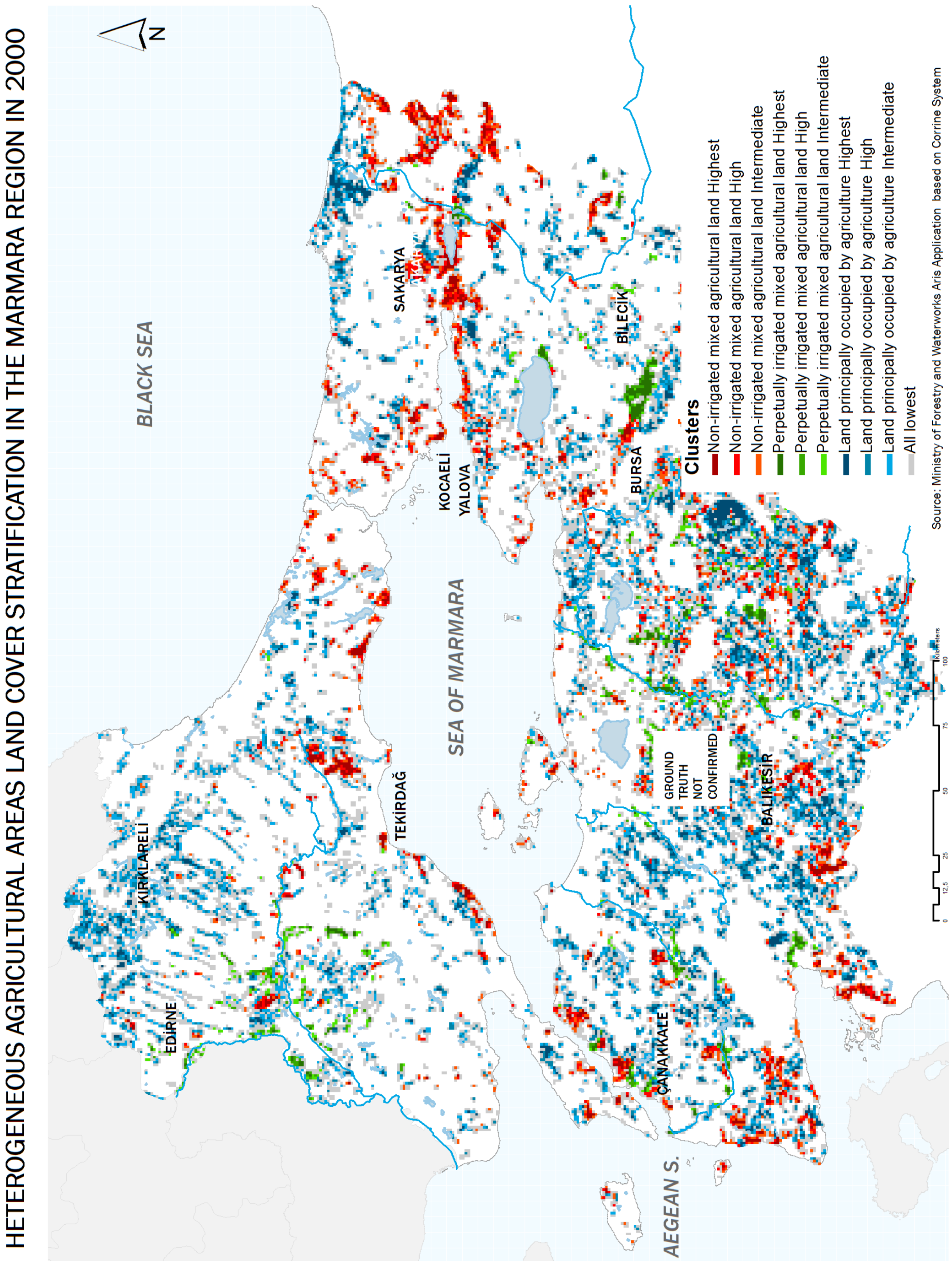

Figure 4.28: Heterogeneous Agricultural Areas land-cover stratification in the Marmara Region in 2000.

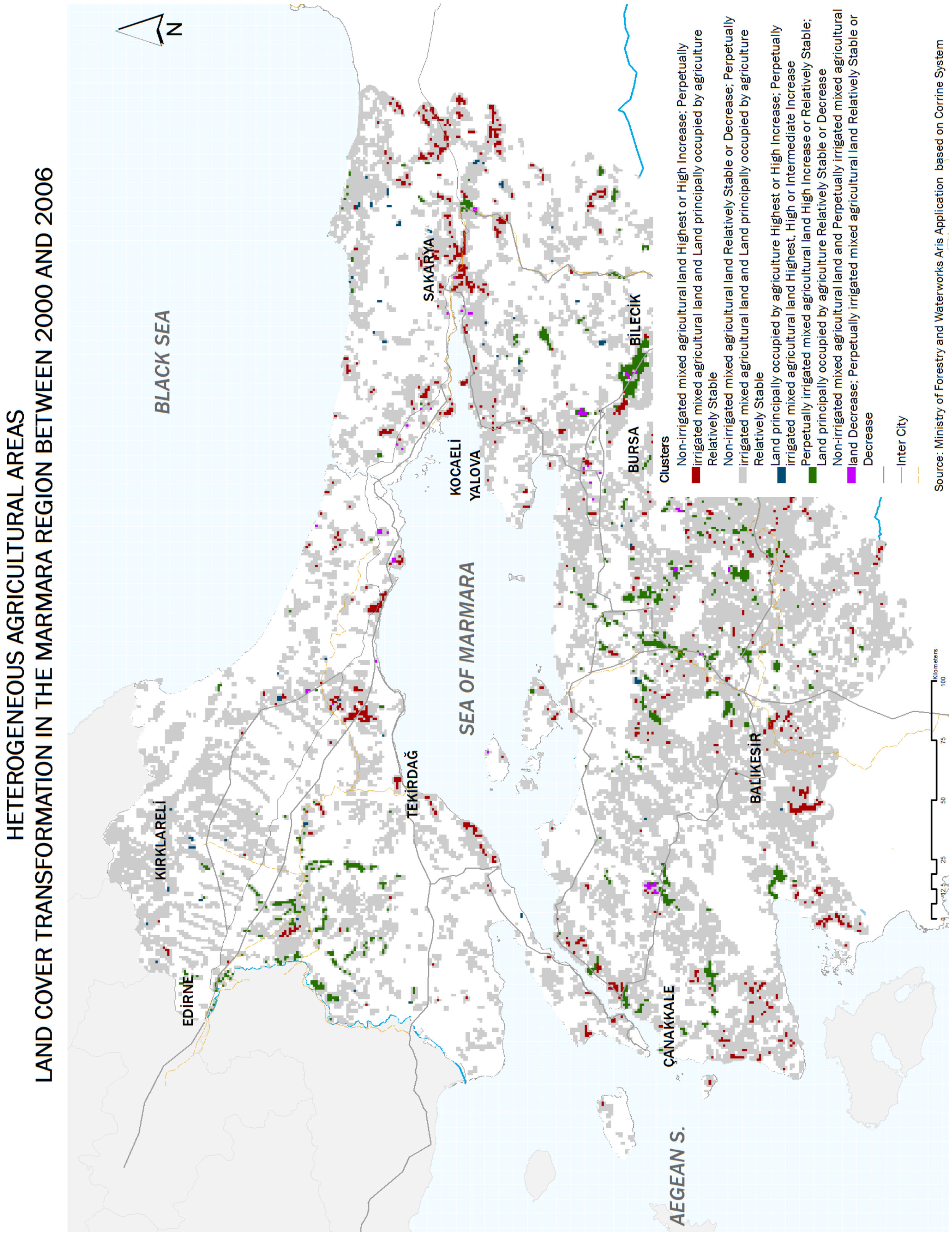

Figure 4.29: Heterogeneous Agricultural Areas land-cover transformation in the Marmara Region between 2000 and 2006.

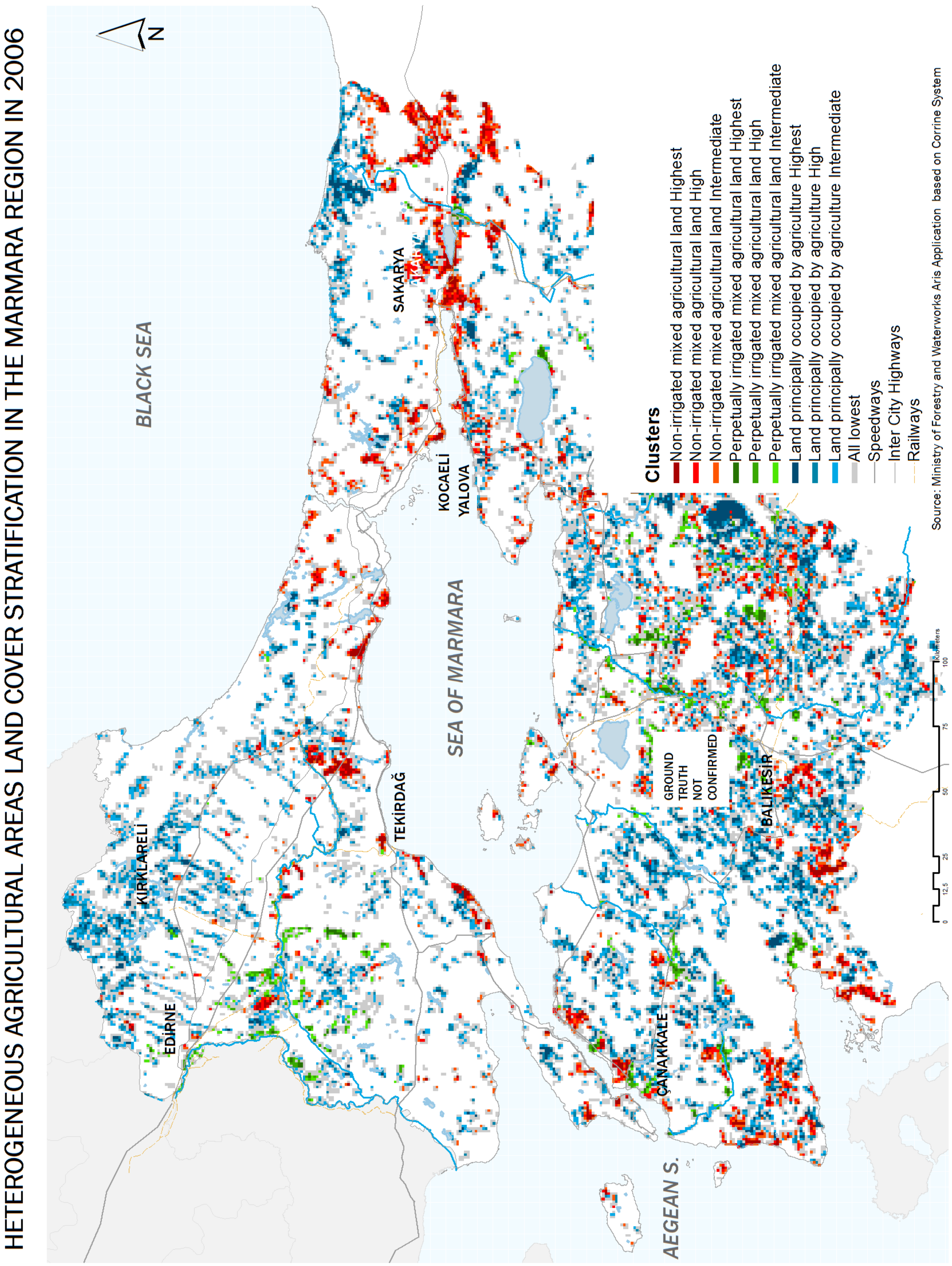

Figure 4.30: Heterogeneous Agricultural Areas land-cover stratification in the Marmara Region in 2006.

4.4 The Transformation of the Forest Areas and Semi-natural Areas between 1990 and 2006

4.4.1 The transformation of the Forest Land-Covers between 1990 and 2006.

As discussed in the previous chapter, the distribution of forests in the Marmara Region is strongly intertwined with its hybrid climate. The forest land-cover maps that encompasses “Broad-leaved Forest”, “Coniferous Forest”, and “Mixed Forest” land-covers demonstrate this distribution in detail (*Figure 4.31-Figure 4.35*). The Broad-Leaved Forest land-cover dominates the Istranca Mountains in the northern Thrace and the northwestern part of the Kocaeli Peninsula. The Mixed Forest land-use category is primarily observed in Hendek and Akyazi in Sakarya, expanding towards the south Gevye and Taraklı. Coniferous Forest Land-Cover dominates the southern part of the Marmara Region, specifically the southern periphery of Çanakkale, Balıkesir, and Bursa. Forest land-covers remain mostly underrepresented in metropolitan areas and the plains.

Between 1990 and 2006 the Forest land-covers increased at the regional scale.[113] Between 1990 and 2000 the Broad-Leaved Forest land-cover in the Istrancalar Mountains expanded towards Thrace. Around the Gelibolu Peninsula and in the southern Balıkesir the increase occurred in all forest land-covers. Between 2000 and 2006 a decrease on the northern part of the Kocaeli and Çatalca Peninsulas is observed, which is more significant in the Broad-Leaved Forest land-cover. Likewise, Mixed Forest land-cover significantly decreased in the Bilecik area. The Coniferous Forests land-cover in the Kaz Mountains

[113] 28.6% in 1990, 30% in 2000, and 30.6% in 2006.

area in the Biga Peninsula and around the southern borders of Bursa and Balikesir increased.

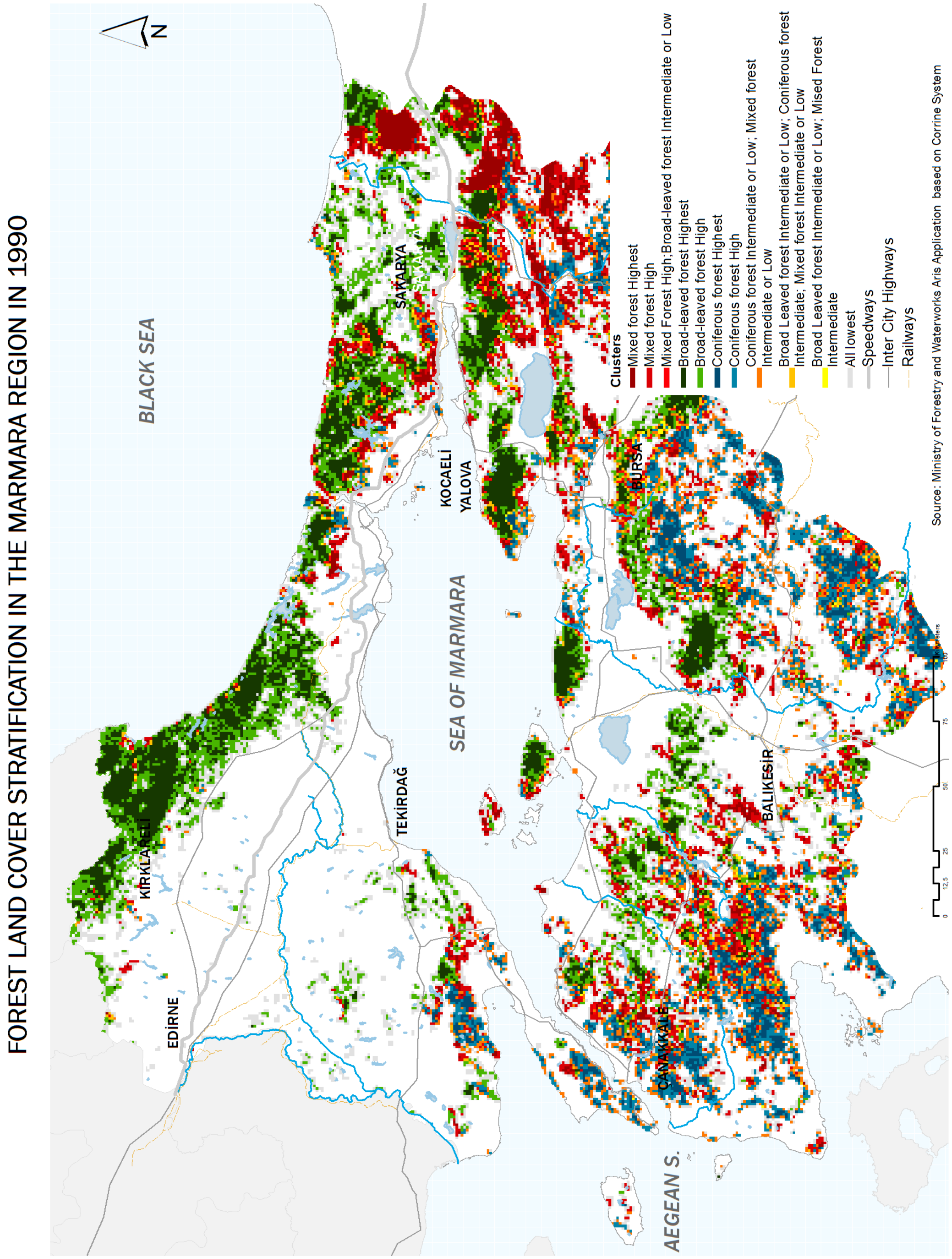

Figure 4.31: Forest land-cover stratification in the Marmara Region in 1990.

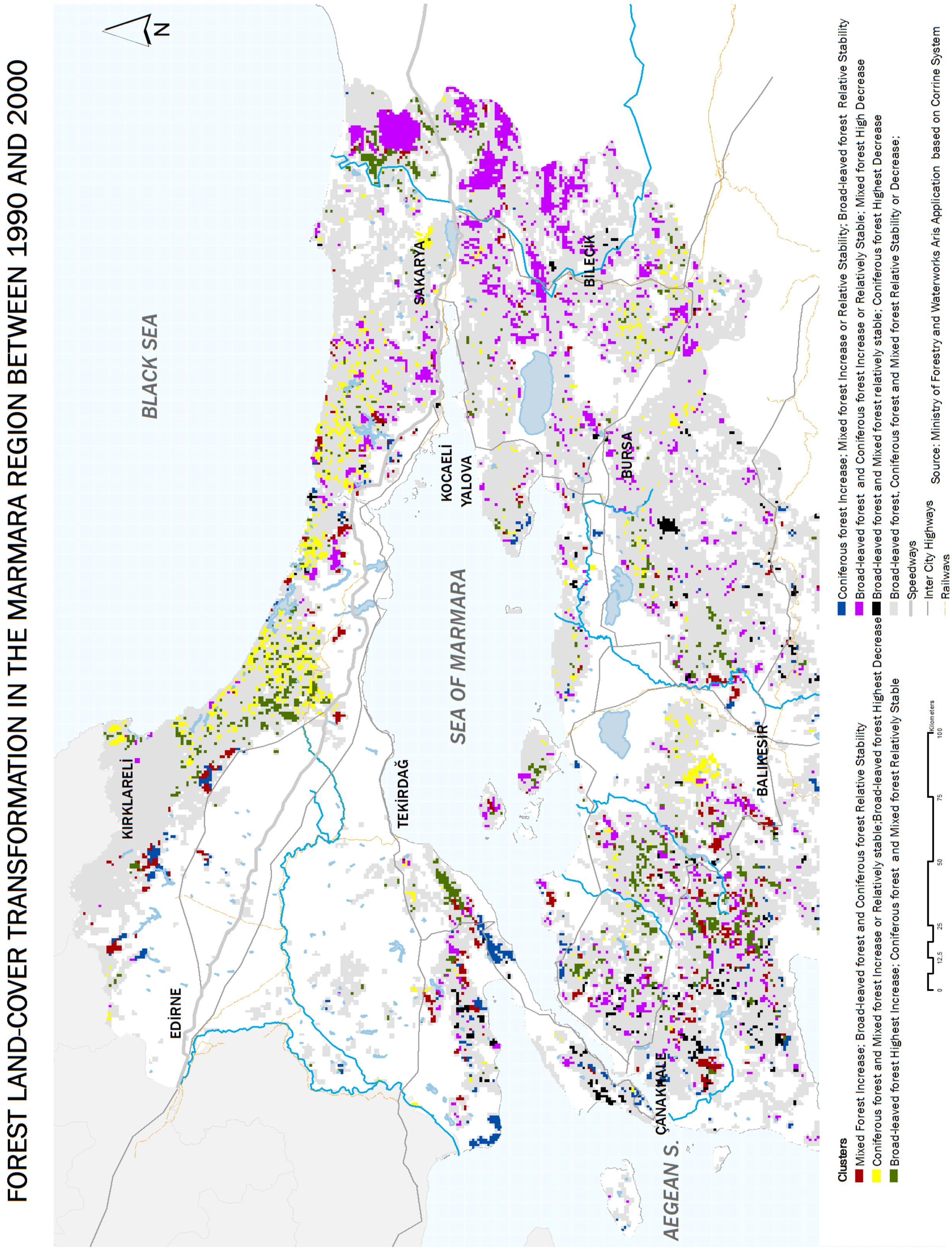

Figure 4.32: Forest land-cover transformation in the Marmara Region between 1990 and 2000.

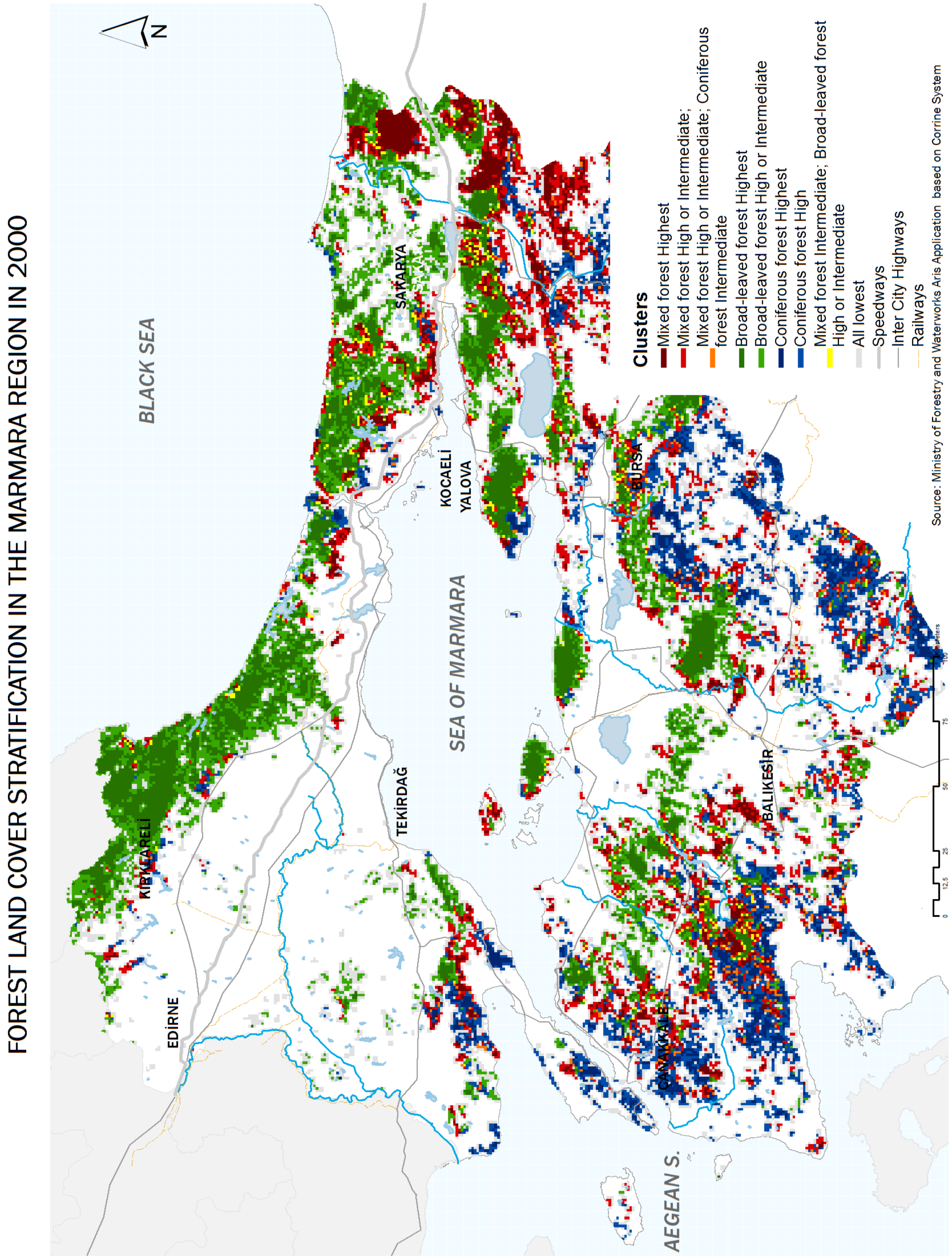

Figure 4.33: Forest land-cover stratification in the Marmara Region in 2000.

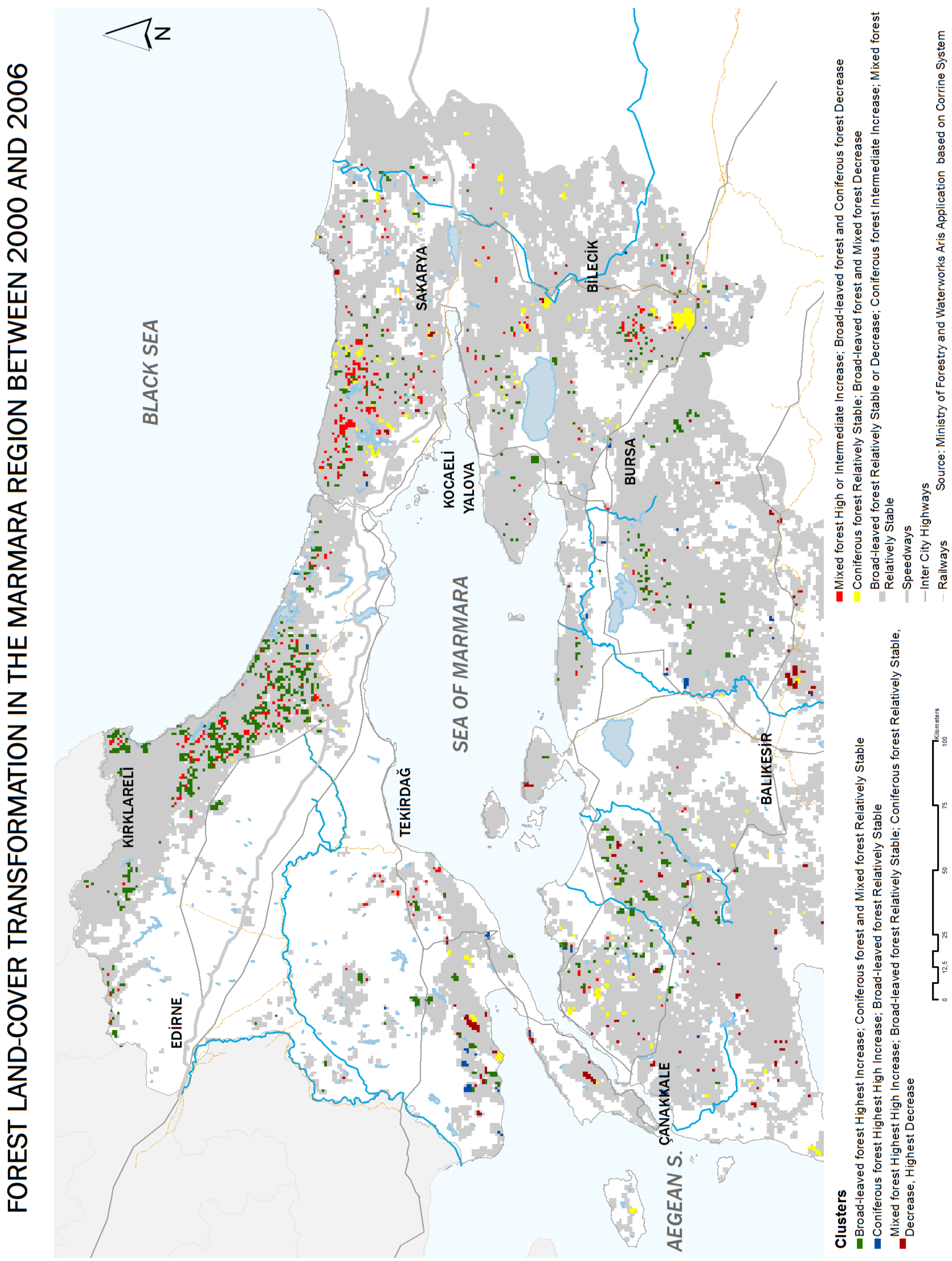

Figure 4.34: Forest land-cover transformation in the Marmara Region between 2000 and 2006.

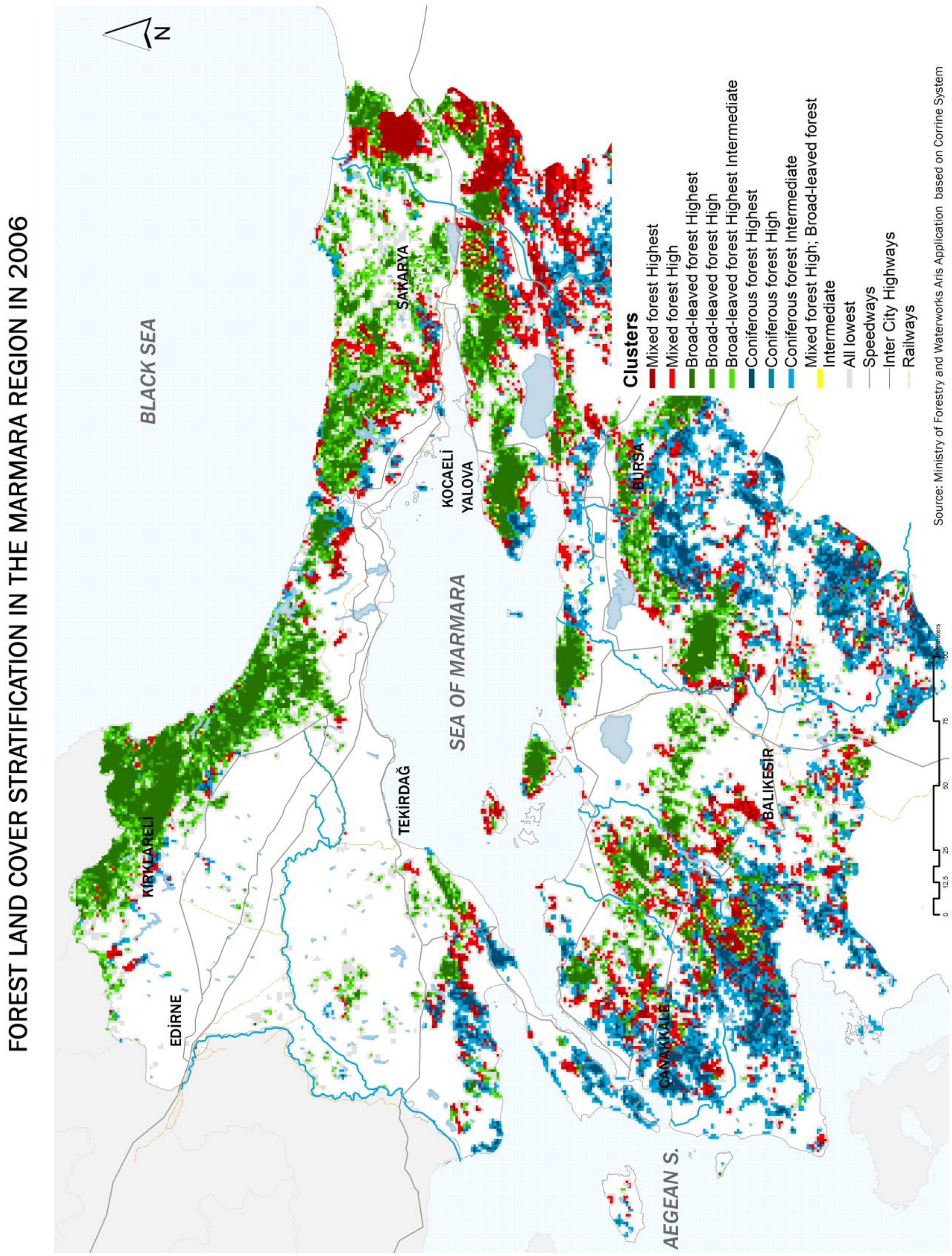

Figure 4.35: Forest land-cover stratification in the Marmara Region in 2006.

4.4.2 The transformation of scrub and herbaceous plants between 1990 and 2006. This category originally comprises. The Pastures land-cover—evaluated in the Agricultural Areas category in the Corine System—is also analyzed in this category as it is closely related to the Natural Grasslands land-cover. The "presence of farm structure such as: fences, shelters, enclosures, watering places, drinking trough, or regular agricultural works: mowing, drainage, hay making, agricultural practices, manuring" in the Pastures land-cover is the primary difference that separates it from Natural Grasslands, *Sclerophyllous* Vegetation, and Transitional Woodland-Shrub land-covers.

As discussed in Chapter 3, the Transitional Woodland-Shrub land-cover signifies woodland degradation or forest regeneration, therefore the Transitional Woodland-Shrub land-cover around the forest areas such as the Istrancalar Mountains points to forest degradation. However, the Transitional Woodland-Shrub land-cover patches in the southern fringe of the Marmara Region probably signify the change in vegetation cover as they form clusters with the *Sclerophyllous* Vegetation land-cover. The Pastures land-cover dominates the Ergene River Basin, the northern parts of the Sazlıdere Dam and the Büyükçekmece Lake in İstanbul, and it is also observed in the southern part of Kandıra and Akçaova, Çayırova, the Manyas, and Ulubat Plains, and the central Balıkesir area. Natural Grasslands are concentrated in Kırklareli, Kızılcaterzi in the Gelibolu Peninsula, in the Biga Peninsula, in Ataşehir and Sultanbeyli in the Anatolian side of İstanbul, and in the Gönen River and Manyas Lake. Natural Grasslands therefore cover an important amount of the southern Balıkesir area. *Sclerophyllous* Vegetation land-cover is overrepresented only in Enez and Uçmakdere districts of Thrace. In the southern Marmara the *Sclerophyllous* Vegetation land-cover is overrepresented in the eastern part of the Biga

Peninsula, Gökçeada and Bozcaada Islands and the southern part of Balıkesir. The highest overrepresentation of the *Sclerophyllous* Vegetation land-cover is around the Ayvacık area in the southern tip of the Biga Peninsula.

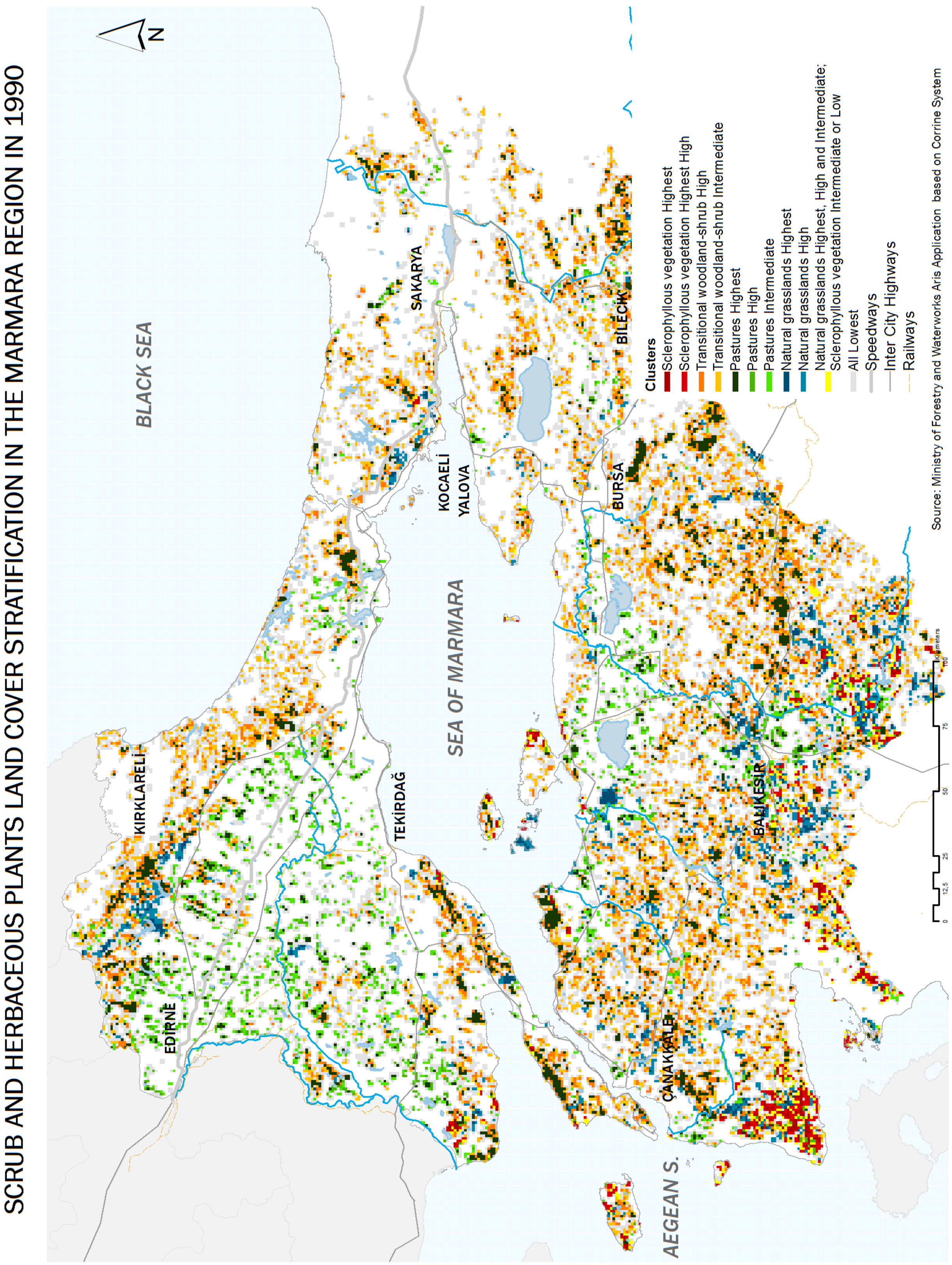

Figure 4.36: Scrub and Herbaceous Plants land-cover stratification in the Marmara Region in 1990.

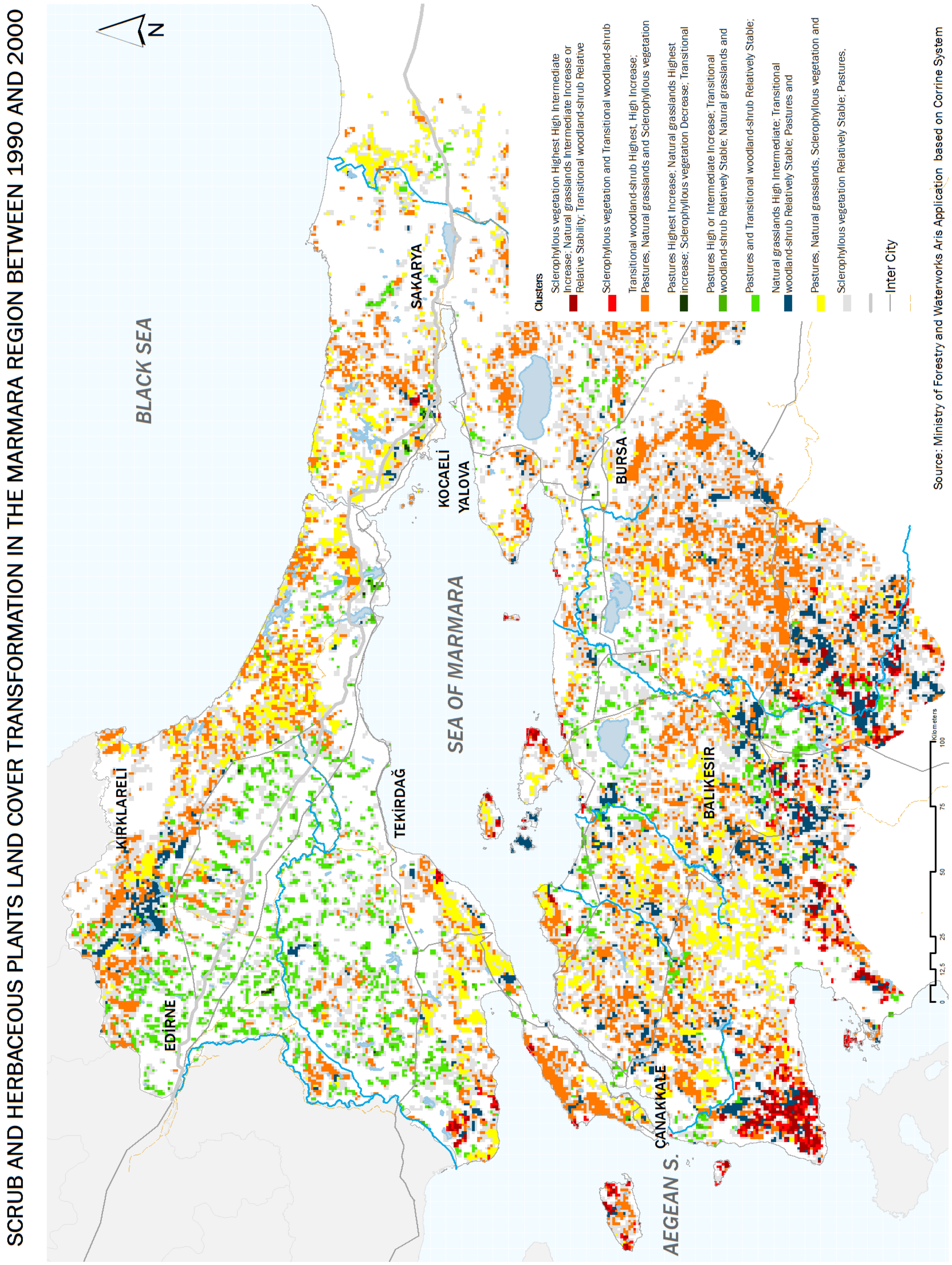

Figure 4.37: Scrub and Herbaceous Plants land-cover transformation in the Marmara Region between 1990 and 2000.

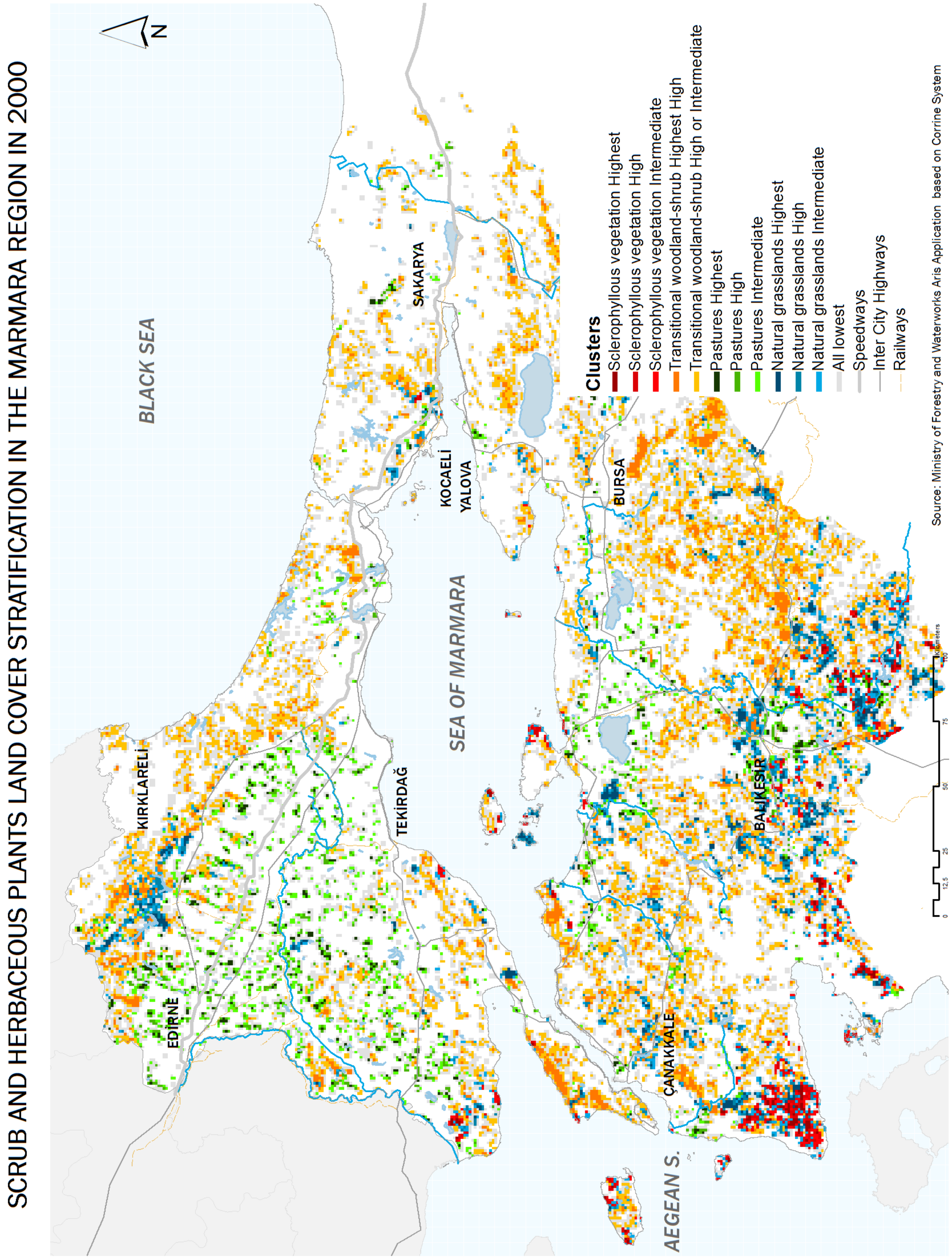

Figure 4.38: Scrub and Herbaceous Plants land-cover stratification in the Marmara Region in 2000.

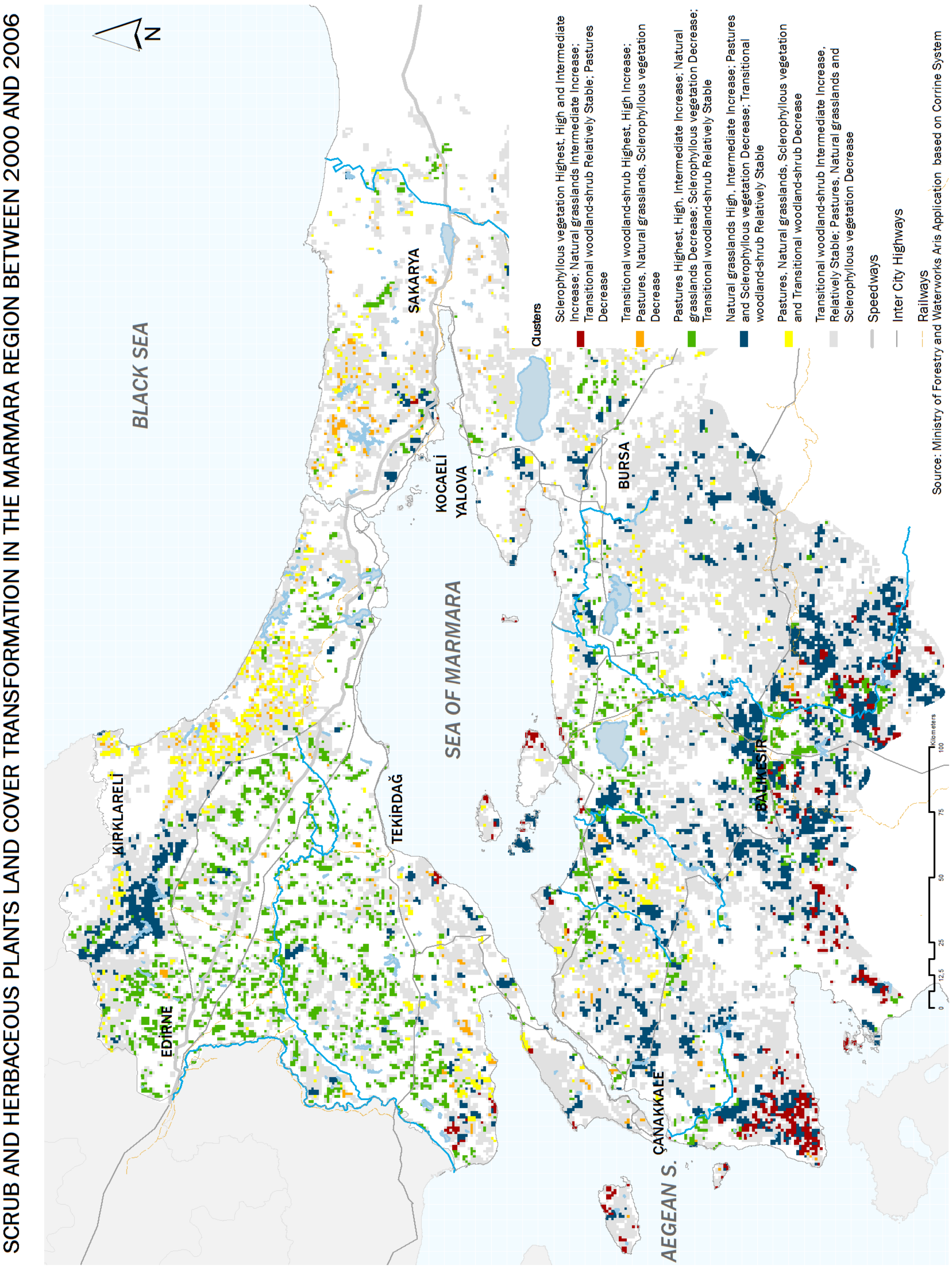

Figure 4.39: Scrub and Herbaceous Plants land-cover transformation in the Marmara Region between 2000 and 2006.

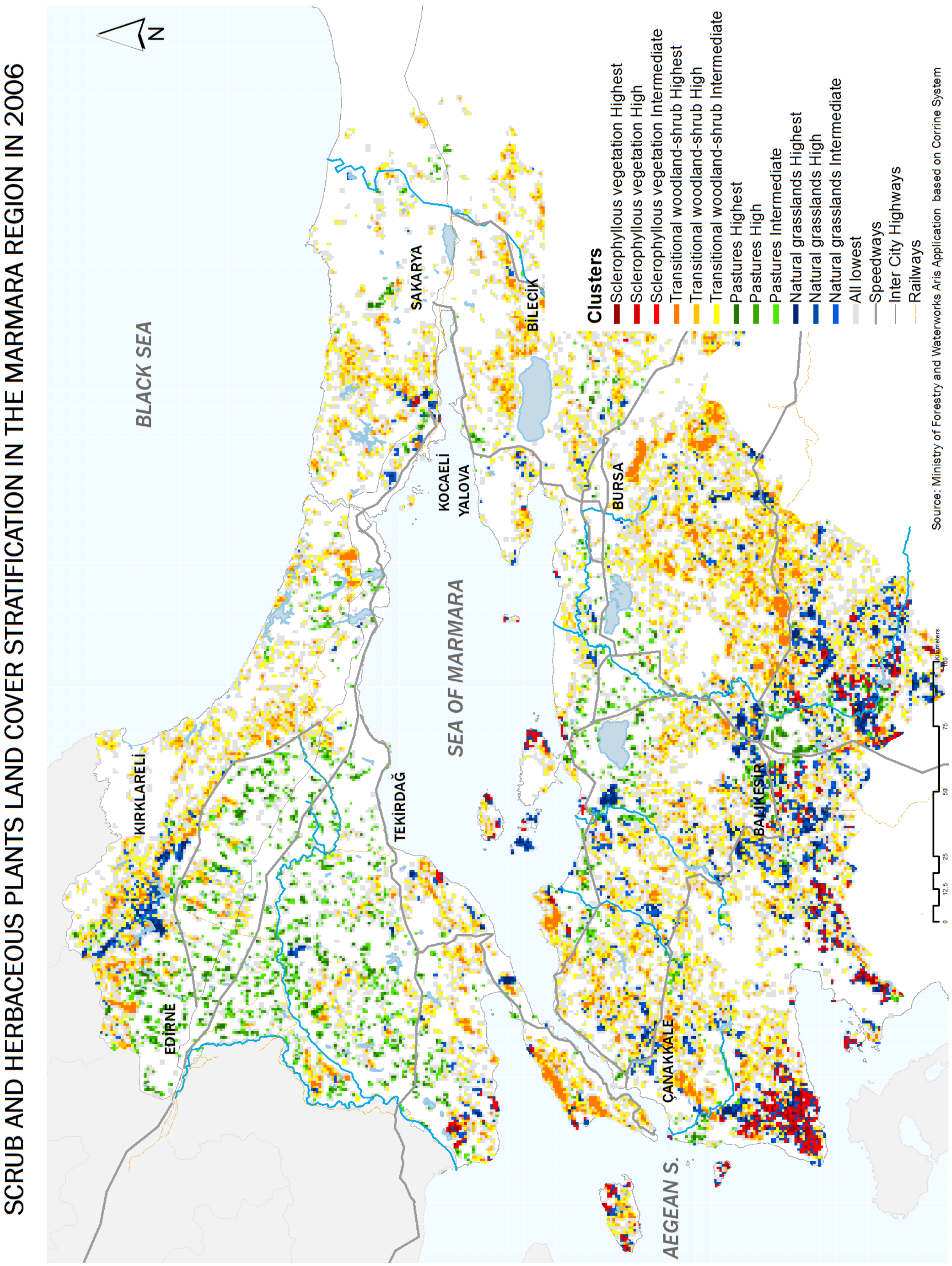

Figure 4.40: Scrub and Herbaceous Plants land-cover stratification in the Marmara Region in 2006.

Between 1990 and 2006 the Pastures land-cover substantially decreased at the regional scale as the most significant change in this category.[114] In *The End of Agriculture as We Know it: Global Power and Peasantry* (*Bildiğimiz Tarımın Sonu: Küresel İktidar ve Köylülük*) Çağlar Keyder (2013) points to the vulnerability of the pasture land and asserts that the lack of cadastral maps in Turkey facilitates the degradation of pasture land (p. 89). This vulnerable condition signifies that the commons were already at stake before the 2012 Metropolitan Municipality Law. Likewise, between 1990 and 2006 the Transitional Woodland-Shrub land-cover decreased drastically, specifically in the Çatalca and Kocaeli Peninsulas.[115]

4.5. The Summary of the Analysis

While the analysis of the 44 land-cover categories in the section titled, “Deciphering the Microecologies of the Region: The Evaluation of 2006 Land-Cover Data in Strata” in Chapter 3 demonstrated the land-cover clusters in the Marmara Region. The separate analyses of the land-cover categories in this chapter enabled a more scrutinized evaluation of the centripedal and the centrifugal forces at the regional scale. The findings of these analyses can be summarized as follows:

1. The overall industrial sprawl in the Marmara Region is related to the dynamics of the country, however the expansion of the industrial and commercial land-covers in İstanbul should be comprehended separately. Despite the deindustrialization

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[114] 2.3 % in 1990, 2.1% in 2000, and 1.9% in 2006.

[115] 13.3% in 1990, 11.6% in 2000, and 11.3% in 2006.

efforts, the substantial increase in Industrial or Commercial Units land-cover between 2006 and 2012 signify the increase of the commercial and mixed-use building types in the city.

2. The significant increase in ports and port related activities around the—already heavily-polluted—Sea of Marmara and their intensification in the earthquake-prone Gulf of İzmit point to serious environmental sustainability problems and earthquake risk. This condition also demonstrates the urgent need for local governance institutions transcending the provincial boundaries.

3. The analyses on the accessibility patterns and particularly on the Marmaray Project demonstrated that the agency of the Mega Infrastructural Projects in facilitating decentralization at the regional scale is limited. Conversely, these projects can operate the other way around, increasing the inter-metropolitan density in İstanbul.

4. The findings of the analyses discussed in this chapter shed light on the centripedal and centrifugal forces operating at the regional scale and also demonstrate that land-cover categories react differently to the rapid urbanization in the region. For instance, while the land-covers in the Arable Land and Permanent Crops categories are more persistent, the land-covers in Heterogeneous Agricultural Areas and Scrub and Herbaceous Plants categories are more vulnerable to urbanization and industrialization as exemplified in the decrease in Non-Irrigated Mixed Agricultural Land and in Pastures.

5. Conclusion: A Divided Regional Structure - the Marmara Region(s)

This dissertation aimed to develop a multi-scalar approach to assess the contemporary urbanization dynamics in and around İstanbul. In doing so, the region is used as a spatial framework to evaluate the emerging scale of urbanization, therefore the applicability of the term—as a fundamental scalar unit in geography and urban studies—to evaluate the contemporary urban circumstance is tested. The initial research began with approaching the Marmara Region as a homogenous singular entity, larger than the sum of its parts. However, throughout the geo-spatial analyses, it is discovered that the Marmara Region is a "fragmented unity", embodying a diverse set of "microecologies".

At the most general level, the findings demonstrate a highly idiosyncratic condition within the Marmara Region; in which the conventional models and metanarratives such as urban expansion, conurbation, and megalopolis would be highly misleading if they were used a priori. The results revealed that the Marmara Region is composed of four autonomous urban assemblages interacting in a non-hierarchical. Hence, these assemblages compose operational scales at the regional level, larger than the metropolitan area of İstanbul. In this context, "region" mediated as a flexible middle ground which enabled the assessment of inter-regional[116], intra-regional[117], centripedal, and centrifugal urbanization dynamics.

[116] Between the Marmara Region, the Aegean Region dominated by İzmir, and the central Anatolia Region dominated by Ankara.

[117] Between the settlements within the boundaries of the Marmara Region.

The urban theories that transcend the urban-rural dichotomy introduced in the first chapter of this study were used to construct a theoretical framework, therefore the spatial concepts including region, microecology, landscape, and hinterland created a multi-scalar lexicon to situate the urban dynamics of the Marmara Region and İstanbul in particular. The historical geography of the Marmara Region compiled from the secondary sources in the second chapter points to intra-regional and inter-regional independence and interdependence that were established in the *Longue Durée.* However, the contemporary urban planning and development history of Turkey demonstrates the substantial governmental efforts to restructure these relationships through new urban policies and infrastructural investments. In the third chapter, the land-use and land-cover analyses beginning from the 1970s onwards, are evaluated at the provincial, district, village and one-kilometer grid cell levels in order to reveal the different dimensions of spatial fragmentation within the Marmara Region. Multiple Correspondence Analysis (MCA), as a statistical method, enabled the analysis of large geo-spatial data sets and facilitated evaluation of empirical data. Through the adopted exploratory method, the idiosyncrasies of the spatial fragmentation within the Marmara Region is thoroughly discussed. The accessibility analyses and the industrial and infrastructural development provided in the fourth chapter facilitated the indication of the intra-regional independence and interdependence. The obtained results put the contemporary infrastructural projects into question. The analyses of the transformation of Agricultural Areas, Forest and Semi-Natural Areas, Wetlands, and Water bodies in the Marmara Region shed light on the negative externalities precipitated by the rapid urban development and industrialization in the region. The overall findings on the urbanization dynamics of the Marmara Region can be discussed under two primary categories: the intra-regional and inter-regional independence and interdependence.

5.1 The Intra-Regional Independence and Interdependence.

The spatial analyses discussed throughout the study revealed a divided regional structure which embodies overlapping consistencies, permanence as well as profound differentiations. Within a span of 22 years, arguably, a transformation from a fragmented regional structure to a multi-nodal network with autonomous entities occurred; however due to the geographic restrictions—as demonstrated in the accessibility patterns in Chapter 4—this urban formation still remains highly divided. In this context, four primary settlement zones can be discussed:

- The imploding İstanbul confined to its provincial borders.
- The southwestern Marmara Region, more integrated to the Aegean system.
- Thrace as a resistive rural structure.
- The interdependent-urbanized eastern Marmara Region.

Given that urban circumstance, it can be asserted that, while İstanbul emerges as an idiosyncratic entity, it is not overly dominant, hence other urban centers including Bursa, Kocaeli, Çerkezköy and Çorlu in Tekirdağ are capable of creating territorial centripedal forces. The transformation of the centripedal and centrifugal forces between 1990 and 2012 with respect to urbanization and industrialization dynamics can be summarized as follows:

1. By 1990 Bursa was the only autonomous developed urban center independent from İstanbul in the Marmara region. Between 1990 and 2000 Thrace remained a dormant rural structure; therefore, İstanbul and Bursa as the primary urban

centers continued to grow. Relative urban growth also occurred around the Gulf of İzmit in the east and around the central Balıkesir in the southwestern Marmara Region. By 1990, industrial areas were primarily agglomerated within İstanbul and the northern part of the Gulf of İzmit, except for the minor industrial sprawl at the regional scale. The industrial development followed different dynamics from the urbanization patterns which demonstrates that the industrial expansion is rather related to the industrialization dynamics in the national scale. Between 1990 and 2000 the industrial agglomeration within İstanbul's provincial borders decentralized, therefore the industrial areas in the north of Tekirdağ in Thrace, the northern periphery of the Gulf of İzmit, the eastern part of the Lake Sapanca, and the central Bursa area expanded.

2. The period between 2000 and 2006 witnessed stagnancy in urban development. The urban development followed the İstanbul-İzmir Highway towards the south. The industrial development followed a similar pattern and the industrial areas skyrocketed in the northern periphery of the Gulf of İzmit (precisely in the Gebze district in Kocaeli), in the southwestern part of Bursa, and in the central Balıkesir.

3. The period between 2006 and 2012 is the period of significant expansion at the regional scale. While Thrace imploded as an autonomous entity in the west, the Gulf of İzmit area pushed urbanization further towards the Sakarya province in the east. In the southern Marmara Region, Bursa, and Balıkesir generated centrifugal forces, therefore the urban areas in the south expanded in the southwestern Marmara towards the Gulf of Edremit. If the urbanization dynamics between 2006 and 2012 are compared with the development of industrial and commercial land-use, it is observed that the urban development in Thrace—specifically in Çorlu and Çerkezköy—is independent from the

industrial and commercial sprawl. This demonstrates that, similar to the previous periods, the territorial industrial and commercial sprawl between 2006 and 2012 is, again, related to the general industrialization of Turkey.

5.2 The Inter-Regional Independence and Interdependence.

The major findings of the accessibility analyses discussed in the fourth chapter demonstrated that Ankara and İzmir—as the second and the third ranking cities—(*Figure 4.7*, *Figure 4.8* and *Figure 4.9*) are capable of generating substantial centripedal forces, that affect the southern periphery of the Marmara Region. This condition signifies that the indicated intra-regional disparities stem from broader inter-regional effects, therefore these disparities transcend regional boundaries. The population projections made by TUIK for the years between 2012 and 2023 anticipates a 19.6% population growth for İstanbul, a 19.4% population growth for Ankara, and a 10% population growth for İzmir which demonstrates that while İzmir will remain stable, İstanbul and Ankara will continue to generate substantial centripedal forces (*Figure 5.1*). In this regard, it can be asserted that, the conurbated expansion towards İzmir along the Bursa Highway—as discussed in Chapter 3—is not city-centric, instead it is a territorial urban sprawl. On the other hand, the findings of this study on the regional development towards İzmir demonstrate that the population projection is probably underestimating the role of İzmir and the role of the İstanbul-İzmir highway in generating inter-regional dynamics. The dynamics of the eastern Marmara Region including Bursa, Bilecik, Sakarya, and Kocaeli seem to more depend on inter-regional push and pull between İstanbul, İzmir and Ankara.

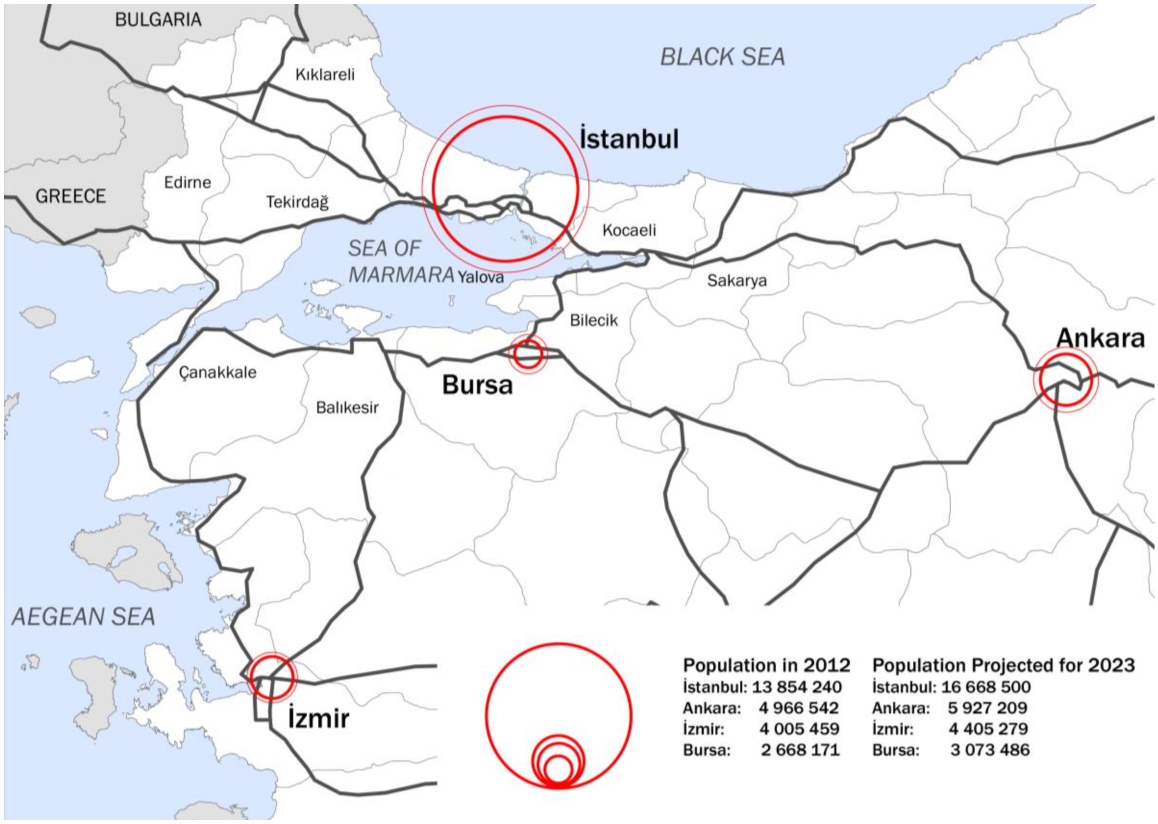


Figure 5.1: The intra-regional network around the Marmara Region with the population projection done by TUIK for the years between 2012 and 2023.

If the population projection made by TUIK is combined with the migration and voting patterns (*Figure 5.2* and *Figure 5.3*), a new set of intra-regional relationships become explicit, shedding light on the peculiarities of Thrace and the southwestern Marmara Region. Given this context, in the layered migratory maps prepared by Güvenç, the overall edge of Greece in Thrace and the Aegean autonomy, manifest these relations. In this map Thrace emerges as a singularity—isolated from the intra-regional effects discussed above—in which Edirne and Kırklareli provinces—as the frontiers along the Greek border—act as independent entities, vaguely interacting with Tekirdağ and İstanbul. Within this scheme, while İstanbul, Tekirdağ, and Koceli can be evaluated as being interdependent, the eastern Marmara provinces—including Bursa and Yalova—form a second interdependent group in close interaction with Düzce. Likewise, Çanakkale and Balıkesir provinces in the southwestern Marmara Region compose a third autonomous group that is integrated into the Aegean migration system and Bilecik emerges as another singularity integrated into the Central Anatolian System.

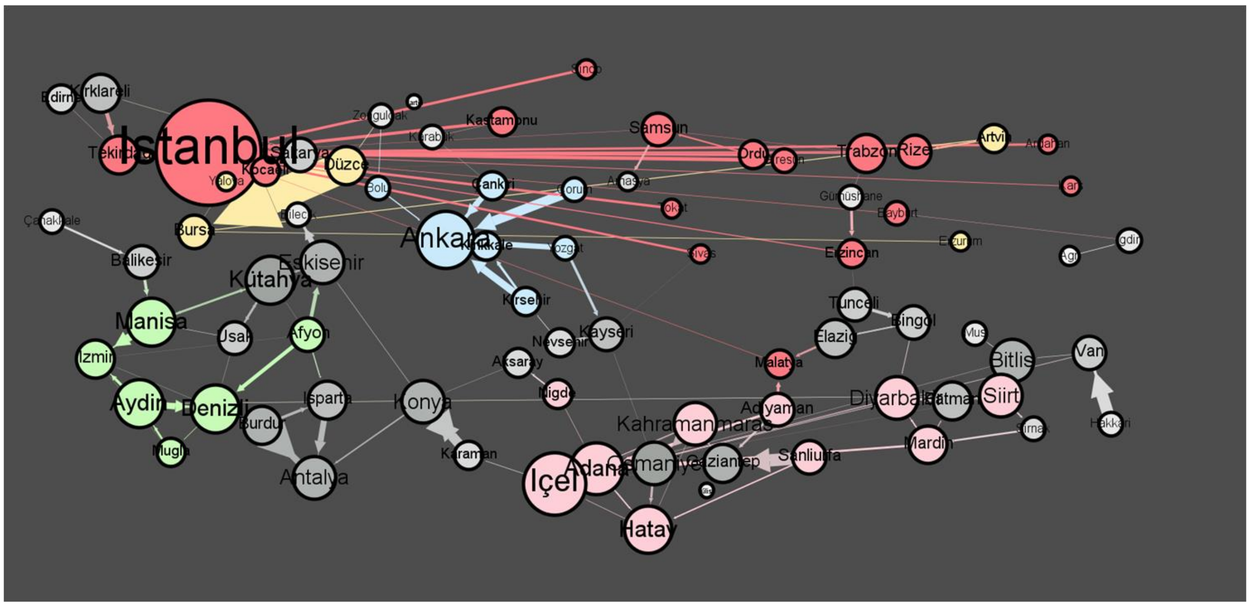


Figure 5.2: Source: Güvenç, M. Aktaş, Ö. (2014) Towards a New Phase of Migration Studies in Turkey.(Türkiye İç Göç Çalışmalarında Yeni Bir Evreye Doğru) Unpublished Tubitak Project Report, Project No.111 K 266.

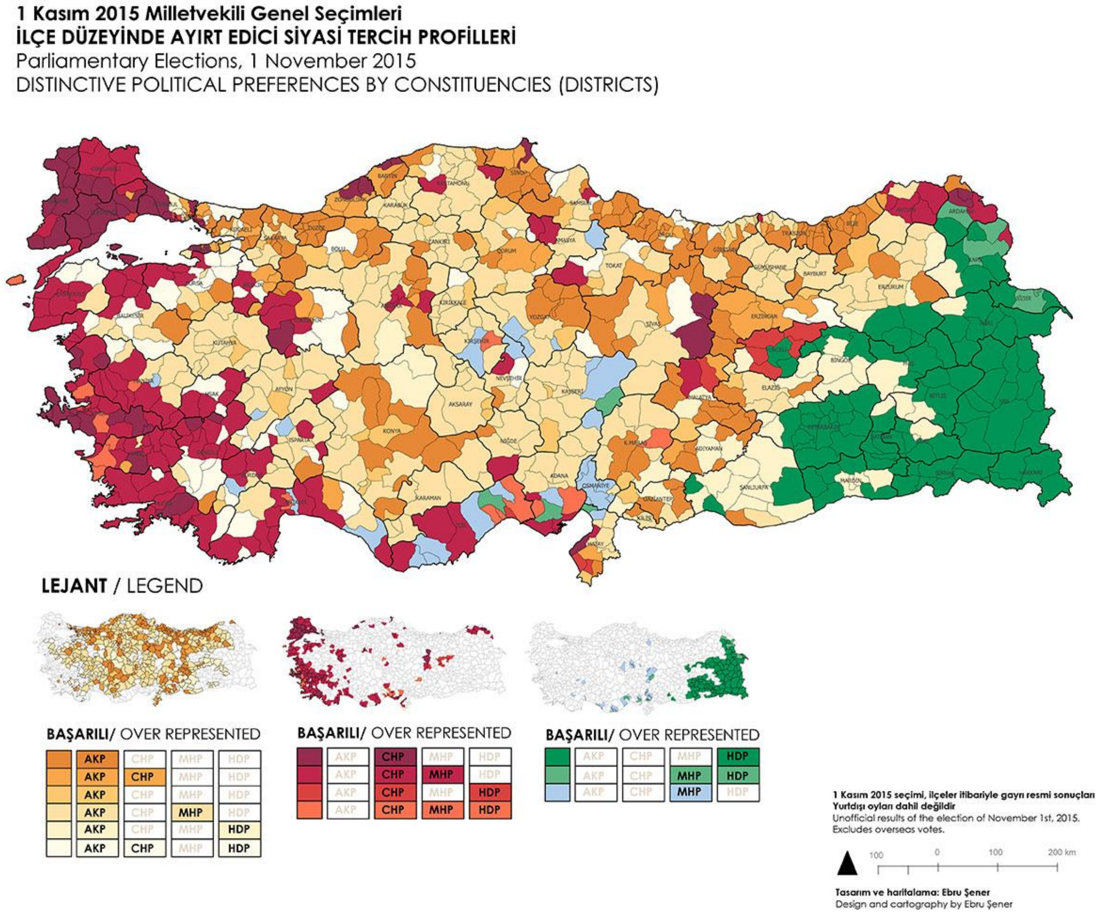


Figure 5.3: Güvenç, M. (2015). Parliamentary Elections, 1 November 2015. Kadir Has University İstanbul Studies Center.

If the electoral map of the parliamentary elections that took place on November 1st 2015 is observed, similar inter-regional disparities and intra-regional continuities can be read. The electoral map demonstrates that—besides being integrated into different migration patterns—Thrace and the southern Marmara region also display different voting patterns from the Marmara Region. According to the electoral map for the November 1st election in 2015, the voting pattern in Thrace and the southwestern Marmara is in continuity with the Aegean voting pattern in which the Republican People's Party (*CHP)* is overrepresented. On the contrary, the Justice and Development Party (JDP) is overrepresented in the rest of the Marmara Region.

This repeating socio-spatial pattern—in which the Aegean coastal system and Thrace are separated from the rest of Anatolia, and thus more integrated into the Mediterranean Region and the Eastern Europe—can be explained through Vidalian and Braudelian perspectives. In "Rural Settlements: Sub-village Formations"[118]—a pioneering article on the settlement systems in Anatolia printed in 1971—geographer Necdet Tunçdilek sheds light on these relations through the rural settlement structures established in the *Longue Durée*[119] in Anatolia (pp. 17-54). According to Tunçdilek, larger processes of territorialization and deterritorialization precipitated this fragmentation: the rural influx and intra-regional migration patterns (p.24). Migrations started at the end of the 18th century (around 1785) from the Caucasus, Crimea, and the Balkan Countries to Anatolia and continued periodically until 1912 (p.24). Subsequently, these migrations transformed into the population exchange between Greece and Turkey after 1923 (p.24). It is roughly estimated that within a span of two hundred years, millions of people migrated, therefore the rural population increased five-fold (pp. 24, 25). Tunçdilek asserts that these population flows essentially effected the rural areas. While the newcomer groups intensified the rural areas, they also diversified the rural settlement types in Turkey by introducing their idiosyncratic settlement systems. According to Tunçdilek, the migrants were located in old

[118] Kır Yerleşmeleri: Köy-Altı Şekilleri .

[119] See the section "Deciphering the Microecologies of the Region: The Evaluation of 2006 Land-Cover Data in Strata" in Chapter 3.

villages and in state and pious foundation lands[120] outside the Turkoman (*Türkmen*) and Nomad (*Yörük)* properties (pp. 24-25). However, some of the migrant groups were not satisfied with the assigned areas and bought large *çiftliks* (farms) and some portions of the commons of villages in Thrace and the western Anatolia in order to settle in these areas (p. 25). Tunçdilek argues that the most important part of this migration is that it reversed the rural structure. A sizable amount of the state and pious foundation land assigned to the newcomers was around the plain bases with alluvial soil. These plain bases were formerly used for overwintering for livestock groups (p. 25) and the replacement, eventually, enabled the transformation of the fertile land into settlement areas.[121]

Tunçdilek asserts that the ethnic diversity of the migrants played an important role in their decision-making processes on locations (p. 26). For instance, Circassians and Abkhazians preferred the mountainous and wooded areas, and Russians, Romanians, and Bulgarians preferred the plateaus and alluvial plains as settlement locations (p. 26). This circumstance caused agglomerations in certain territories including primarily Thrace, followed by the Marmara Region, the western part of the Central Anatolia, Aegean and Çukurova Regions. After the population exchange between Greece and Turkey in 1923, the Ottoman-Greek (*Rum*) villages that were heavily agglomerated in the Black Sea, Marmara, and Aegean Regions became even denser because of the migrants coming from Greece (p. 26). Through the lens of Vidal de la Blache, it can be argued that the outcomes

[120] *Evkafa ait* in the original text.

[121] Tunçdilek notes that, all the plain bases were malaria fields which, in the short term, caused the termination of many newcomers and precipitated internal migration.

of the two hundred year-influx over *pays* transformed *genre de vie* in such a way that can still clearly be seen in the contemporary settlement, voting, and migration patterns.

These inter-regional and intra-regional independence, interdependence, fragmentation, and persistence in the Marmara Region accounted for raise a simple, albeit a fundamental theoretical question: Are regions unified entities? Scott's explanation of the contemporary regionalism points to the necessity of acknowledging the geographic characteristics that define regions as an alternative to globalization's discourse on space as an unbounded construct:

> The new regionalism stands in opposition to the view of borderless space of flows that is sometimes set forth in the discussions of the future course of international development. It does not present the antithesis of globalization, however, but is its counterpart in a world from which geography has not yet been – and cannot yet be—abolished. (2001, p.1)

In this regard, the findings of these study utilizes the redefinition of the concept of the region in the 21st century. While the geographic characteristics of the region such as the Sea of Marmara with the two straits and its transitory climate construct a unity, the inter-regional consistencies and intra-regional fragmentation reveal that the concept of the region as a geographically-bounded unit has to be revisited. This study asserts that, if defined as a mediating unit with flexible boundaries, the region—as the base unit of geography—is a substantially adequate term to explain the complex layers of contemporary planetary urbanization.

As stated in the introduction, while this study is not on neoliberal urbanization, its findings on the spatial patterns in the Marmara Region can pave the way to more thorough discussions on the subject. Firstly, the findings reveal that—despite the scale and scope of the recent neoliberal interventions—the urban landscape of the Marmara Region is also shaped by the *Longue Durée* processes such as migration waves and the geographic characteristics of the region. This separation facilitates the deciphering of the idiosyncrasies of neoliberal urbanism in Turkey. The findings also revealed that the neoliberal project changed gears in very short time spans, which immediately reflected in spatial transformation. Besides the development of the built-environment the neo-liberal interventions also affected other land-covers such as forests and agricultural areas. Together these results indicate that the studies on neoliberal urbanism in Turkey—and in İstanbul in particular—should be sensitive to local, contextual, and temporal differences as well as environmental and ecological changes, and thus the idea of neoliberal urbanism as a homogenous entity should be revisited.

5.3 If-Then Scenarios

Within a set of governmental and institutional efforts to comprehend the rapid urbanization in the Marmara Region—and in İstanbul in particular—the mega-infrastructural projects are the most controversial interventions. However, the results obtained from a diverse set of analyses within this study clearly demonstrated that these infrastructural projects have little agency in changing the spatial divisions within the Marmara Region based on the geographical thresholds. For instance, in terms of accessibility patterns, the Third Bridge is basically an offset of the Bosphorus and the Fatih Sultan Mehmet Bridges, therefore its impact will remain local, solely increasing the urban expansion towards the north of İstanbul. The Marmaray project has a broader area of influence including Gebze and Tekirdağ. However, a simple planning principle should be acknowledged here, that is, “Trains move in both directions”. In other words, the efforts to decentralize İstanbul, based solely on infrastructural investment are far-fetched and likely to operate the other way around. The simple neighborhood-level analysis on the impact of the Marmaray project in Kadıköy—as discussed in Chapter 4—clearly demonstrates that the mega projects are already generating real-estate speculation and triggering the densification of the city center. Within this scheme, it is quite likely that the imploding İstanbul will be prone to more complex sustainability problems.

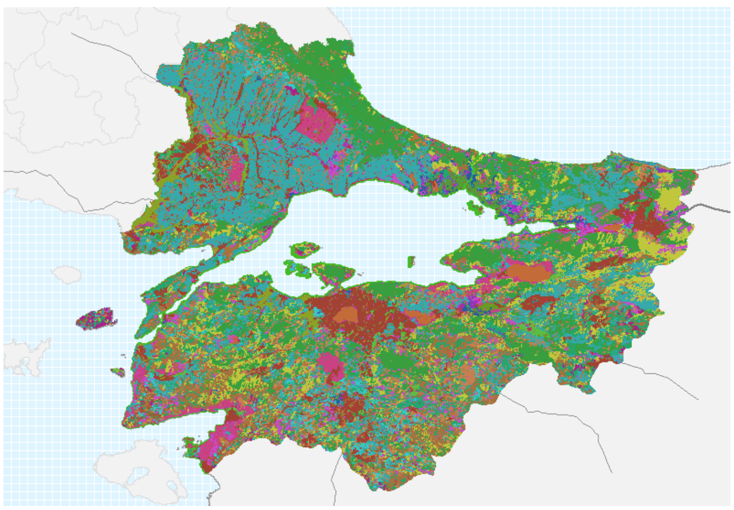
That said, the Kocaeli Bridge, as another mega-scale infrastructural intervention can be evaluated in a slightly different manner. The Kocaeli Bridge has the potential to decentralize urbanization towards the Gulf of İzmit and Bursa, which can eventually be beneficial for İstanbul. However, this potential will probably not regionalize the impact, and Thrace and the southwestern Marmara Region will continue to develop as autonomous entities. From an environmental point of view, this autonomy can be evaluated as a positive sign in the sense that, the recreational lifestyle or *genre de vies* enhanced in these areas will be preserved. On the other hand, this spontaneous progress is far from being sufficient to solve the negative externalities generated primarily by İstanbul. The invaluable geographic entities of the region including the Sea of Marmara, Kaz Mountains, and the Ergene River Basin are subject to intense environmental degradation. These geographic entities are located within the provincial borders of several provinces which makes the generation of policies and plans more complex. In this regard, the coalition of the NGOs within the Marmara Region under the title of We are Defending Marmara in 2014 (*Marmara'yı Savunuyoruz*) is a small but fundamental step to internalize the negative externalities precipitated by İstanbul and the emerging industrial zones within the region.

The central concern of this study has been to construct a common-ground to raise awareness of the issues discussed above. While the outcomes of this research is open to critical readings, it is hoped that this study will be an origin point for future studies on the settlement systems in Anatolia in the fields of humanities and social sciences as well as for participatory local think-tanks and planning institutions in order to develop sustainable pathways forward.

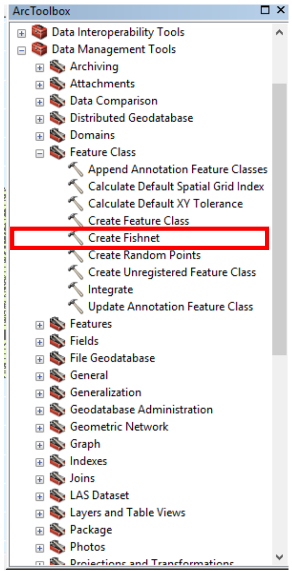
Appendix

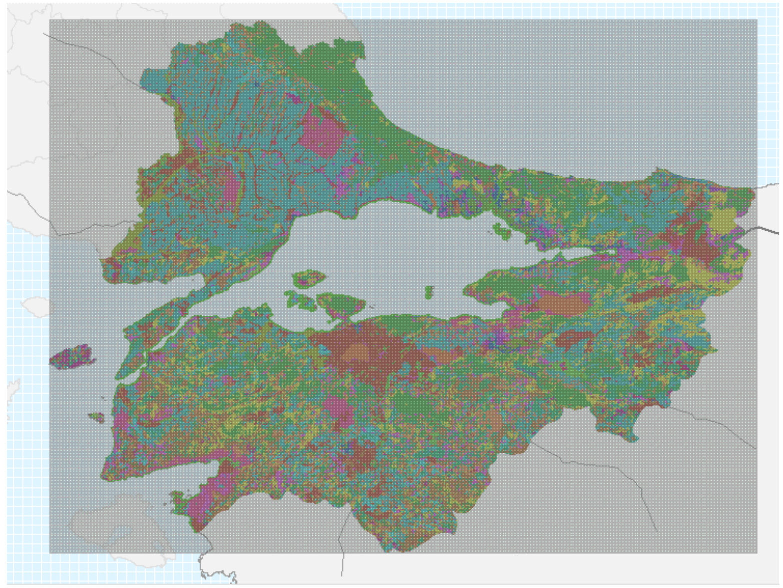
The appendix comprises a tutorial on the mapping technique used in this study. The combined use of GIS and MCA to analyze the land-cover data of the Marmara Region—obtained from the Ministry of Forestry and Water Management in the Corine System—will be explained in steps.

1. WGS 1984 UTM Zone 35 is applied as the coordinate system to the 2006 land-cover data of the Marmara Region.



2. A grid is created by the Create Fishnet command under the Future Class Toolset in the Data Management Toolbox. The extent of the grid is limited to the boundary of the Marmara Region. The one-kilometer grid cell size is determined after the testing of different grid cell sizes. While the total number of grid cells in the one-kilometer grid are appropriate for computing, this resolution also generates fine-grain detail for spatial analysis at a diverse set of scales.

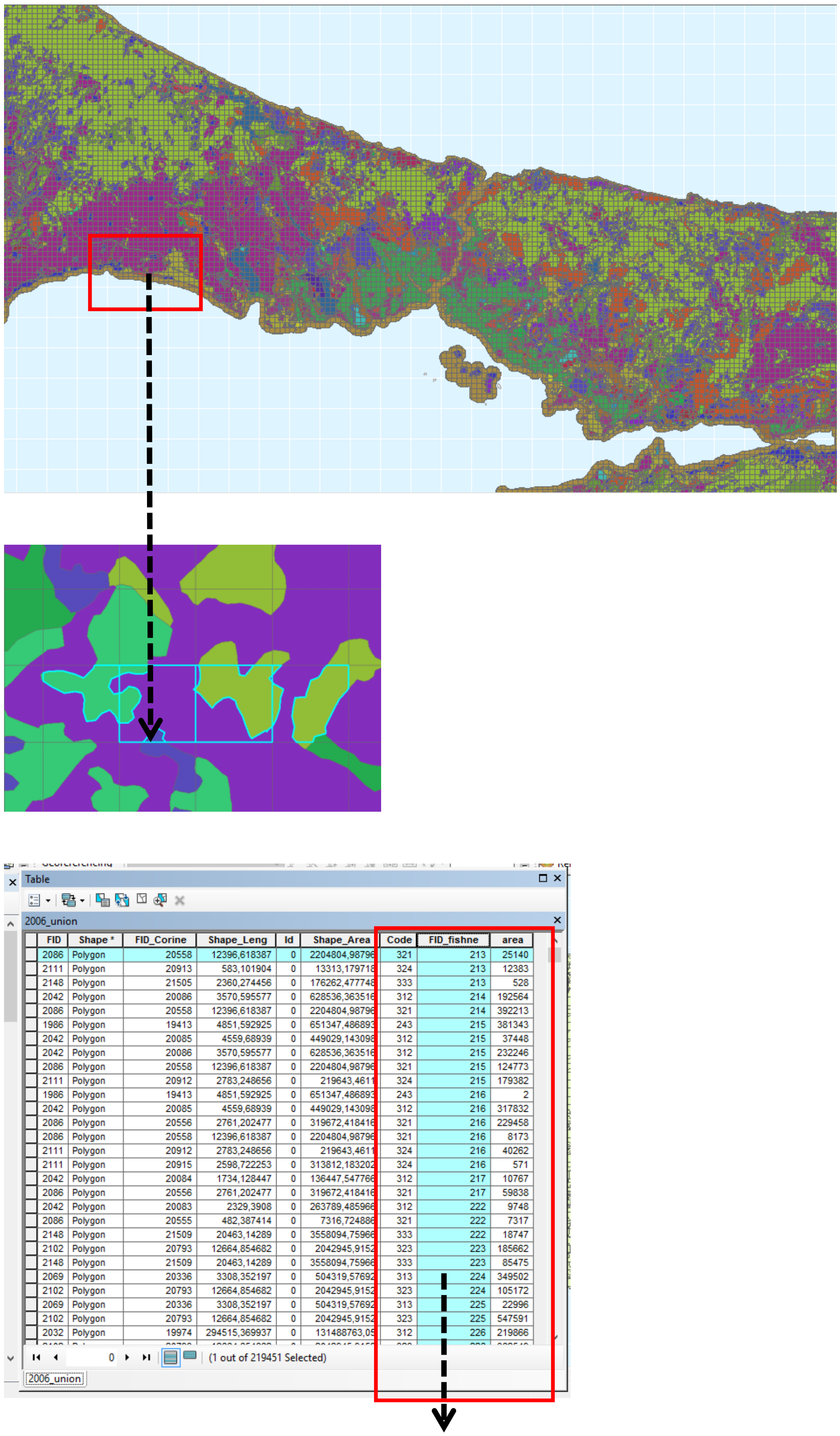




3. The land-cover data and the one-kilometer grid are merged by the Union command under Geoprocessing in Arcmap and a new shape file that comprises both the grid cells and the land-cover information is obtained.

4. Through the Union command Arcmap generates a unique cell ID for each grid cell in the obtained shape file. [122] The land-cover proportions in each grid cell can be calculated. The obtained unique cell IDs are consistent for the 1990, 2000, 2006, and 2012 data.

[122] The one-kilometer grid for the Marmara Region is composed of 70,000 grid cells.



FID	Shape *	FID_Corine	Shape_Leng	Id	Shape_Area	Code	FID_fishne	area
2086	Polygon	20558	12396,618387	0	2204804,98796	321	213	25140
2111	Polygon	20913	583,101904	0	13313,179718	324	213	12383
2148	Polygon	21505	2360,274456	0	176262,477748	333	213	528
2042	Polygon	20086	3570,595577	0	628536,363516	312	214	192564
2086	Polygon	20558	12396,618387	0	2204804,98796	321	214	392213
1986	Polygon	19413	4851,592925	0	651347,486893	243	215	381343
2042	Polygon	20085	4559,68939	0	449029,143098	312	215	37448
2042	Polygon	20086	3570,595577	0	628536,363516	312	215	232246
2086	Polygon	20558	12396,618387	0	2204804,98796	321	215	124773
2111	Polygon	20912	2783,248656	0	219643,4611	324	215	179382
1986	Polygon	19413	4851,592925	0	651347,486893	243	216	2
2042	Polygon	20085	4559,68939	0	449029,143098	312	216	317832
2086	Polygon	20556	2761,202477	0	319672,418416	321	216	229458
2086	Polygon	20558	12396,618387	0	2204804,98796	321	216	8173
2111	Polygon	20912	2783,248656	0	219643,4611	324	216	40262
2111	Polygon	20915	2598,722253	0	313812,183202	324	216	571
2042	Polygon	20084	1734,128447	0	136447,547766	312	217	10767
2086	Polygon	20556	2761,202477	0	319672,418416	321	217	59838
2042	Polygon	20083	2329,3908	0	263789,485966	312	222	9748
2086	Polygon	20555	482,387414	0	7316,724886	321	222	7317
2148	Polygon	21509	20463,14289	0	3558094,75966	333	222	18747
2102	Polygon	20793	12664,854682	0	2042945,9152	323	223	185662
2148	Polygon	21509	20463,14289	0	3558094,75966	333	223	85475
2069	Polygon	20336	3308,352197	0	504319,57692	313	224	349502
2102	Polygon	20793	12664,854682	0	2042945,9152	323	224	105172
2069	Polygon	20336	3308,352197	0	504319,57692	313	225	22996
2102	Polygon	20793	12664,854682	0	2042945,9152	323	225	547591
2032	Polygon	19974	294515,369937	0	131488763,05	312	226	219866

The land-cover codes, unique cell ID's and areas of the each land-cover types in the one-kilometer grid cells.

5. This table is imported to a spreadsheet, and a matrix of the unique cell IDs with the areas of each land-cover category in the one-kilometer grid is composed.

1	Row Label	111	121	122	123	124	131	132	133	141	142	213	221	223	231
60396	104457	0	44325	0	0	0	0	0	0	0	0	0	0	0	0
60397	104458	0	831462	0	0	0	0	0	0	0	0	0	0	0	0
60398	104459	0	208973	0	0	0	0	0	0	0	0	0	0	0	0
60399	104460	0	312443	0	0	0	0	0	0	0	0	0	0	0	0
60400	104461	0	275507	0	0	0	0	0	0	0	0	0	0	0	0
60401	104462	0	106993	0	0	0	0	0	0	0	0	0	0	0	0
60402	104463	0	678808	0	0	0	0	0	0	0	0	0	0	0	0
60403	104464	0	887637	0	0	0	0	0	0	3274	0	0	0	0	0
60404	104465	0	536589	0	0	0	0	0	0	65783	0	0	0	0	0
60405	104466	0	0	0	0	0	0	0	0	117400	0	0	0	0	0
60406	104467	0	0	0	0	0	0	0	0	275257	0	0	0	0	0
60407	104468	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60408	104469	250819	0	0	0	0	0	0	0	0	0	0	0	0	0
60409	104470	948820	0	0	0	0	0	0	0	0	1688	0	0	0	0
60410	104471	932165	0	0	0	0	0	0	0	0	0	0	0	0	0
60411	104472	309709	0	0	0	0	0	0	0	0	0	0	0	0	0
60412	104473	0	0	0	0	0	0	0	0	0	0	0	0	0	0

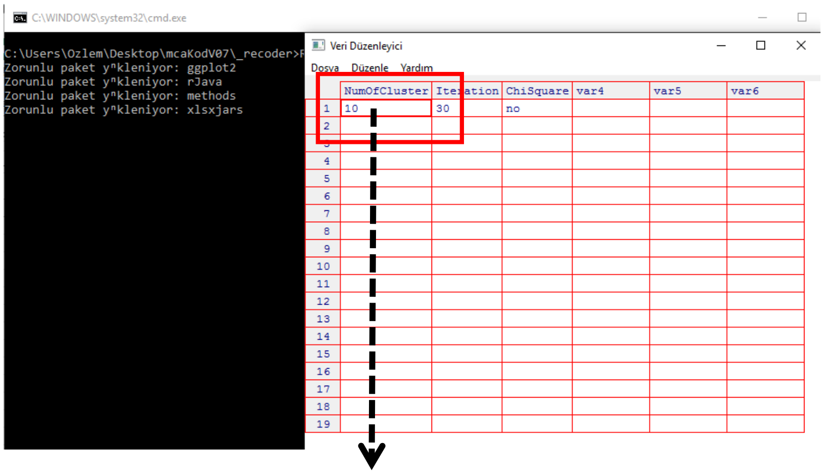
unique cell ID's *land-cover codes* *areas of land-cover categories in one-kilometer grid cells*

6. For the urban fabric land-cover maps, urban fabric land-covers are evaluated in a separate file.

	111	1121	1122
213	0	0	0
214	0	0	0
215	0	0	0
216	0	0	0
217	0	0	0
222	0	0	0
223	0	0	0
224	0	0	0
225	0	0	0
226	0	0	0
227	0	0	0
228	0	0	0
229	0	0	0
663	0	0	0
664	0	0	0
665	0	0	0
666	0	0	0
667	0	0	0

the matrix of urban fabric land-cover areas (Continuous Urban Fabric [111], Discontinuous Urban Fabric [1121] and Discontinuous Rural Fabric [1122]) and unique cell ID's

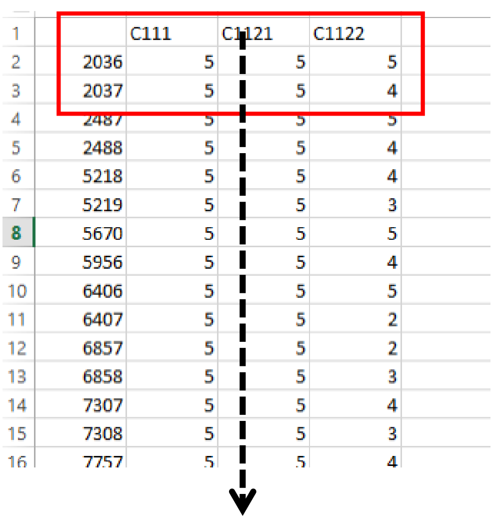
7. This matrix is coded in MCA via the recoder tool.[123] For the maps produced in this study the number of clusters for recoding are assigned between five and seven.



a cluster number is assigned for coding

8. Through the recoding process in MCA two different files types are generated.

a. A recoded version of the matrix

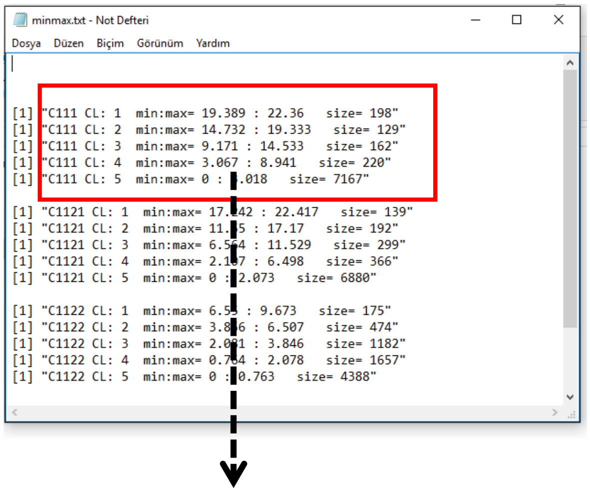


		C111	C1121	C1122
1				
2	2036	5	5	5
3	2037	5	5	4
4	2487	5	5	5
5	2488	5	5	4
6	5218	5	5	4
7	5219	5	5	3
8	5670	5	5	5
9	5956	5	5	4
10	6406	5	5	5
11	6407	5	5	2
12	6857	5	5	2
13	6858	5	5	3
14	7307	5	5	4
15	7308	5	5	3
16	7757	5	5	4

coded areas of the urban land-cover categories for each one-kilometer grid cell

[123] See page 40 for the coding process in MCA.

b. A min-max table that shows the ranges of the code levels.


minmax.txt - Not Defteri

Dosya Düzen Biçim Görünüm Yardım

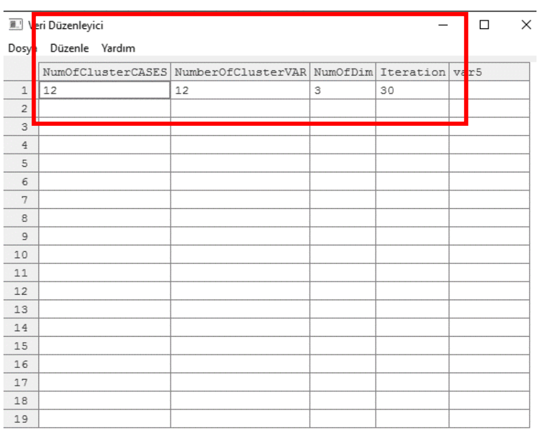
[1] "C111 CL: 1 min:max= 19.389 : 22.36   size= 198"
[1] "C111 CL: 2 min:max= 14.732 : 19.333   size= 129"
[1] "C111 CL: 3 min:max= 9.171 : 14.533   size= 162"
[1] "C111 CL: 4 min:max= 3.067 : 8.941   size= 220"
[1] "C111 CL: 5 min:max= 0 : [illegible].018   size= 7167"

[1] "C1121 CL: 1 min:max= 17.[illegible]42 : 22.417   size= 139"
[1] "C1121 CL: 2 min:max= 11.[illegible]5 : 17.17   size= 192"
[1] "C1121 CL: 3 min:max= 6.5[illegible]4 : 11.529   size= 299"
[1] "C1121 CL: 4 min:max= 2.1[illegible]7 : 6.498   size= 366"
[1] "C1121 CL: 5 min:max= 0 : 2.073   size= 6880"

[1] "C1122 CL: 1 min:max= 6.5[illegible] : 9.673   size= 175"
[1] "C1122 CL: 2 min:max= 3.8[illegible]6 : 6.507   size= 474"
[1] "C1122 CL: 3 min:max= 2.0[illegible]1 : 3.846   size= 1182"
[1] "C1122 CL: 4 min:max= 0.7[illegible]4 : 2.078   size= 1657"
[1] "C1122 CL: 5 min:max= 0 : 0.763   size= 4388"

code level ranges for the Continuous Urban Fabric category (1 refers to the highest overrepresentation and 5 refers to lowest overrepresentation)

9. The recoded data is processed and the number of clusters and iteration are assigned in MCA. MCA generates a merged table and an index table.


Veri Düzenleyici

Dosya Düzenle Yardım

	NumOfClusterCASES	NumberOfClusterVAR	NumOfDim	Iteration	var5
1	12	12	3	30	
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					

10. The merged table is used to determine the legend categories of the maps. The generated clusters in MCA signify the one-kilometer grid cell types with similar urban fabric land-cover distributions. The values in the merged tables are used to determine if a land-cover category is overrepresented or underrepresented in a particular cluster (if the value is over zero it is evaluated as overrepresented and highlighted in yellow, if the value is below zero it is considered as underrepresented). For instance, in the 8.x cluster. C111_2, C1121_3, C1121_4 and C1122_5 are overrepresented.

		39,6	1,638	0,39	1,663	2,285	2,387	2,819	3,492	3,92	5,993	14,92	20,89
		1	2	4	3	6	5	12	11	7	8	9	10
	cl	1.x	8.x	10.x	7.x	11.x	5.x	12.x	6.x	4.x	9.x	2.x	3.x
C111_1	1	13,3	-1,8	-0,9	-1,8	-2,1	-2,2	-2,4	-1,9	-2,8	-3,4	-5,4	-6,4
C111_2	2	-7,1	87,3	-0,7	-1,5	-1,7	-1,8	-1,9	-2,1	-2,2	-2,8	-4,4	-5,2
C111_3	3	-8	-1,6	3,3	78,2	-1,9	-2	-2,1	-2,4	-2,5	-3,1	-4,9	-5,8
C111_4	4	-9,3	-1,9	-0,9	-1,9	78	15,2	-2,5	-2,8	-2,9	-3,6	-5,7	-6,8
C111_5	5	1,6	-10,8	-5,3	-10,9	-12,8	-1,8	1,4	1,4	1,7	2,1	3,2	3,8
C1121_1	6	-7,4	-1,5	-0,7	-1,5	1	-1,8	-2	-2,2	55	-2,9	-4,6	-5,4
C1121_2	7	-8,7	-1,8	-0,9	0,5	-2,1	85,7	-2,3	-2,6	-2,7	-3,4	-5,4	-6,3
C1121_3	8	-10,9	1,9	-1,1	11,7	11,5	-2,7	**73,6**	-3,2	-3,4	-4,2	-6,7	-7,9
C1121_4	9	-12	9,8	24,6	-2,5	7,5	-3	-3,2	**73,4**	-3,8	-4,7	-7,4	-8,7
C1121_5	5	7,6	-2,1	-5,2	-1,7	-3,9	-12,8	-13,9	-15,5	-5,8	2,9	4,6	5,5
C1122_1	10	-8,3	-1,7	-0,8	-1,7	-2	-2	-2,2	-2,5	64,2	-3,2	-5,1	-6
C1122_2	11	-13,7	-2,8	-1,4	-2,8	-3,3	-3,4	-3,7	-3,6	-4,3	83,2	-8,4	-9,9
C1122_3	12	-21,6	-4,4	-2,2	-4,4	-5	-5,1	-5,3	-6,1	-6,8	-8,4	75,2	-15,7
C1122_4	5	-25,6	-5,2	-2,6	-5,2	-6,2	-6	-6,5	-6,8	-7,8	-10	-15,7	69,8
C1122_5	5	33,1	6,7	3,3	6,8	7,9	7,8	8,4	9	-3,1	-16,2	-25,6	-30,3

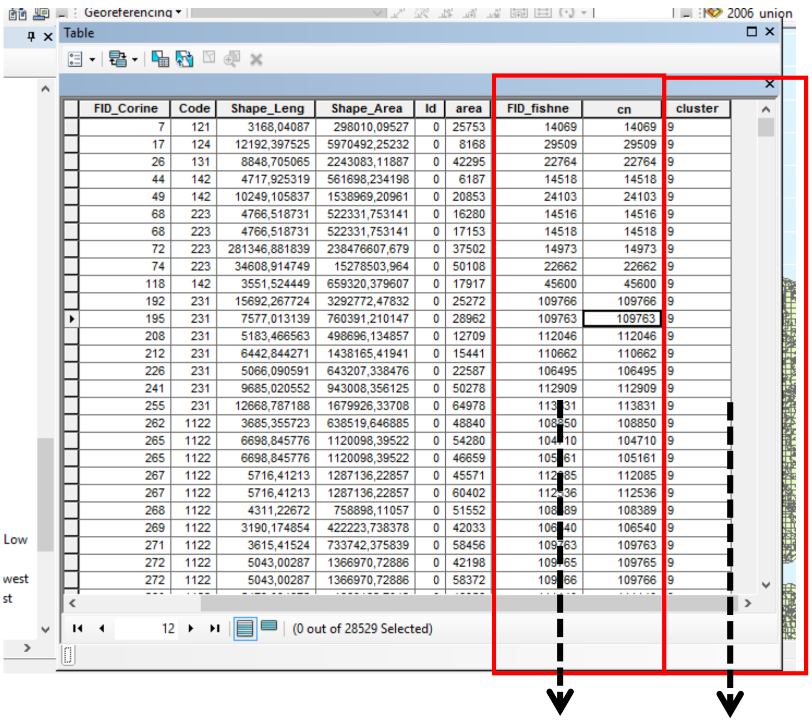
This is interpreted as follows: In this category the Continuous Urban Fabric has high overrepresentation, Discontinuous Urban Fabric has intermediate and low overrepresentation and Discontinuous Rural Fabric has the lowest overrepresentation.

11. The index table displays the cluster number for each one-kilometer grid cell.

	C111	C1121	C1122	cluster
30406	1	5	5	1
30857	1	5	5	1
58020	1	5	5	1
58472	1	5	5	1
58859	1	5	5	1
58919	1	5	5	1
59368	1	5	5	1
59369	1	5	5	1
60717	1	5	5	1
65591	1	5	5	1
87842	1	5	5	1
87843	1	5	5	1
87847	1	5	5	1
88713	1	5	5	1
88714	1	5	5	1
89165	1	5	5	1
89166	1	5	5	1
89613	1	5	5	1
89616	1	5	5	1
89617	1	5	5	1
90063	1	5	5	1
90064	1	5	5	1
92310	1	5	5	1
92759	1	5	5	1
92760	1	5	5	1
92761	1	5	5	1
93207	1	5	5	1

unique IDs for grid cells   *cluster numbers*

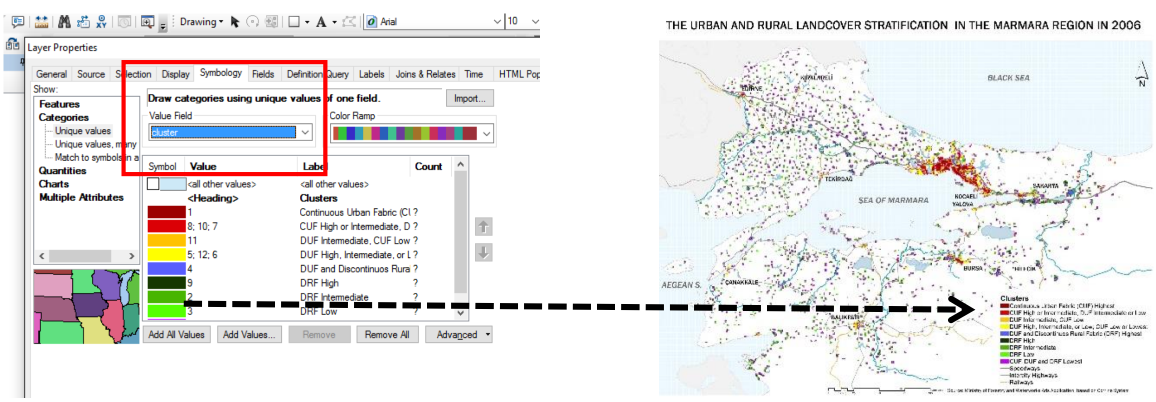
12. The cluster numbers are merged with the 2006 land-cover shape file via the unique cell ID's by the Join Data tool in Arcmap.



FID_Corine	Code	Shape_Leng	Shape_Area	Id	area	FID_fishne	cn	cluster
7	121	3168,04087	298010,09527	0	25753	14069	14069	9
17	124	12192,397525	5970492,25232	0	8168	29509	29509	9
26	131	8848,705065	2243083,11887	0	42295	22764	22764	9
44	142	4717,925319	561698,234198	0	6187	14518	14518	9
49	142	10249,105837	1538969,20961	0	20853	24103	24103	9
68	223	4766,518731	522331,753141	0	16280	14516	14516	9
68	223	4766,518731	522331,753141	0	17153	14518	14518	9
72	223	281346,881839	238476607,679	0	37502	14973	14973	9
74	223	34608,914749	15278503,964	0	50108	22662	22662	9
118	142	3551,524449	659320,379607	0	17917	45600	45600	9
192	231	15692,267724	3292772,47832	0	25272	109766	109766	9
195	231	7577,013139	760391,210147	0	28962	109763	109763	9
208	231	5183,466563	498696,134857	0	12709	112046	112046	9
212	231	6442,844271	1438165,41941	0	15441	110662	110662	9
226	231	5066,090591	643207,338476	0	22587	106495	106495	9
241	231	9685,020552	943008,356125	0	50278	112909	112909	9
255	231	12668,787188	1679926,33708	0	64978	[illegible]	113831	9
262	1122	3685,355723	638519,646885	0	48840	[illegible]	108850	9
265	1122	6698,845776	1120098,39522	0	54280	[illegible]	104710	9
265	1122	6698,845776	1120098,39522	0	46659	[illegible]	105161	9
267	1122	5716,41213	1287136,22857	0	45571	[illegible]	112085	9
267	1122	5716,41213	1287136,22857	0	60402	[illegible]	112536	9
268	1122	4311,22672	758898,11057	0	51552	[illegible]	108389	9
269	1122	3190,174854	422223,738378	0	42033	[illegible]	106540	9
271	1122	3615,41524	733742,375839	0	58456	[illegible]	109763	9
272	1122	5043,00287	1366970,72886	0	42198	[illegible]	109765	9
272	1122	5043,00287	1366970,72886	0	58372	[illegible]	109766	9

the unique ID's and the cluster numbers for each one-kilometer grid

13. Subsequently, the Urban Fabric land-cover clusters are in the 2006 land-cover data are mapped via the Symbology tool.



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