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The landscape identity of rural settlements: Turkey's Aegean Region

This research presents a methodology for assessing the landscape identity of rural settlements. The methodology evaluates landscape identity parameters as descriptive units and analyses landscape identity according to natural, built, socioeconomic, and sociocultural parameters at various scales. Turkey's Aegean Region was selected as a case study for the research because of its rich rural pattern created by the combination of diverse geomorphology, a unique rural architectural character, climatic conditions, the rural economy, and sociocultural structures. The research presents several findings related to physical landscape identity. In addition, it shows important aspects of rural settlements through the lens of landscape identity and highlights the importance of identity-based approaches for sustainable rural development.

Keywords: landscape identity, rural settlements, rural landscape, Turkey

1 Introduction

Rural settlements differ from urban settlements in many ways. Understanding these differences is crucial to meet the challenging demands of contemporary urbanism and development trends and to understand their impact on rural areas. However, rural areas have undergone just as radical a transformation as urban areas due to factors such as demographic changes, population mobility, housing needs, and increased demand for nature and recreation areas. All these factors lead to the transformation of rural space, accompanied by socioeconomic and sociocultural changes (Carlin & Saupe, 1993; Boyle & Halfacree, 1998; Dax, 1999; Mahon, 2007; Lampietti et al., 2009; Silva & Figueiredo, 2013).

Turkey has been experiencing dramatic changes in rural areas over the last decades. In addition to general trends that can be seen everywhere in the world, such as migration, globalization, technological development, and its impact on rural space, some of the important factors that have accelerated the rural transformation process are the EU accession process, the European Spatial Development Perspective, new agricultural policies, environmental and sustainability debates, and new legal frameworks for the management of rural lands (Çörek Öztaş & Karaaslan, 2017; Oğuz, 2013). In particular, with the enactment of law no. 6360 in 2012, previously medium-sized cities were declared "metropolitan municipalities", and the previously rural "villages" were declared "urban neighbourhoods" (Soydal & Türk, 2016). With this regulation, the rural areas of metropolitan municipalities have been subjected to management policies restricting rural-based economic activities and providing services within an urban jurisdiction. It is obvious that this regulation threatens rural character and signals an urgent need to develop new strategies and methods to control the transformation process physically, socially, and economically.

The number of studies that offer a methodological approach to describing the multi-layered structure of rural settlements is limited. The tendency of studies can be observed in three main areas. One group of studies evaluates rural settlements from a geographical point of view and typologically classifies them according to geomorphology, ethnic structure, economy, function, and size (Mitković et al., 2002). Some studies offer a typological classification according to the macro form (compact, dispersed, linear, etc.) of the rural settlements from an urban planning perspective (Sharp, 1946; Bunce, 1982; Mandal, 2001; Roberts, 2006). A remarkable number of studies focus on rural architecture to document the vernacular character (Oliver, 2003; Sabatino, 2010; Donovan & Gkartzios, 2014; Philokyprou & Michael, 2021). Some valuable approaches and ideas have emerged with the adoption of the European Landscape Convention (Council of Europe, 2000), which emphasizes the protection of rural character and identity as part of the cultural landscape. In particular, since the 1980s the Countryside Agency of England emphasized countryside character and landscape values that create a distinctive rural character to help manage change and achieve sustainable development (Swanwick, 2004; Tudor, 2014). Landscape character assessment has emerged as one of the most important and comprehensive methods of identifying and describing the characteristics of a landscape at multiple scales. There are some other valuable approaches and methods for identifying the character of rural settlements, such as townscape character assessment, village design guidelines, and village design statements, all of which tend to identify the characteristics of rural settlements, including architectural features, open space, and green space characteristics, to guide development in harmony with the existing character (Swanwick, 2004; Landscape Institute, 2017).

Landscape identity, as another approach, is considered an important asset in both literature and policy documents. Like landscape character studies, landscape identity assessment also focuses on the perceptible characteristics of a landscape that distinguish it from other landscapes (Stobellar & Pedroli, 2011; Loupa-Ramos et al., 2016; Nitavska, 2020; Shao et al., 2020).

Based on the problem of identity loss in rural settlements in the contemporary era, this research evaluates landscape identity as a method specifically developed to reveal the multifaceted characteristics of rural settlements, including tangible elements such as architecture, open space, street patterns, land-use patterns, and natural features as well as social, cultural, and economic features that are associated with rural life. In this respect, the research identifies landscape identity parameters that are intrinsic to rural settlements and introduces a method to obtain physical landscape identity indices 1) to objectively show the contribution of the parameter to defining physical landscape identity, 2) to provide detailed information about rural settlements as a basis for rural development plans, and 3) to propose a framework for the decision-making process by the government concerning rural settlements.

Landscape identity is defined as the perceivable unique structure of a place (Stobellar & Pedroli, 2011), formed by the combination of characteristics that distinguish one landscape from others, and as an integrated structure that evokes a strong spatial feeling in people (Jackson, 1984; Hough, 1990; Shao et al., 2020). Stobellar and Pedroli (2011) distinguish between four types of landscape identity: personal-existential landscape identity, cultural existential landscape identity, cultural-spatial landscape identity, and personal-spatial landscape identity. Landscape identity can represent all the characteristics that distinguish one landscape from others, and there are also studies on how people utilize the landscape to create individual and collective identities. However, regardless of the approach, landscape identity emphasizes the reciprocal relationship between people and the landscape (Loupa-Ramos et al., 2016, Loupa-Ramos et al., 2019).

In the literature, landscape identity focuses more on the human perspective than on the physical reality of the landscape. In this context, Egoz (2013) defines "landscape and identity" as the relationship between the landscape and the identity of the people that are associated with the landscape, emphasizing the constructive role of landscape identity in shaping both individual and collective identity. Loupa-Ramos et al. (2016) have developed a different perspective on landscape identity by proposing a transactional model of landscape identity. This model provides a conceptual framework for understanding landscape identity that is influenced by social factors as well as physical changes in the environment (Loupa-Ramos et al., 2019). Their approach emphasizes that landscape identity is shaped by two distinct levels of reciprocal interaction between the landscape and people: perception and activity. The first approach asserts that landscape identity is based not only on the perceivable character of the landscape but also on the character of the landscape as a built asset (Altman & Rogoff, 1987; Werner et al., 2002; Loupa-Ramos et al., 2016, Loupa-Ramos et al., 2019). The second approach is that society and landscape have evolved in response to people's physical acts affecting the landscape (e.g., policy, planning, and management). It focuses on how these acts change the landscape and its characteristics and thus how the landscape shapes the connections between people and space (Antrop, 2005; Selman, 2012; Ramos et al., 2016).

In recent decades, landscape identity has been considered an important source for sustainable planning approaches, and methodologies and tools have been developed to determine identity (Stobellar & Pedroli, 2011; Loupa-Ramos et al., 2016; Shao et al., 2020; Nitavska, 2020) and character. These methodologies are based on qualitative approaches and discuss how landscape identity can be made more operational and meaningful for spatial planning. This study is structured around a framework that was developed in a 2012 study addressing landscape identity in relation to rural settlements. This study considers landscape identity an indicator of the unique characteristics of the rural settlements and provides a holistic approach to assessing settlements as a part of a broader landscape perspective (see Erdem, 2012; Erdem Kaya, 2013). The previously developed study provided a basis for the identification of landscape identity parameters. These parameters were developed and reclassified in the context of the research, and a new methodology was developed to identify landscape identity indices. Although landscape identity can be understood from both a physical and social perspective, only the evaluation method of physical landscape identity is presented in this paper.

2 Research design and methodology

The research is structured around a combined method that includes both qualitative and quantitative components to assess the landscape identity parameters and indices. Here the term *parameter* defines the components that make up the landscape identity and *indices* refer to the quantitative value of the level of contribution of each parameter to the construction of the physical landscape identity. Data collection through field observations, interviews, document analysis, mapping, typological classification, land cover classification, scaling, and weighting of the landscape identity parameters are the components of the methodology. The research questions of the study are as follows: 1) How can we define the landscape identity? 2) Can we measure the landscape identity parameter to see the level of contribution of the parameters in defining the landscape identity? and 3) Is it possible to compare rural settlements based on landscape identity? These questions were structured to test the following hypotheses: 1) It is possible to identify different types of landscape identity within a given geographical region; 2) Today, development dynamics have a negative impact on the landscape identities in rural settlements; 3) Negative impacts on rural settlements can be measured with landscape identity parameters; and 4) Landscape identity parameters allow a more systematic and detailed classification of rural settlements, different from the groups identified by traditional classification methods.

To answer the research questions and test the hypotheses, a four-step methodology was designed (Figure 1). The first step involves data collection through an in-depth literature review to define the parameters of landscape identity. The second step involves a large-scale analysis of eighty selected rural settlements in Turkey's Aegean Region according to physical identity parameters. In this step, these eighty rural settlements were classified into major landscape identity groups based on geomorphology such as valley villages, plain villages, foothill villages, coastal villages, and hill villages, and land-cover analyses were conducted using remote sensing technology. In the third step, detailed field surveys were conducted for thirty rural settlements to define physical and social landscape identity parameters. All the parameters were collected in the form of a matrix. After collecting the data, factor analysis and cluster analysis were carried out to show the similarities and differences between villages and the spatial distribution of identity groups across the Aegean Region. The fourth step involved the creation of a matrix to define the physical landscape identity indices for the thirty rural settlements.

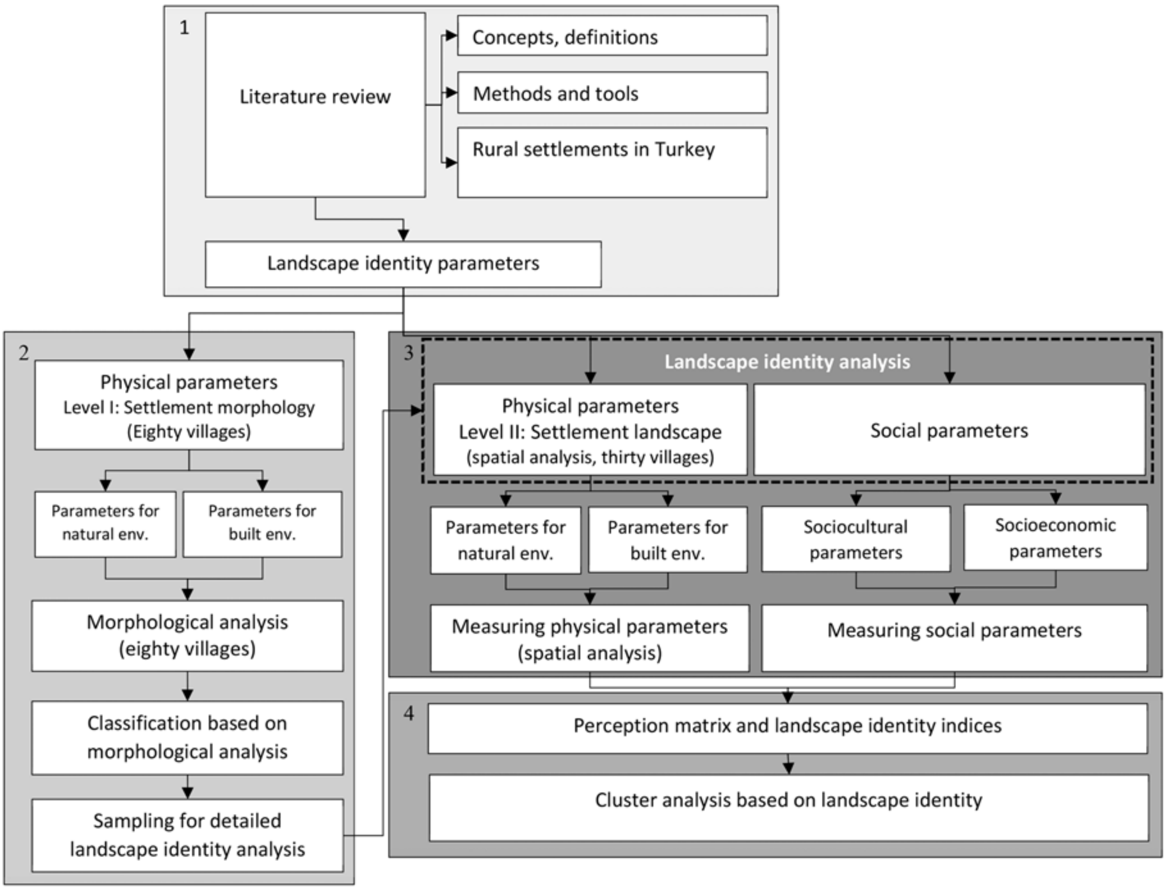

Figure 1: Research methods (illustration: Meltem Erdem Kaya).

2.1 Sampling

This research focuses on the rural settlements of the Aegean Region. The Aegean Region was chosen because it has rural settlements with quite a different character, and the region is also diverse in terms of the natural environment, the built environment, and its agricultural characteristics. The Aegean Region has both coastal settlements and examples of central Anatolian rural settlements. On the other hand, the Aegean Region is home to large cities, such as İzmir, and important industrial cities of Anatolia, such as Denizli. Beyond the urban scale, the demand for tourism and related uses within the region is very high.

According to the Turkish Statistical Institute (2024), the Aegean Region had 2,916 villages with a population between 150 and two thousand in 2023. Sampling was carried out using the categorical random sampling method. Three basic criteria played a determining role in the sampling: 1) presentation of the basic geomorphological categories of the rural areas of the Aegean Region; 2) representation of the various elevation levels with different vegetation cover; and 3) formation of groups containing the maximum number of villages with different morphological types.

First, four hundred villages were selected from among the target population, and then the villages were classified into hill villages, foothill villages, valley villages, plain villages, and coastal villages according to the basic geomorphological structure of the area they are located in, and elevation was also taken into account to show the differences in vegetation cover in addition to the morphological differences in the sample areas. From these four hundred samples, it was necessary to select at least seventy-eight villages with a confidence interval of 95%, with a ±10% error, to analyse the physical characteristics of the landscape. The sample areas also had to have a minimum area of 100 km² in each independent area and a minimum distance of 5 km between two points, which is required for taking satellite images. Accordingly, because each area is required to cover the maximum number of villages, it is assumed that a 100 km² area contains a rectangle with a maximum side length of 20 km. First, the distance between each village in the Aegean Region and the neighbouring villages within the area within a radius of 20 km was calculated. Then the village groups with the

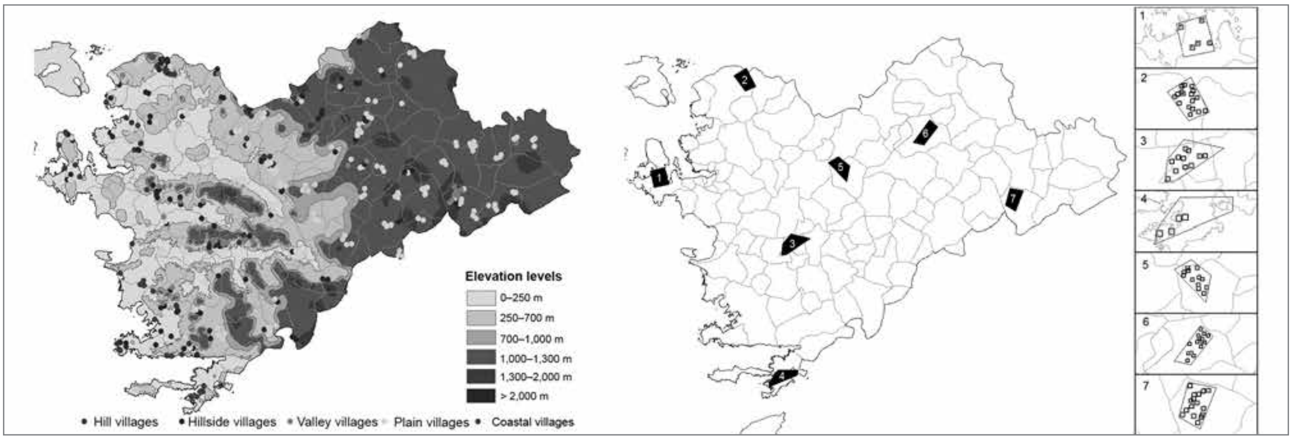

Figure 2: Village types and spatial distribution of four hundred villages according to elevation (left); village groups and the eighty villages selected (right) (illustration: Hasan Serdar Kaya).

Table 1: Thirty selected villages in Turkey's Aegean Region.

Province, district, village	2023 population	Distance to centre (km)		Economy
		City	District	
Afyonkarahisar, Şuhut, Ağzıkara	620	25.4	7.6	Agriculture
Afyonkarahisar, Şuhut, Başören	674	47.4	16.1	Husbandry, apiculture, horticulture
Afyonkarahisar, Şuhut, Güneytepe	356	38.1	7.3	Agriculture, husbandry
Afyonkarahisar, Şuhut, İlyaslı	166	42.5	11.7	Retired
Afyonkarahisar, Şuhut, Ortapınar	759	35.2	4.0	Agriculture, husbandry, service
Aydın, Köşk, Baklaköy	288	20.4	2.2	Agriculture, husbandry, olive cultivation
Aydın, Köşk, Çiftlikköy	1,486	18.8	5.6	Agriculture, husbandry
Aydın, Köşk, Menteşeler	196	33.4	15.1	Agriculture, husbandry, fig orchards
Aydın, Sultanhisar, Eskihisar	1,110	30.0	5.4	Agriculture, orchards, husbandry, apiculture
Aydın, Sultanhisar, Malgaçmustafa	410	37.2	7.7	Agriculture, orchards, olive cultivation
İzmir, Çeşme, Ildır	742	81.0	23.7	Agriculture, tourism
İzmir, Urla, Balıklıova	1,240	67.8	30.0	Agriculture, tourism, fishery
İzmir, Urla, Barbaros	427	59.0	25.2	Agriculture, tourism, fishery
İzmir, Urla, Birgi	199	61.7	25.0	Orchards
İzmir, Bergama, Durmuşlar	371	137.0	31.8	Retired, husbandry, day-labour
İzmir, Bergama, Karalar	255	138.0	32.8	Retired, husbandry, day-labour
İzmir, Bergama, Kozluca	254	133.0	29.0	Agriculture, husbandry
İzmir, Bergama, Tırmanlar	442	135.0	30.3	Agriculture, husbandry
Kütahya, Gediz, Dedeköy	178	97.2	6.0	Agriculture, husbandry
Kütahya, Gediz, Işıklar	84	82.0	17.7	Agriculture
Kütahya, Gediz, Kayacık	98	87.0	18.0	Agriculture, forestry, husbandry
Kütahya, Gediz, Yaylaköy	190	79.0	14.0	Husbandry
Kütahya, Gediz, Yunuslar	711	75.8	18.9	Agriculture, husbandry
Manisa, Kula, Börtlüce	202	131.0	33.0	Agriculture, husbandry, tobacco, retired
Manisa, Kula, Emre	190	110.0	20.0	Agriculture, husbandry
Manisa, Kula, İncesu	164	124.0	8.0	Agriculture, husbandry
Manisa, Kula, Saraçlar	367	115.0	11.5	Agriculture, husbandry
Muğla, Marmaris, Bozburun	2,240	100.0	47.4	Tourism
Muğla, Marmaris, Turgutköy	826	81.6	31.1	Apiculture, agriculture
Muğla, Marmaris, Selimiye	1,360	102.0	43.4	Tourism, agriculture, husbandry

Source: Türkiye Nüfusu İl ilçe, Mahalle, Köy Nüfusları (2023)

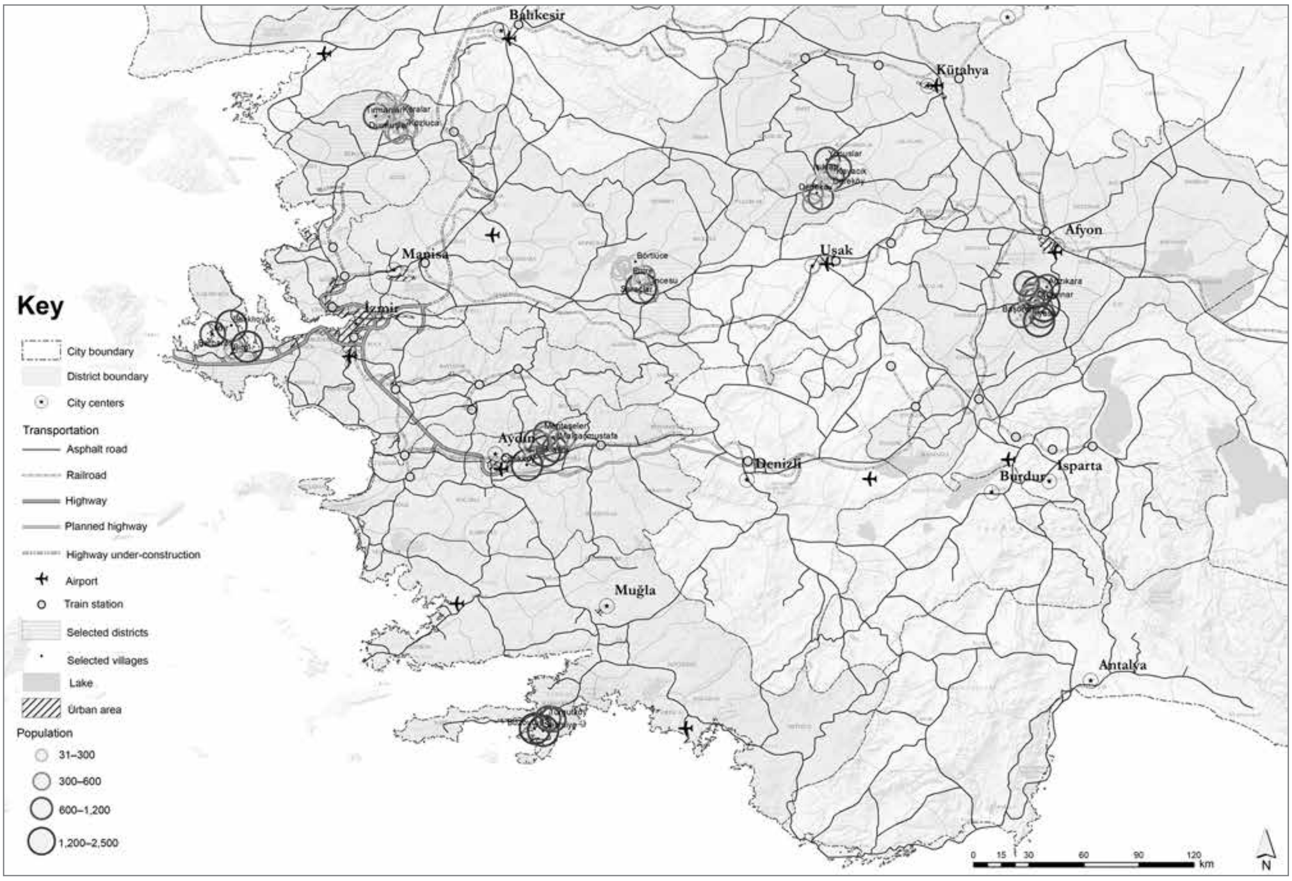

Figure 3: Selected villages within Turkey's Aegean Region (illustration: Hasan Serdar Kaya, Gökçe Şahin).

minimum total distances were determined. Seven groups of villages, consisting of the maximum number of villages in a 100 km^2 area, were selected to include six different elevation areas and an equivalent number of samples from each morphological group. A total of eighty villages were then selected from among these groups (Figure 2).

In the sample areas, a general physical landscape identity analysis was carried out to form physical landscape identity groups as a basis for selecting the samples for a detailed analysis. Considering the distribution of eighty villages according to the physical landscape identity groups, a minimum of twenty-eight rural settlements with a total confidence interval of 80% and a sampling error of ±10% was required to select samples for physical landscape identity analysis. A minimum of thirty samples was required to assess the correlation between independent variables with a correlation analysis. This requirement was also important in terms of the study's contribution to protecting the identity of rural settlements in Turkey and allowing statistical comparative analyses such as comparative multivariate analysis for comparison with studies conducted in other regions (Table 1, Figure 3). Accordingly, this study selected thirty villages for detailed landscape identity analyses, and a two-day field survey was conducted in each sample area.

2.2 Selected villages

The selected villages among the seven groups of villages represent different geographical conditions within the region, ranging from the coast to highlands. The population of the villages ranges from eighty-four to 2,240 according to the Turkish Statistical Institute (2024). Coastal villages tend to have a larger population than the other villages. Some villages have experienced population loss and have fewer than one hundred inhabitants. In some villages, the population tends to decrease as a result of migration, whereas in other villages the population has increased. In most villages, the majority of the population is elderly, and only a few villages have a few people under age forty. The villages are physically closer to the district centres. There are thirteen villages with a distance less than 15 km to the district centre, eleven villages with a distance of 16 to 30 km, and seven villages with a distance of more than 31 km. The main sources of livelihood are agriculture and animal husbandry in the villages close to the district centre. Economic diversity is seen in the villages located a medium or long distance from the district centre. Unlike the villages that are close to the provincial centre, the average population of the villages that are farthest from the district centre is higher (890 persons).

Table 2: Parameters used in the large-scale analysis.

Natural parameters	Built parameters
Topography: Elevation, aspect, geomorphology, natural edges *Vegetation:* Natural vegetation, land cover, natural edges, percentages, and types that penetrate the settlement pattern *Water resources:* Water surface, types, natural edges *Climate:* Macroclimate	*Mass and void:* Distance between buildings, building density, built-up setting, location in topography, closure, openness *Open spaces:* Open space typologies *Productive landscape:* Field system, boundaries, hedges

The main economic activity is agriculture in all the villages except for a few coastal villages, where the economy mainly depends on tourism. In addition to agriculture, animal husbandry, beekeeping, horticulture, and fishing are the other economic activities that support the rural character. Some villages have a retired population, and others have a population working in the service sector (Figure 3).

2.3 Data collection and analysis

Secondary data were collected from published documents and internet resources such as the Turkish Statistical Institute (TÜİK, https://www.tuik.gov.tr), the local government portal (https://www.yerelyonetim.net/), and the official websites of the districts: Muğla (https://www.mugla.bel.tr/), Afyon (www.afyon.bel.tr), Kütahya (www.kutahya.bel.tr), Manisa (www.manisa.bel.tr), Çeşme (www.cesme.bel.tr), Aydın (www.aydin.bel.tr), and Bergama (www.bergama.bel.tr). The primary data were collected through field observations, interviews with village mukhtars, and expert opinions.

The research used a multiscale analysis method, which included a large-scale analysis to reveal the general characteristics of the interaction between the settlement pattern and the surrounding environment, which is reflected in the macro form of the settlement, as well as spatial analysis, which was carried out to reveal spatial characteristics such as street patterns, open space types, green areas, architectural features, productive landscapes, environmental control measures, and the macro form. The model to determine the rural settlement landscape identity index consisted of four phases.

2.3.1 Phase 1: Large-scale analysis

This step involves a large-scale analysis of eighty rural settlements in the Aegean Region based on components of physical identity. The parameters help understand landscape identity to the maximum extent, and they also reveal the physical structure, environmental relationship, and land-use patterns of the settlement (Table 2).

Squares measuring 2 km on each side were structured around the village and covering the residential area, and the adjacent natural areas were determined and a large-scale analysis was carried out. The large-scale analysis made it possible to determine the primary identity classes of the settlements, including valleys, plains, coasts, hills, and foothills, and the macroform of the settlements: compact, scattered, clustered, star-shaped, and so on (Figure 4).

2.3.2 Phase 2: Rural settlement landscape identity parameters

This step reviewed methodologies such as landscape inventories, morphological aesthetic models, ecological models, landscape character assessment, visual landscape assessment, historic rural landscape assessment, townscape character, village design guidelines, and statements. The landscape identity parameters of rural settlements were developed and categorized under two main headings: physical identity parameters and social identity parameters. The parameters under each main heading were identified, and a parameter index was produced.

The detailed landscape identity analysis aimed at in this study includes physical analyses based on field research (Figure 4). Physical identity is assessed under two main categories: natural parameters and built parameters (Table 3).

2.3.3 Phase 3: Field studies of thirty villages

Field studies were conducted to assess selected villages based on their physical and social landscape identity parameters. A two-day field study aimed to identify landscape identity parameters for each village. Architectural features and open space use, streets, village squares, and agricultural plots were mapped, and typological drawings were developed for each village (Figure 6). Photos were taken to reflect the physical landscape identity and were organized to facilitate visual assessment.

2.3.4 Phase 4: Rural landscape identity matrix and indices

The data obtained from the fieldwork research were arranged in the landscape identity parameter matrix. The matrix de-

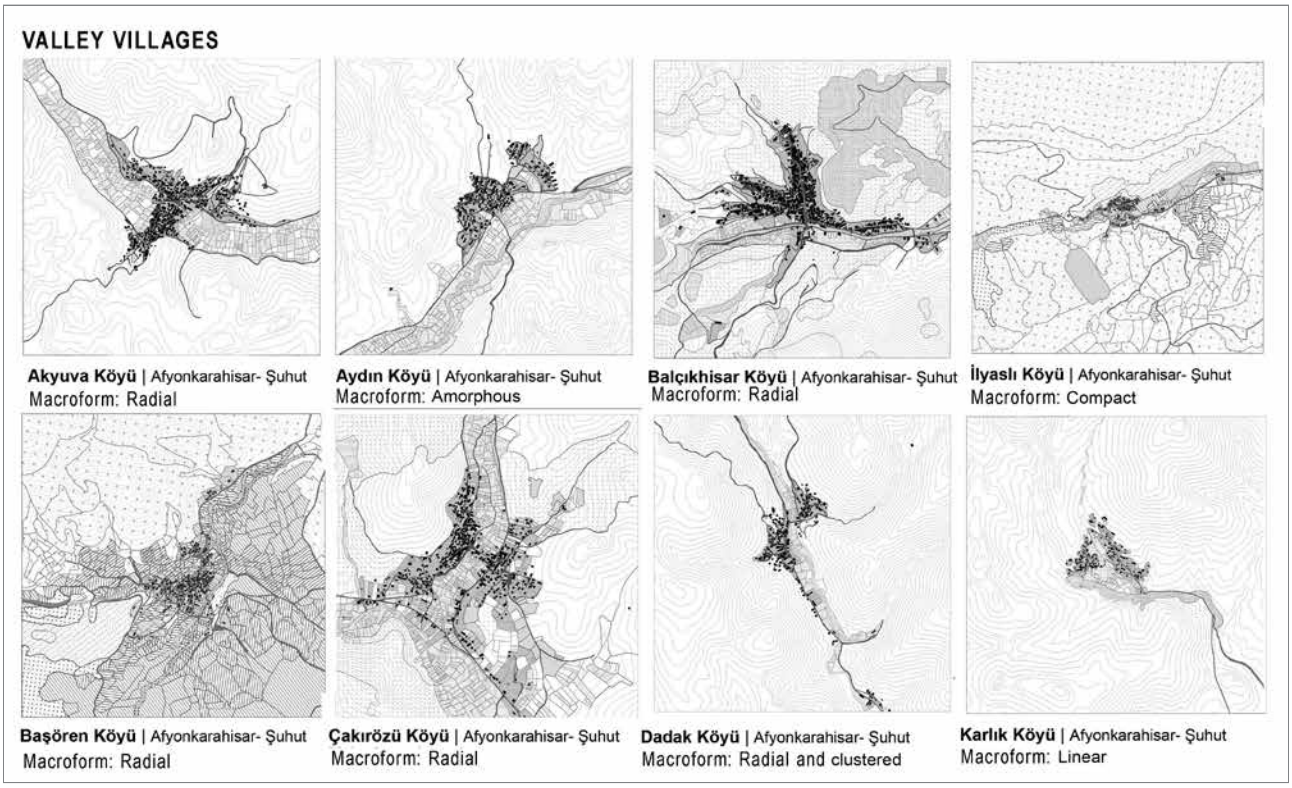

Figure 4: Sample village typology based on geomorphology and macroform: valley villages in the Şuhut district of the Afyonkarahisar province (illustration: Hasan Serdar Kaya and Ezgi Güler Tozluoğlu).

Table 3: Physical landscape identity parameters (phase 2).

Natural parameters	Built parameters
Topography	Physical character
Vegetation	Architectural features
Geology	Open space setting
Water surfaces	Transportation/communication
	Cultural vegetation

scriptively shows the elements that make up the identity of the natural and built landscape (Figure 8). Photos were taken at various levels to reflect street characteristics, open spaces, the immediate environment, land-use patterns, and architectural features, and then classified. The members of the research team (landscape architects, urban planners, an architect, a geomatics engineer, and a forest engineer) evaluated all the visual features to determine their contribution to creating a perceptible identity in terms of physical characteristics. Based on the experts' review, each parameter was scored on a scale of 1 to 5, where 1 was the lowest level of contribution and 5 was the highest. The matrix consists of the average of the sum of the scores obtained from the individual assessments and the scores of each member. The matrix includes the scores in the main headings: natural features and built features. Under the main headings, the subcategories of each feature were identified and scored as an individual element. After obtaining the individual scores for each parameter, its weight within the main category was also determined. Information on social identity parameters was obtained from interviews and field surveys and excluded from the scoring; instead, this information was used as supporting data to assess landscape identity.

2.3.5 Factor analysis: natural parameters and built parameters

To perform the analysis, the lowest-level parameters were grouped with the upper-level parameters; the natural identity components were reduced to eighteen parameters, and the built identity components to twenty-nine parameters. Because the total number of parameters exceeds the number of villages, factor analysis was calculated separately for each parameter. As

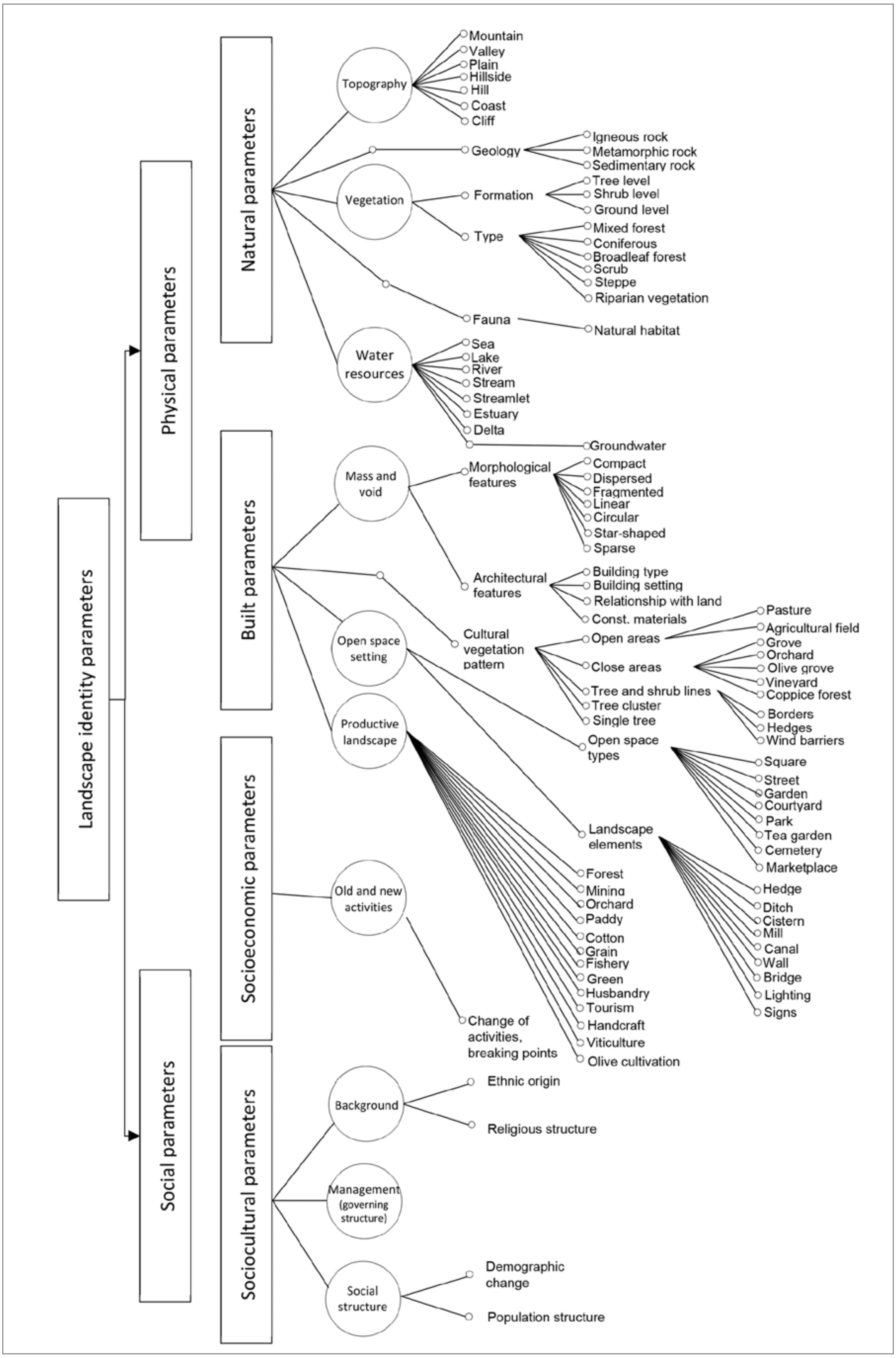

Figure 5: Landscape identity parameters (illustration: Meltem Erdem Kaya).

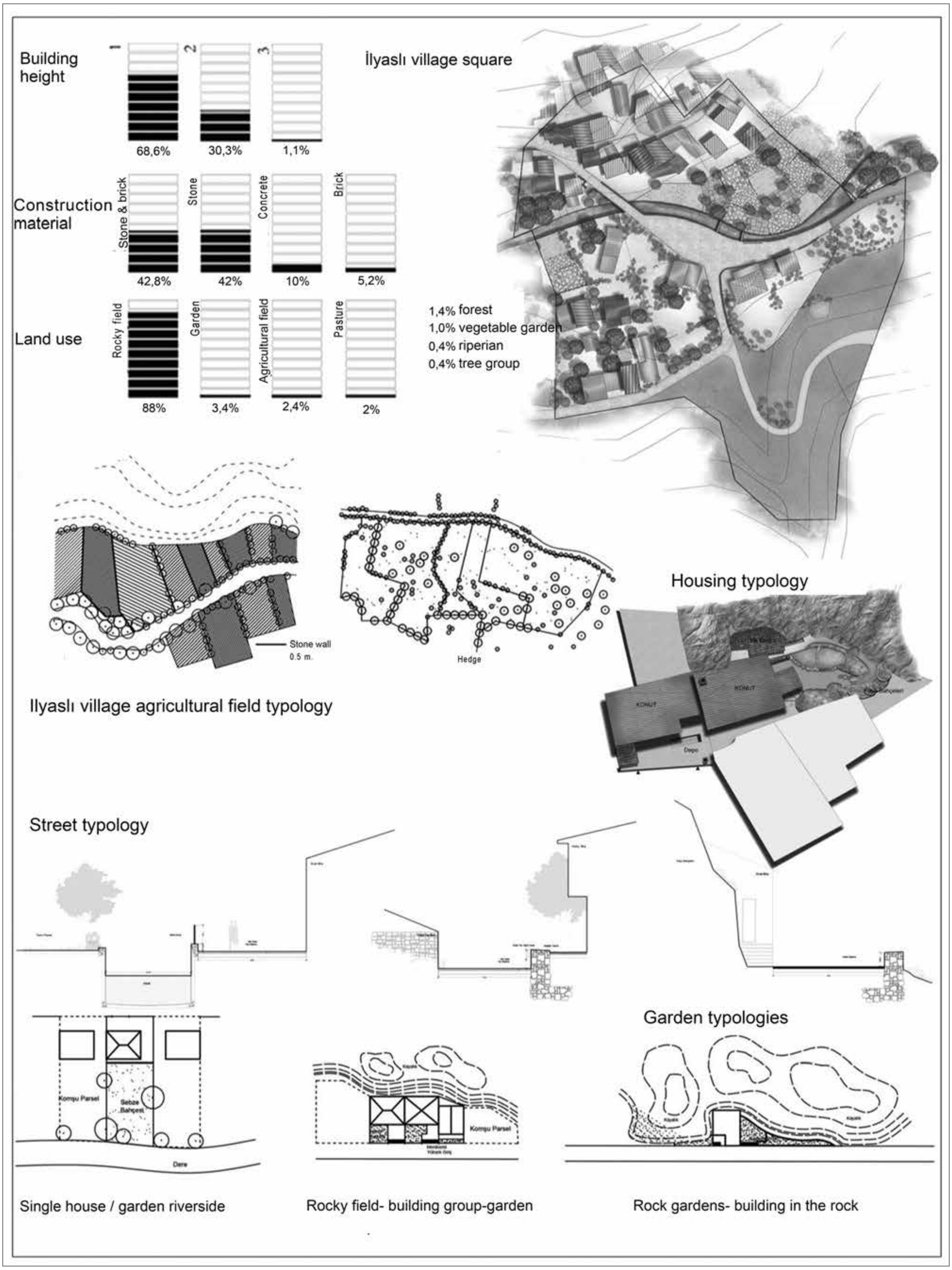

Figure 6: Sample village studies: İlyaslı housing, street, garden, and field typology (illustration: Meltem Erdem Kaya, S. Elif Serdar Yakut, and Ezgi Güler Tozluoğlu).

Table 4: Results of factor analysis of natural components: rotated component matrix.

Parameter	Factor						
	1	2	3	4	5	6	7
DT_Steppe	–.786	.159	.115	–.066	–.203	.235	–.075
DT_Maquis	.705	.429	–.402	.198	–.073	.041	–.159
DF_Shrub-Mass	.687	–.217	.175	.408	.017	.128	.122
DF_Shrup-Group	.685	.198	–.313	.059	–.154	–.241	–.149
D_Elevation	–.655	–.119	.463	.132	.101	.102	.335
D Water Surface	.630	–.171	.283	.037	–.489	.281	.069
DT_Forest	–.141	–.911	–.075	–.052	.154	.028	–.034
DF_Tree-Mass	.168	–.899	–.014	.227	–.178	.000	–.175
DF_Tree-Group	–.125	.425	.811	.058	.123	–.046	–.023
DF_Tree-Single	.200	.285	–.781	–.248	.104	–.050	.249
DT_Stream Veg. VEJ	–.029	.079	.735	.008	–.040	.070	.487
D_Slope%	.201	–.041	.040	.876	.111	–.137	.114
DF_Y Agriculture	–.053	.043	–.151	–.739	.299	–.226	–.022
DF_Y Meadow	–.098	.061	.096	–.013	.898	.186	.116
DF_Y Rock	–.267	.282	.078	.265	–.643	.310	.355
DF_Y Sand	.057	.076	–.019	.005	.002	–.905	–.104
DF_C Single	–.334	.356	.019	.292	.303	.511	–.259
D_Geology	–.044	.110	.016	.102	.005	.041	.857

Note: Extraction method: principal component analysis; rotation method: Varimax with Kaiser normalization. Rotation converged in twenty--two iterations.

a result, seven-factor groups were defined for natural parameters, and ten-factor groups were defined for built parameters. Although the KMO value for factor analysis was found to be very small, such as 0.391 (natural) and 0.414 (built), these values were found to be meaningful according to Bartlett's test data. It was found that the parameters that form the factors also form meaningful subgroups. Natural parameters were grouped into seven factors.

Built landscape identity includes a wide range of parameters. This is why the number of parameters was so large and detailed. Only some parameters that were found in some villages were simplified, and the total number of parameters was reduced to twenty-six. After the tenth factor, eigenvalues were reduced below the score of 1.

2.3.6 Cluster analysis

Cluster analysis was performed on the calculated factor scores, and groups were defined that included the villages that shared the same characteristics. Clusters were defined by using hierarchical cluster analysis. Because there were five basic groups based on their geomorphological characteristics, the minimum number of clusters was defined as five. Because there were thirty villages in a detailed analysis, a maximum of fifteen group options were allowed to emerge from the analysis to prevent each village from being a separate group.

As a result of the analysis, the villages were divided into nine groups (Table 6).

The spatial distribution of villages within the region also shows a heterogeneous structure. Coastal villages such as Balıklıova and Ildır can be grouped with Barbaros and Emre, which are plain and hillside villages located far from the coast. The fact that Barbaros and Emre are lively villages with good economic opportunities, the presence of important historical and architectural values in Emre, and the local tourism potential distinguish them from other plain and hillside villages where agriculture and animal husbandry predominate. The greatest spatial diversity can be observed in the sixth cluster, where villages are located both on the coast and in the interior.

3 Results and discussion

Among the thirty villages, İlyaslı, a valley village in the Şuhut district of the Afyonkarahisar province, with a score of 0.62, and Bozburun, a coastal village in the Marmaris district of the Muğla province, also with a score of 0.62, were identified as

Table 5: Results of factor analysis of built components: rotated component matrix.

Parameter	Factor									
	1	2	3	4	5	6	7	8	9	10
YMK_G Material	.857	.081	.099	–.028	–.015	–.090	–.202	.243	.096	–.096
YPD_G Wall Material	.809	–.187	–.046	.063	.007	.024	–.100	–.155	–.196	–.197
YPS_Natural Border	.653	–.191	–.245	.170	.173	–.132	.331	–.039	–.195	.187
YAS_Street	–.593	–.315	.362	.047	–.387	–.078	.078	.078	.153	–.062
YMY_SDiscrete	.113	–.923	–.095	–.058	.032	–.142	.052	–.137	.099	.029
YMY_Thick	–.144	.867	–.046	–.012	.053	.170	–.076	.013	.004	–.071
YB_Compact	.163	.678	.297	.007	.065	.021	.016	–.063	.056	.470
YB_Dispersed	–.243	–.490	–.276	.013	.107	.270	.309	.126	–.017	–.385
YPK_AK Mixed	–.087	.166	.912	–.042	–.036	–.143	.004	.029	.014	.049
YPK_AK Isolated	.031	.035	–.689	.278	–.387	–.173	–.076	–.068	–.260	.257
YPK_Plant Border	–.172	.138	.570	.123	.198	.037	–.383	.463	–.242	.211
YP_Production	–.125	.204	–.111	.860	–.008	–.129	.036	–.112	.137	.078
YPU_Garden	–.092	.035	.227	–.712	–.071	.163	–.041	.357	.228	.233
YME_Adjunct Building	.351	–.129	.253	.708	–.164	.117	–.311	.119	–.137	.117
YPZ_DPavement	.450	–.260	–.002	.480	.254	.230	–.166	.011	.366	–.069
YPU_Field	.093	–.065	–.068	.198	.904	–.119	.101	.084	–.028	.181
YPU_Olive grove	–.121	–.122	–.330	.352	–.807	–.125	–.003	–.036	.152	–.006
YMB_Other Buildings	.209	–.118	.076	.021	.124	–.891	.040	.101	–.072	.113
YMB_Residential	.160	.175	.037	–.118	.119	.877	.123	.165	.047	.154
YPK_TADominant	–.044	.024	.074	.001	.209	.067	.892	.141	.105	–.022
YP_Water Structure	.248	.347	.108	.166	.247	–.010	–.663	.151	.068	–.011
YPU_Pasture	.096	.186	.209	–.250	.057	.132	.058	.818	–.088	–.200
YPU_Forest	.053	.272	.446	.062	–.077	.217	–.099	–.635	–.379	–.158
Y_CKEnv. Ctrl. Measure	–.313	–.002	.059	.092	–.021	.112	.058	–.037	.788	–.006
YMA_Grading	.188	–.046	.007	–.247	–.344	–.007	.039	.086	.605	–.370
YAT_Open Space	–.153	.018	–.072	–.020	.135	.034	–.004	–.026	–.112	.847

Note: Extraction method: principal component analysis; rotation method: Varimax with Kaiser normalization. Rotation converged in twenty iterations.

the villages with the highest physical landscape identity index. According to the scaling of each parameter in the matrix, the natural landscape identity index value of İlyaslı was determined to be 0.37, and the built landscape identity index value was determined to be 0.26. The geological formation, vegetation, and riparian zone are the dominant parameters of the natural landscape identity of İlyaslı, which contribute to the formation of a remarkable physical landscape identity. In particular, rock gardens have emerged as original and site-specific formations that are used as small niches for plant cultivation and are one of the characteristic elements of the village. In this context, the natural structure and the patterns of use adapted to this structure are important factors influencing the landscape identity index of İlyaslı. In Bozburun, which is a coastal village, the natural landscape identity index was found to be 0.36, and the built landscape identity index was found to be 0.26. In Bozburun, the effect of the natural environment on the landscape identity is more pronounced. The main reason for this is that the village is geomorphologically located on the coast, and it has different coastal types and natural scrub vegetation on the hilly land.

Another village with a high landscape identity index is İncesu, a plain village, with an index value of 0.6. The originality components of İncesu are the topographic structure, meadow vegetation, compact formal structure, low buildings, natural stone walls and stone structures, and a square with wells. Interventions in the stone structures (brick additions, etc.) are one of the most important factors affecting the identity of the settlement. Despite these interventions, the village has maintained its local character. However, the presence of many ruined buildings in the village, maintenance problems, and practices that are not in keeping with the local character (e.g., use of concrete and bricks) damage the identity of the

Table 6. Groups created with cluster analysis.

Village	Geomorphology	Cluster
Eskihisar	Foothill	1
Baklaköy	Valley	
Menteşeler	Hillside	
Malgaçmustafa	Hillside	
İncesu	Foothill	2
Börtlüce	Hillside	
Saraçlar	Hillside	
Bozburun	Coast	3
Selimiye	Coast	
Emre	Foothill	4
Ildır	Coast	
Balıklıova	Coast	
Barbaros	Plain	
Durmuşlar	Hill	5
Karalar	Valley	
Birgi	Plain	6
Yaylaköy	Hill	
Kozluca	Hill	
Tırmanlar	Hill	
Turgutköy	Valley	
Kayacık	Hillside	
İlyaslı	Valley	7
Başören	Valley	
Ortapınar	Hillside	
Işıklar	Hillside	
Güneytepe	Foothill	8
Yunuslar	Foothill	
Ağzıkara	Plain	
Çiftlikköy	Plain	
Dedeköy	Plain	9

landscape. The correlation between the wells in the square and the quality of space is quite distinct. In İncesu, the built landscape identity index was higher than that of the natural landscape. The main reason for this is the preservation of the local architectural features consisting of stone buildings and tiled roofs, the presence of natural stone pavements on the streets, and its compact macroform with low-rise housing.

In nineteen villages, the natural landscape identity index was higher than the built landscape identity index. In ten villages, the situation was the opposite. In one village, the natural and built landscape identity indices were equal. It can be concluded that, in rural settlements, the natural environment plays an important role in the formation of physical landscape identity. In addition, many villages have site-specific architectural and construction features that are integrated with traditional architectural structures and reflect the use of local materials. However, this structure has begun to deteriorate with modern interventions. This is the main reason why the built landscape identity index is low in many villages. On the other hand, in almost all villages, with a few exceptions, the streets are paved with cobblestones. Village-specific materials are either used very little or not at all. This is a major threat to the identity of the built landscape. Construction style, the number of storeys, the relationship with the natural environment, and the village skyline in the landscape have a positive impact on landscape identity. However, the deterioration in the quality of these components is the main factor affecting the landscape identity of all villages. The landscape identity index of twenty-three villages was 0.5 or higher. Seven of these villages are valley villages, four are coastal villages, six are plain villages, four are foothill villages, and two are hill villages. Based on these data, the topographic structure and the presence of the coast have a significant impact on the landscape identity of rural settlements. The dominant agricultural landscape and its elements in the plain villages have a significant impact on landscape identity, whereas in the valley villages the gradual building order created by the sloping topography stands out as an important characteristic. The presence of streams in the valley villages is another important element that has a positive impact on landscape identity. In particular, the presence of vegetation and gardens along the course of the stream has emerged as a unique value that influences the identity of the landscape. However, in many villages the streams have been rehabilitated and turned into canals. As a result, the streams have lost their spatial relationship with the village.

In all the villages, fields account for an average of 33% of the village's land use. Eighteen villages have olive groves. On average, olive groves account for 26% of the total land use; they have the status of a special product field and play an important role in the land-use pattern of the villages. Twenty-one villages have forests. With an average share of 23% of their total land use, the forest areas are considered areas with high economic potential. Gardens, especially those associated with residential use, appear as an important sub-identity group in the villages as part of the productive landscape. For example, the residential structure with gardens located on large plots of land in Turgutköy (in the Marmaris district of the Muğla province), and its direct connection to the street in some places and the absence of any limiting elements, support the dominant garden identity of the village. On the other hand, the buildings with different shapes, colours, and materials and the lack of an architectural language are among the negative effects on the landscape identity.

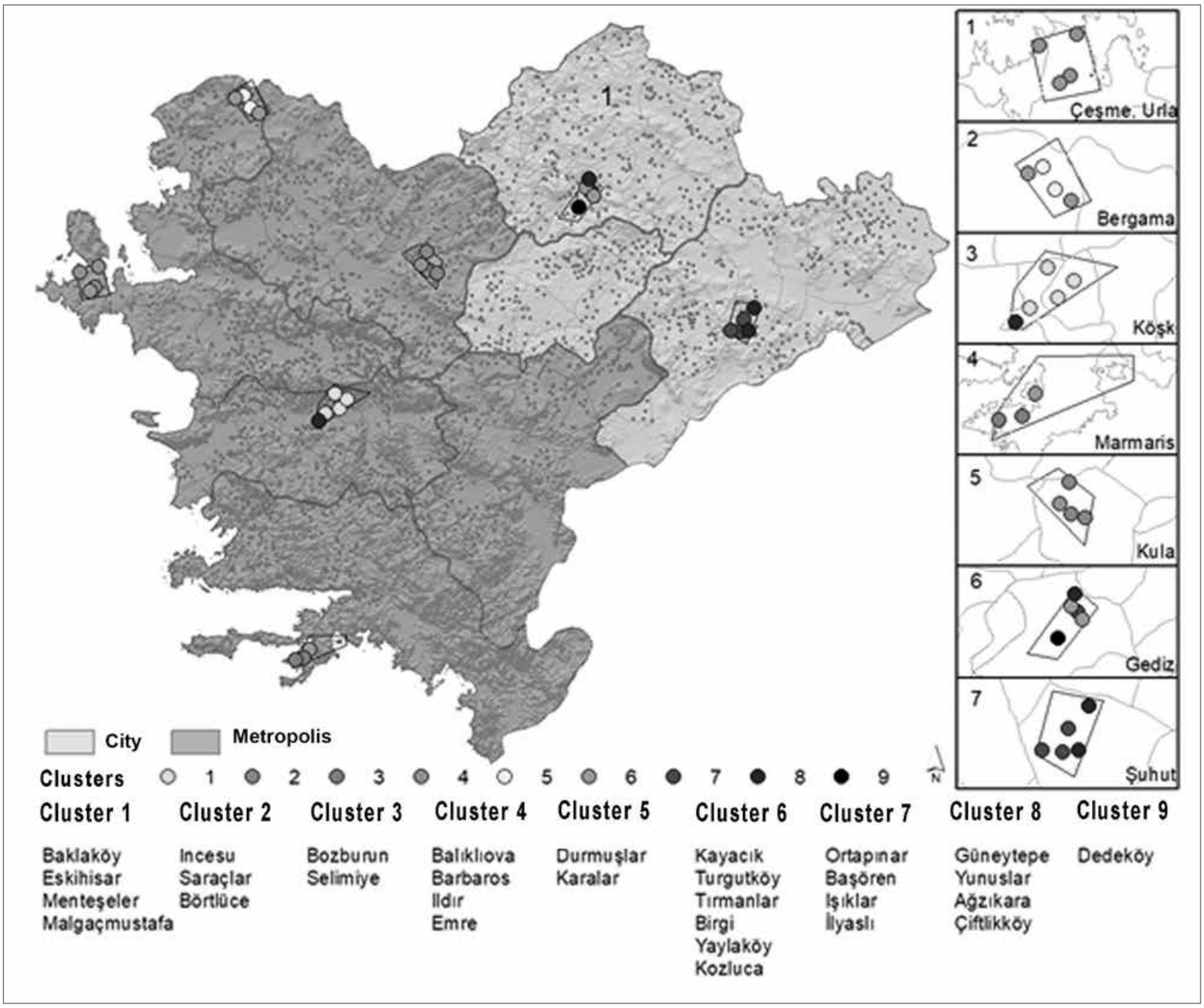

Figure 7: Spatial distribution of identity groups in the Aegean Region (illustration: Hasan Serdar Kaya).

Among the thirty villages, the village with the lowest physical landscape identity index was Güneytepe in the Şuhut district of the Afyonkarahisar province, with a score of 0.43. The deterioration of the built environment observed in the settlement located at the foot of a hill, the intensity and frequency of repetition of interventions that are incompatible with the local identity, and the lack of development of the open space structure within the village are the features that have a negative impact on the landscape identity index.

Community spaces such as the square, mosque courtyard, mosque garden, and plaza are still actively used in many of the villages covered by the fieldwork. Especially for rituals such as weddings and circumcisions, the village square serves as an important meeting place. In some villages, the village square is still used for collective work (e.g., in Emre).

3.1 Factor analysis of thirty villages

During the field study, the physical data were examined and factor analysis was used to group related components. Natural identity components were reduced from eighteen variables to seven factors, and twenty-nine variables belonging to built landscape identity components were grouped into ten factors.

3.1.1 Factor analysis of natural identity components

After seven factors in the natural identity components, the eigenvalues decrease from 1.015 to 0.7. Therefore, seven factors were used. Steppe, maquis, mass bush, group bush, elevation, and water resources form one group. The second factor consists of the parameters forest and mass tree. The third factor group

			UNDER OWN TITLE				THROUGHOUT THE NATURAL STRUCTURE				UNDER OWN TITLE										THROUGHOUT THE BUILT-UP STRUCTURE										GRAND TOTAL SCORE 2,070					
District name	Village name	Village type	TOPOGRAPHY = 45	GEOLOGY/SOIL = 45	WATER BODIES= 45	VEGETATION = 180	TOPOGRAPHY	GEOLOGY /SOIL	WATER BODIES	VEGETAION	MORPHOOGICAL FEATURES = 45	ARCHITECTURAL FEATURES = 315	OPEN SPACE TYPE = 45	STREET FEATURES = 45	SQARE FEATURES = 45	LANDSCAPE ELEMENTS = 225	PRODUCTIVE LANDSCAPE = 45	CULTURAL VEGETATION = 135	TRANSPORTATION / COMMUNICATION = 45	ENVIRONMENTAL CONTROL MEASURES = 90	MORPHOOGICAL FEATURES = 45	ARCHITECTURAL FEATURES = 315	OPEN SPACE TYPE = 45	STREET FEATURES = 45	SQUARE FEATURES = 45	LANDSCAPE ELEMENTS = 225	PRODUCTIVE LANDSCAPE = 45	CULTURAL VEGETATION = 135	TRANSPORTATION / COMMUNICATION=45	ENVIRONMENTAL CONTROL MEASURES=90	TOTAL	TOTAL PERCENTAGE	NATURAL	NATURAL / TOTAL PECENTAGE	BUILT TOTAL	BUILT TOTAL PERCENTAGE
Afyon	İlyaslı	Valley	93%	76%	58%	72%	13%	11%	12%	29%	96%	68%	76%	82%	11%	37%	80%	27%	62%	14%	4%	21%	3%	4%	0%	8%	3%	4%	3%	1%	1292	0.62	762	36.8%	530	25.6%
Afyon	Ortapınar	Valley	64%	7%	67%	64%	9%	1%	13%	25%	80%	58%	49%	60%	16%	30%	89%	47%	20%	10%	3%	18%	2%	3%	1%	7%	4%	6%	1%	1%	1048	0.51	585	28.3%	463	22.4%
Afyon	Güneytepe	Hill-side	84%	0%	18%	53%	12%	0%	8%	22%	67%	48%	36%	47%	27%	34%	82%	41%	33%	0%	3%	15%	2%	2%	1%	7%	4%	5%	1%	0%	881	0.43	467	22.5%	414	20.0%
Afyon	Başören	Valley	69%	7%	60%	68%	10%	1%	12%	27%	91%	53%	84%	64%	20%	18%	80%	43%	60%	7%	4%	16%	4%	3%	1%	4%	3%	6%	3%	1%	1053	0.51	601	29.0%	452	21.8%
Afyon	Ağzıkara	Plain	76%	4%	40%	49%	11%	1%	9%	19%	89%	47%	71%	62%	13%	33%	89%	33%	62%	3%	4%	14%	3%	3%	1%	7%	4%	4%	3%	0%	915	0.44	470	22.7%	445	21.5%
Kütahya	Dedeköy	Plain	89%	0%	7%	61%	13%	0%	13%	22%	82%	61%	84%	80%	18%	43%	96%	44%	80%	0%	4%	18%	4%	3%	1%	9%	4%	6%	3%	0%	1048	0.51	503	24.3%	545	26.3%
Kütahya	Yaylaköy	Hill	82%	0%	0%	61%	12%	0%	11%	23%	93%	71%	47%	67%	9%	50%	84%	36%	62%	0%	4%	22%	2%	3%	0%	11%	4%	5%	3%	0%	1029	0.50	480	23.2%	549	26.5%
Kütahya	Işıklar	Hill-side	89%	0%	53%	71%	13%	0%	16%	25%	93%	67%	82%	76%	9%	51%	78%	48%	58%	26%	4%	20%	4%	3%	0%	11%	3%	6%	3%	2%	1219	0.59	628	30.3%	591	28.6%
Kütahya	Kayacık	Valley	78%	0%	58%	61%	11%	0%	16%	19%	93%	75%	80%	80%	20%	64%	87%	50%	64%	24%	4%	23%	3%	3%	1%	14%	4%	6%	3%	2%	1221	0.59	562	27.1%	659	31.8%
Kütahya	Yunuslar	Hill-side	69%	0%	13%	61%	10%	0%	8%	27%	89%	51%	76%	67%	9%	36%	82%	41%	58%	24%	4%	15%	3%	3%	0%	8%	4%	5%	3%	2%	972	0.47	483	23.3%	489	23.6%
Manisa	Börtlüce	Hill-side	96%	0%	2%	77%	14%	0%	14%	30%	80%	74%	73%	84%	2%	55%	96%	16%	53%	0%	3%	22%	3%	4%	0%	12%	4%	2%	2%	0%	1150	0.56	598	28.9%	552	26.7%
Manisa	Emre	Plain	89%	0%	16%	71%	13%	0%	12%	28%	84%	73%	84%	78%	40%	65%	82%	47%	73%	0%	4%	22%	4%	3%	2%	14%	4%	6%	3%	0%	1212	0.59	572	27.6%	640	30.9%
Manisa	İncesu	Plain	91%	0%	0%	75%	13%	0%	14%	29%	87%	75%	60%	76%	71%	76%	84%	38%	60%	0%	4%	23%	3%	3%	3%	17%	4%	5%	3%	0%	1234	0.60	578	27.9%	656	31.7%
Manisa	Saraçlar	Hill-side	89%	56%	0%	62%	13%	8%	13%	23%	80%	68%	51%	71%	11%	44%	87%	30%	56%	0%	3%	21%	2%	3%	0%	9%	4%	4%	2%	0%	1094	0.53	582	28.1%	512	24.7%
Muğla	Bozburun	Coast	98%	11%	96%	76%	14%	2%	17%	26%	80%	55%	80%	76%	56%	44%	80%	24%	80%	22%	3%	17%	3%	3%	2%	10%	3%	3%	3%	2%	1280	0.62	752	36.3%	528	25.5%
Muğla	Selimiye	Coast	98%	0%	98%	74%	14%	0%	15%	28%	84%	49%	76%	58%	53%	38%	56%	17%	69%	1%	4%	15%	3%	3%	2%	8%	2%	2%	3%	0%	1169	0.56	729	35.2%	440	21.3%
Muğla	Turgutköy	Plain	80%	0%	76%	61%	11%	0%	14%	21%	84%	50%	67%	76%	11%	47%	96%	35%	56%	17%	4%	15%	3%	3%	0%	10%	4%	5%	2%	1%	1088	0.53	588	28.4%	500	24.2%
Aydın	Baklaköy	Plain	87%	0%	24%	69%	12%	0%	13%	27%	80%	54%	67%	64%	22%	32%	100%	40%	51%	2%	3%	16%	3%	3%	1%	7%	4%	5%	2%	0%	1047	0.51	575	27.8%	472	22.8%
Aydın	Çiftlikköy	Plain	96%	0%	20%	49%	14%	0%	10%	18%	84%	47%	80%	56%	44%	44%	89%	30%	38%	3%	4%	14%	3%	2%	2%	10%	4%	4%	2%	0%	928	0.45	460	22.2%	468	22.6%
Aydın	Menteşeler	Valley	89%	0%	18%	66%	13%	0%	15%	24%	84%	60%	56%	78%	36%	38%	98%	41%	36%	4%	4%	18%	2%	3%	2%	8%	4%	5%	2%	0%	1059	0.51	549	26.5%	510	24.6%
Aydın	Eskihisar	Plain	89%	0%	49%	51%	13%	0%	13%	16%	78%	58%	73%	78%	44%	53%	96%	37%	51%	0%	3%	18%	3%	3%	2%	11%	4%	5%	2%	0%	1048	0.51	506	24.4%	542	26.2%
Aydın	Malgaçmustafa	Valley	91%	0%	47%	53%	13%	0%	14%	17%	84%	57%	58%	82%	24%	40%	93%	30%	24%	0%	4%	17%	3%	4%	1%	9%	4%	4%	1%	0%	994	0.48	519	25.1%	475	22.9%
İzmir	Durmuşlar	Hill	96%	11%	16%	60%	14%	2%	12%	24%	89%	79%	38%	73%	33%	58%	60%	37%	53%	0%	4%	24%	2%	3%	1%	13%	3%	5%	2%	0%	1122	0.54	536	25.9%	586	28.3%
İzmir	Karalar	Valley	96%	0%	69%	64%	14%	0%	14%	23%	78%	63%	53%	71%	36%	51%	80%	24%	31%	26%	3%	19%	2%	3%	2%	11%	3%	3%	1%	2%	1146	0.55	621	30.0%	525	25.4%
İzmir	Kozluca	Hill-side	80%	0%	16%	70%	11%	0%	15%	28%	84%	62%	78%	84%	51%	62%	87%	33%	40%	0%	4%	19%	3%	4%	2%	14%	4%	4%	2%	0%	1126	0.54	555	26.8%	571	27.6%
İzmir	Tırmanlar	Hill-side	87%	0%	33%	52%	12%	0%	15%	17%	89%	62%	60%	62%	33%	37%	82%	30%	44%	0%	4%	19%	3%	3%	1%	8%	4%	4%	2%	0%	968	0.47	483	23.3%	485	23.4%
İzmir	Balıklıova	Coast	96%	0%	98%	76%	14%	0%	15%	29%	87%	51%	76%	64%	18%	42%	69%	15%	76%	10%	4%	16%	3%	3%	1%	9%	3%	2%	3%	1%	1194	0.58	733	35.4%	461	22.3%
İzmir	Barbaros	Plain	96%	0%	27%	71%	14%	0%	16%	29%	84%	56%	89%	60%	24%	58%	84%	27%	53%	2%	4%	17%	4%	3%	1%	13%	4%	3%	2%	0%	1124	0.54	601	29.0%	523	25.3%
İzmir	Birgi	Plain	82%	0%	51%	63%	12%	0%	17%	26%	73%	52%	38%	64%	11%	44%	82%	21%	33%	0%	3%	16%	2%	3%	0%	10%	4%	3%	1%	0%	997	0.48	568	27.5%	429	20.7%
İzmir	Ildır	Coast	91%	7%	93%	71%	13%	1%	12%	28%	89%	68%	71%	76%	2%	34%	76%	39%	62%	0%	4%	21%	3%	3%	0%	7%	3%	5%	3%	0%	1210	0.58	700	33.8%	510	24.6%

Figure 8: Landscape identity matrix and indices of thirty villages (illustration: Hasan Serdar Kaya and Ezgi Güler Tozluoğlu).

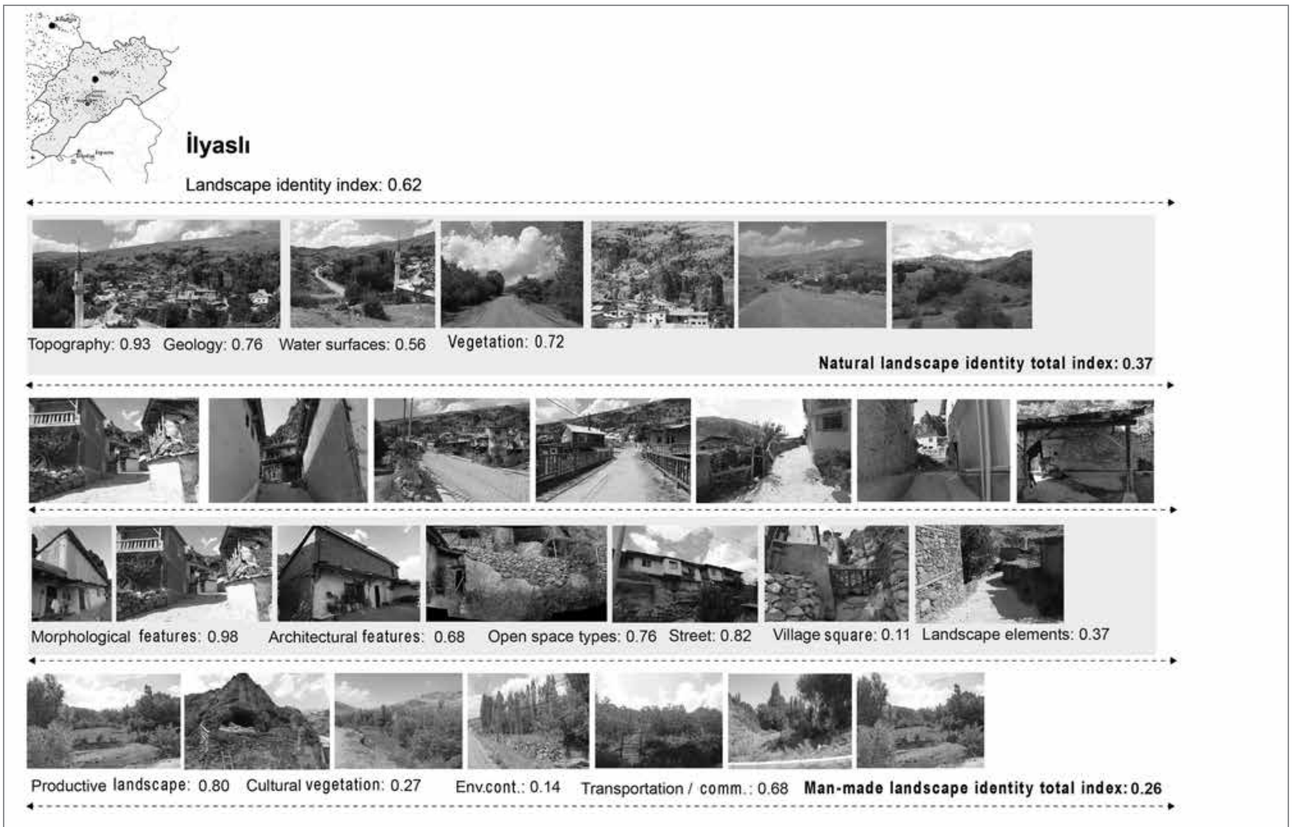

Figure 9: Visual assessment and index values for a sample village (illustration: Meltem Erdem Kaya).

includes the parameters tree group, single tree, and riparian vegetation. The fourth factor consists of slope and agricultural area parameters. The fifth factor consists of grassland and rocky surfaces. A rocky surface has a negative value. The sixth factor consists of dune surface and single bush parameters. The last factor is geology (Table 7).

3.1.2 Factor analysis of built landscape identity parameters

Factor analysis revealed ten factors. The first factor shows the presence of natural materials in buildings, walls, and boundaries. The second factor refers to settlement density and form. The third factor consists of the parameters of mixed trees, single-species trees, and vegetative boundary element. The fourth factor consists of the production landscape, gardens, additional residential structures in a garden, and ground-cover characteristics. The fifth factor includes field and olive grove parameters. The sixth factor represents the presence of dwellings and characteristic non-residential structures, such as mosques. The seventh factor includes the dominance of single-tree and water structures. The eighth factor consists of pasture and forest parameters. The ninth factor includes environmental control measures. The last factor consists only of the open area parameter (Table 8).

Table 7: Natural landscape identity factors.

Factor	Description
1	Elevation-dependent vegetation
2	Vegetation density
3	Streamside vegetation
4	Agricultural surface on sloping land
5	Vegetation on rocky surface
6	Vegetation in coastal areas
7	Geologic structure

Table 8: Built landscape identity factors.

Factor	Description
1	Built environment boundary elements
2	Form of construction
3	Natural environment border elements
4	Rural outdoor features
5	Agricultural landscape
6	Building typology
7	Focal elements
8	Natural resource areas
9	Environmental control measures
10	Common spaces

3.2 Cluster analysis of thirty villages

Following the factor analysis, a cluster analysis was carried out using the natural and built landscape identity factor scores. Comparing the basic morphological characteristics of the villages and the clusters, it was found that that valley, plain, foothill, hillside, hill, and coastal villages were in different clusters. This result supports the hypothesis that villages can form different groups based on built landscape identity data. The fact that valley, plain, foothill, and hillside villages are found in more clusters means that geographical features are less dominant than other features. Hill and coastal villages are grouped into two clusters. The main reason for this is that the coastal villages are generally the most accessible and the hill villages are the least accessible, the level of development varies, and the economic sectors are focused on tourism in the coastal villages and animal husbandry and agriculture in the hill villages. Hill and coastal villages differ from other villages in terms of population, natural environment, and vegetation. The clusters formed are indicators of the rich identity of the villages. Looking at clusters of villages, it can be seen that there are similarities within each cluster, as well as between clusters. For this reason, the groups formed are not considered village clusters as an alternative to geomorphological classification. These clusters show that villages can form different clusters when evaluated from different perspectives and with more parameters. This multidimensional and rich structure should be taken into account when making evaluations and suggestions about villages.

4 Conclusion

This research focusing on landscape identity was structured to find answers to three research questions. The first research question concerns the definition of landscape identity. The research introduces and evaluates landscape identity as a holistic approach to identifying rural settlements. Rural settlements as catalysts of the rural system represent patterns of life associated with productive landscapes and natural environments. These settlements are places where pragmatic adaptation to natural conditions generates cultural patterns that are site-specific. In the research, the rural settlement was evaluated as an entity with its operative landscape, and the landscape identity approach used underlies the integration of culture with the natural landscape. In this regard, it has been proposed that landscape identity has two main components: physical landscape identity and social landscape identity. The second research question seeks to understand whether landscape identity parameters can be measured quantitatively. The proposed method is therefore an attempt to objectively show which parameters make the settlement remarkable, qualified, and worthy of protection. The method also makes it possible to compare settlements in terms of landscape identity. The landscape identity matrix developed for thirty rural settlements reflects index values for each parameter as an answer to the second and third research questions and proves that even within the same geographical context the villages show diversity in terms of landscape identity. This result confirms the first and fourth hypotheses of the research. The matrix also shows that the natural environment, rural land-use patterns, and architectural features are the dominant parameters of landscape identity. These qualities, in addition to continuing social patterns of life, still exist in rural settlements but are threatened by the pressures of urbanisation. Understanding these rural characteristics becomes crucial in a continuously urbanizing world to protect values and control development. In this regard, it is suggested that landscape identity can be used as an approach, method, and way of thinking about rural areas to reveal regional and local characteristics, and that it can be used as a tool for sustainable rural development.

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