

Contemporary Studies in Environment and Tourism

Contemporary Studies in Environment and Tourism

Edited by

Recep Efe and Münir Öztürk

Cambridge
Scholars
Publishing



Contemporary Studies in Environment and Tourism

Edited by Recep Efe and Münir Öztürk

This book first published 2017

Cambridge Scholars Publishing

Lady Stephenson Library, Newcastle upon Tyne, NE6 2PA, UK

British Library Cataloguing in Publication Data

A catalogue record for this book is available from the British Library

Copyright © 2017 by Recep Efe, Münir Öztürk and contributors

All rights for this book reserved. No part of this book may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the copyright owner.

ISBN (10): 1-4438-7283-0

ISBN (13): 978-1-4438-7283-6

TABLE OF CONTENTS

Preface	xi
Chapter One.....	1
Exploration Tourism: Based on Selected Areas	
Marek Zoladek and Monika Kordowska	
Chapter Two	9
Analyzing the Impacts of Tourism-Based Development on Mediterranean Coastal Landscape	
Yüksel Ünlükaplan and Hakan Alphan	
Chapter Three	21
Assessment of Wetlands and Water Plants within the Scope of Ecosystem Services	
Elif Bozdoğan and Zerrin Söğüt	
Chapter Four	43
Ecosystem Services: A Function of Natural Capital	
Assen Assenov, Alexandre Chikalanov, Mariyana Lyubenova and Sofia Kostadinova	
Chapter Five	61
Enriching Tour-Operators' Offer to Go Beyond Sea, Sun and Sand: The Case of the Dominican Republic	
Renata Rettinger and Michal Apollo	
Chapter Six	83
Natural History, Cultural Heritage and Tourism Potential of Çakıt Valley, Southern Turkey	
Tülay Öcal and Şule Kocabağ	
Chapter Seven	101
Destination Development: Overcoming Social and Environmental Limitations of Tourism in Bulgaria	
Mariya Stankova, Milena Filipova and Stoian Kirov	

Chapter Eight.....	121
Tourism Potential of Natural Caves in Bursa-Turkey	
Kadir Tuncer, Murat Poyraz and Lutfi Nazik	
Chapter Nine.....	145
The Population of Himalayan Regions by the Numbers: Past, Present and Future	
Michal Apollo	
Chapter Ten.....	161
Differentiation of Demographic Developments of Major Cities of Central Europe	
Sławomir Dorocki, Piotr Raźniak and Paweł Struś	
Chapter Eleven.....	173
The Population Situation in Selected Muslim Countries in the Context of Selected Demographic Parameters	
Zbigniew Długosz and Anna Winiarczyk-Raźniak	
Chapter Twelve.....	195
Change in the Function of a Municipality: The Example of Caye Caulker (Belize)	
Anna Winiarczyk-Raźniak	
Chapter Thirteen.....	209
The Fundamental Geographical Criteria for the Site Selection and Planning of Housing Estates Using GIS: Malatya (Turkey) Case Study	
M.Taner Şengün, Muzaffer Siler and Fahrettin Engin	
Chapter Fourteen.....	225
Hobby Gardens: Case Study of Recreation Areas in Konya City Centre	
Tahsin Tapur	
Chapter Fifteen.....	239
GIS Based Mapping of Noise Pollution in Bakırköy District of İstanbul	
Nüket Sivri, Dursun Zafer Seker, H. Kurtulus Özcan, Nurdan Ün, Nevin Balca, Deniz Gökçe Poyraz, Didem Doğal, Neslihan Kara and Damla Özkurt	

Chapter Sixteen	253
A Perception of Protection, Attitudes, and Behavior among Local People in the Rural Settlements: Case Study from Tahtali Dam Protection Basin (Izmir)	
Nevzat Gümüş, Ali Ekber Gülersoy, Ali İlhan and Mehmet Ali Çelik	
Chapter Seventeen	273
Analysing, Experiencing and Designing Urban Space	
Meltem Özçaki	
Chapter Eighteen	319
Create a Park: Difference from the World Gardens	
Nurhan Koçan	
Chapter Nineteen	325
Geographical Environmental Changes in Tekirdag Province and its Neighbourhood during 1900-2015 (Thrace-Turkey)	
Emre Özsağın, Halid Pektezel and Ilker Eroğlu	
Chapter Twenty	347
The Approach of Local People towards the Phenomenon of Protection: Case Study of Fethiye-Gocek Special Environmental Protection Area	
Zeynep R. Bozhüyük Ardahanlioğlu, Nihat Karakuş and Serdar Selim	
Chapter Twenty-One	357
Environmental Rights and Responsibilities: Students' Perspective from Ataturk University-Turkey	
Neslihan Kulözü Uzunboy	
Chapter Twenty-Two	379
The Determination of Sustainability of Rural Development Projects: Case of Beekeeping Investments in Forest Villages in Southern Turkey	
Ufuk Coşgun and K. Hale Güler	
Chapter Twenty-Three	399
The Historical Geography of Caria-Turkey	
Neslihan Dal	

Chapter Twenty-Four	409
The Architectural Patterns of Traditional Cultural Geography in the Adriatic Abruzzo (Central Italy)	
Kemal Reha Kavas	
Chapter Twenty-Five	417
Role of Vernacular Architecture in Cultural Landscapes: A Case Study from Elmali, Antalya – Turkey	
Hacer Mutlu Danaci and Meryem Atik	
Chapter Twenty-Six	427
Terrain Morphometric Analysis to Support Tourism Development in the Tusheti Protected Area	
Nana Kvirkvelia, Mariam Tsitsagi, Meri Gugeshashvili and Tamila Chaladze	
Chapter Twenty-Seven	435
The Effect of Geomorphological Features on Karstification: Case Study from Anamur (Mersin/Turkey) Surroundings	
Muzaffer Siler and M.Taner Şengün	
Chapter Twenty-Eight	453
Conglomerate Habitat in the Köprü River Basin in the Western Mediterranean Region of Turkey	
Ibrahim Atalay, Recep Efe, Abdullah Soykan and Isa Curebal	
Chapter Twenty-Nine	465
Spatial Differentiation in Financial Performance of Corporations Headquartered In Central and Eastern Europe in Times of Economic Recession	
Piotr Raźniak	
Chapter Thirty	479
Regional Distribution of the Main Economic Activities in the Field of “Information and Communication Technologies” in Bulgaria	
Tereza Stefanova	
Chapter Thirty-One	499
A Model for Tracking the Amount and the Yield of Agricultural Product Using GIS	
M. Fahri Karabulut, Batuhan Kiliç, Yalçın Yılmaz and Fatih Güngen	

Chapter Thirty-Two.....	507
Planning Process of Recreational Areas Based on the Use of Forest Sources for Recreational Purpose Metin Demir, Süleyman Toy and Tendü Hilal Göktuğ	
Contributing Authors.....	521

PREFACE

Environmental quality is the backbone of tourism but the relationships between the two are complex. Tourism directly involves activities which result in adverse effects on the environment. Its negative effects lead gradually towards the destruction of environmental resources. An ecosystem is a geographical area which includes all the living organisms, their physical surroundings and the natural cycles sustaining them. The threats to these ecosystems are severe because of their attractiveness to tourists and the tourism industry. The ecologically fragile and pristine ecosystems are the most threatened ones in this connection due to degradation related to tourism, because the latter involves land clearing and construction as well as long-term changes in local economies and ecologies.

However, tourism can have several beneficial effects on the environment. It can contribute much towards environmental protection and conservation through direct financial contributions for the conservation of sensitive areas and habitats, improve environmental management and planning, and add to clean production technologies which can help in the planning and operating of tourism facilities in a way that minimizes their environmental impacts.

This book includes thirty-two chapters prepared by seventy contributors. The first part provides discussions on tourism based on selected areas; it analyzes the impact of tourism-based development on Mediterranean coastal landscapes; provides information on ecosystem services as a function of natural capital as well as an assessment of wetlands and water plants within the scope of ecosystem services; enlightens with facts on enriching tour-operators which offer to go beyond sea, sun and sand; includes natural history and cultural heritage in tourism potential; and provides destination development views on overcoming social and environmental limitations of tourism together with the tourism potential of natural caves.

The second part deals with demographic developments like the population of Himalayan regions—by numbers—past, present, and future and the differentiation of the demographic development of major cities of central Europe followed by historical geography; the architectural patterns of traditional cultural geography; the role of vernacular architecture in cultural landscapes and the population situation in selected Muslim

countries in the context of selected demographic parameters.

The third part includes changes in the function of a municipality; the fundamental geographical criteria for the site selection and planning of housing estates using GIS; hobby gardens; the integration of GIS and noise measurements; local people's perceptions of protection, attitudes and behaviour in rural settlements; the designing of urban spaces; the creation of parks and their differences in relation to world gardens; geographical environmental changes within a century; the approach of local people to the phenomenon of protection; information on environmental rights and responsibilities among university students; and the sustainability of rural development projects.

The final section includes terrain morphometric analysis for the support of tourism development; the effects of geomorphological features on karstification; conglomerate habitats; spatial differentiation in the financial performance of corporations headquartered in central and eastern Europe in a time of economic recession; regional distribution of the main economic activities in the field of information and communication technologies and finally a model for tracking yield using GIS. We feel that the topics presented in this book have the potential to increase public appreciation of the environment and to spread awareness of environmental problems in the tourism industry.

THE EDITORS

CHAPTER ONE

EXPLORATION TOURISM: BASED ON SELECTED AREAS

MAREK ZOLADEK AND MONIKA KORDOWSKA

Introduction

Humans have always wanted to know the unknown corners of our planet. In the early 20th century, the largest white spots on the map were circumpolar areas. The first years of this century brought the first research expeditions to areas of the Arctic and Antarctic. Their final destination was to reach the North Pole and the South Pole. In 1905 began the first ever expedition to the polar regions of the northern hemisphere, led by Peary. However, the first person at the North Pole was Cook, who reached it in 1908. Two years later began the first expedition to the South Pole, which was conquered in 1911 by Amundsen. In 1950, an advanced stage of high mountain area exploration began by the first-ever summiting of an 8000 m peak by man (Maurice Herzog climbed to the top of Annapurna I). The "Third Pole" of the Earth, Mount Everest was finally conquered in 1953 by Sir Edmund Hillary and Tenzing Norgay (Walczak, 1959; Burton et al., 1992, Kieras and Lewandowski, 1995).

In the mid-20th century on Earth there were a few undiscovered places. These were mostly areas that were difficult to access, characterized by an extremely unfavorable climate and position. These areas slowly began to be within reach of almost every person with the development of technology and better communication. After many centuries of work by discoverers, who published new maps with new areas they showed that the world is a lot bigger than people had thought. However, there are still some mysterious places to discover (Burton et al., 1992). Some of them are hidden in the mountain range of the Himalayas. The desire to satisfy scientific curiosity is an impulse for scientists and travelers to start their explorations. Alpinists also have other motives for their activity (Czyż, 2010).

In the 19th century, discoveries mainly interested mountain topographers, who were occasionally performing measurements in mountainous regions due to their professional targets. During this period the first tourists also appeared. The year 1830 is taken as the first date of tourist exploration of the Himalayas. It was an expedition by G. W. Trail, which went from south to north through the pass of Nanda Devi. Since that time, this tour has been called Trail Pass (5212 m). After these occasional exploits finally the second half of the 20th century brought Himalayan expeditions, undertaken for scientific purposes and climbing. These included seeking new trails, climbing routes and research in various fields, including geography, geology and biology (Dorawski, 1957). Since the first explorers, the Himalayas have become very popular for mountaineering. Their popularity and fame have encircled all the earth. Other expeditions for scientific and climbing purposes began to multiply, and their popularity is now continuous.

Due to the increasing interest in mountain climbing, the purpose of this study is to present the history of the development of exploration tourism and the possibilities of this type of tourism development on the selected modern examples.

Methodology

The study area: The area of the study was the Miyar Valley which is located in the Indian part of Great Himalaya. It lies in the North-Western part of Lahaul valley in the western corner of a large district of Lahaul and Spiti, in the state of Himachal Pradesh. It starts north of the small city of “Udaipur” and stretches for about 100 km towards the Kang La pass (5350 m). The location map of the valley is presented in figure 1-1.

In this region the climate varies from a dry temperate to an alpine type. The area remains snow-covered for almost six months of the year. The temperature ranges between -19° and 30°C . Moreover this region is characterized by scanty rainfall, massive snowfall, high wind velocity and intense solar radiation (Deshmukh and Jain, 2016). Altitude varies from 2600 meters a.s.l. to 6448 meters a.s.l., covering 963 km^2 areas (Padigala, 2014).

The valley is infrequently inhabited by the local people. The villagers depend on agriculture (Deshmukh and Jain, 2016) and a pastoral life. The main crops grown are seed potato, peas, *Kuth (Saussurea)*, barley and buckwheat. The houses are built in Lahauli style and are made of local materials (slate, granite and wood) (Padigala, 2014).

The study area included Miyar Valley with the surrounding peaks and massifs.

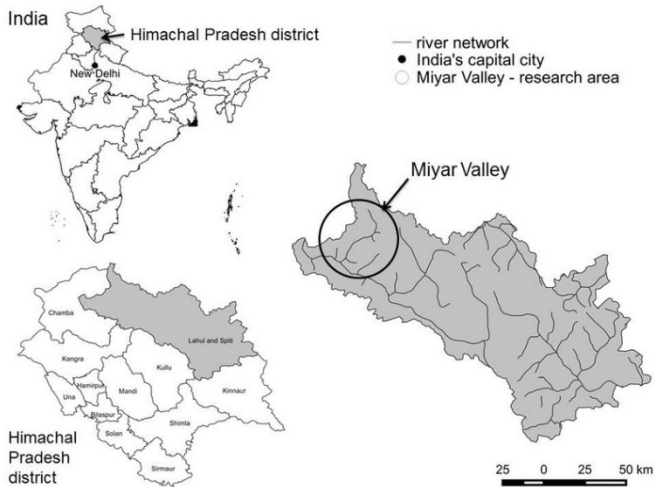


Fig. 1-1: Location map of the Miyar Valley

Source: authors

Methods: The study used available publications of geographical discoveries, mountain climbing and the development of tourism in high mountain areas. The basis of the literature describes the history of mountain-climbing tourism in the Miyar Valley. Furthermore one of the authors conducted their own research in this Valley. He actively participated in mountain expeditions during field observation, interviewed the heads of the villages, professional climbers and logistics experts and prepared expeditions in all fields.



Fig. 1-2: Exploration tourism in the Miyar Valley, porters of Polish UP University Expedition in 2013
Source: Żołądek, M.

Also he was the first climber to climb the virgin peaks in the Miyar Valley—Masala Peak and Forgotten Peak. All studies were conducted in jottings and notes. The expedition during the years 2006–2014 was organized in the remote corners of the Miyar Valley (Fig. 1-2).

History of exploration: Search for white spots on the map

The history of the beginnings of tourism in the Miyar Valley dates back to the mid-twentieth century. In the year 1970 the highest peak within the valley, Menthosa, 6440 m was conquered by S. Rae and R. Cape from an expedition of a British Service Team. It is also the 2nd highest summit in the Lahaul–Spiti Province. Another main summit in the Miyar Valley is Phabrang 6172 m (Fig. 1-3), climbed for the first time in 1972 by S. Ibayashi from the Japanese Team (Kumar, 1988). The first serious exploration of the Miyar Valley, including the upper part began in 1978 (Kapadia, 1999). This was done by the “King's School, Ely, Himalayan Expedition 1978”. The participants made several summit climbs including a few on virgin peaks, made the first maps of the valley and described the life of the inhabitants of the area. The expedition also discovered the Tawa Valley (Figs. 1-3, 4), located in the same upper part of the main valley as the north side hanging valley. In 1992, the Miyar Valley was visited by the Italian expedition of alpinist Paolo Vitali, who made a climbing reconnaissance in the Tawa Valley and also summited the first major peak in this small valley: the granite and magnificent peak of Neverseen Tower. The beginning of the 21st century brought an increase in popularity for exploration tourism in the area of the Miyar Glacier and the trekking trail to Padum via the Kang La pass (Fig. 1-3).

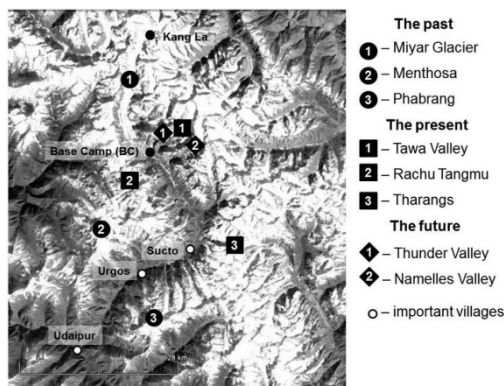


Fig. 1-3: Main areas for exploration tourism in the Miyar Valley in the past, present and future. Source: compiled by the authors, Google Earth

Climbers' activity was focused mainly on the Tawa Valley. Until the end of 2015 in the valley there were several active climbing expeditions from

different countries of the world, including five from Poland. They gained first access to the top of virgin peaks and designated new climbing routes on the walls of Castle Peak, Masala Peak, Mount Mahindra, Forgotten Peak, Lotos Peak and more.



Fig. 1-4: Tawa Valley with Forgotten Peak (left) and Neverseen Tower (right) in 2012. Source: Żołądek M.

Tourist Activity—Today and the Future

Currently the Miyar Valley is a popular destination for ambitious trekkers and climbers. The number of visitors is growing rapidly, but still remains at a safe level for the environment. Even in a period of increased activity which falls in the summer months, from July to September, the area of the valley is in harmony with nature. There is a phenomenon exceeding the absorption capacity of the environment, which currently can be seen in popular areas of the Himalayas such as around Leh and in the massif of Annapurna in Nepal. Getting to the Miyar Valley is much easier and faster than a few years ago, but it is still a kind of adventure. The road leading through the valley of the river Chenab is narrow and unstable and its crossing largely depends on weather conditions. Also the road from the city of Udaipur to the inside valley is limited by natural factors. A large number of visitors are people involved in tourism, climbing and the scientific exploration of the Miyar Valley. The size of the valley itself is important for individual scientific and climbing expeditions with its smaller hanging and side valleys and also the large mountain massifs located inside the Miyar Valley. Currently, the major developing areas of exploration tourism are the Tawa Valley (Apollo, Varley and Żołądek, 2014) and the massif of Tharang's summits (Figs. 1-3, 5). There are several other areas in the valley where this form of tourism occurs. However, what has complicated this approach is the poor quality of rock and unfavourable changes in geomorphology due to changes in climate,

which have led to the removal of these areas from the list of tourist destinations. This tendency can be observed in the massif Rachu Tangmu (Fig. 1-6). A similar phenomenon of transformation of the high mountain areas due to climate change has been observed in other mountain ranges in the world (Żołądek, 2014). The Miyar Valley still offers ideal areas to "explore and discover". Unclimbed, unnamed peaks and areas which are marked on maps as white spots still exist in this valley. Small Thunder Valley also has a large potential for exploration tourism. After the first expedition at the beginning of this century, today the area is not frequented because of the difficult and complicated approach. This is due to climate change affecting the current condition of the geomorphology of the valley. One of the most important areas for future exploration expeditions is Nameless Valley (Fig.1-3). For people related with exploration tourism it is an ideal place to find new discoveries in the second decade of the 21st century. This area does not have any professional maps and other scientific descriptions. The surrounding peaks reach a height of about 6000 meters; only some of them are conquered, named and measured. Many of them are still virgin and do not have names and heights. To the present time only a few expeditions have explored this valley. Currently, Nameless Valley is waiting for the next climbers and scientists who want to be marked in the history of mountaineering and geography.

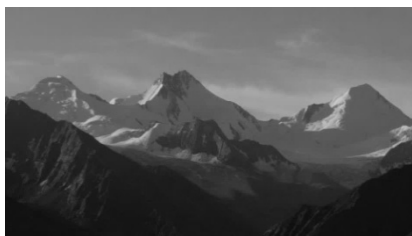


Fig. 1-5: The Tharangs, from left Tharang III, Tharang I and Tharang II in 2012

Source: Żołądek, M.



Fig. 1-6: View from RachuTangmu's slopes to the Tawa Valley (left) and Namelles Valley (right) in 2006

Source: Żołądek, M.

Conclusions

Explorers are always looking to satisfy their scientific curiosity. That is the reason for the rapid and dynamic development of exploration tourism in the Miyar Valley and also in other parts of the world, especially in the mountainous areas of South America and Asia as well as in the Antarctic

and other isolated and poorly known areas of the earth. Exploration tourism lets us get to know and discover all areas but brings with it certain consequences that should not be forgotten. Increasing tourism in mountain areas can lead to accelerated risks for nature and the whole ecosystem. The effects of increased human activity in the mountains can be observed in the massifs that are particularly popular, for example the peaks of the Seven Summits (Apollo and Żołądek, 2010). Moreover, exploration tourism is going to end in the future. Its era will be ended with the discovery of the last white spot on the map. For this reason, it is not a permanent part of the economic development of villages and areas where it is one of the existing forms of activity. It is not the only form of tourism which can increase popularity in this area. The Miyar Valley has many other tourist attractions of natural and cultural aspects, which may be attractive to other groups of tourists. Types of visitors to this area are diverse. Among those visiting the Miyar Valley we can find scientists, climbers, trekkers, cartographers, geographers, biologists and other specialists. Certainly this part of the Himalayas is the perfect destination for people looking for places to discover, and those who want to relax and enjoy places with views of the majestic peaks. Today it is one of the few places on earth where the properly prepared professional can make new discoveries not only in geography, but also possibly in other areas of science. For geographers and alpinists this place is particularly attractive because it is located within the valley of virgin peaks. For this reason, exploration tourism will be one of the forms of activity that still exists in the Himalayan Miyar Valley.

References

- Apollo, M.; Żołądek, M. (2010). Wpływ turystyki na środowisko naturalne gór Korony Ziemi. *Aura–Ochrona Środowiska* 3 (2010): 31–33.
- Apollo, M. and Phil V.; Żołądek, M. (2014). Searching for Geographical White Spots – First Ascents on Himalayan Summit. *Current Issues of Tourism Research* 4(1) 58-59.
- Burton, R.; Cavendish, R.; Stonehouse, B. (1992). *Journeys of the Great Explores* (New York: Facts on File, Inc 200.
- Czyż, M. (2010). Dlaczego chodzimy po górach? Czyli o motywach uprawiania sportów wysokogórskich w świetle publikacji Jana Alfreda Szczepańskiego. *Folia Turistica* 23: 241-255.
- Deshmukh, P.; Shrikant, J. (2016). Assessment of floristic diversity in Miyar Valley of Lahaul and Spiti district, Himachal Pradesh, India.

- Journal of Global Resources* 2: 90-95.
- Dorawski, J.K. (1957). *Człowiek zdobywa Himalaje* (Kraków: Wydawnictwo literackie Himalaje, 312.
- Kapadia, H. (1999). *Across Peaks & Passes in Himachal Pradesh* (New Delhi: Indus Publishing Company, 203.
- Kieras, Z.; Lewandowski, W. (1995). *100 Najpiękniejszych Gór Świata* (Warszawa: Grupa IMAGE: 159.
- Kumar, A. (2014). A tryst with Phabrang, 1987. *The Himalayan Journal* 14:1-21.
- Walczak, W. (1959) *Jak białe plamy znikają z map* (Warszawa: Wiedza Powszechna, 316-318; 347-394.
- Zoladek, M. (2014). Transformation processes in alpinist regions – mountain glaciers changes – based on selected earth's glaciers. *Procedia–Social and Behavioral Sciences* 120: 186–189.

CHAPTER TWO

ANALYZING THE IMPACTS OF TOURISM- BASED DEVELOPMENT ON MEDITERRANEAN COASTAL LANDSCAPE

YÜKSEL ÜNLÜKAPLAN AND HAKAN ALPHAN

Introduction

Tourism involves many activities which have positive and negative effects on local communities. Associated negative impacts of tourism are directly linked with the effects on the environment. Tourism and the environment have a complex and interdependent relationship. Thullen (1996) summarizes both negative and positive effects of tourism and the environment. Several studies stress the negative impact of tourism on the physical environment. Zhong et al. (2011) evaluate the effect of tourism in terms of the impacts on vegetation and the decrease in plant productivity. Another negative effect of tourism on the environment is related with arable lands. Irregular and profit-oriented tourism investments, including secondary residential settlements cause agricultural lands, *macchia*, etc., to decrease. As touristic activities increase, natural vegetation, pastoral landscapes, forests and recreational zones will be affected in a negative manner (Dal and Baysan, 2011).

The existence of rich resource potential and favorable transportation and climate conditions has enabled coasts to be attractive residential areas for centuries (Jaakson, 1986; Girard and Gartner, 1993). Today, especially in the big cities, people's motivation for moving away from the cities' tiring and noisy environment and the desire to live in healthy environments intertwined with nature-enabled houses built on the waterfront have become a good investment instrument. After the 1980s, governments' selective policies on promoting tourism and recreational activities increased the number of houses on the coasts (Kurt, 2015). In recent years, valuable agricultural areas have been located in the coastal

areas, especially on the Aegean and Mediterranean coasts. Valuable agricultural areas have been transformed into secondary housing and leisure areas for profit considerations. The important factor behind this transition can be attributed to the task of preparing the zoning plan being given to local governments in 1985 (Kurt and Karaburun, 2013). Agricultural lands under private ownership are continuously transforming into secondary housing and businesses associated with touristic activities as they are more profitable. One of the factors behind this transformation is the lack of an adequate and reliable source of income for small farmers.

Multi-story holiday resorts constructed along the coasts usually follow a strip line. This structure prevents the incursion of the sea breeze into the inner areas thereby eliminating the link between the houses and the sea due to roads, parallel to the houses. In this manner, existing coastal areas are being exterminated and visual quality is deteriorating (Bieger et al., 2007; Kurt, 2015). Urbanization generates negative impacts on the environment i.e. the destruction of vegetation, changing the structure of the rural economy, and pollution caused by seasonal population growth (Alpaslan and Ortaçşme, 2009).

Study Area

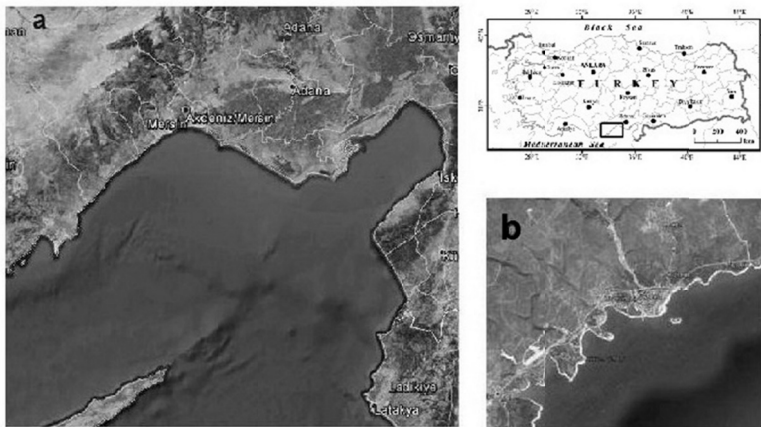


Fig. 2-1: Location of the study area (a: Overview of the region; b: Kizkalesi) In the associated areas secondary residential settlements serving domestic tourism are widespread. In addition, agricultural areas and other common *macchia* constitute common types of land cover.

The study area is Kizkalesi (Maiden's castle, Corycus or Korykos), which is a Mediterranean coastal town, part of Erdemli district, Mersin Province. It covers Kizkalesi residential and coastal areas, located in the Eastern Mediterranean region and approximately 60 km to the south-west of Mersin (Fig. 2-1).

Material and Method

In recent years the study area has been facing significant development pressure. In this process agricultural activities and secondary residential settlements have increased steadily. This type of settlement leads to significant changes of the coastal landscape.

Within the framework of this study, the effect of secondary residential settlements on land cover was analyzed by employing Cluster Analysis, an important multivariate statistical method (Fig. 2-2).

Land cover and land use data were classified by processing SPOT panchromatic images acquired in 1989, 1995, 2001 and 2007.

In this context, land cover types in the study area (agricultural fields, *macchia*, forest areas, bare areas, etc.), variables of land morphology (altitude, slope and aspect) and variables such as distance to roads, residential areas and coastline were taken into account. Land cover information was extracted from georeferenced land cover maps. The Digital Elevation Model (DEM) was used for calculating morphological features (e.g., altitude, slope, etc.). Road network and coastline data were also used to produce distance maps (e.g., proximity to the coast and roads). All these datasets were processed in a GIS environment.

A total of 250 randomly distributed points were created. The above-mentioned land cover, geomorphology and other data were used for extracting quantitative information for these 250 points (Fig. 2-3).

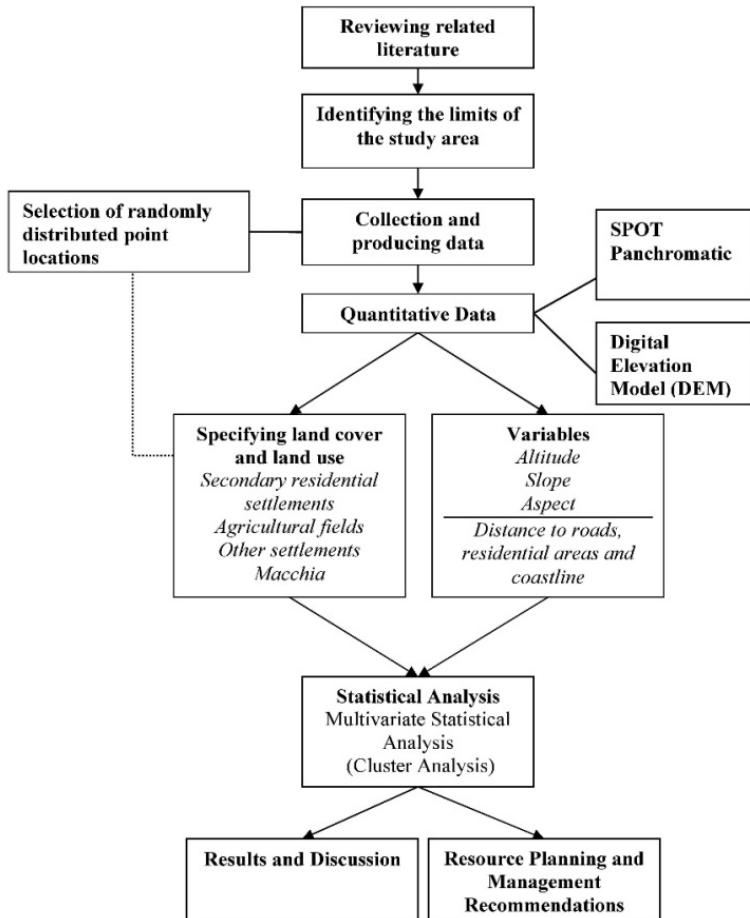


Fig. 2-2: Research Method

Statistical analysis was based on this dataset. In order to explain the effects of settlement development in a coastal landscape due to tourism activities, the spatial distribution of land use was analyzed using cluster analysis as a classification method. Cluster analysis was conducted by MVSP 3.13I (Kovach Computer Services, 2004) where the agglomerative clustering method was minimum variance clustering (Ward's (1963) method or sum-of-squares cluster) and the distance measure was Squared Euclidean distance.

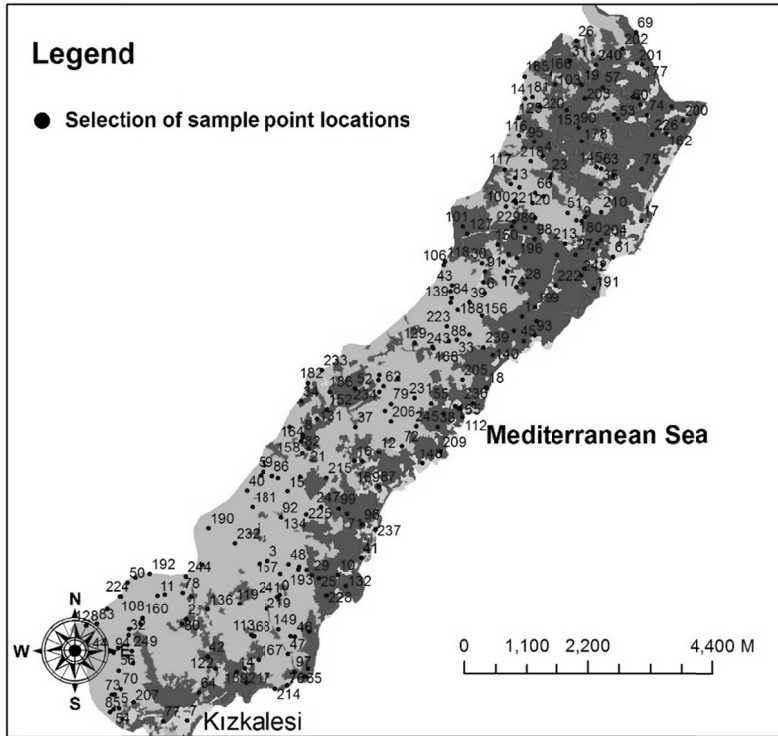


Fig. 2-3: A total of 250 randomly distributed points

Results and Discussion

In this study, the evolution process of the secondary residential settlements and changes in land use in Kizkalesi was analyzed for the 1989-2007 period. The classification of SPOT images was made with respect to four different land use types: built-up areas, agricultural areas, *macchia* (maquis) and bare areas (Fig. 2-4).

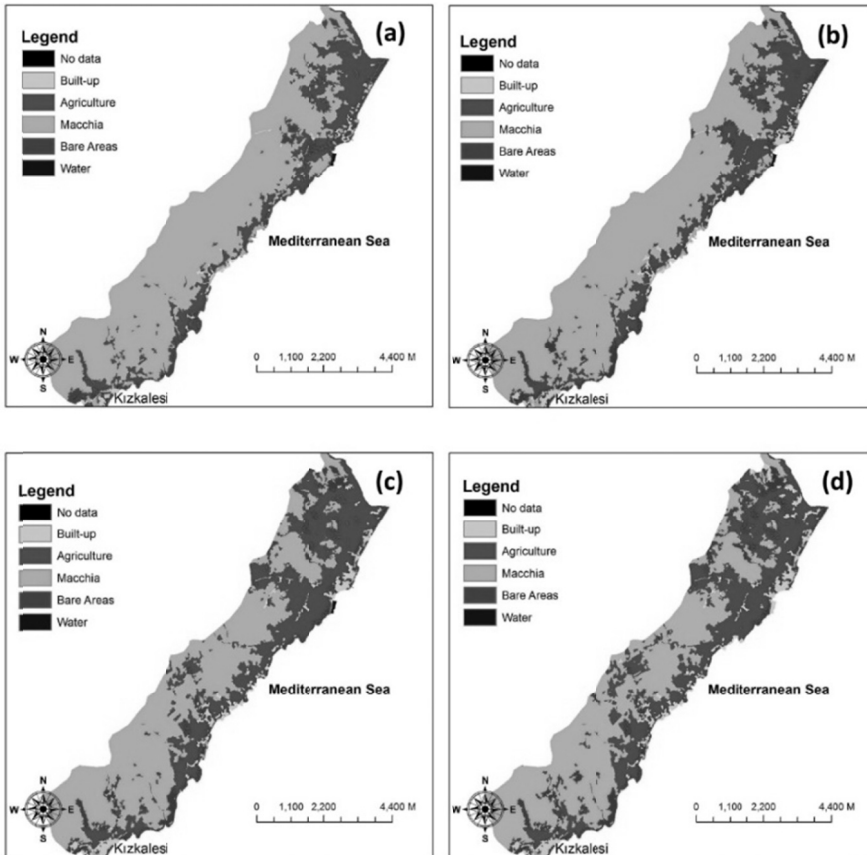
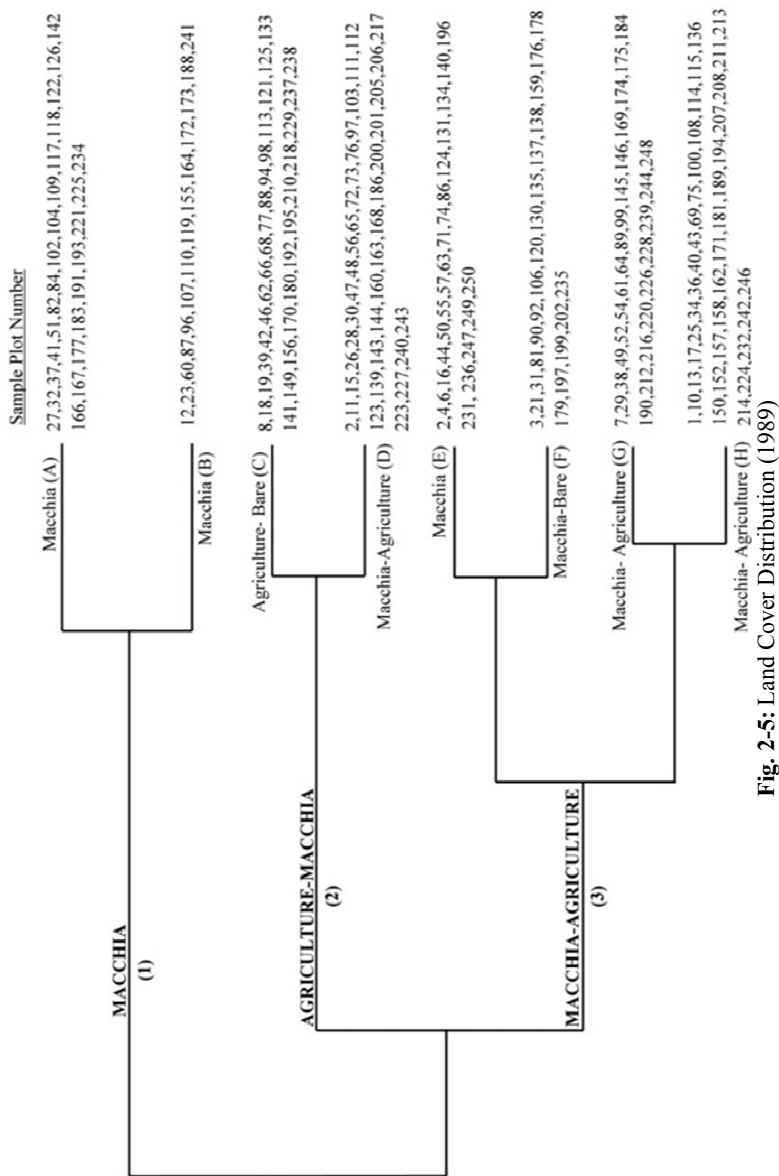


Fig. 2-4: Land-use change in Kizkalesi ((a) 1989, (b) 1991, (c) 2001, (d) 2007). It was concluded that during the specified 16 years, natural *macchia* areas were transformed to residential areas.

Considering the 1989-2007 period, an increase in agricultural areas and a decrease in *macchia* were observed. According to the data of 1989, *macchia* were transformed to agricultural areas as this process heavily occurs where the slope is low and the distance to the road is small. This situation was introduced by the Cluster Analysis where the data for classification were gathered by random selection (Fig. 2-5).



Macchia appears to spread purely, and in a protected manner, where the slope is 12-20% and partially 30% (Fig. 2-5-A, B). Considering morphological structure, distance to road, distance to coast and slope, "distance to road" and "slope" come into prominence thereby causing a territorial change (Fig. 2-5).

In terms of area accessibility, intensive agricultural activities are observed where the slope is flat and the distance to road is a maximum of 200 m. Moreover, associated agricultural areas include *macchia* (Fig. 2-5-D). Besides *macchia*, apertures are also observed (Fig. 2-5-E, F). However, even if areas exhibiting diversity in terms of slope continued their dominance, *macchia* transformed to agricultural areas (Fig. 2-5-G, H).

In 2007, the most crucial change in land cover was in the *macchia*. Pure *macchia* were transformed into apertures, agricultural areas and partial residential settlements. This kind of change in land cover was exoterically explained by the cluster analysis (Fig. 2-6).

Comparing 1989 and 2007, the study area witnessed a substantial decrease in the number of pure *macchia* as a result of increases in new agricultural areas (Fig. 2-6-A, B). Between 2001 and 2007 the share of residential settlements increased. The important factors during this process were the "obstacle" role of the area's morphological structure on the expansion of agricultural areas, the saturation of areas suitable for agriculture, and the decrease in the growth rate of agricultural fields compared to previous years (Fig. 2-6-C, D). Residential settlements are located in agricultural areas. There are still *macchia* areas which have maintained their dominance where the slope is greater than 20% and transportation is relatively difficult (Fig. 2-6-E). In the areas in which the morphological structure varies, the transformation from *macchia* to the bare areas is observed (Fig. 6-6-G, H).

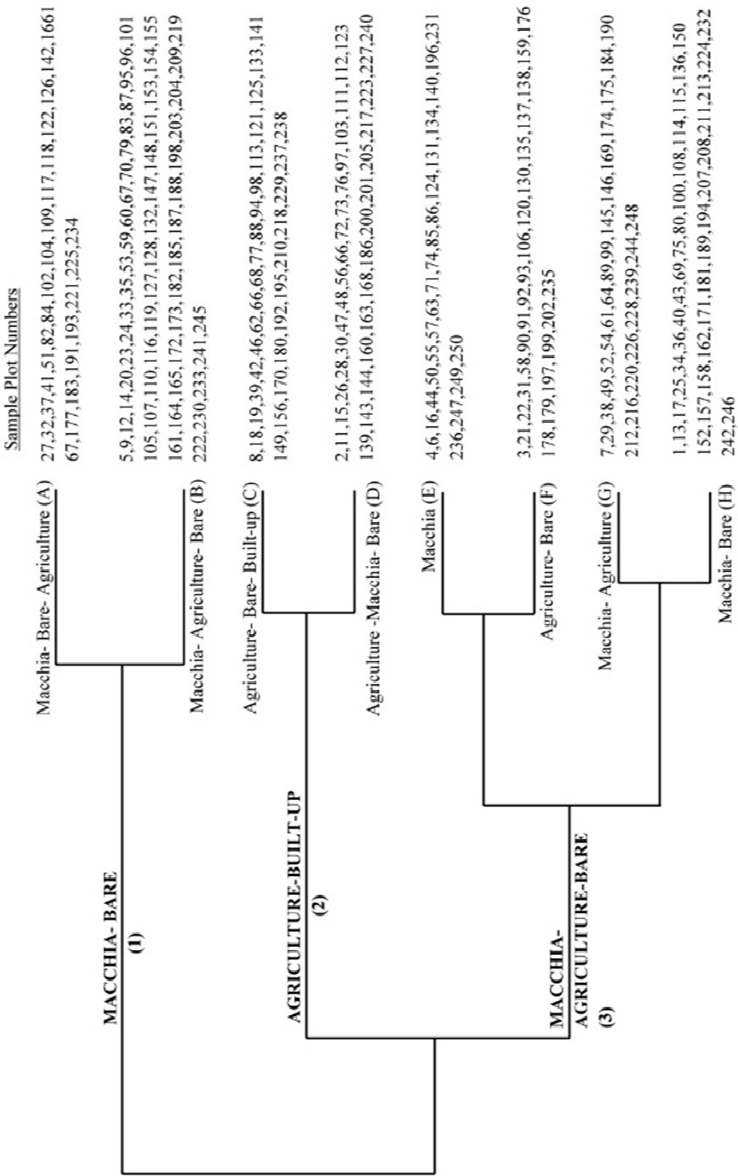


Fig. 2-6: Land Cover Distribution (2007)

Conclusion

This study took the physical characteristics of a coastal area into consideration in order to study changes in land cover and the effects of secondary residential settlements and agriculture on the structure of the Kizkalesi coast. For this purpose, 1989, 1995, 2001 and 2007 period images were investigated.

Considering the data gathered by the study, significant changes were observed in the land cover of the study area. A transformation from *macchia* to agricultural areas and secondary residential settlements took place. Alphan et al. (2013) conducted a detailed analysis of the land cover of the study area and they emphasized that *macchia* cover around Kizkalesi still protects its naturalness. This study demonstrated that these areas protect their naturalness even though serious threats exist due to the expansion of agricultural areas and building development.

Kizkalesi, and its surroundings, is one of the major tourism development areas of the Eastern Mediterranean region due to its historical assets and geographical location. This causes a transformation of agricultural areas in private ownership to more profitable investment types such as secondary residential settlements and other touristic uses. One of the prominent factors behind this transformation is the lack of adequate planning decisions. Therefore planning and management unprecedentedly need the spatial information of the past and the present state of these landscapes.

Acknowledgements: This study was supported by Cukurova University Department of Research Projects and TUBITAK under the grant numbers FBA-2015-5500 and CAYDAG 111Y253, respectively. Background data were provided by CAYDAG 111Y253. Statistical analyses and fieldwork were done in FBA-2015-5500. Support from Cukurova University and TUBITAK is acknowledged.

References

- Alphan, H., Tuluhan Y. K., and Oğuz, H. (2014). “Mersin-Erdemli İlçesi Kıyı Peyzajındaki Gelişimin İzlenmesi: Mevcut Yapılaşma Eğilimleri ve Gelecek Kestirimleri.” TÜBİTAK 111Y253 No’lu Proje Final Raporu, Tübitak.
- Alpaslan, Ö., A., and Ortaçesme, V. (2009). “An Evaluation of Side - Manavgat Coastal Land Uses with respect to Coastal Planning and Management.” *Akdeniz Üniversitesi Ziraat Fakültesi Dergisi* 22(2) 169–178.