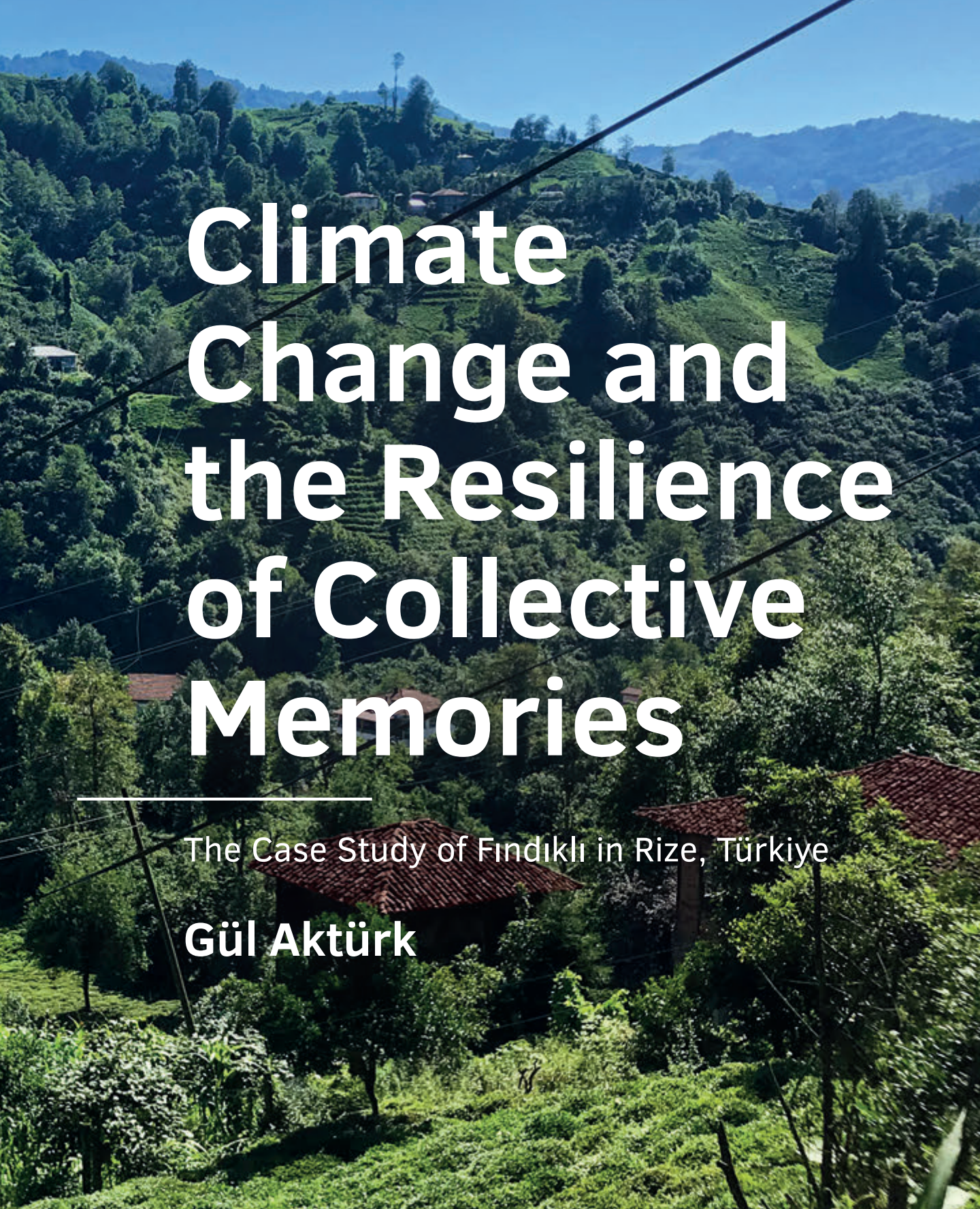

Climate Change and the Resilience of Collective Memories

The Case Study of Fındıklı in Rize, Türkiye

Gül Aktürk

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Climate Change and the Resilience of Collective Memories

The Case Study of Fındıklı in Rize, Türkiye

Dissertation

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by

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Preface

Since my graduation with a master's in Architectural conservation in 2013, I have been working as an architect and restoration specialist in Istanbul, Turkey. Over the period of 5 years, I learnt a lot in practice in heritage preservation, including monuments, archaeological objects, and remnants. I was in contact with academicians in Istanbul in search of a Ph.D. program with my interest in safeguarding cultural heritage. The Turkish architect and heritage expert, former Prof. Zeynep Ahunbay, advised me to focus on the least investigated areas of Turkey, outside of the metropolitan cities, e.g. Istanbul, Ankara, and İzmir, which were exploited in many studies. Although it would be easier for me to access the materials and sources in my town in Istanbul, I wanted to challenge myself by selecting a case area from Anatolian cities. This would not only be more valuable and needed but also bring the attention of stakeholders and scholars to remote areas with more challenges of preservation of cultural heritage.

The studies in cultural heritage globally deviated toward disaster risk management and adaptation of cultural heritage to climate change. In the summer of 2018, there was news of flooding in the Eastern Black Sea region in Turkey. I developed an interest in the impacts of flooding and landslides on cultural heritage sites in the region. Although at the beginning of my research I had picked three case studies in Trabzon, Rize, and Artvin, I limited the case study to the city of Rize. Covering a single detailed case study is preferable rather than multiple-case studies in the qualitative and grounded/engaged nature of the work and can dig deeper.[1] Despite its richness in natural and cultural heritage sites, the vernacular heritage in the city of Rize is today exposed to climatic and anthropic pressures. The district of Fındıklı in Rize has been an interesting case as the vernacular heritage sites are rather "untouched" and survived until today despite various pressures.

With my cultural and ethnic background from Bayburt, in the Eastern Black Sea region, I interacted with the local communities, administrators, and scholars with whom I remain in contact. Thanks to this close relationship, I could establish a link at the intersection of cultural heritage and climate change. I had a meeting with

1 D. Gaya, "Developing a Qualitative Single Case Study in the Strategic Management Realm: An Appropriate Research Design?" (2016).

the aforementioned Turkish architects who specialized in Turkish architecture and architectural history, Prof. Mustafa Reşat Sümerkan and Orhan Ozguner, who also supported me in further investigating this topic. I chose the selected case area to study in this topic, as literature, authorities, and citizens pay little attention to the cultural heritage under climate threat in Turkey. I gathered the data with the support of many individuals and their compliance with this research. Many discussions during seminars and conferences with many scholars and colleagues opened several opportunities for me to put this into the context of Turkey.

Starting my research, I thought that this topic would be too limited and in time, I realized the challenges brought by this cross-sectoral and multidisciplinary work, which required much expertise such as historians, heritage conservers, architects, urban planners, and environmental scientists. This doctoral thesis comprises several components that concern every field. This study is about understanding the critical considerations given to the management of cultural heritage at different scales under the threat of climate change. My interest lies in vernacular rural settlements which are more vulnerable as there are fewer economic investments. I appreciate the spontaneous building genius behind the vernacular settlements not only because of their climate resilience but also because of their witnesses to past climate events. Vernacular heritage encompassing local practice and knowledge can help us to learn from the past and develop more compatible adaptation and mitigation strategies for the future. Thus, I gave importance to the climate narratives of these buildings in the past and their response to changing climate today. By doing so, it was possible to shed light on some of the issues associated with climate change and their impacts on cultural heritage in the future.

Acknowledgements

I would like to pay my sincere gratitude to the people who gave me the strength, support, and encouragement for me to complete my research. Foremost, I would like to express special thanks to my supervisors Prof. Carola Hein, and Dr. Herman van Bergeijk for their spot-on advice, challenging questions, and insightful comments. Prof. Carola Hein, whom I admire and respect in many ways, has become more than a mentor during my Ph.D. Aside from being a critical reader, her suggestions not only shaped the way I write and think but also guided me in my professional life. And Dr. Herman van Bergeijk is the reason why I finished my research within 4 years of time. My love and hate relationship with him kept me sane throughout my Ph.D. He also pushed me to think strategically, creatively, and critically. Thanks to him, I built more confidence, finding my own voice in presentations and writings when I doubted myself and my research. He above all supported me in every step by encouraging me not to lose my hope and faith in this journey. His contributions are not only limited to this book but also to my personal development as a researcher.

I would like to extend my gratitude to M.Reşat Sümerkan and Hamiyet Özen who gave me the initial guide to shape my selection of case study area and the villagers of Fındıklı who cooperated with me during my research and helped me with data collection. I would like to express my greatest gratitude to Sandra Fatoric, Hannah Fluck, Meredith Wiggins, and Hana Morel who supported and cheered me during this time by giving me external feedback. My thanks and appreciations also go to all of my colleagues and friends at TU Delft, Cor Wagenaar, Charlotte van Wijk, Rachel Lee, Burcu Köken, Gökçe Önal, Dirim Dinçer, Penglin Zhu, Elmira Jafari, Sandra Fatoric, Jungmin Yoo, Ying Ying Gan, Fatma Tanis, Maria Novas Ferradas, Kaiyi Zhu, John Hanna, Gabriel Schwake, Phoebus Panigyrakis, Rose Sarkhosh, Li Lu, Grazia Tona, Wenwen Sun, Anteneh Tesfaye Tola, Brook Teklehaimanot, Siton Luo, Federica Marulo, and those whose names I forgot to mention, for their friendship and time during coffee breaks. Moreover, I wish to thank my Dutch language coach and friend Floor Sizoo for her help and support in her friendly guidance throughout my studies. I would also like to thank Amber Leeuwenburgh, Salma Ibrahim, Monica Boen, Nathalie Kooijmans, Andrea Degenhardt and the other members of the secretary in the department not only for their administrative work and assistance but also for their friendship during my PhD studies.

Special thanks are dedicated to my parents: my mother Şennur and my father Hükmü Aktürk, who valued education more than anything, supported my decision to re-start at 30 by leaving my business career behind. My parents continued to support me in every way possible, even though they received criticism for letting me go off pursuing my dream. Not every family would be behind the decisions of their adult children who take such a radical decision. For this, I am forever grateful to my parents. Having their emotional support, they also accompanied me in my case study visits and helped me to collect data. I am especially grateful for my dearest brother, Volkan, who kept looking out for me all these years by visiting me several times despite the distance. And for my little brother, Barış, who backed me up on my decisions when I need and I hope I can be much more support for him than he is to me.

Lastly, I would like to take this opportunity to thank my husband, Stephan J. Hauser, who went through a similar Ph.D. journey with me. His understanding of the longevity of this journey helped me to “practice patience” throughout it. His love, care, and faith in me gave me the strength to endure the most difficult times. I felt really lucky to meet him in my working environment and to get to know him first as a colleague and as a friend, for him to later become my husband.

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List of Abbreviations

AFAD	Afet ve Acil Durum Yönetimi Başkanlığı [Ministry of Interior Disaster and Emergency Management Presidency]
DOKAP	Doğu Karadeniz Projesi Bölge Kalkınma İdaresi Başkanlığı [Eastern Black Sea Project Regional Development Administration]
DRM	Disaster Risk Management
DRR	Disaster Risk Reduction
DSI	Devlet Sular İdaresi [General Directorate of Hydraulics Works]
EU	European Union
GIS	Geographic Information System
HGM	Harita Genel Mudurlugu [General Directorate of Mapping]
ICOMOS	International Council on Monuments and Sites
IPCC	Intergovernmental Panel on Climate Change
KUDEB	Koruma Uygulama ve Denetim Büroları [Conservation Implementation and Supervision Bureau]
NGO	Non-governmental organizations
NPS	Natural Park Service
RCC	Koruma Bölge Kurulu [Regional Conservation Council]
TKGM	Tapu ve Kadastro Genel Müdürlüğü [General Directorate of Land Registry and Cadastre]
UCLG	United Cities and Local Governments
UNDP	United Nations Development Programme
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
WMF	World Monuments Fund
WMO	World Meteorological Organization

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Summary

This dissertation seeks to understand the climatic conditions in the past as a shaping factor of vernacular landscapes and then analyzes the impacts of climate change today on vernacular architecture conceptualized as a form of cultural heritage. These vernacular heritage sites present how local people without expertise have shaped the traditional vernacular landscapes by constructing buildings, bridges, mills, and roads in line with the climatic conditions of the time. However, the specific climate and place that shaped the construction of these vernacular buildings are today changing. Although some local communities adapted their traditional buildings to these changes to meet changing demands of local people, climate change created new challenges by causing a loss of resilience in some other sites. Climate stories of vernacular architecture will shed light on the loss of knowledge in the area, which led to the destruction of historic buildings and settlements. Under the pressure of changing climate, vernacular heritage shows an example of climate resilience, which constantly regrows, reshapes, and readapts. This continuous transformation of the built and natural environment with culture, identities, and attitudes reveals how communities perceive climate change and how different groups and individuals acted in the past to overcome the issues.

Past climate knowledge of local communities is embedded in vernacular heritage, but it has nevertheless largely been overlooked or forgotten by the next generations. The homeowners consider these buildings pre-dated and find it difficult to update them to the requirements of modern lifestyles. The climate adaptation of these buildings can advocate building climate-resilient settlements and cities for our future not only in practice but also in policy. Looking at successful and unsuccessful adaptation practices of vernacular settlements in rural settings can conclude how climate adaptation of vernacular heritage can contribute to building climate-resilient cities.

The selected case study of Fındıklı in Rize which is located in the Eastern Black Sea region of Turkey illustrates the relation between past local knowledge of vernacular architecture and changing environmental conditions. And the best way to understand this interlinkage is through the analysis of vernacular landscapes in relation to the climatic conditions that shaped them. This dissertation first identifies the historic link between climate and vernacular buildings and lifestyles. It then focuses on the challenges of climate change as a threat to vernacular landscapes through the lens of spatial planning decisions and local actions. In addition, it identifies the local

challenges of preserving these vernacular buildings. Finally, it reveals how climate knowledge of vernacular architecture can inspire solutions to cope with future climate change.

This dissertation builds on a diverse methodological approach to address the complex relation of climate as shaping and changing factor of vernacular heritage. The historical relation between lifestyles, knowledge of people, historic buildings, and local climate is explored through the analysis of local, regional, and national archival sources, including books, images, newspapers from the case study area, and unstructured interviews with different stakeholders including homeowners, farmers, and constructors in the selected case area. It then identifies the vulnerabilities of the rural areas under the present challenges of climate change through the GIS mapping of floods, landslides, and heritage sites at a spatial scale. A mixed method of qualitative and quantitative approaches is used to highlight the issues of changing climate exacerbated by spatial planning decisions and local practices at the city, landscape, and building scales. Implications of these findings can inform policy actors and decision-makers to develop actions and policies to tackle the effects of climate change in the cities based on the lessons learnt from vernacular heritage through the analysis of spatial planning decisions and local actions. The results from the case study demonstrated that river and forest management and the vernacular knowledge relating to it can have a great impact on building climate resiliency in the cities. Other cities in global context can adopt the nature- based solutions such as giving back the space for forests and rivers by reconsidering the past practices.and weakened relationship of land, water and settlements.

KEYWORDS Vernacular heritage, climate resilience, river flooding, landslides, disaster risk management

Samenvatting

Dit proefschrift tracht de klimatologische omstandigheden in het verleden te begrijpen als een vormgevende factor van lokale landschappen en analyseert vervolgens de effecten van klimaatverandering vandaag op de lokale architectuur die wordt geconceptualiseerd als een vorm van cultureel erfgoed. Deze lokale erfgoedsites laten zien hoe lokale mensen zonder expertise de traditionele lokale landschappen hebben gevormd door gebouwen, bruggen, molens en wegen te bouwen in overeenstemming met de klimatologische omstandigheden van die tijd. Het specifieke klimaat en de specifieke plaats die de constructie van deze lokale gebouwen hebben gevormd, zijn tegenwoordig echter aan het veranderen. Hoewel sommige lokale gemeenschappen hun traditionele gebouwen aan deze veranderingen aanpasten om aan de veranderende eisen van de lokale bevolking te voldoen, creëerde klimaatverandering nieuwe uitdagingen door op sommige andere locaties een verlies aan veerkracht te veroorzaken. Klimaatverhalen van lokale architectuur zullen licht werpen op het verlies van kennis in het gebied, dat leidde tot de vernietiging van historische gebouwen en nederzettingen. Onder druk van het veranderende klimaat toont het lokale erfgoed een voorbeeld van klimaatbestendigheid, die voortdurend opnieuw groeit, hervormt en zich opnieuw aanpast. Deze voortdurende transformatie van de gebouwde en natuurlijke omgeving met cultuur, identiteiten en attitudes onthult hoe gemeenschappen klimaatverandering waarnemen en hoe verschillende groepen en individuen in het verleden hebben gehandeld om de problemen te overwinnen.

Klimaatkennis van lokale gemeenschappen uit het verleden is ingebed in het erfgoed in de volkstaal, maar is desalniettemin grotendeels over het hoofd gezien of vergeten door de volgende generaties. De huiseigenaren beschouwen deze gebouwen als verouderd en vinden het moeilijk om ze aan te passen aan de eisen van de moderne levensstijl. De klimaatadaptatie van deze gebouwen kan niet alleen in de praktijk maar ook in het beleid pleiten voor het bouwen van klimaatbestendige nederzettingen en steden voor onze toekomst. Als we kijken naar succesvolle en onsuccesvolle adaptatiepraktijken van lokale nederzettingen in landelijke omgevingen, kunnen we concluderen hoe klimaatadaptatie van lokaal erfgoed kan bijdragen aan het bouwen van klimaatbestendige steden.

De geselecteerde case study van Fındıklı in Rize, gelegen in de oostelijke Zwarte Zee-regio van Turkije, illustreert de relatie tussen lokale kennis van lokale architectuur uit het verleden en veranderende omgevingsomstandigheden. En de beste manier

om deze onderlinge samenhang te begrijpen, is door de lokale landschappen te analyseren in relatie tot de klimatologische omstandigheden die ze hebben gevormd. Dit proefschrift identificeert eerst de historische link tussen klimaat en lokale gebouwen en levensstijlen. Het richt zich vervolgens op de uitdagingen van klimaatverandering als een bedreiging voor lokale landschappen door de lens van ruimtelijke planningsbeslissingen en lokale acties. Bovendien identificeert het de lokale uitdagingen om deze lokale gebouwen te behouden. Ten slotte laat het zien hoe klimaatkennis van lokale architectuur oplossingen kan inspireren om toekomstige klimaatverandering het hoofd te bieden.

Dit proefschrift bouwt voort op een diverse methodologische benadering om de complexe relatie tussen klimaat als vormende en veranderende factor van volkstaal erfgoed aan te pakken. De historische relatie tussen levensstijlen, kennis van mensen, historische gebouwen en het lokale klimaat wordt onderzocht door analyse van lokale, regionale en nationale archiefbronnen, waaronder boeken, afbeeldingen, kranten uit het case study-gebied en ongestructureerde interviews met verschillende belanghebbenden, waaronder huiseigenaren, boeren en aannemers in het geselecteerde gebied. Vervolgens identificeert het de kwetsbaarheden van de landelijke gebieden onder de huidige uitdagingen van klimaatverandering door middel van GIS-kartering van overstromingen, aardverschuivingen en erfgoedlocaties op ruimtelijke schaal. Een gemengde methode van kwalitatieve en kwantitatieve benaderingen wordt gebruikt om de problemen van het veranderende klimaat te benadrukken die worden verergerd door ruimtelijke planningsbeslissingen en lokale praktijken op de schaal van de stad, het landschap en de gebouwen. De implicaties van deze bevindingen kunnen beleidsactoren en besluitvormers informeren om acties en beleid te ontwikkelen om de effecten van klimaatverandering in de steden aan te pakken op basis van de lessen die zijn getrokken uit lokaal erfgoed door de analyse van ruimtelijke ordeningsbeslissingen en lokale acties. De resultaten van de casestudy toonden aan dat rivier- en bosbeheer en de lokale kennis hierover een grote impact kunnen hebben op het opbouwen van klimaatbestendigheid in de steden. Andere steden in mondiale context kunnen de op de natuur gebaseerde oplossingen overnemen, zoals het teruggeven van de ruimte voor bossen en rivieren door de praktijken uit het verleden te heroverwegen en de verzwakte relatie tussen land, water en nederzettingen.

TREFWOORDEN Lokaal erfgoed, klimaatbestendigheid, rivieroverstromingen, aardverschuivingen, rampenrisicobeheer

1 Introduction

Vernacular architecture is built by local artisans, constructors, masons, and laypeople in the pre-industrial period as a response to the needs of individuals and communities in line with the local conditions of climate, topography, geography, economy, and culture of a particular region.[1] It represents the local context in which it is crafted and evolves throughout time in order to reflect the changing environment, lifestyles, needs, and values of local people. In Turkey, vernacular building types are categorized based on their geographical location in the regions, sub-culture, environment, climate, and builders.[2] Vernacular landscapes is a landscape shaped by those everyday lives and intertwined with social or cultural activities of individuals, families, and communities.[3] Thus, vernacular architecture becomes a part of the constant evolution of vernacular landscapes. The vernacular landscapes in the Eastern Black Sea region show the everyday activities of local communities surrounding their settlements consisting of stone-infilled timber buildings next to the timber storage houses. The availability of the construction materials of chestnut timber in the nearby forests and stones in the nearby rivers helped local people to master the timber artisanship and therefore to construct vernacular buildings and structures with specific variations in their design approximately 250 years ago. The vernacular architecture of the past is today's cultural heritage as the homeowners residing in these buildings listed their settlements, including their buildings and storage houses as cultural heritage sites. Cultural heritage is a legacy from previous generations which embodies unique representations (tangible and intangible) of our identity from the past and connects us to our present and future.

The local conditions and time in which vernacular heritage sites were created have changed drastically since industrialisation, including rapid urban development, technologies, changing lifestyles, and environmental concerns, mainly climate

1 Marcel Vellinga and Lindsay Asquith, "Vernacular Architecture in the 21st Century: Theory, Education and Practice," *Vernacular Architecture in the 21st Century: Theory, Education and Practice* (2005); Paul Oliver, *Built to Meet Needs : Cultural Issues in Vernacular Architecture*, (Amsterdam: Architectural Press, 2006).

2 Erem, Ömer, and Mümüne Selen Abbasoğlu Ermiyagil. "Adapted Design Generation for Turkish Vernacular Housing Grammar." Environment and Planning B: Planning and Design 43, no. 5 (2016): 893–919. https://doi.org/10.1177/0265813515600442.

3 The Cultural Landscape Foundation, "Vernacular Landscape," https://www.tclf.org/category/landscape-category/vernacular-landscape.

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change. Changing climate —the issue of the century— is imposing risks several risks on health, economy, livelihoods, infrastructures, and settlements globally. The impacts of climate change affect all regions around the world in various ways and scales. Global consequences of climate change are global warming with rising air and sea temperatures,[4] heatwaves, and droughts which are likely to increase in terms of intensity and frequency in the case of Turkiye.[5] Hotter and drier summer causes wildfires, insect attacks, crop failures, and water stress in the country.[6] A decline in rainfall and precipitation[7] may cause water conflicts and migration of humans and animals.[8] However, 25% and 10% of the disasters over the last 25 years in Turkey comprise landslides and floods, according to the United Nations Development Program.[9] The events of flooding and landslides have so far, caused direct impacts such as loss of lives and damage to residential properties, farm fields, infrastructure, and indirect impacts including economic disruption.[10] With increasing anthropic influences and climate change, the frequency and severity of rainfalls, floods, and landslides are rising, especially in the Black Sea region,[11] where typical timber and stone-infilled timber vernacular buildings are located.

The Black Sea region due to its geographical, topographical, meteorological, and geological features,[12] is particularly vulnerable to the disaster risks of flooding and landslides and climate change has been multiplying these risks. Climate across the Black Sea region is shifting to the Mediterranean climate with rising temperature and this aggravates forest fires.[13] Conversely, the rise in temperature in the region is slightly lower, compared to the Aegean and Mediterranean regions.[14]

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4 Ömer Lütfi Şen, *A Holistic View of Climate Change and Its Impacts In Turkey*, Istanbul Policy Centre (Istanbul: Istanbul Policy Centre, 2013).

5 Cüneyt Bagdatli and Korkmaz Belliturk, "Negative Effects of Climate Change in Turkey," *Adv Plants Agric Res.* 3, no. 2 (2016).

6 Mikdat Kadıoğlu, "Küresel İklim Değişikliği Ve Türkiye," *Mühendis ve Makina* 50, no. 593 (2008).

7 Ömer Lütfi Şen et al., "Türkiye'de İklim Değişikliği Ve Olası Etkileri." (2013).

8 Kadıoğlu, "Küresel İklim Değişikliği Ve Türkiye."

9 UNDP, https://www.adaptation-undp.org/explore/western-asia/turkey.

10 Sultan Kocaman et al., "Evaluation of Floods and Landslides Triggered by a Meteorological Catastrophe (Ordu, Turkey, August 2018) Using Optical and Radar Data," *Geofluids* 2020 (2020).

11 Ibid.; G. Aktürk, & Hauser, S. J., "Detection of Disaster-Prone Vernacular Heritage Sites at District Scale: The Case of Fındıklı in Rize, Turkey," *International Journal of Disaster Risk Reduction* 58 (2021).

12 Yahya Kadioglu, Harun Reşit Bagci, and Cihat Yilmaz, "An Example of Natural Disasters in Eastern Black Sea Coastline: Flood and Landslides of Beşikdüzü on 21 September 2016," *Marmara Geographical Review*, no. 36 (2017).

13 Ömer Lütfi Şen et al., "Türkiye'de İklim Değişikliği Ve Olası Etkileri."

14 Ibid.

The Black Sea is facing a low risk of sea-level rise along with coastal erosion and increasing sea temperature may influence the local economy of fisheries and marine ecosystems.[15] In the last 30 years, snowfall has decreased to 200 mm per year in the region in the eastern part of the Black Sea mountains.[16] Snow melts earlier, and this causes the river to discharge at an earlier period.[17] There is a regional increase in flooding as the seasonality of precipitation increases,[18] which are triggering factors for landslides.[19] Landslides can be detrimental in the region considering the rugged terrains, extreme rainfalls, and soil structure.[20] The potential risk of landslides can increase due to over steep slopes, soil saturation in areas of heavy rainfall, and removal of slope vegetation.[21] Local populations have deforested parts of their surroundings to grow tea plants and this, along with heavy rainfall, led to an increase in erosion and fast surface streamflow[22] because the traditional practices are no longer working. In addition to changing climate, the factors such as changes in land use, population growth, as well as consumption habits[23] accelerate climate-induced events. The lack of proper infrastructure development, urban and rural development projects, and insufficient consideration of environmental and climatic conditions in the planning processes increased the severity of these disasters on the built environments.[24] To deal with these impacts, developing a strategy for the integration of disaster risk management and climate change adaptation in vernacular landscapes is required for building resilience.

15 Türkiye Cumhuriyeti Çevre ve Şehircilik Bakanlığı, *Türkiye'nin Yedinci Ulusal Bildirimi*, (Ankara: Ministry of Environment and Forestry, 2018), https://iklim.csb.gov.tr/ulusal-bildirimler-i-307.

16 Hasan Nüzhet Dalfes, Mehmet Karaca, and Ömer Lütfi Şen, "Türkiye İçin İklim Değişikliği Senaryoları: Ön Çalışmalar," in İklim Değişikliği ve Türkiye: Etkiler, Sektörel Analizler, Sosyo-Ekonomik Boyutlar, ed. Çağlar Güven (Ankara: UNDP Türkiye., 2007).

17 Şen, *A Holistic View of Climate Change and Its Impacts in Turkey*.

18 Ibid.

19 Sultan Kocaman et al., "Evaluation of Floods and Landslides Triggered by a Meteorological Catastrophe (Ordu, Turkey, August 2018) Using Optical and Radar Data." *Geofluids* (2020), https://doi.org/10.1155/2020/8830661.

20 Türkan Bayer Altın and Ergin Gökkaya, "Landslide-Triggering Factors in Korucak Subbasin, North Anatolian, Turkey," *Procedia Earth and Planetary Science* 15 (2015).

21 Ali Yalçın, "Environmental Impacts of Landslides: A Case Study from East Black Sea Region, Turkey," *Environmental Engineering Science* 24, no. 6 (2007).

22 Orhan Cerit Lokman Hakan Tecer, "Temperature Trends and Changes in Rize,Turkey, for the Period 1975 to 2007," *Clean* 37, no. 2 (2009).

23 Osman Ücuncu and Öner Demirel, "Precautions for the Prevention of Global Warming, Climate Change and Other Environmental Problems: The Case of Eastern Black Sea Region Cities," *GSI Journals* 1, no. 2 (2019).

24 Lokman Altun and Ismet Yener, *A General Outlook of Flood Disaster and Landslides in the Light of Ecological Factors in the Eastern Blacksea Region of Turkey* (2010).

The objective of this research is to understand the influences of spatial planning decisions and local practices on the management of vernacular heritage sites against the integrated risks of climate change and disasters. Through the analysis of literature on climate change adaptation and disaster risk management in cultural heritage sites, it aims to contribute to the literature by evaluating the vulnerabilities of vernacular landscapes to changing climate along with other challenges. This is done through a case study research, by first using the historical approach for looking into the past planning and construction decisions and practices of vernacular landscapes. It then investigates the causes of climate change from anthropic influences, including the influences of historical spatial planning decisions on vernacular landscapes along with preservation problems that homeowners encounter since industrialisation. It concludes by explaining the building resilience of vernacular heritage sites as an integral part of the landscapes for the future from the climate narratives of local people. Vernacular heritage in the hinterland is the focus of this dissertation because the impacts of climate change and vulnerabilities of rural communities are not receiving the attention of public and private institutions in addressing climate adaptation actions in the cities. Historical perspectives in understanding the evolution of vernacular heritage sites and their surrounding landscapes are essential for addressing environmental challenges (e.g. spatial planning, disaster risk management, climate adaptation). The results obtained from the analysis of these buildings and developments surrounding them not only emphasize the importance of preservation of cultural heritage for present-day challenges but also present solutions for future planning and building resilience by suggesting ways to tackle potential future risks.

1.1 Problem Statement

Many scholars like Yurt and Kulaksizoglu have studied these disasters—conceptualized as natural disasters— and prepared disaster risk maps in the Eastern Black Sea region,[25] without considering the implications of climate change on the rural areas where vernacular heritage sites are prominently located. Although climate and disaster risks have always been interacting with one another and exacerbating other risks, the integrated understanding of climate and disaster risks has been lacking in building climate resilience in the city.[26] Despite being a hazard-prone area, the region has not been studied within the scope of the integrated understanding of climate and disaster risks until very recently.[27] However, these measures are trend analyses of precipitation and rainfalls, which do not reveal the implications of these indicators in the various sectors in the region. Only governmental reports from the Minister of Environment, Urban Planning, and Climate Change reveal some implications of it in the different sectors.[28]

Much of the work by public authorities at the national level concerns future climate impacts across different sectors and regions except the cultural heritage sector.[29] One indication of this is that the national stakeholder's map in climate adaptation and planning does not involve the stakeholders in cultural heritage.[30] Despite the evidence of loss and damage to cultural heritage sites in the Eastern Black Sea region, cultural heritage is not a necessary component of the national agenda to deal with climate change risks. Yet, local communities have occupied these sites for generations. Without the identification and documentation of these vulnerable sites, the sense of history, place, and identity held in these sites will be irreversibly lost. Building resilience of vernacular heritage to climate and disaster risks in the Eastern Black Sea region in the

25 Recep Yurt, "Doğu Karadeniz Bölümü Doğal Afet Planlarının Hazırlanması," in *Tücaum Vii Coğrafya Sempozyumu* (Ankara: Ankara Universitesi Turkiye Cografyasi Arastirma ve Uygulama Merkezi, 2012); Ismail Kulaksizoglu, "Dogal Afetler Ve Dogu Karadeniz," *Türkiye Mühendislik Haberleri* 354 (1991).

26 UNDRR, *Integrating Disaster Risk Reduction and Climate Change Adaptation in the Un Sustainable Development Cooperation Framework*, 1st ed. (Geneva, Switzerland: United Nations Office for Disaster Risk Reduction 2020).

27 Osman Ücuncu and Öner Demirel, "Precautions for the Prevention of Global Warming, Climate Change and Other Environmental Problems: The Case of Eastern Black Sea Region Cities," *GSI Journals* 1, no. 2 (2019).

28 T.R. Ministry of Environment and Urbanization, "Enhancing the Capacity of Turkey to Adapt to Climate Change Participatory Vulnerability Analysis," (Ankara 2010).

29 Ceylan İrem Gençer, "Utilizing Cultural Heritage for Climate Change Adaptation Strategies," in 7th *Global Conference on Global Warming* (Izmir, Turkey 2018).

30 Ümit Şahin, "Türkiye'nin Iklim Politikalarında Aktör Haritası," İstanbul Politikaları Merkezi (2014).

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Republic of Türkiye (formerly the Republic of Turkey) requires the implementation of conceptual integration of climate change adaption and disaster risk management. Based on the long-term history of vernacular built heritage and flooding and landslides in the rural areas of Fındıklı of Rize in Türkiye, the decisions and practices at various levels highlight the complementary act of the destruction of vernacular heritage in times of climate change. Studies such as this can inform the public authorities about the urgency of the matter and emphasize the significance of political will and act on the investment in climate adaptation and disaster risk management of cultural heritage sites.

Governments work to mitigate the effects of climate change, although developing countries are slow to address these issues. The Republic of Türkiye has implemented the initial steps to meet the targets. As climate change multiplies the risks of hazards, the political discourse in Türkiye shifts towards accepting these hazards as the effects of climate change rather than as natural hazards. The Minister of the Environment, Urban Planning, and Climate Change[31], Murat Kurum, announced the Regional Climate Action Plan on 12 July 2019[32] for seven regions starting from the Black Sea region, which is further discussed in Chapter 7. While these 15 actions attracted the interest of the public to the environmental challenges, the awareness of traditional practices of the past has been only referred to in one action mentioning the importance of using local construction materials. This decisive shift in political discourse paved the way for investments in international agreements on climate action. The ratification of the Paris Agreement by Türkiye's parliament at the time of writing this thesis in 2021 is an example of this. It also marked the start of an increasing acceptance of climate change in political and academic discussions. And yet, the national government has not set the preservation of cultural and natural heritage resources as a priority in climate adaptation and action plans.

In the international arena, UNESCO and its advisory bodies of IUCN, ICOMOS, and ICCROM elaborated on the necessity of integrating cultural heritage management in climate change adaptation and disaster risk reduction with their initiatives in the last decade.[33] The global actors and institutions grew in climate adaptation and disaster risk management of cultural heritage sites with the launching of initiatives such as Climate Heritage Network

31 The title of the Ministry of the Environment and Urban Planning has changed to the Ministry of the Environment, Urban Planning, and Climate Change (decision number 31643 of 29 October 2021, "Cumhurbaskanligi Kararnamesi"). See: https://www.resmigazete.gov.tr/eskiler/2021/10/20211029-35.pdf. Accessed 28 January 2022. The decision is given after Turkey rectified the Paris climate agreement on October 6th, 2021.

32 Türkiye Cumhuriyeti Çevre ve Şehircilik Bakanlığı, "Karadeniz Bolgesi İklim Degisikligi Eylem Plani," (2019).

33 ICCROM UNESCO, ICOMOS, IUCN., Managing Disaster Risks for World Heritage, (2010).

in October 2019. In collaboration with it, several other public and private actors, as well as NGOs, joined the initiative to add climate change adaptation of heritage assets into their agenda. World Monuments Fund (WMF), a private nonprofit organization founded in 1995, has similarly in its programs such as Worlds Monument Watch included climate change-related vulnerabilities in its criteria to protect the sites under threat. Recently, the virtual International Co-sponsored Meeting on Culture, Heritage and Climate Change[34] discussed strengthening the role of culture and heritage in climate change adaptation through expert meetings. Similarly, Climate Heritage Network aimed to incorporate heritage in IPCC reports which are scientifically and methodologically rigorous. Despite the loss and damage of vernacular assets as integral parts of landscapes, vernacular heritage sites are not the key focus of heritage institutions in climate change adaptation actions and strategies. While heritage studies were found to be less methodologically sound and place-based by the IPCC scientific community[35], there is a strong motivation for the establishment of the linkages between the two.

The governance of climate change nationally requires a wholesome approach, which includes the collaboration of all sectors, especially cultural heritage agencies. Local management of cultural heritage is undermined by the public stakeholders in addressing climate change adaptation, which is dealt with on a greater scale. For instance, in 2021 the municipality of Izmir, with the help of United Cities and Local Governments (UCLG) announced the “İzmir Declaration” in an event to emphasize the important role of local stakeholders’ participation in culture and cultural heritage for sustainable development.[36] Initiatives such as this can help the mainstreaming of protection of cultural heritage against the impacts of climate change at the local level for sustainable development of cities by proving the bridging role of global city actors. One example of this is funded projects such as developing a novel “Climate change Risk Assessment Framework for cultural heritage in Turkey (CRAFT)” led by Durham University in collaboration with the Middle Eastern Technical University.[37] Through these initiatives and collaborative works with universities, there may be progress made in recognizing the necessity and urgency in climate adaptation and disaster risk management of cultural and natural heritage sites. Managing the integrated risks of climate and disasters in vernacular heritage sites by local communities with the help of public and private authorities can enhance building resilience.

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34 The meeting was held between 6 and 10 December in 2021. https://www.ipcc.ch/event/ipcc-icomos-unesco-co-sponsored-meeting-on-culture-heritage-and-climate-science/

35 Ibid.

36 İzmir Büyükşehir Belediyesi, "Kültür İnsanlığın Geleceğini Kuruyor."

37 UK Research and Innovation, “Developing a Novel Climate Change Risk Assessment Framework for Cultural Heritage in Turkey (Craft),” https://gtr.ukri.org/projects?ref=AH%2FV006320%2F1#/tabOverview.

This research, therefore, calls for attention from the national governing bodies of the Ministry of Environment, Urban Planning, and Climate Change, the Ministry of Interior Disaster and Emergency Management Presidency (AFAD), the General Directorate of Hydraulics Works (DSI), the Ministry of Culture and Tourism, and local communities and local decision-makers which are referred to throughout the dissertation. Regarding the role of water in disasters, water institutions play a significant role in flood management, mainly through top-level authorities including the central government, and its representatives in the regions and cities.[38] The Turkish State Hydraulics Works (DSI) is authorized to construct protective structures against floods, while the Ministry of Interior Disaster and Emergency Management Presidency (AFAD) plans for disaster prevention and manages disasters including floods and landslides.[39] As an environmental disaster, the impacts of climate change are also problematized in disaster risk management. The climate and disaster risk management of cultural heritage has become more challenging due to the localized effects of these hazards.

1.2 Research Objectives and Questions

Safeguarding vernacular heritage is today more challenging than ever as the interventions to natural and built environment increased to the extent that they accelerated the effects and speed of climate and disaster risks, especially on vernacular heritage sites. Environmental concerns and anthropic interventions to surrounding landscapes are causing complexities and conflicts in managing these sites. There are lessons to be learned from past local communities on how they have adapted their settlements and buildings to climate challenges, by embracing their successes and failures. By tracing back the planning decisions and actions in the past, one can understand how vernacular heritage sites have become vulnerable to the effects of climate change. Considering the rising concerns over the current climate change effects on vernacular heritage, the overarching research question of this dissertation is:

38 Ibrahim Gürer and Hamza Ozgüler, "Integrated Flood Management Case Study Turkey: Recent Flood Disasters in Northwestern Black Sea Region," in *The Associated Programme on Flood Management*, ed. Technical Support Unit (2004).

39 Ibid.

How have spatial planning decisions and local practices influenced the management of the vernacular heritage sites against combined risks of climate change and disasters in Fındıklı in Rize? And what lessons can be learned from these decisions and practices in developing more effective strategies for integrated climate disaster risk management of vernacular heritage sites in the future?

This dissertation aims to investigate the relationships between the spatial planning decisions and local practices by various stakeholders, i.e. central government versus local communities at different scales which paved the way for the increasing risks of flood and landslide disasters in the traditional vernacular landscapes of Fındıklı in Rize. Traditional vernacular landscapes of the area can represent many undesignated sites, which are located on the outskirts of Anatolian cities and are exposed to the threats of changing climate. These issues, including climate migration, crop failures, and rural tourism, on traditional vernacular landscapes, are yet to be discussed by academics in the field of climate change and heritage.

To explain the complexity of the issue, this thesis focuses on the occurrence of vernacular heritage through the lens of local climate and assesses the impacts of climate-induced and anthropic interventions on vernacular built heritage at the city, district (landscape), and building scales. It unravels what conditions forced the local people to build innovatively from the user's perspective and whether their knowledge responds to the present conditions of changing climate. The message taken away from these decisions and practices is that the local communities used to have the self-autonomy in sheltering themselves and using the sources available in their surroundings but as these lands became economically more valuable for development, both local communities and stakeholders in urban development exploit the resources used in the construction of these settlements. These factors in combination with changing climatic conditions increased the rapid deterioration of vernacular settlements, which require intervention for building climate resilience.

To answer the key research question, each chapter of this dissertation addresses and discusses the problems mentioned below. Based on the research objective, there are six sub-questions aligned with the chapters, excluding the introduction and the conclusion chapters.

Chapter 2: How is climate and disaster risk management of vernacular heritage considered in the existing literature? Scholars claim that vernacular heritage sites have always been climate-resilient although these sites are now exposed to the risks of climate change. The literature provides a theoretical and conceptual understanding of this new shift from climate-resilient to vulnerable vernacular heritage sites and can serve as basic knowledge for managing disasters in vernacular

heritage sites. Reviewing the works of scholars on both vernacular heritage in Türkiye, especially in the Black Sea and land use and land cover changes can provide a national and regional context for understanding the nature of this form of cultural heritage and disasters in its surrounding.

Chapter 3: What are the local characteristics (e.g. administration, history, geography, climate, topography, and socio-economic structure) of today that can help the understanding of the distinctive characteristics of the vernacular architecture in the selected case city and district? The research question of this chapter is descriptive. It gives a general overview of the characteristics of the region, city, and district in relation to the features of typical vernacular architecture.

Chapter 4: How did past climatic conditions determine the creation and shaping of vernacular heritage in the district? Vernacular heritage sites, dating back to 250 years ago, were constructed by skilled artisans according to the local conditions, including the local climatic parameters of the era and place. The historical perspective provides a critical analysis of climatic considerations in the construction and planning of these sites in the past. Studying these past decisions and practices can demonstrate what certain deliberate design and planning decisions play a significant role in building climate resilience today and in the future.

Chapter 5: To what extent have the spatial planning decisions and practices of regional and urban authorities from the past to today led to the deterioration of vernacular heritage sites? The spatial planning decisions at the district, city and regional scale reveal how urbanization, river corrections, coastal developments, deforestation, the Green Road Project, and hydropower plant construction caused deterioration in vernacular heritage sites in the rural areas since the 1950s. The irresponsible planning and environmental degradation surrounding vernacular landscapes can be traced through the historical analysis of the aerial images. By detecting the sites at risk and site-specific challenges, this chapter presents evidence of the destruction of the vernacular heritage sites derived from spatial planning decisions.

Chapter 6: How have the practices of local communities caused recurrent challenges in preserving vernacular buildings? The spatial planning decisions and practices were not the only contributing factor to the challenges in preserving vernacular heritage sites since the 1950s. Local residents and their successive generations made modifications to their buildings and their lands and the transformation of these settlements increased the vulnerabilities of the local communities. Analysing these practices of local communities from their statements can generate an understanding of their difficulties in preserving their buildings today.

Chapter 7: How do the statements, insights, and perceptions of local people on the changing climate conditions in the city and their effects on vernacular landscapes in the district shape the understanding of climate-resilient vernacular heritage sites? Local people today living in these settlements experience the effects of climate change. Their narratives reveal certain patterns in understanding climate resiliency, which can help planning for the future.

The synthesis of the main findings is discussed in Chapter 8. What are the shared interests and differences between spatial planning decisions and local practices in the climate and disaster risk management of vernacular heritage sites? And how can the evidence found from these decisions and practices be used in developing strategies for climate and disaster risk management of vernacular heritage sites? These results offer solutions and recommendations for the future of vernacular heritage sites not only in the case of Türkiye but also around the world.

This dissertation is interdisciplinary by bridging history, heritage, urban planning, landscape, and environmental studies. In response to the different scales, it places itself primarily in the fields of architectural and urban planning history. It primarily concerns heritage studies and the heritage management sector, which includes heritage scholars, architects, archaeologists, curators, civil engineers, urban planners, and other related professions and associations. The analysis of historic and present-day conditions of the case-study site can help increase awareness among various stakeholders on the challenges that vernacular landscapes are facing to prepare for the near-and far-future threat of climate change. Using a historical approach in analysing spatial planning decisions and a narrative approach in analysing local practices from the past to today present evidence of the acceleration of the effects of climate change on vernacular landscapes, which can be used in the development of the strategies.

While the emergence of vernacular heritage sites dates back to approximately 200 to 250 years ago, climate change has been a critical topic since the end of the 20th century. Therefore, this dissertation covers a period of approximately 300 years by dividing this into the periods of 1800-1923 (Ottoman Empire) to give a background of the environment in which vernacular landscapes were constructed, and 1950-2019 to refer to the destruction of vernacular landscapes with urban developments and depopulation of rural areas. Each chapter responds to the key question thematically and by respecting the chronological order and development of the events within the chapters. As climate change deals with global, national, regional, and sometimes local scales, it is difficult to estimate its impact on vernacular heritage. In this aspect, each chapter also focuses on different scales— for example, spatial planning decisions are referring to regional and city developments, while local practices are often taking place on a building scale.

The findings of this dissertation will offer integrated climate disaster risk management strategies for the vernacular built heritage in Fındıklı of Rize in Türkiye to contribute to the development of policies. The objective is to inform decision- and policymakers about the site-specific climate-induced and anthropic pressures on cultural heritage sites and incorporate and transfer this knowledge into the local and regional climate action plans. More than its theoretical and conceptual contribution, this dissertation generates information on building and planning traditions from the groundwork in the case of Fındıklı of Rize by proposing a methodology, including the analysis of interviews and historical sources. The collection of evidence from the case study on local traditional knowledge contributes to disaster risk reduction policies. Local traditional knowledge that is not yet embedded in existing policies is considered by stakeholders to be outdated. However, the inclusion and incorporation of the vernacular buildings in a local climate action plan[40] can support climate change targets, along with preserving this unique vernacular heritage.

40 Municipalities in the cities are already preparing for local climate action plan. Izmir metropolitan municipality is one of the few municipalities, which has local climate action plan for the city.

1.3 A Mixed Method Research

In this research, a mixed method is adopted by employing a qualitative method and supporting it with quantitative data.[41] This study is interdisciplinary and is then based on several methodological approaches, including the analysis of narratives and spatial mapping may offer transferable strategies for the integrated climate disaster risk management of vernacular heritage sites. It conducts a combination of inductive and deductive approaches to address the research question. Using a deductive approach may help understand the effects of spatial planning decisions on the vernacular landscapes in the selected case study area. The use of an inductive approach contributes to the understanding of the emerging issues in local practices from the interviews with stakeholders and theorizing the local management of vernacular heritage sites. The findings of interviews and spatial planning decisions through overlapping historical maps can generate evidence to come up with strategies for disaster risk management of these sites.

Studies on the impacts of climate change (Chapter 2.4.) usually focus on quantitative measures, i.e. use of GIS software, models, and statistical analysis rather than qualitative. The qualitative methods in the existing literature are focusing on the climate narratives without incorporating the spatial scale data. However, there is an urgent need for complementary methods to incorporate perceptions, insights, and attitudes towards cultural heritage and climate change.[42] Moreover, the use of mixed methods can contribute to further collaboration and cooperation between many disciplines. Therefore, this study fills the gap using a case study from a developing country with a triangulation of data and methods. The study relies primarily on interpreting qualitative methods of the review of literature, archival sources, and interviews with supporting materials from quantitative use of ArcGIS mapping and meteorological data. The results derived from these methods help generate strategies for better management of vernacular heritage sites under changing climate change by providing evidence from the examples of sites at risk.

41 Julia K. Day and David E. Gunderson, "Mixed Methods in Built Environment Research" (paper presented at the 54th ASC Annual International Conference Proceedings, Mississippi 2018).

42 Scott Allan Orr, Jenny Richards, and Sandra Fatorić, "Climate Change and Cultural Heritage: A Systematic Literature Review (2016–2020)," *The Historic Environment: Policy & Practice* 12, no. 3-4 (2021).

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1.4 Motivation for the Chosen Selected Case Area and Theme

The district of Fındıklı of Rize in Türkiye is selected as a case study area to illustrate the impacts of the disasters such as extreme rainfalls, floods, and landslides on vernacular heritage. Two main reasons behind the selection of the case study area are: (1) the province of Rize experiences frequent and severe floods and landslides[43] and (2) Fındıklı is rich in vernacular and natural heritage sites.[44] Furthermore, it illustrates the vernacular heritage as the production of past climate knowledge as well as a legacy under the risk of climate change. The villages from the major riverside areas are largely prone to heavy rainfalls, floods, and landslides, among other risk multipliers.

For the scope of this research, the vernacular architecture in Fındıklı of Rize is recognized as vernacular built heritage due to the listing of some of these buildings. Therefore, these buildings are analyzed within their historic vernacular landscapes surrounding natural and intangible heritage. The focus is given to the vernacular buildings as a form of cultural heritage with a reference to the other elements in vernacular landscapes, as further elaborated in chapter 3.3. The analysis focused on the vernacular heritage in the hinterland rather than on the coast because the majority of urban vernacular settlements were lost over the period of coastal developments (see chapter 5.3.).

The case study areas include the four villages (Çağlayan, Hara, Gürsu, and Beydere villages) and the centre of the district of Fındıklı. The first key reason behind the selection of the villages of Çağlayan, Hara, and Gürsu is that the majority of the vernacular heritage sites are located in these areas. Beydere village and the district centre as opposed to the other villages are greatly affected by the disasters in general and flooding in particular, as mentioned throughout the dissertation. Another key reason is that the snowballing method of identifying interviewees and their availability at the time of the interviews in 2019 led to the concentration on these sites. Fındıklı appears as this architecturally aesthetically pictured vernacular landscape in books published by governmental and provincial bodies and NGOs

43 Fevzi Karsli et al., "Effects of Land use Changes on Landslides in a Landslide-Prone Area (Ardesen, Rize, Ne Turkey)," *Environmental monitoring and assessment* 156, no. 1-4 (2009).

44 Rize Il Kultur Turizm, Konaklar Kenti Rize, (Kaçkar Turizm Birliği, 2014), http://www.visitrize.com/Arsiv/BasiliYayinlar/konaklar_kenti_rize.pdf.

such as DOKAP.[45] However, at the time of the visit to the case area, the reality behind these artisanal practices revealed that under the impact of the improper interventions, rural developments, and climate-induced disasters vulnerabilities of these settlements increased gradually.

In view of the projected acceleration of extreme rainfalls, river flooding, and landslides, there is a need for understanding the destruction and loss of vernacular heritage sites in Fındıklı of Rize. Moreover, the impacts of these events in the hinterland are yet to be discovered as the records of the damage are not precisely known. Therefore the study conducted in these areas will be of great importance for local administrators to take an action on the urgent need for coming up with new strategies to tackle climate change in the vernacular heritage context. This local case study and the methodological approach applied in this doctoral thesis can be exemplary for relevant future research and global cases in terms of adopting multiscalar thinking.

1.5 Data Collection and Analysis

This section explains the multiple methods that were collected and analysed in this thesis, including spatial analysis, archival data, field observation, secondary sources, unstructured interviews, and meteorological data as supporting data. Secondary data were collected and extracted from official records, previously conducted studies, book publications, journal articles, reports, and other relevant documents. Employing techniques of field observation, documentation and recording, spatial analysis, archival data, and unstructured interviews with various stakeholders gave an insight into the vernacular heritage sites in remote rural areas and recurrent hazards.

45 Fındıklı Kaymakamlığı, *Fındıklı* (Fındıklı, Rize: Fındıklı Kaymakamlığı, 2017); Rize Il Kultur Turizm, *Konaklar Kenti Rize*; DOKAP, *Karadeniz'de Zamanin Izleri* (2019).

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1.5.1 Archival Data

This dissertation proposes the use of archival sources of historical maps, images, and local newspapers on past climate-induced events such as flooding and landslides and the development projects in the city and district to identify the vulnerable sites. As the database of the public institutions often lacks systematic documentation of vernacular heritage, additional sources of information are used from personal photography archives of the local photographer Erkan Aksu, residents such as C.K. and N.B., and drawings of a former professor Mustafa Reşat Sümerkan in the department of architecture at Trabzon Technical University. Aerial images were obtained from the Rize Provincial Directorate of Environment and Urbanization and the General Directorate of Mapping (HGM Harita) with an official letter. The current maps of the selected villages were acquired from the General Directorate of Land Registry and Cadastre (TKGM) in Fındıklı District Governor. These maps and images were used to analyse the development of the district with coastal expansion, deforestation for construction, and changes in land use (later explained in Chapter 5.3).

The printed archival sources are from the national, and local institutions e.g. the public records of the Presidency of the Republic of Türkiye, the public library of Fındıklı, the provincial public library of Rize, and the library of the Ministry of Culture and Tourism, these include books, which were published by the local government. These books, such as *Rize Defteri* and *Fındıklı* include inventories as well as information on the geography, economy, and culture of the city and the district. For instance, the past records of disasters in Fındıklı of Rize were collected from the local newspaper of the *Vice* and the General Directorate of Hydraulics Works (DSI). The latter has dealt with the planning and rehabilitation of water resources. The use of library sources and records of local newspapers revealed some evidence of past events such as flooding and landslides and the damage that resulted from them.

The information on vernacular heritage sites was collected from the database of the Regional Conservation Councils (RCCs) of the Ministry of Culture and Tourism and the Conservation Implementation and Supervision Bureau, hereinafter referred to as “KUDEB”, supervision bureau in Trabzon. It is based in the city of Trabzon, which is 80 km far from the city of Rize and 142 km far from the district of Fındıklı. The control of the bureaus over the heritage sites in Fındıklı is; therefore, difficult to maintain. This public heritage agency under the jurisdiction of municipalities and provinces plays a significant role in the identification, documentation, listing, promoting, and taking necessary measures for a survey, restitution, and restoration of cultural heritage and natural heritage sites of Rize.

The Fındıklı municipality procured me with the restoration and renovation projects of the guest house by Koray Güler, whereas the drawings, such as the analytical building survey and restoration projects of some of the selected buildings were obtained from Ayben Aydogan Babuz who is an architect and the owner of the architectural office called Vaynapsa Concept. These drawings proved some examples of restoration of listed vernacular buildings. The drawings were not included in the dissertation but the conclusions drawn from them supported the argument throughout.

ArcGIS software, along with archival sources, historical records, images, and maps, can reveal disappearing heritage sites[46] and sites under threat. Historical maps contribute significantly to the identification and monitoring of changes in land use[47] and natural changes (e.g., floods and land erosion).[48] The data gathered from historical maps offer reliable sources for the disaster risk assessment of cultural heritage[49] and management of these sites.[50] Traces of past traditional landscapes can be determined through the analysis of historic maps, images, aerial photographs, cadastral, and military maps in ArcGIS although it is difficult to quantify and rectify them even with multiple control points.[51] However, the data regarding the floods, landslides, and locations of heritage sites in rural areas are usually inconsistent and vary depending on the inventories of different institutions. The aerial photographs used in a paper published on this topic by the author were obtained from the General Directorate of Mapping (HGM Harita).[52]

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46 Stephan J. Hauser, "Long Live the Heritage of Petroleum—Discoveries of Former Oil Sites in the Port City of Dunkirk," *Urban Sci.* 4, no. 22 (2020).

47 Ionut Cristi Nicu and Cristian Constantin Stoleriu, "Land Use Changes and Dynamics over the Last Century around Churches of Moldavia, Bukovina, Northern Romania – Challenges and Future Perspectives," *Habitat International* 88 (2019); Dina Statuto, Giuseppe Cillis, and Pietro Picuno, "Using Historical Maps within a Gis to Analyze Two Centuries of Rural Landscape Changes in Southern Italy," *Land* 6, no. 3 (2017).

48 Ionut Cristi Nicu, "Tracking Natural and Anthropic Risks from Historical Maps as a Tool for Cultural Heritage Assessment: A Case Study," *Environmental Earth Sciences* 76, no. 9 (2017); Gheorghe; Nicu Romanescu, Ionuţ C., "Risk Maps for Gully Erosion Processes Affecting Archaeological Sites in Moldavia, Romania," *Zeitschrift für Geomorphologie* 58, no. 4 (2014).

49 Ionut Cristi Nicu, "Cultural Heritage Assessment and Vulnerability Using Analytic Hierarchy Process and Geographic Information Systems (Valea Oii Catchment, North-Eastern Romania). An Approach to Historical Maps," *International Journal of Disaster Risk Reduction* 20 (2016).

50 Nicu and Stoleriu, "Land Use Changes and Dynamics over the Last Century around Churches of Moldavia, Bukovina, Northern Romania – Challenges and Future Perspectives."

51 Dan Liu et al., "Integration of Historical Map and Aerial Imagery to Characterize Long-Term Land use Change and Landscape Dynamics: An Object-Based Analysis Via Random Forests," *Ecological Indicators: Part 1* 95, no. Part 1 (2018).

52 General Directorate of Mapping, https://geoportal.harita.gov.tr/

The aerial photos from the district of Fındıklı in Rize were taken in 1956, 1959, 1969, 1970, 1973, 1975, 1982, 1989, and 2002 (Table 1.1). The oldest aerial photograph dating back to 1956 in the archives of the institute could not be used due to its low resolution and the scale of 1/60.000. Furthermore, many of these photos focus on the coastal area leaving the hinterland in the dark. In a similar study, these maps were slightly offset from the base map.[53] Thus, in this study, the area was analyzed separately on aerial pictures from 1969 and 2019. The aerial photograph of 1969 is used because it included the inland areas, where most of the built and natural heritage is located.

TABLE 1.1 The details of the data used in Chapter 5

Data	Year	Source
Aerial photo	1969	HGM Harita[1]
Flooding	2019	DSI
Landslides	2019	DSI
Disaster prone	2019	AFAD
Natural heritage	2019	https://karadeniz.gov.tr/harita/
Built heritage	2019	https://karadeniz.gov.tr/harita/
Imagery base map	2019	ArcGIS World Imagery

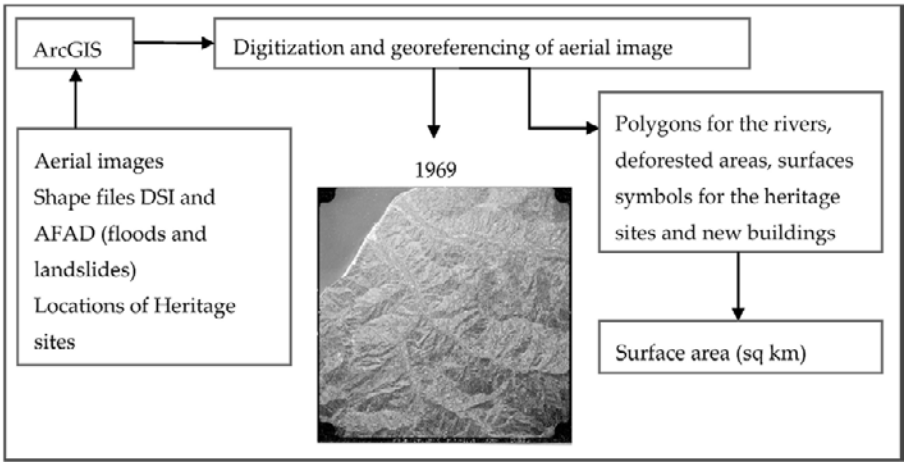

FIG. 1.1 Flow diagram of the methodology used in Chapter 5. Source: G. Aktürk, & Hauser, S. J., "Detection of Disaster-Prone Vernacular Heritage Sites at District Scale: The Case of Fındıklı in Rize, Turkey," International Journal of Disaster Risk Reduction 58, [102238] (2021).

53 Aylin Alisan-Yetkin, "Community-Based Mixed Method Research to Understand Rapidly Changing Cultural Landscapes " (Virginia Polytechnic Institute and State University, 2018).

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The aforementioned aerial photographs are not geographically coordinated. However, the orthophotos that are geo-rectified are not used for this dissertation as the oldest dates back to 1980 – the orthophotos of the area were obtained for a close-up view from the General Directorate of Hydraulic Works (DSI). These photos are monochrome, and their quality depends on the altitude, the weather, and technological conditions on that date, as well as on the photographic processing of negatives, and their scanning. For the scope of this research, the main data was obtained from several national, regional, and local institutions to crosscheck the accuracy and precision. Additionally, the aerial picture used as a reference dates back to 1969 on a scale of 1/30.000 and as such experienced some deterioration and loss of visibility. A few areas were damaged, and the quality of the contrast was definitely an obstacle to the accurate mapping of buildings and yet, it was used in the mapping due to its clear points of reference.

The shape files of flooded and eroded areas in Fındıklı in Rize come from the General Directorate of Hydraulic Works while files related to disaster-prone areas are from the Ministry of Interior Disaster and Emergency Management Presidency (AFAD). The data on landslides from DSI was combined with the data on disaster-prone areas from AFAD as the data from the two institutions overlaps in some areas. The data for this research is from both institutes although the data from the AFAD is updated documentation of the landslide areas.

In addition, the names and locations of the natural and built heritage of Fındıklı in Rize were collected from two different sources: the document of the Rize Provincial Ministry of Culture and Tourism, [54] and the Eastern Black Sea Development Agency, hereinafter referred to as “DOKAP”, the project of Black Sea Culture Inventory known as *Karadeniz Kültür Envanteri*.[55] DOKAP, as one of the several Non-governmental organizations, contributes to the safeguarding of cultural heritage not only in the region but also at a national scale, particularly in digital documentation of the cultural and natural resources inter alia the city of Rize.

The data from the DOKAP project is more recent documentation of the historic sites which includes museums, cultural, and natural heritage sites, whereas the document of the ministry only includes the historic mansions.[56] Thus, the data used in this paper primarily relies on information from the DOKAP project. The geographical locations of the sites were entered into a Microsoft Excel Sheet in the format of

54 Rize Il Kultur Turizm, *Konaklar Kenti Rize*.

55 Karadeniz Kultur Envanteri, “Dogu Karadeniz Kultur Envanteri,” https://karadeniz.gov.tr/-el-sanatlari/#nesne0.

56 Rize Il Kultur Turizm, *Konaklar Kenti Rize*.

longitude and latitude. These coordinates were in degrees decimal minutes and through google maps, and these were converted into decimal degrees. Then the Excel file was imported into ArcGIS to identify the exact location of heritage sites on the maps. Vernacular heritage is built in some cases, 300 years ago, thus appearing on both past and actual pictures.

The inventories of vernacular heritage of public heritage agencies in the area are often outdated, incomplete, and inconstant as they do not give a precise image of the existing historic sites, though they have been digitized. There are more than 150 vernacular houses scattered into, sometimes, inaccessible lands in the hinterland. Every institution has a variety of different inventories such as *Kültür Envanter Atlası*,[57] by DOKAP, or the conservation office in Trabzon. As the identified sites in the excel sheet rely on the aforementioned institution of DOKAP, it may not reflect the complete view of existing vernacular heritage in the district.

The aerial photograph of 1969 has been rotated, georectified, and adjusted to overlap with the aerial and satellite image of 2019 according to points that have not changed over the last 50 years. The border of the case area, within the district of Fındıklı, is determined according to the rotated aerial image of 1969. Thus, the Sümer river was left out on the map as it does not include cultural heritage sites according to the inventory of the Black Sea DOKAP project. The data outside of these borders was not involved in the analysis of the disaster risk map. To avoid inconsistencies, each dataset was analysed within the borders of the oldest image from 1969. Specific characteristics of the landscape were analysed from the map of 1969 such as the shape of the river, coastal line, buildings, and deforested areas of that date.

Once the old map was geo-rectified reasonably well by adding points of control about the map of 2019 in ArcGIS, polygon features were used to illustrate the elements analysed for this study (Figure 1.1.). This way, a line feature was created for the coastline, the polygon was used for rivers and deforested areas, whereas buildings were detected using symbols. While deforested areas are visible on the current map, the white patches in the forestry in 1969 were accepted as deforested sites as the black and white orthophoto of this date made it difficult to identify. The white patches are understood as deforestation in recent years where nature did not have time to re-take over. GIS database is used to collect location information of cultural properties and historically analyse the depletion of forests, modifications in rivers, and urban sprawl as accelerating factors of flooding and landslides which

57 Karadeniz Kultur Envanteri, “Dogu Karadeniz Kultur Envanteri”.

affect the vernacular built heritage. This method can be used as a base to generate risk assessment maps of cultural and natural heritage sites and illustrate the threat to vernacular heritage sites in the area and beyond the protected areas.

1.5.2 Secondary Sources

Vernacular architecture in the region is extensively studied by prominent Turkish scholars and architects such as Orhan Ozguner from the Middle Eastern Technical University, Mustafa Reşat Sümerkan and Hamiyet Ozen from the Black Sea Technical University, Cengiz Eruzun from the Mimar Sinan University, Necati Sen from the Istanbul Technical University, and art historians such as Seyfi Baskan from the Ankara Hacı Bayram Veli University and Hasim Karpuz from the Atatürk Üniversity (See Chapter 2.6.). The vernacular heritage of the area is analysed through the review of existing literature in Turkish. Furthermore, the state of the art in the field of climate change, cultural heritage, and disaster risk management is investigated. The governmental documents and reports, especially from the AFAD and DSI are obtained. Despite the clear distinction between the works of the two institutions, Rize Provincial Directorate of Environment, Urbanization, and Climate Change has become the most influential actor in the governance of climate change at the city and local scale. Thus, their documents and action plans are used in the interpretation of the findings. The popular magazine articles, documentaries, and dissertations were also helpful in understanding the intersection of this topic.

1.5.3 Field Observation

The five case study areas for detailed study are Fındıklı centre, Beydere, Çağlayan, Hara, and Gürsu villages in the district of Fındıklı in Rize, Türkiye. These sites were purposely selected due to the locations of the vernacular heritage sites and the occurrence of the disasters. While the villages of Çağlayan and Hara exemplify the remaining vernacular heritage, the case of Beydere shows the current disaster management practices, more specifically recovery from the often occurring river flooding and landslides. The case of Çağlayan; though it was not yet a disaster risk area like Beydere during the first half of the case study trip, became one of the risky areas in the second case study trip. In this way, these five cases give a picture of past and current disaster management from a holistic and dynamic perspective. It also shows the utilization of local knowledge, skills, and resources to overcome the issues and authorities' decisions at a local, city, and regional scale that accelerated the issues.

A first week-long survey was conducted on-site in January 2019. A second site visit was carried out for two weeks in July 2019. Because of COVID-19 pandemic and its restrictions on travels, it was not possible to investigate the case study area any further. However, more data was gathered after the case study visits thanks to the contacts which were made during these visits. In both case study trips, the local people were approached individually and visited in their houses, and walks were made on/to the sites with their guidance. This allowed a more casual setting to discuss the challenges relating to the vernacular buildings. A detailed analysis of the local conditions is done by the author by taking photographs, and notes, and spending time in these houses.

1.5.4 Interviews

The study is mainly based on a qualitative analysis of interviews with a broad spectrum of local stakeholders such as local administrators, constructors, craftspeople, farmers, and mainly the homeowners in the region for exploring the climate-induced impacts on the historic buildings (Table 1.2). The interviewees were informed about the study and agreed to be interviewed. Human Research Ethics Committee at TU Delft approved the application in the condition of using initials. The interviewees were asked about local livelihoods, major climatic hazards, coping strategies, and how the residents of historic buildings respond to the current changes.

TABLE 1.2 The list of the general characteristics of the interviewees with the dates of the interviews

Interviewee	Gender	Profession	Villages	No. of Interviews	Date
C.K.	Male	Retired/primary school teacher	Hara	3	03.07.19
F.H.	Female	Retired	Çağlayan	1	12.01.19
G.A.	Female	Retired	Hara	1	03.07.19
H.Ş.	Male	Retired/ primary school teacher	Çağlayan	1	30.06.19
M.A.	Male	Retired/ post officer	Çağlayan	1	12.01.19
Ş.S.	Male	Stone mason	Fındıklı centre	1	14.01.19
S.T.	Female	Housewife	Gürsu	1	02.07.19
Ş.Ö.	Male	Land registry	Çağlayan	1	06.07.19
S.Ş.	Female	Retired	Çağlayan	1	11.01.19
Y.G.	Male	Retired	Çağlayan	1	05.07.19
Y.Y.	Male	Teacher	Fındıklı centre	1	11.01.19
A.S.	Male	Stone mason	Beydere	1	11.01.19
B.U.	Female	Retired/primary school teacher	Çağlayan	1	10.01.19
Y.H.	Male	Retired	Gürsu	1	02.07.19

The central data encompasses 16 unstructured, face-to-face interviews with 14 participants from four villages and the center of Fındıklı by using a respondent-driven method of 'snowball sampling'. The verbal consent of the local people was taken before the interviews were recorded. The participants are five women and nine men whose ages ranged from 40 to 84 years. There are eight retirees, and one-third of the participants used to be teachers. Among the participants, the mansion owners are geographically more mobile whereas the craftspeople reside in the area. Stonemasons A.S. and Ş.S., for instance, have a father-son and master-apprentice relationship. These two craftspeople were born and raised in the area. The farmer, on the other hand, migrated to a western city for work and returned to his village for the duration of his retirement.

Aside from 14 interviewees, there were a scholar, a local truck driver, and a local administrator, who were not initially considered for the interviews, and participated in the conversations during the case study visit. These people volunteered to give some information without necessarily being acknowledged in the record of the interviews. Thus, they are anonymised and are not officially considered in the list of interviewees. However, their statements sometimes gave insightful information, which is why they are sometimes referred to (see Chapter 4).

First, the interviewees were informed of the scope of the research and its objective. With their approval, the interviews were video, or sound recorded. The statements were then transcribed into text. Lastly, the text is translated by the author from Turkish to English, keeping the meaning of local terms for the wood carving. The longest interview was one hour long while the shortest interview was thirty minutes. The collection of narratives highlights the technical knowledge of the laypeople and the relation between master and apprentice in the transmission of expertise. Overall, the customary knowledge from the past to the present illustrates how rural dwellers adopted the necessary skills in the formation of tangible heritage.

With respect to the verbal testimonies of local people with local terms and different educational backgrounds, conversational narratives were used rather than the widely used semi-structured interview system. This interactive process between the interviewer and interviewee[58] captured a natural flow of dialogue. During these site visits, on-site observations included some of the personal thoughts about the cultural heritage under threat. Since the interviews were held in a more informal setting, there was more information provided by the interviewees, on the history of

58 Ronald J. Grele, "History and the Languages of History in the Oral History Interview: Who Answers Whose Questions and Why," in *Interactive Oral History Interviewing*, ed. Eva M. McMahan and Kim Lacy Rogers. Hillsdale (Hillsdale, NJ: Lawrence Erlbaum, 1994).

Fındıklı, agricultural activities, and nearby cities outside the focus of this research within the time spent there.

The unstructured interviews are exploratory in nature but allows flexibility for follow up questions.[59] Although there were no fixed number and order of questions, the conversations were centred around certain themes,[60] which were later analyzed based on their content.[61] The interview questions covered seven different main themes (Table 1.3): (1) local climate, (2) vernacular heritage,[62] (3) observed impacts of climate change, (4) impacts of anthropic pressures, (5) impacts of disasters, (6) issues of preservation, (7) climate-resilient cultural heritage. These themes were divided into 29 sub-themes. Each of the seven themes is discussed within the relevant sections of the chapters. The results of the content analysis are presented throughout the chapters e.g. for local climate and vernacular heritage see Chapter 4, for issues of preservation, see Chapter 6, for observed impacts of climate change, human intervention, disasters, and resilience of vernacular heritage see Chapter 7.

The interviews that were held helped us understand the evolution of the vernacular built heritage in the hinterland, as the images, maps, and documents are rarely recorded in archival sources. These interviews capture the oral history of cultural heritage and recent climate change-related events in the area. Oral history was developed with follow-up questions on their memories regarding the historical events that they have witnessed such as flooding, the way they have handled damages, and construction of the vernacular buildings. The interviews with local residents reveal their personal experiences, memories of changing climate, and recollections of disaster and damage. These memories were sometimes stimulated with bringing out images and/or objects. Some of their encounters revealed family histories in addition to the construction of vernacular buildings. These oral histories on family histories and generational skills of artisanship were recognized as part of the themes. The numbers (n) refer to the number of people who mentioned these themes, which emerged from the inductive analysis.

59 Yan Zhang and Barbara M. Wildemuth, "Unstructured interviews.," in Applications of Social Research Methods to Questions in Information and Library Science, ed. B. Wildemuth (Westport, CT: Libraries Unlimited, 2009).

60 Pauline Prevett et al., "Integrating thematic analysis with cluster analysis of unstructured interview datasets: an evaluative case study of an inquiry into values and approaches to learning mathematics," International Journal of Research and Method in Education (2020), https://doi.org/10.1080/1743727X.2020.1785416.

61 Udayangani Kulatunga, Dilanthi Amaratunga, and Richard Haigh, "Structuring the unstructured data: the use of content analysis," *7th International Postgraduate Conference in the Built and Human Environment*, Salford Quays, UK, 28-29th March 2007, Unpublished.

62 Gül Aktürk, "Remembering Traditional Craftsmanship: Conserving a Heritage of Woodworking in Rize, Turkey," *International Journal of Intangible Heritage* 15 (2020).

These experiences may vary from one village to another within the district of Fındıklı and the city of Rize. Considering the perspectives of the dwellers of historic buildings, the impact of climate change can be perceived differently from a traditional settlement to more urbanized city centres. In this case, the nature of the research focuses on the cultural traditional landscapes and includes the views of historic mansion owners as primary users of the cultural heritage.

TABLE 1.3 The hierarchy of codes and sub-codes is used in the content analysis.

No.	Codes	Sub-codes
1	Vernacular Heritage	VH: Buildings
		VH: Storage houses
		VH: Building age
		VH: Landowner
		VH: Masters
		VH: Households
		VH: Construction materials
		VH: Construction techniques
		VH: Building significance
		VH: Listed buildings
		VH: Restrictions
		VH: Renovations
2	Local Climate	LC: Past climate
		LC: Past settlements
3	Observed Impacts of Climate Change	CC: Time
		CC: Rainwater
		CC: Flooding
		CC: Landslides
		CC: On agriculture
		CC: On vernacular built heritage
		CC: Institutions
		CC: Deforestation
4	Impacts of Human Interventions	HI: New buildings
5	Impacts of Disasters	ND: Rock falls
6	Issues of Preservation	IP: Abandonment
		IP: Maintenance cost
		IP: Many heirs
		IP: Funding
7	The resilience of Vernacular Heritage	RV: Climate Resilience

1.5.5 Meteorological Data

Statistical investigation of meteorological data provided by the provincial directorate of meteorological service in Trabzon reveals historical daily, monthly, and annually climate parameters of the selected case area. Statistical analysis is only used to convert daily and monthly variables into annual data. This analysis gives a picture of the local climatic conditions from past to present to better understand the disasters in the area.[63] Supporting sources for the research encompass meteorological evidence from the provincial directorate of meteorological service in Trabzon. The meteorological service provided meteorological data from 1980 to 2018 i.e. monthly maximum wind direction and speed (m/sec), maximum, minimum, and average temperatures (°C), average actual pressure (hPa), relative humidity (%), total rainfall (mm=kg÷m²). The meteorological station in Fındıklı was established five years ago which explains why the readings from the station in Rize city centre will be used as a priority to evaluate the past and present weather conditions in the area.

Subsequently, another set of data was collected from the provincial directorate of meteorological service in Trabzon on the 5th of November 2019. This data is more precise and detailed in comparison to the previous one. It comprises data from station number 17040 in the centre of Rize with coordinates of 41.0400 and 40.5013, and at an altitude of 3 meters. The daily data from 1968 to 2019 includes the duration of solar radiation (hours), maximum, average wind direction and speed (m/sec), the maximum duration of the wind (coordinated universal time), maximum, minimum, and average temperatures (°C), the snow cover (cm), relative humidity (%), total rainfall (mm=kg÷m²), total and average solar radiation (kW hour/m²). The data for the last 35 days from 2019 was not recorded by the meteorological service at the time of data collection. The given coordinated universal time is converted to Türkiye's real-time system by adding two hours for wintertime, and three hours for summertime, and in 2016 and afterwards, three hours were added to the data. Meteorological data collected from local stations was supported by technical reports from the hydraulic works and interviews with stakeholders using the software of Atlas. ti.

63 Kadioglu, Bagci, and Yilmaz, "An Example of Natural Disasters in Eastern Black Sea Coastline: Flood and Landslides of Beşikdüzü on 21 September 2016."

1.5.6 Limitations, site-specific challenges, and methodological considerations

The limitations of this study consist of methodological and site-specific challenges. The case study is considered to have some bias and deficiencies in terms of interpreting the data by a single researcher.[64] The local archives of public and private institutions are quite incomplete and restricted. Unlike that of the city of Trabzon, the vernacular architecture of Fındıklı of Rize is not very well documented. In addition, the meteorological data in this local area is very recent. Thus, the detection and investigation of the sites under changing climate has been mainly analysed through the interviews made. The interviews do not always mention the impacts of changing climate as not all local people refer to them. The interviews mainly indicate the characteristics of vernacular heritage and the challenges of preserving it while occasionally signalling the damage brought about by changing climate.

Another limitation is the geographical location of the selected site. The fact that it is located on the steep terrains in the hinterland made it difficult to reach some of the buildings. Interviews were held in a geographically distant area such as Fındıklı. Thus, local people agreed to interview in a conversational and friendly setting, accompanied by the tradition of serving tea. This allowed the creation of mutual trust with some of the building owners who initially refused interviews. In some cases, homeowners abandoned their buildings. In the absence of the building owners, the farmers did not feel adequate in answering questions.

1.6 Scientific and Societal Relevance

This research reflects many complex issues around climate change and its impact on cultural heritage across different scales. As the climate crisis is already showing its effect on cities, little is known about the implications of climate change on cultural heritage preservation in rural areas. The amount of research undertaken, and literature written on the selected city is strictly framed in vernacular heritage in the field of architecture, whereas in environmental sciences the studies focus on disasters. However, the effects of climate change on the vernacular landscapes are undermined not only in the city of Rize but also in the national context.

64 Zaidah Zainal, "Case Study as a Research Method," *Jurnal Kemanusiaan* 9 (2007).

The debate on the topic of climate change and cultural heritage often focuses on the major European cities which extended to developing countries recently. In Türkiye, climate change and cultural heritage have been often regarded by scholars as two separate topics. This research aims to contribute to the academic discussions about disaster risk management on vernacular heritage and covers the impacts of climate change as a risk multiplier on all. In this regard, it does not necessarily have a full focus on climate change's effects on vernacular heritage. This research covers the climate change impact as an additional factor to the existing issues of preserving vernacular heritage. Through analyzing the users' experiences and the local administrators' perspectives and mapping the vulnerable heritage sites, this research hopes to fill this gap in the academic discourse by raising awareness of the need for further research in the field.

This research considers the organizations and institutions behind decision-making processes to offer an integrated across-scales governance solution. Therefore, it brings several different actors and stakeholders together to get their reflections and perceptions on the barriers, needs, and gaps in the management of cultural heritage sites under the risk of disasters. It brings a greater clarification of the relevant heritage stakeholders that need to be included in the decision-making process to anticipate the effects of climate change. Homeowners deal alone with the loss of and damage to their private properties. This study will not only benefit the house owners but also the national government, regional and local public agents i.e. the Ministry of Culture and Tourism, Ministry of Environment and Urban Planning, Directorate of State Hydraulic Works, Council for the Protection of Cultural Heritage (as explained in Chapter 1.1.). The national, regional, and local stakeholders, the authorities, and experts can benefit from the findings of the study. It therefore defines and positions the role of cultural heritage in overcoming the issues of climate change. The contributions of this study lie in the methodological arena. The methodological approaches of learning from members of custodial and stakeholder communities and mapping of vernacular landscapes are very valuable and lays some groundwork for similar studies It can bridge the scale gap in climate and disaster risk management strategies of the local areas by creating a database with similar methodological approaches in the city and regional scales or even in the different geographical locations in the world that face similar issues. The database can have an impact on the development of policies and strategies for climate adaptation of cultural heritage sites.

1.7 Chapters Overview

This thesis overviews the evolution of vernacular heritage from their existence in the 1800s (see Chapters 3 and 4) to their destruction by both human hands (see Chapters 5 and 6) and by changing climate (see Chapter 7) by following a chronological order. These chapters are divided into different timelines as climate change is a topic of debate since the 1970s, while vernacular heritage dates back to the early 1800s. As it covers a large period, major milestones were taken as a reference to divide them. Moreover, these chapters zoom in and out depending on the theme. Each chapter, after the introduction of the case study, discusses the relationship between the construction of vernacular landscapes and damages to them which are caused by development projects at a spatial scale or by homeowners at a local scale or by climate change effects. These chapters overlap in certain issues and challenges due to the chronological arrangement. Chapters four and seven may seem to be similar and reductive in terms of presenting lessons for climate resiliency, but these two address different periods.

This thesis consists of eight chapters of which four are stand-alone. The first and last chapters are the introduction and conclusion. The second chapter introduces the key terminology and discusses the existing literature on the climate and disaster risk management of vernacular heritage sites. Thus, this chapter shows the need for climate and disaster risk management of vernacular heritage sites by presenting the theoretical discussions on a global to local scale. It first introduces vernacular architecture studies and how it is conceptualized as a form of cultural heritage in the national and regional context. It then looks into the existing literature on climate change adaptation of cultural heritage, including from climate-resilient to vulnerable vernacular heritage, managing climate and disaster risks for vernacular heritage sites, and changes in land use and land cover in the city of Rize.

Chapter three first gives a background of the selected city and district and then explains the administration, history, geography, climate, topography, and socio-economic structure of the selected case region, city, and district, and lastly reviews the characteristics of the vernacular architecture in the city and the district. This is background information on the site characteristics to give an overview of the local conditions of the selected region, city, and district and as such is descriptive. This description is useful in understanding the characteristics and conditions shaping and influencing the construction of vernacular heritage sites.

Chapter four investigates the construction of the vernacular heritage in the district in relation to the determinant factor of local climatic conditions through the analysis of literature and interviews. It generates the climate-resilient features of these settlements in the past.

Chapter five focuses on spatial planning decisions by the Ministry, regional and provincial directorate of Urban Planning, Environment, and Climate Change such as urbanization, river corrections, coastal changes, and deforestation that accelerated the impacts of climate change in the city. This chapter highlights the modifications at the landscape scale through the analysis of historical maps, especially overlapping of the maps of the district from 1969 and 2019, as already mentioned in chapter 1.7. Additionally, it investigates the major development projects such as the hydroelectric plant and Green Road Project by analysing the existing literature. The results conclude the site-specific threats on vernacular heritage sites at a spatial scale.

Chapter six unveils the local level practices in understanding the challenges of the preservation of vernacular buildings. On the building scale, the analysis of the interviews with local building owners and farmers revealed the issues regarding the preservation of vernacular buildings. People from the area face these issues since the 1950s and bottom-up practices also led to the building degradation, material deterioration, and loss of rural built heritage that contributed to the rising concerns of climate change.

Chapter seven outlines an assessment of the future challenges of changing climate and its implications on the vernacular heritage. The critical analysis of the interviews and national and local documents reveal the expected threats on it. By looking into the present conditions of this type of heritage, the future challenges of preserving it are presented in this chapter. This chapter questions the climate-resilient features of these buildings today and analyses the disaster risk management in these areas.

2 Literature and Theoretical Framework

2.1 Introduction

Putting forward an interdisciplinary approach in the fields of environmental science and cultural heritage, the objective of this dissertation is to investigate the influences of spatial planning decisions and local practices in the management of the vernacular heritage sites against combined risks of climate change and disasters. There remains a gap in the literature, with a focus on the integrated understanding of climate and disaster risks on vernacular heritage sites despite the growing number of studies focusing on the impacts of climate change on cultural heritage sites.

Chapter two first explains the use of the key terms, particularly in cultural heritage, climate change resilience and adaptation, and disaster risk studies (Chapter 2.2.). The key terminology helps bridge the concepts used between vernacular architecture in architectural and heritage studies and disasters in natural sciences. By describing the nature of vernacular architecture, it also touches upon the aspect of the local climate of a particular place and time as a shaping factor in the construction of vernacular architecture (elaborated later in Chapter 4). The focus of literature sometimes expands to a larger concept of cultural heritage as there are insufficient studies on the management of vernacular heritage under the current changing climate. Thus, the contribution from this theme is relatively recent and few, despite the emerging and fast-growing literature on climate change and cultural heritage studies.

TOC

The literature review presented in this chapter can be grouped under the umbrella of four main themes: 1. The documentation of vernacular architecture, 2. Climate change adaptation of cultural heritage, 3. Vernacular architecture as a form of heritage in Türkiye, and 4. Climate and land use/cover changes in the city of Rize. The literature started with the pioneers' work in vernacular architecture studies in terms of documentation methods (Chapter 2.3.). Given the growing complexity of the issue of climate change, chapter 2.4. touches upon climate change adaptation of cultural heritage broadly. Chapter 2.4.1. explains how the perspectives of scholars on vernacular architecture shifted from a resilient type to, in the current context, a vulnerable one. This is to explain that vernacular heritage sites, which were once resilient, are now extremely vulnerable to the effects of climate change due to unsustainable development plans, maladaptation practices, and disasters. In accordance with it, Chapter 2.4.2. discusses the need for the analysis of vernacular heritage in the context of climate and disaster risk management by providing examples across the globe.

It then elaborates on the important works of Turkish scholars and architects in the categorization of vernacular architecture in Türkiye based on the regional characteristics and its understanding as a form of heritage (Chapter 2.5.). Chapter 2.5.1. discusses the regional characteristics of vernacular architecture building upon the critical readings of key literature from Turkish architects and scholars with regional interest. Here, the aim is to understand the various regional differences in vernacular heritage sites in terms of characteristics to later identify the resilient features. The next theme is narrowed down to the local issues of climate and land use/cover changes in the city of Rize (Chapter 2.6.). This sub-chapter aims to provide the contributing factors of the changes in the land use and land cover to the disasters whether at spatial or local scales.

To deal with the research problem, this chapter discusses the theories, which are used to support to argument behind this research. The aim of it is to understand the interlinkages and discrepancies in spatial planning decisions and local practices in managing vernacular heritage in changing climate in Fındıklı, Rize. This research fills the gap in disaster risk management of vernacular heritage in changing climate through the understanding of the influences of spatial planning decisions and local actions. By doing so, it employs a more future-forward looking on the management of vernacular heritage sites considering the effects of climate change.

2.2 Identifying Key Terminology

UNESCO defines cultural heritage as "our legacy from the past, what we live with today, and what we pass onto future generations."[65] The definition and interpretation of cultural heritage and its value evolve and point in different directions with emerging issues in time. Similar to the UNESCO's definition, Robert Palmer, the Director of Culture and Cultural and Natural Heritage, from the Council of Europe, claims that heritage is not only about our past but also about the present and future.[66] Over time, the concept has expanded to include objects, buildings, cities, landscapes, and properties as "tangible" forms.[67] The understanding of the term, then, has further extended to the "intangible" forms by considering the traditional knowledge systems, language, expressions, and cultures. This dissertation uses the broadest understanding of cultural heritage by going beyond its relationship to communities, place, and time. Cultural heritage is a 'process' as emergent and routed through intangible experiences, skills and attitudes towards resilience. The preservation of it should be dealt with in a processual manner, which requires understanding micro scale individual actions and lived experiences across multiple time-frames. There is the time scale element to it which refers to daily, seasonal, and generational aspects of lived experiences.

Throughout the dissertation, the term vernacular heritage is used to understand vernacular buildings with their surrounding as a whole, including land practices, socio-economic activities, and lifestyles, which shaped the identity of the community. Vernacular heritage in this dissertation is sometimes used interchangeably with vernacular settlements and vernacular landscapes to include other components than buildings and unlisted buildings although the meanings of these terms differ. Vernacular heritage is an umbrella term for the concepts that are introduced later with a reference to locality and traditional and is picked up by the term vernacular architecture, which is why the understanding of these concepts matters.

65 UNESCO, "Policy Document on the Impacts of Climate Change on World Heritage Properties," (2008), http://whc.unesco.org/uploads/activities/documents/activity-393-2.pdf.

66 Robert Palmer, "Preface," ed. Council of Europe, *Heritage and Beyond* (Strasbourg: Council of Europe Publishing, 2009).

67 ICOMOS Climate Change and Cultural Heritage Working Group, "The Future of Our Pasts: Engaging Cultural Heritage in Climate Action," (Paris: ICOMOS, 2019).

The term vernacular comes from the Latin word *vernaculus* and embraces native, folk, peasant, and tribal practices.[68] The term "vernacular" is problematic as it is used often misunderstood and ill-defined.[69] Architects and architectural historians use the term in the same way as "traditional."[70] Traditional represents "a timeless heritage subjected to the preservation," while the term vernacular is exposed to change and innovation.[71] The concept of vernacular refers to the locality, *genius loci* or spirit of the place, authenticity, and indigeneity, and can be associated with peasants, farmers, folk, agricultural communities, traditions, customs, and language. *Genius loci*, though seen as religious iconography, have to do with the essence and characteristics of the place that shapes this form of architecture. *Genius loci* require an insight knowledge derived from experiencing the place, culture, and values of local communities to understand the particularities of the vernacular architecture in the area.[72] It can be a tool to recognize the relationship between the vernacular settlements and the occupants. Mores a word derived from Latin *mōrēs* emphasize the folkloric and conventional aspects of norms, habits, and cultures that are socially acceptable. The *mōrēs* from the architecture is a reflection of ethical beliefs, customs, values, and ideas.

Peculiar to a specific location, local communities built vernacular settlements compatible with the natural environment including geographical, climatic, and topographic conditions in addition to cultural, socio-economic, and intangible values. "Every difference under architectural tradition is also a tradition of attitudes toward nature (and therefore a teleology)."[73] Locality, on the other hand, refers to a particular area and a neighborhood whereas vernacular architecture tells the story of local people through observing their customs, traditions, language, and dialect which extends beyond the settlements, native construction techniques, and material. Although the terms vernacular and rural are sometimes used interchangeably in the literature, rural architecture emphasizes geographical location while vernacular focuses on ancestral knowledge passed from generation to generation.

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68 Oliver, *Built to Meet Needs : Cultural Issues in Vernacular Architecture*.

69 Christiane Brosius and Axel Michaels, "Vernacular Heritage as Urban Place-Making. Activities and Positions in the Reconstruction of Monuments after the Gorkha Earthquake in Nepal, 2015–2020: The Case of Patan," *Sustainability* 12, no. 20 (2020); Mark Crinson, "Dynamic Vernacular – an Introduction," [Les dynamiques vernaculaires – Introduction.] *ABE Journal* (2016).

70 Abidin Kusno, "Reframing the Vernacular and Other Tales" (Cham, 2020).

71 Ibid.

72 Kemas Kurniawan and Elita Nuraeny, "Understanding Genius Loci to Sustain Ume Bangka's Traditional Architecture Based on Intangible Material Culture," *IOP Conference Series: Earth and Environmental Science* 213 (2018).

73 Henry Glassie, "Architects, Vernacular Traditions, and Society," *Traditional Dwellings and Settlements Review* 1, no. 2 (1990).

ICOMOS recognizes vernacular heritage[74]—at the intersection of cultural, natural, tangible, and intangible heritage—as a part of cultural landscapes with its generational cultural practices, traditional construction systems, and crafts.[75] The term vernacular heritage encompasses customs, practices, places, objects, artistic expressions, and values that are innate to a particular place and time. Supporting the needs of communities in decision-making that rely on livelihoods can enhance the resilience of land use, farming practices, biodiversity, fauna, habitats, wilderness in changing climate, and the intangible values attached to them. Vernacular sites are mostly encountered in rural areas, though they can also be part of urban areas. The rural vernacular built heritage — countryside dwellings, farmhouses, cottages— inevitably become a representation of vernacular traditions. "The vernacular environment can be conceived as a constructed life of (once) marginalized communities (e.g. indigenous people)."[76] This interlinkage between vernacular and marginalized communities is particularly relevant in today's climate change context considering the rising concerns for equity, rights, and intangible values of these communities. Vernacular recalls the period of colonialization, though is not the focus of this dissertation. It is something to be aware of in analysing the vernacular heritage.[77]

By giving voice to these alternative knowledge systems in a (centralised) decision-making, the concept of traditional ecological knowledge (TEK) comes into mind as a "complex body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (including humans) with one another and with their environment."[78] These alternative knowledge and management systems are adaptable, flexible, and proactive as they are characterized by generational accumulation and transmission of knowledge.[79]

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74 Paul Oliver, *Built to Meet Needs: Cultural Issues in Vernacular Architecture*, (Amsterdam: Architectural Press, 2006).

75 ICOMOS, "Charter on the Built Vernacular Heritage," (1999), http://www.international.icomos.org/charters/vernacular_e.pdf.

76 Kusno, "Reframing the Vernacular and Other Tales."

77 Crinson, "Dynamic Vernacular – an Introduction."

78 Fikret Berkes, Traditional ecological knowledge in perspective. In: J.T. Inglis, Ed., Traditional Ecological Knowledge: Concepts and Cases, (Ottawa: Canadian Museum of Nature, 1993).

79 Fikret Berkes, Johan Colding, and Carl Folke, "Rediscovery of Traditional Ecological Knowledge as Adaptive Management," Ecological Applications 5 (10/01 2000), https://doi.org/10.2307/2641280.

"Vernacular architecture is a continuing process including necessary changes and continuous adaptation as a response to social and environmental constraints."[80] Vernacular is established based on collective memories of the place. The building decisions behind the vernacular design were never coincidental or arbitrary. Climate knowledge is embedded in vernacular settlements and lifestyles along with other environmental, cultural, and societal determinants of the place. It is important to emphasize that these climate experiences, memories, and perspectives in isolated rural places at a micro level experiences do not reflect from backward looking nostalgia but rather mobile nostalgia, which binds past, present, and future vision.[81]

As the scale of cultural heritage forms grew, the term vernacular expanded from vernacular architecture to vernacular built heritage and vernacular landscapes as part of cultural landscapes. Considering the notion of vernacular on the landscape scale, understanding material culture and the process of construction in the past and present is an indicator of how the knowledge of design is inherited, transmitted, and adapted.[82] The ICOMOS Charter on Built Vernacular Heritage states that:

"Vernacular building is the traditional and natural way by which communities house themselves. It is a continuing process including necessary changes and continuous adaptation as a response to social and environmental constraints."[83]

The term "vernacular heritage" is mentioned, in the literature, in many different ways at a national scale including modest,[84] village,[85] and rural architecture[86] while globally expanding to the vernacular landscape. The search of key terms in the database of Scopus shows the wide range of uses in different weights and manners. Using the search terms of "vernacul* architect*" OR "vernacul* heritag*" OR "vernacul*

80 ICOMOS, "Charter on the Built Vernacular Heritage".

81 Alastair Bonnett and Catherine Alexander, "Mobile nostalgias: connecting visions of the urban past, present and future amongst ex-residents," Transactions of the Institute of British Geographers 38, no. 3 (2013), https://doi.org/https://doi.org/10.1111/j.1475-5661.2012.00531.x,

82 Simon J. Bronner, "Building Tradition Control and Authority in Vernacular Architecture," ed. Lindsay Asquith and Marcel Vellinga, *Vernacular Architecture in the 21st Century : Theory, Education and Practice* (Taylor & Francis Group, 2006), http://ebookcentral.proquest.com/lib/delft/detail.action?docID=256919.

83 ICOMOS, "Charter on the Built Vernacular Heritage".

84 Sevcan Karadağ and Nazan Kırcı, "Tropikal Modernizm'in Yerelliği Ve Sürdürülebilir Mimarlık Tarihi İçindeki Yeri," *Tasarım Kuram* 17, no. 33 (2021).

85 Zeynep Eres, "Türkiye'de Geleneksel Köy Mimarisini Koruma Olasılıkları," *Ege Mimarlık* (2016); Orhan Özgüner, "Village Architecture in the Eastern Black Sea Region" (PhD diss., Middle East Technical University, 1970).

86 Afife Batur et al., *Doğu Karadeniz'de Kırsal Mimari: Rural Architecture in the Eastern Black Sea Region* (Milli Reasürans, 2005).

landscap*" in the database of Web of Science in October 2021, yielded 1907 publications. The search excluded non-English publications due to translation issues. It also excluded reviews, biographical items, early accesses, fiction creative pros, editorial materials, and letters. The findings refine 908 publications. The records were exported including author, title, source, and abstract as text format to visually analyze in VOSviewer through overlay visualization (Figure 2.1). The term "vernacular architecture" has been first used in 1971 according to the results.[87] Since then, it has been widely used, especially in 1980s. The term "vernacular landscape" in the title of the publications emerged for the first time in 1989.[88] Similarly, the use of the term "vernacular heritage" does not appear in the titles of the studies until 2008.[89] The number of publications (n=901) reaches the highest peak in 2021, indicating through its frequent use the importance given to the subject.

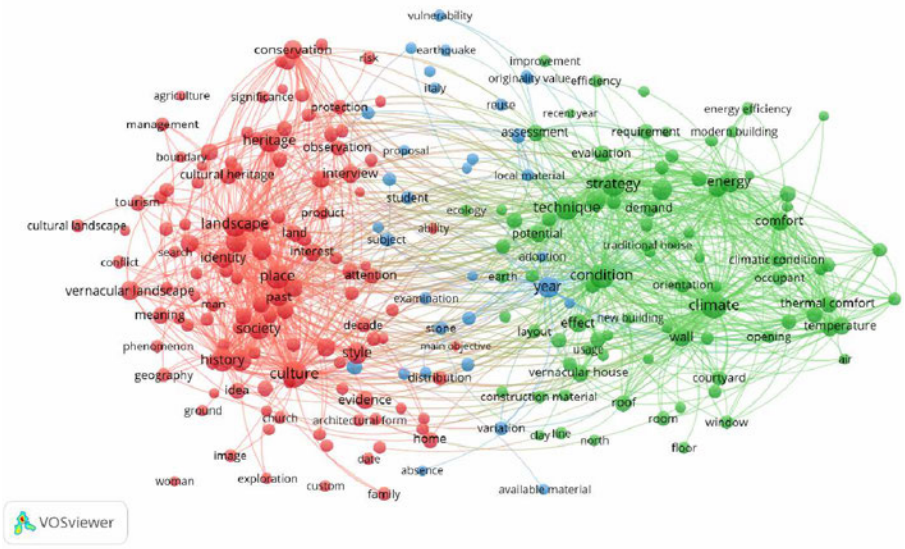

FIG. 2.1 The search terms of "vernacul* architect*" OR "vernacul* heritag*" OR "vernacul* landscap*" Source: author based on Vosviewer visualization from 1971 to 2021.

87 Leland B. Tate, "Illustrated Handbook of Vernacular Architecture - Brunskill,Rw," *Rural Sociology* 36, no. 4 (1971).

88 Michael Zappala, "Fablemos Latino": Diálogo, Latin Roots and Vernacular Landscape in Fifteenth and Sixteenth Century Castile," *Iberoromania* 1989, no. 29 (1989).

89 Ruth Lane et al., "Vernacular Heritage and Evolving Environmental Policy in Australia: Lessons from the Murray-Darling Outreach Project," *Geoforum* 39, no. 3 (2008).

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Vernacular heritage is associated with many determinants in which climate (n=298) has an overwhelming weight. As it is one of the key determinants, the analysis of climate is quite common in vernacular heritage studies. However, the majority of the studies focus on micro-climate,[90] which is defined as "any area where the climate differs from the surrounding area." Macro-climate refers to the climate of larger areas such as continents. In this sense, the analysis of it varies greatly. The starting point of this dissertation is to understand the challenges of preserving vernacular heritage sites, particularly against changing climate, on both micro-and macroscales.

Climate describes the average weather conditions for a particular location and over a long period[91] with the variables of temperature, humidity, atmospheric pressure, wind, and precipitation. Climate is closely related to the physical landscape as well as to society. The climate in vernacular heritage studies mostly refers to the local and micro-climate as the shaping factors of vernacular practices (Figure 2.1). While the interior comfort of these buildings gained importance, the analysis of the determinants of climate such as wind, temperature, and relative humidity revealed adaptive and ingenious solutions behind openings, windows, materials, and courtyards.

However, local climatic conditions today are changing rapidly due to climate change. Climate change refers to a change in the long-term weather conditions known as climate. Intergovernmental Panel on Climate Change (IPCC), a UN body, determines the scientific body of knowledge on climate change.[92] According to IPCC, it is:

"A change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer". [93]

It may be due to natural internal processes or external forcing or to anthropogenic changes in the consumption of the atmosphere or land use".[94] It is often a debate to diversify the disasters from climatic and anthropic influences. Moreover, there is evidence of man-made interventions to the physical environment which might have

90 Timothy O. Iyendo et al., "A Relative Study of Microclimate Responsive Design Approaches to Buildings in Cypriot Settlements," *ITU Journal of the Faculty of Architecture* 13, no. 1 (2016).

91 World Meteorological Organization, "Climate," https://public.wmo.int/en/our-mandate/climate.

92 The Intergovernmental Panel on Climate Change, https://www.ipcc.ch/.

93 IPCC, "Glossary of Terms," ed. C.B. Field, V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, and and P.M. Midgley M. Tignor, *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* (Cambridge University Press, Cambridge, UK, and New York, NY, USA: A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC), 2012).

94 Ibid.

contributed to climate change and/or accelerated its impacts.[95] The man-made interventions refer to anthropic influences (hereafter). Whether these consequences are bio-physical, socio-economic,[96] or combined, climate change is happening.[97]

This research does not argue whether the consequences of such destructions are due to anthropogenic climate change or disasters. It does not extend to these problems but it certainly recognizes climate change as a fact. This dissertation considers extreme rainfalls, flooding and landslides as responses to natural events and anthropic activities impacting the environmental situation of the selected case area. Although the United Nations Framework Convention on Climate Change (UNFCCC) Article 1 distinctively separates climate change from human activities, it is mentioned in this context as a risk multiplier[98] for the scope of the research as it is not the aim of the study to identify the cause of it.

With the changing climate, the definition of cultural heritage is reinterpreted, revalued, and reformulated. Cultural heritage has become a central focus in the literature under several headings i.e. climate change assessment,[99] adaptive capacity,[100] vulnerability,[101] resilience,[102] mitigation,[103] adaptation,[104] relocation,[105] governance, policies,[106] and disasters risk assessment, reduction, and

95 Gül Aktürk and Stephan J. Hauser, "Detection of Disaster-Prone Vernacular Heritage Sites at District Scale: The Case of Fındıklı in Rize, Turkey," *International Journal of Disaster Risk Reduction* 58 (2021).

96 Simon Kapitza et al., "Assessing Biophysical and Socio-Economic Impacts of Climate Change on Regional Avian Biodiversity," *Scientific Reports* 11, no. 1 (2021).

97 Intergovernmental Panel on Climate Change, "Climate Change Widespread, Rapid, and Intensifying," https://www.ipcc.ch/2021/08/09/ar6-wg1-20210809-pr/.

98 Jen Heathcote, Hannah Fluck, and Meredith Wiggins, "Predicting and Adapting to Climate Change: Challenges for the Historic Environment," *The Historic Environment: Policy & Practice* 8, no. 2 (2017).

99 Elena Sesana et al., "Climate Change Impacts on Cultural Heritage: A Literature Review," *WIREs Climate Change* 12, no. 4 (2021).

100 Helen Phillips, "The Capacity to Adapt to Climate Change at Heritage Sites—the Development of a Conceptual Framework," *Environmental Science & Policy* 47 (2015).

101 A. Gandini et al., "Vulnerability Assessment of Cultural Heritage Sites Towards Flooding Events" (2018).

102 Erin Seekamp and Eugene Jo, "Resilience and Transformation of Heritage Sites to Accommodate for Loss and Learning in a Changing Climate," *Climatic Change* 162, no. 1 (2020).

103 Elena Sesana et al., "Mitigating Climate Change in the Cultural Built Heritage Sector," *Climate* 7 (2019).

104 Sandra Fatorić and Robbert Biesbroek, "Adapting Cultural Heritage to Climate Change Impacts in the Netherlands: Barriers, Interdependencies, and Strategies for Overcoming Them," *Climatic Change* 162, no. 2 (2020).

105 Gül Aktürk and Martha Lerski, "Intangible Cultural Heritage: A Benefit to Climate-Displaced and Host Communities," *Journal of Environmental Studies and Sciences* (2021).

106 Kristine Kern et al., "Cultural Heritage, Sustainable Development, and Climate Policy: Comparing the Unesco World Heritage Cities of Potsdam and Bern," *Sustainability* 13, no. 16 (2021).

management. However, on the path toward climate adaptation planning, first and foremost there is a need for the correct and accurate assessments of the impacts of climate change and vulnerabilities.

Climate change assessment identifies and quantifies the impacts of climate change on several sectors. Impacts and vulnerabilities are strongly interlinked with a particular place. Experts and scholars from different scientific disciplines interpreted the concept of "vulnerability" in their respective fields such as climate change, health, geography, and anthropology.[107] The vulnerability may encompass physical, social, economic, and environmental factors or processes. Neil Adger, a British geographer, explains climate vulnerability as "the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes."[108] The definition of vulnerability describes the characteristics and conditions of a community, system, or asset that increase their susceptibility to the damaging effects of a hazard[109] and is used within the scope of this research.

Climate change effects speed up the occurrence and intensity of the disaster risks. Disasters do not solely include the effects of climate change but also refer to natural events such as earthquakes or anthropic interventions, including wars. In this respect, neither disasters nor climate change effects are natural. The notion of disaster refers to:

"severe alterations in the normal functioning of a community or a society due to hazardous physical events interacting with vulnerable social conditions, leading to widespread adverse human, material, economic or environmental effects that require an immediate emergency response to satisfy critical human needs and that may require external support for recovery."[110]

Disaster risk assessment, according to UNDRR is "the qualitative or quantitative approach to the identification of hazards and evaluating the evaluating existing conditions of exposure and vulnerability that together could harm people, property, services, livelihoods and the environment on which they depend."[111] Understanding

107 Shitangsu Paul, "Vulnerability Concepts and Its Application in Various Fields: A Review on Geographical Perspective," *Journal of Life and Earth Science (J. Life Earth Sci.)* 8 (2013).

108 W. Neil Adger, "Vulnerability," *Global Environmental Change* 16, no. 3 (2006).

109 United Nations Office for Disaster Risk Reduction, "Vulnerability," https://www.undrr.org/terminology/vulnerability.

110 ICOMOS Climate Change and Cultural Heritage Working Group, "The Future of Our Pasts: Engaging Cultural Heritage in Climate Action."

111 United Nations Office for Disaster Risk Reduction, "Disaster Risk Assessment," https://www.undrr.org/terminology/disaster-risk-assessment.

the disaster risks is significant and closely linked with the effects of climate change. For this reason, disaster risk and climate change should be managed in an integrated way.[112] Integrating disaster risk management and climate change adaptation, in vernacular heritage sites, in return can strengthen resilience to climate change and disaster risks. Disaster risk management (DRM) "sets out objectives for reducing the disaster risks with related actions to accomplish these objectives."[113] Disaster risk reduction (DRR) "is aimed at preventing new and reducing existing disaster risk and managing residual risk, all of which contribute to strengthening resilience and therefore to the achievement of sustainable development."[114] Climate change adaptation requires efforts in reducing vulnerability or building resilience as a response to the impacts of climate change.[115]

Learning about climate-resilient vernacular settlements through spatial analysis in combination with the analysis of local people's insights can contribute to building climate-resilient cities. As some of the vernacular buildings are still resistant, there is still much to learn from them to improve the resilience of the damaged vernacular buildings and the new settlements. Here, the term resilience is used as:

"The ability of a social or ecological system to absorb disturbances while retaining the same basic structure and ways of functioning, the capacity for self-organization and the capacity to adapt to stress and change."[116]

Climate resilience is "the ability to prepare for, recover from, and adapt to these impacts brought by climate cange."[117] This is not only important in the management of vernacular heritage sites but also on a larger scale, through spatial and urban planning. Spatial planning can be broadly defined as planning processes of spatial configuration and distribution and development of activities, including living,

112 Joshua Hallwright and John Handmer, "Progressing the Integration of Climate Change Adaptation and Disaster Risk Management in Vanuatu and Beyond," *Climate Risk Management* 31 (2021).

113 United Nations Office for Disaster Risk Reduction, "Disaster Risk Management," https://www.undrr.org/terminology/disaster-risk-management.

114 "Disaster Risk Reduction," https://www.undrr.org/terminology/disaster-risk-management.

115 W.N. Adger, S. Agrawala, M.M.Q. Mirza, C. Conde, K. O'Brien, J. Pulhin, R. Pulwarty, B. Smit and K. Takahashi: , "Assessment of Adaptation Practices, Options, Constraints and Capacity. Climate Change: Impacts, Adaptation and Vulnerability. Contribution of Working Group Ii to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change," ed. O.F. Canziani M.L. Parry, J.P. Palutikof, P.J. van der Linden and C.E. Hanson (Cambridge, UK2007).

116 IPCC, Climate Change 2007: Impacts, Adaptation, and Vulnerability. Contribution of Working Group Ii to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change, (2007), https://www.ipcc.ch/report/ar4/wg2/.

117 Centre for Climate and Energy Solutions, "Climate Essentials: What is Climate Risk, and Why Does it Matter," https://www.c2es.org/wp-content/uploads/2019/04/what-is-climate-resilience.pdf

working, and environmental conditions by public governance. As it engages with several sectors such as tourism, rural affairs, infrastructure, and urban development, it is operated at local, regional, national, and international levels. The Ministry of Environment, Urbanisation, and Climate Change has had responsibility for spatial and urban planning in the country. Urban planning also deals with rural planning in addition to the metropolitan area, including vernacular heritage sites in the hinterland. And as such these sites should be included in urban and spatial planning decisions and practices. However, the fragmentation of inter-sectoral planning, which is required in climate adaptation and disaster risk management plans, causes issues in holistic planning. In this sense, the little consideration given to vernacular heritage sites by local public administrators in urban planning impedes their inclusion in upper-level planning through urban and spatial planning. Improving the resilience of vernacular landscapes can also contribute to the climate adaptation and disaster risk management of vernacular heritage sites. By using the framework of disaster risk reduction (DRR) and disaster risk management (DRM) in order to reduce the impacts of different climate change impacts, this research aims to contribute to building the resilience of vernacular heritage sites due to its methodological approach.

2.3 Spatial Analysis of Vernacular Architecture

The interest in vernacular buildings as architecture grew with Paul Oliver and Bernard Rudofsky, even before the rise of environmental concerns in the 1970s. Paul Oliver, an English architectural historian, argued that there is a need for understanding the cultures and values behind the production of vernacular buildings through interdisciplinary approaches including anthropology, archaeology, architecture, landscape, and environment.[118] In his book and exhibition in the MoMa, *Architecture Without Architects* in 1964, Bernard Rudofsky, an Austrian architect, engineer, and a critic, emphasized that vernacular architecture never falls out of fashion as there is always wisdom derived from the practical solutions of primitive architecture constructed by "untutored builders."[119] The atlas of vernacular architecture of the world by Oliver analyzed the global examples of vernacular architecture by highlighting the regional features including topography, climate, water resources, culture, and language.[120] Despite the global atlas of vernacular architecture, certain placed based features of vernacular architecture remained uncovered, by the architects behind the construction of it. The systematic analysis of this form of architecture has been missing in the literature.

Rudofsky further noted that some concepts that are inherent to the vernacular of the past seem to gain popularity in sustainability such as ventilation, daylight, and flexibility and movability of building parts.[121] Eventually, these two pioneers of vernacular architecture paved the way for the application of different methods in recording and analyzing vernacular architecture with methods beyond photography, architectural drawings, and mapping. In the studies of vernacular architecture globally, the methodologies of building surveys are a common practice, especially in regional and national contexts. However, more recent methods used in the analysis

118 Oliver, *Built to Meet Needs: Cultural Issues in Vernacular Architecture*.

119 B. Rudofsky, *Architecture without Architects: A Short Introduction to Non-Pedigreed Architecture* (University of New Mexico Press, 1987).

120 Marcel Vellinga, Paul architectuur blues Oliver, and Alexander Bridge, *Atlas of Vernacular Architecture of the World* (Abingdon [etc.]: Routledge, 2007).

121 Rudofsky, *Architecture without Architects: A Short Introduction to Non-Pedigreed Architecture*; Burcu Salgın et al., "Sustainable Features of Vernacular Architecture: Housing of Eastern Black Sea Region as a Case Study," *Arts* 6, no. 11 (2017).

of vernacular architecture introduced new ways of investigating the challenges that this form of architecture is facing.[122] Aside from architectural drawings, methods of storytelling helped the transmission of knowledge through oral history,[123] while GIS mapping contributed to the spatial analysis of vernacular landscapes.[124] These techniques are yet to be improved for the preservation and management of vernacular heritage sites.[125]

Planning of vernacular settlements by local communities may seem arbitrary in comparison to spatial planning which is strategic and driven by the coordination of policies and practices. Planning of vernacular settlements is much more adapted to conditions of the time, whereas spatial planning focuses on future development. While these two planning types seem to diverge in many ways, even in disciplinary terms (former in architecture discipline and latter in the interdisciplinary field), the studies on the planning of vernacular settlements adopt spatial planning tools such as GIS, remote sensing and mapping. Incorporation of tools such as these can help to complement historical and archival documentation and field work required for the analysis of vernacular settlements.[126] Furthermore, the quantification of the characteristics of vernacular settlements and using spatial analysis at several scales can advance the studies in the field. Therefore, contemporary studies and challenges require the combination of these two types of planning.

122 Isaac Meir and Roaf S, "The Future of the Vernacular. Towards New Methodologies for the Understanding and Optimization of the Performance of Vernacular Buildings," (2005).

123 Aktürk, "Remembering Traditional Craftsmanship: Conserving a Heritage of Woodworking in Rize, Turkey."

124 Giuseppe Cillis, Dina Statuto, and Pietro Picuno, "Vernacular Farm Buildings and Rural Landscape: A Geospatial Approach for Their Integrated Management," *Sustainability* 12, no. 1 (2020).

125 E. Sevillano Gutiérrez B. Rakotomamonjy, E. Carnevale, "A Pilot Project, a Tool for Conserving the Historic City of Cuenca, Ecuador," ed. F. Vegas López-Manzanares C. Mileto, L. García-Soriano, V. Cristini, 1st ed., *Vernacular and Earthen Architecture: Conservation and Sustainability: Proceedings of SosTierra 2017* (Valencia, Spain: CRC Press, 2017).

126 Margaret Ford, Hisham El Kadi, and Linda Watson, "The Relevance of GIS in the Evaluation of Vernacular Architecture," *Journal of Architectural Conservation*, 5:3, (1999).

2.4 Climate Change Adaptation of Cultural Heritage in the 20th Century

The intersection of climate change and cultural heritage has become a topic of particular interest from the start of 1999.[127] The majority of the studies on climate adaptation of cultural heritage focused on the quantitative impact assessments at the beginning of the 21st century. Earlier studies by Cristina Sabbioni, an Italian researcher and Peter Brimblecombe, an Australian scholar, in atmospheric sciences with May Cassar, an English architect have focused on assessing the impacts of climate change on cultural heritage sites, mainly in Europe, by presenting management strategies for policy makers.[128] Brimblecombe extensively addresses the climate-comfort challenges indoors by using different meteorological models[129] and parameters of wind, water, and temperature and their structural damages to the cultural heritage as part of NOAH's ARK project.[130] Many other scholars contributed to impact studies on the exterior of the buildings i.e. bio deterioration, and salt crystallisation by Annika Haugen, a Norwegian civil engineer, and Johan Mattsson, who specialised in the field of biological degradation of cultural heritage sites,[131] salt weathering by Menendez,[132] salt crystallisation, biological growth, surface recession by Chiara Ciantelli, an Italian earth scientist and others,[133] and pollution by Roger-Alexandre Lefèvre, a French atmospheric scientist[134] as well as the indoor

127 M. J. Rowland, "Accelerated Climate Change and Australia's Cultural Heritage," *Australian Journal of Environmental Management* 6, no. 2 (1999).

128 C. Sabbioni, Peter Brimblecombe, and May Cassar, *The Atlas of Climate Change Impact on European Cultural Heritage : Scientific Analysis and Management Strategies*, Ec Cultural Heritage Research Series; N. 19 (London ; New York: Anthem; Publications Office, 2012).

129 Peter Brimblecombe, "Refining Climate Change Threats to Heritage," *Journal of the Institute of Conservation* 37, no. 2 (2014).

130 P. Brimblecombe, C. M. Grossi, and I. Harris, "Climate Change Critical to Cultural Heritage," in *Survival and Sustainability: Environmental Concerns in the 21st Century*, ed. H. Gokcekus, U. Turker, and J. W. LaMoreaux, Environmental Earth Sciences-Series (2011).

131 A. Haugen and J. Mattsson, "Preparations for Climate Change's Influences on Cultural Heritage," *International Journal of Climate Change Strategies and Management* 3, no. 4 (2011).

132 B. Menendez, "Estimators of the Impact of Climate Change in Salt Weathering of Cultural Heritage," *Geosciences* 8, no. 11 (2018).

133 C. Ciantelli et al., "How Can Climate Change Affect the Unesco Cultural Heritage Sites in Panama?," ibid., no. 8.

134 Roger-Alexandre Lefèvre, "The Impact of Climate Change on Slow Degradation of Monuments in Contrast to Extreme Events," ed. Sabine von Schorlemer and Sylvia Maus, *Climate Change as a Threat to Peace: Impacts on Cultural Heritage and Cultural Diversity* (Frankfurt Am Main: Peter Lang AG, 2014), http://www.jstor.org/stable/j.ctv2t4cvp.9.

climate by Johanna Leissner, a German scholar in natural sciences and others.[135] These studies are usually used for long-term monitoring methods,[136] meteorological data, and climate models.[137]

Many scholars conducted vulnerability assessments to measure the level of exposure of cultural heritage sites to hazards from low to high index. A study by Paula Ezcurra a Mexican oceanographer and a Puerto Rican archaeologist Isabel C. Rivera-Collazo an anthropologist and archaeologist from Puerto Rico revealed threatened 1185 cultural heritage sites by sea-level rise in Puerto Rico by the year 2100.[138] With the use of a nine-step prioritization model, the study revealed the need for more research on indigenous sites as well as intangible cultural heritage.[139] Furthermore, a vulnerability assessment on a WH earthen site in Iran by an Iranian scholars Masoud Nakhaei Ashtari and Mariana Correia revealed the site is exposed to the risks of river flooding, soil erosion, and penetration of rainwater.[140] Ashtari and Correia emphasized that traditional artisans and constructors hold significant information on dealing with the climate risks as they have developed ingenious solutions that are the base of today's climate adaptation discussions.

The views of experts and communities in vulnerability assessments gained importance in the methodological approaches, especially in the prioritization of heritage sites for preservation. Cathy Daly, an Irish researcher and practitioner in heritage management, developed and implemented a six-step vulnerability assessment in two case study sites in Ireland.[141] She claimed that this value-based approach can be more precise than statistical risk analysis in terms of future projections of climate change. She and others published the use of the methodology along with expert consultation in improving national climate adaptation planning

135 Johanna Leissner et al., "Climate for Culture: Assessing the Impact of Climate Change on the Future Indoor Climate in Historic Buildings Using Simulations," *Heritage Science* 3 (2015).

136 Annika Haugen et al., "A Methodology for Long-Term Monitoring of Climate Change Impacts on Historic Buildings," *Geosciences* 8, no. 10 (2018).

137 Jørgen Hollesen, Henning Matthiesen, and Bo Elberling, "The Impact of Climate Change on an Archaeological Site in the Arctic," *Archaeometry* 59, no. 6 (2017).

138 Paula Ezcurra and Isabel C. Rivera-Collazo, "An Assessment of the Impacts of Climate Change on Puerto Rico's Cultural Heritage with a Case Study on Sea-Level Rise," *Journal of Cultural Heritage* 32 (2018).

139 Ibid.

140 Masoud Nakhaei Ashtari and Mariana Correia, "Assessment of Vulnerability and Site Adaptive Capacity to the Risk of Climate Change: The Case of Tchogha Zanbil World Heritage Earthen Site in Iran," *Journal of Cultural Heritage Management and Sustainable Development* ahead-of-print, no. ahead-of-print (2021).

141 Cathy Daly, "A Framework for Assessing the Vulnerability of Archaeological Sites to Climate Change: Theory, Development, and Application," *Conservation and Management of Archaeological Sites* 16, no. 3 (2014).

for cultural heritage in Ireland.[142] The Climate Vulnerability Index (CVI) is a risk assessment tool to assess climate change vulnerability of World Heritage (WH) properties, including two phases of Outstanding Universal Value (OUV) Vulnerability and Community Vulnerability.[143] OUV Vulnerability assessment focuses on the potential impacts on the key values for which the property is recognized while Community Vulnerability focuses on the adaptive capacity of communities based on the economic, social, and cultural connections of the associated with the World Heritage property.[144] As it is implemented several cases, including the Neolithic Orkney World Heritage site in Scotland, CVI is developed through workshops.[145]

Similarly, an Italian architect and researcher Elena Sesana and others developed a conceptual framework for assessing the vulnerabilities of three World Heritage Sites through the analysis of semi-structured interviews with academics and experts in the management and conservation of cultural heritage.[146] This framework is aimed at informing decision-makers and site managers to develop new strategies for climate adaptation measures. In addition, George Hambrecht, a German anthropologist, and Marcy Rockman, an American archaeologist, studied the four-pillar framework in Natural Park Service (NPS) in the US to use citizen science in the prioritization of threatened heritage sites.[147] The database NGOs such as NPS and Historic England helped assist in the detection of the sites at risk in vulnerability assessments.

A common drawback in these assessments of vulnerabilities was the missing understanding of past communities and their practices to draw conclusions for current and future planning. British archaeologists working in the Historic England, Jen Heathcote, Hannah Fluck, and Meredith Wiggins proposed adaptive measures for Historic England and addressed the risks and opportunities in planning for

142 Cathy Daly and Caroline Cox, "Climate Change Adaptation Planning for Cultural Heritage, a National Scale Methodology," *Journal of Cultural Heritage Management and Sustainable Development* ahead-of-print (2020).

143 Jon C. Day et al., *Climate Risk Assessment for Heart of Neolithic Orkney World Heritage property: An application of the Climate Vulnerability Index* (Edinburgh: Historic Environment Scotland, 2019), https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=c6f3e971-bd95-457c-a91d-aa77009aec69.

144 Ibid.

145 Ibid.

146 Elena Sesana et al., "An Integrated Approach for Assessing the Vulnerability of World Heritage Sites to Climate Change Impacts," *Journal of Cultural Heritage* (2019).

147 George Hambrecht and Marcy Rockman, "International Approaches to Climate Change and Cultural Heritage," *American Antiquity* 82, no. 4 (2017).

climate adaptation through the analysis of the policies in the UK.[148] In terms of opportunities, they suggest that there is a lot to learn from the way which people traditionally adapted to change in the past, including patterns of settlement and land use in floodplains and construction of their buildings to avoid the risks of flooding.[149] Donna Graves, an American historian and urban planner, and others supported this argument by expressing that the place-based insights of local people can highlight how past societies interacted with their environment.[150] The documentation of the change in climate and landscape from the lens of local stakeholders should not be overlooked to generate knowledge in building climate resiliency.

In vulnerability and risk assessments, using GIS in spatial analysis has become a common methodology for bridging the scale gap between climate change effects and cultural heritage sites. Uta Hassler, a German architect, in her report reveals the need for a combination of spatial planning decisions and local practices in addition to mapping the risky areas by using GIS data. [151] Assessing the climate change vulnerability and adaptation of heritage landscapes in Flanders, Belgium, Belgian geographers studying landscape science, Lien Dupont and Veerle Van Eetvelde mapped the case in detail with the use of GIS and suggested the integration of adaptation plans into spatial planning.[152] Similarly, Branka Cuca, a Serbian architect, found out that World Heritage sites in Cyprus have been exposed to soil loss as a result of the analysis of land use change.[153] Most importantly, the use of archival sources in these spatial analyses proved the increased vulnerability of heritage sites in time.

When incorporated into risk assessments, archival sources can provide information on the changing landscapes. Ionut Cristi Nicu, a Romanian geographer studying the effects of natural hazards such as gully erosion, landslides, and coastal erosion on cultural heritage, used spatial data gathered from historical maps and ortho photos between 1894 and 2012 in GIS detecting vulnerable heritage sites in a catchment

148 Jen Heathcote, Hannah Fluck, and Meredith Wiggins, "Predicting and Adapting to Climate Change: Challenges for the Historic Environment."

149 Ibid.

150 Donna Graves, Elizabeth Villano, and Clare Cooper, "Expanding the Narratives: How Stories of Our Past Can Help Inspire Our Response to the Climate Crisis," ibid.12, no. 3-4 (2021).

151 Uta Hassler, "Implications of Climate Change on Heritage," *Building Research & Information* 34, no. 2 (2006).

152 Lien Dupont and Veerle Van Eetvelde, "Assessing the Potential Impacts of Climate Change on Traditional Landscapes and Their Heritage Values on the Local Level: Case Studies in the Dender Basin in Flanders, Belgium," *Land Use Policy* 35 (2013).

153 Branka Cuca and Athos Agapiou, "Impact of Land use Change and Soil Erosion on Cultural Landscapes: The Case of Cultural Paths and Sites in Paphos District, Cyprus," *Applied Geomatics* 10, no. 4 (2018).

area in Romania.[154] The results revealed that there was an increasing trend in a very high vulnerable heritage site from two sites in 1894 to seven sites in 2012.[155] In a similar study by Antoni Alcaraz Tarragüel and others on the impacts of avalanches and landslides on the 60 cultural heritage sites in Upper Svaneti of Georgia, two hazard susceptibility maps were created with the classifications of low, moderate, and high risk for Ushguli and Chazhashi villages.[156] The risk assessment of the sites in Ushguli revealed that 19 out of 30 objects show low susceptibility and three of them are highly vulnerable.[157] Meanwhile, in the case of Chazhashi, 12 out of 30 objects have low susceptibility and four are highly vulnerable.[158] While these assessments pinpointed the specific threats associated with heritage sites, some local practices in terms of incompatible interventions to heritage sites were also found to be threatening.

In practice, stakeholders often disregard the damaging effects of maladaptation examples as a result of development projects on heritage properties. Jim Perry, an American professor in climate adaptation of natural heritage sites, claimed that in practices of disaster preparedness and climate change adaptation, many communities sometimes come up with engineering solutions such as sea walls, altered drainage, culverts, and bridges, which may damage World Heritage sites if not designed with respect to the site attributes.[159]

The tourism value of heritage sites became a driver for incorporating heritage into climate change adaptation efforts. Michael Colin Hall, a British geographer, conducted a literature analysis on the impacts of climate change on cultural landscapes, built environments, archaeological sites, parks and gardens and analysed key themes of strategies which appeared in the literature.[160] He claimed that heritage tourism is not only affected by climate change but also contributes to climate change due to emission transfer.[161] He and Yael Ram, an Israeli scholar in tourism and environmental studies assessed where heritage stands in the reports

154 Nicu, "Cultural Heritage Assessment and Vulnerability Using Analytic Hierarchy Process and Geographic Information Systems (Valea Oii Catchment, North-Eastern Romania). An Approach to Historical Maps."

155 Ibid.

156 Antoni Tarragüel, Bart Krol, and C. J. Westen, "Analysing the Possible Impact of Landslides and Avalanches on Cultural Heritage in Upper Svaneti, Georgia," *Journal of Cultural Heritage* 13 (2012).

157 Ibid.

158 Ibid.

159 Jim Perry, "Climate Change Adaptation in the World's Best Places: A Wicked Problem in Need of Immediate Attention," *Landscape and Urban Planning* 133 (2015).

160 Colin Michael Hall et al., "Climate Change and Cultural Heritage: Conservation and Heritage Tourism in the Anthropocene," *Journal of Heritage Tourism* 11, no. 1 (2016).

161 Colin Michael Hall, "Heritage, Heritage Tourism and Climate Change," ibid.

of IPCC since the 1990s.[162] They argue that it is up to heritage professionals and researchers to find ways to better communicate the value of heritage to planners, the public, and policymakers.

Additionally, American archaeologist, Marcy Rockman explains that not every heritage asset can be saved and that a values-based approach to vulnerability and adaptation is used to prioritize some over others.[163] This approach may downsize the importance of certain cultural heritage forms over others. However, she emphasized the role of cultural heritage in climate adaptation by stating "every place has a climate story, many have more than one."[164] Cassar and British archaeologist Pender revealed that the maintenance, monitoring, and management of the sites will be even more difficult in decisions prioritizing sites and that requires directing of funding.[165] The research gap on environmental monitoring of cultural heritage is emphasized by Italian professor in earth science, Alessandra Bonazza to understand the multi risks associated with the site.[166] Sabbioni and others developed guidelines for new management practices to improve the climate adaptation of cultural heritage,[167] which particularly focus on monitoring, maintenance, and preparation for floods and landslides in cultural heritage sites. [168]

Managing such an entanglement—a heritage asset with its intangible practices in its natural setting—can require multiple stakeholders' involvement. American geographers Sandra Fatoric and Erin Seekamp, through a systematic literature review, emphasized the need for stakeholder collaboration and communication by valuing the place and its meaning.[169] Five years after the publication of this

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162 Colin Michael Hall and Yael Ram, "Heritage in the Intergovernmental Panel on Climate Change Assessment Reports: A Lexical Assessment," ibid.

163 Marcy Rockman, "An Nps Framework for Addressing Climate Change with Cultural Resources," *The George Wright Forum* 32, no. 1 (2015).

164 Ibid.

165 May Cassar and Robyn Pender, "The Impact of Climate Change on Cultural Heritage: Evidence and Response" (paper presented at the ICOM Committee for Conservation: 14th Triennial Meeting, The Hague, 2005).

166 Alessandra Bonazza, "Cultural Heritage in the Italian Strategy for Adaptation to Climate Change ", ed. B. Lefebvre and C. Sabbioni, *Cultural Heritage Facing Climate Change: Experiences and Ideas for Climate Resilience and Adaptation* (Bari: EDIPUGLIA, 2018).

167 Sabbioni, Brimblecombe, and Cassar, *The Atlas of Climate Change Impact on European Cultural Heritage : Scientific Analysis and Management Strategies.*

168 Cristina Sabbioni et al., "Vulnerability of Cultural Heritage to Climate Change," (Strasbourg, France: European and Mediterranean Major Hazards Agreement, Council of Europe, 2008); Sesana Elena et al., "Adapting Cultural Heritage to Climate Change Risks: Perspectives of Cultural Heritage Experts in Europe," *Geosciences* 8, no. 8 (2018).

169 Sandra Fatoric and Erin Seekamp, "Are Cultural Heritage and Resources Threatened by Climate Change? A Systematic Literature Review," *Climatic Change* 142, no. 1-2 (2017).

systematic literature review, Scott Allan Orr, a British engineer whose interest lies in heritage studies, together with Jenny Richards and Sandra Fatoric in their systematic literature review mentioned the lack of collaboration and coordination as a significant barrier to adapting cultural heritage to climate change. [170]

Above all, the proactive (preventative) or anticipatory approaches in climate adaptation allow more time to prepare for the effects of climate change. Reactive adaptation planning responses take place after disaster hits. Thus, Sesana and others suggested that heritage professionals should move away from reactive to proactive planning in the adaptation which can increase the climate-resiliency of the historic buildings in the future.[171] Caitlin DeSilvey, a British geographer interested in the cultural significance of the material change, referred to anticipatory adaptation, a concept used in a proactive approach, in analysing the past landscape narratives to draw a conclusion for future processes of coastal heritage in times of climate change.[172]

Critical heritage theories on cultural heritage under changing climate suggest clarifying the "active" role of heritage and exploring ways in which heritage contributes to climate crisis. The British geographer David Charles Harvey argues that climate debates channel through heritage, thus heritage is future-oriented.[173] He further analysed the narratives of landscapes to understand how changing climate and heritage are perceived by the local people.[174] An overwhelming amount of literature focuses on the local perceptions of climate change and its associated risks as evidence for climate change vulnerability and impact assessments. The Australian scholar in sustainable tourism Susanne Becken and others emphasize that the integration of this "insider knowledge" with climate modelling can further validate the results better during impact and adaptation studies.[175] According to German scholars in geography Anja Weber and Matthias Schmidt, the qualitative analysis of the perceptions that local people have regarding the changing climate in the case

170 Orr, Richards, and Fatorić, "Climate Change and Cultural Heritage: A Systematic Literature Review (2016–2020)."

171 Elena et al., "Adapting Cultural Heritage to Climate Change Risks: Perspectives of Cultural Heritage Experts in Europe".

172 Caitlin DeSilvey, "Making Sense of Transience: An Anticipatory History," *Cultural Geographies* 19, no. 1 (2012).

173 David Charles Harvey and Jim Perry, *The Future of Heritage as Climates Change: Loss, Adaptation and Creativity* (London, New York: Routledge, 2015).

174 Ibid.

175 Susanne Becken, Anu Kumari Lama, and Stephen Espiner, "The cultural context of climate change impacts: Perceptions among community members in the Annapurna Conservation Area, Nepal," Environmental Development 8 (2013/10/01/ 2013), https://doi.org/https://doi.org/10.1016/j.envdev.2013.05.007.

of the Peruvian Andes reveals that there is a conflict between local knowledge and scientific knowledge as well as the knowledge that is shared among the stakeholders involved.[176] They also recognized the translation of local and indigenous knowledge as the "downscaling of climate adaptation".[177] Uncovering local awareness of the effects of climate change and the analysis of these perceptions aims to bridge the gap between the stringent climate targets set by national policies and community-led local actions. Thus, embracing diverse voices, stories, memories, and narratives on the challenges that heritage assets face can activate local participation in terms of strengthening adaptation efforts, according to British archaeologists Rose Ferraby and Dominic Powlesland.[178]

Furthermore, this struggle between heritage and climate is a representation of the relationship between humans and the environment.[179] These discussions contributed to the redefinition of cultural heritage as an "active" solution to climate change adaptation rather than "passive".[180] Cornolius Holtorf, an archaeologist and a scholar in heritage studies, suggests that as heritage, heritage values and practices evolve and will likely to evolve in the anticipation of climate change, the heritage management and strategies towards it should also evolve.[181] This approach to heritage as a creative process of future-making[182] nods to capacity building. In this respect, oral histories and narratives of local communities can help us understand the dynamism between landscape, people, and heritage. Yet, the use of narratives or spatial analysis via GIS solely is not enough to analyze the effects of climate and disaster risks on cultural heritage sites, mainly vernacular heritage sites.

176 Anja Weber and Matthias Schmidt, "Local perceptions, knowledge systems and communication problems around the climate change discourse – examples from the Peruvian Andes," Erdkunde 70 (10/01 2016), https://doi.org/10.3112/erdkunde.2016.04.05

177 Ibid.

178 Rose Ferraby and Dominic Powlesland, "Heritage and landscape change: Recording, archiving and engaging with photogrammetry on the Jurassic Coast World Heritage Site," Proceedings of the Geologists' Association 130, no. 3 (2019), https://doi.org/https://doi.org/10.1016/j.pgeola.2019.02.007.

179 Ibid.

180 Dastgerdi Ahmadreza Shirvani, Sargolini Massimo, and Pierantoni Ilenia, "Climate Change Challenges to Existing Cultural Heritage Policy," *Sustainability* 11, no. 19 (2019).

181 Cornelius Holtorf, "Conservation and Heritage As Creative Processes of Future-Making," International Journal of Cultural Property 27, no. 2 (2020), https://doi.org/10.1017/S0940739120000107, https://www.cambridge.org/core/article/conservation-and-heritage-as-creative-processes-of-futuremaking/08E3735FFD8AF7DD841D4E057AFA651F.

182 Ibid.

2.4.1 From Climate Resilient to Vulnerable Vernacular Heritage Sites

The indigenous knowledge of vernacular heritage—an accumulation of years of experience and generational practices—corresponds to the surrounding environmental context. Although every place is facing specific hazards, the stories of the indigenous practices reveal disaster prediction, preparedness, prevention, mitigation, and adaptation knowledge, which apply to vernacular heritage in the world. An Algerian scholar in architecture and urban planning, Nadia Samia Daoudi studying the indoor climate comfort of vernacular architecture in a warm climate and others mentioned that global examples of vernacular heritage reveal that this form of cultural heritage is particularly resilient to disasters i.e. earthquakes, fires, hurricanes, overflow of rivers, and adaptable to the impacts of climate change.[183] Vernacular houses are often equipped with the necessary tools to be resilient to their surroundings with their specific construction detailing of the buildings.[184]

Many scholars such as Italian architect Letizia Dipasquale cover vernacular architecture as a heritage under the concepts of sustainability and disaster-resiliency inspired by its construction in favor of local context.[185] An American architect, Carl Elefante's quote on "the greenest building is… one that is already built" echoed among many debates. It was meant to emphasize the need to preserve, maintain, and reuse by strengthening the existing building stock.[186] In mitigation and adaptation efforts, strengthening the resilience of cultural heritage through local knowledge can contribute to the recovery processes from disasters.[187] More precisely, Cornelius Holtorf claimed that cultural heritage became a learning tool by giving references to the successful adaptation of past communities that embraced the disasters and built climate-responsive settlements.[188]

183 Nadia Samia Daoudi et al., "Vernacular Architecture in Arid Climates: Adaptation to Climate Change," ed. Manuel Correia Guedes and Gustavo Cantuaria, *Bioclimatic Architecture in Warm Climates: A Guide for Best Practices in Africa* (Cham: Springer International Publishing, 2019).

184 Eduardo Wiegand and Cristian Simonetti, "Vernacular Architecture and Climate Change," Oxford Urbanists, https://www.oxfordurbanists.com/oxford-urbanists-monthly/2020/1/5/vernacular-architecture-and-climate-change.

185 Letizia Dipasquale et al., "Resilience of Vernacular Architecture ", ed. Mariana Correia, Letizia Dipasquale, and Saverio Mecca, *VERSUS: Heritage for tomorrow, vernacular knowledge for sustainable architecture* (Firenze: Firenze University Press, 2014).

186 Carl Elefante, "The Greenest Building Is...One That Is Already Built," *FORUM JOURNAL* 27, no. 1 (2012).

187 Bárbara Mínguez García, "Resilient Cultural Heritage for a Future of Climate Change," *Journal of International Affairs* 73, no. 1 (2019).

188 Cornelius Holtorf, "Embracing Change: How Cultural Resilience Is Increased through Cultural Heritage," *World Archaeology* 50, no. 4 (2018).

Acknowledging that not all vernacular architecture respects local climatic conditions, the climate adaptability of these buildings has been the centre of recent discussions.[189] However, the interlinkage between resilience and the resilient character of vernacular is yet to be understood and clarified, according to Marcel Vellinga, who specialised in the anthropology of architecture, and architect Lindsay Asquith.[190] The resilient design principles of vernacular heritage derive from the processes of the transmission, interpretation, negotiation, and adaptation of vernacular knowledge, skills, and experiences, according to Priya Choudhary, an Indian architect and scholar.[191] The recognition of the importance of this type of heritage can pave the way for the identification of vulnerabilities and risks in addition to enhancing resilience through the prevention of anthropic risks.[192]

A significant point raised by Bárbara Mínguez García, a consultant in disaster risk management of cultural heritage, is the integration of cultural heritage into the discipline of disaster risk management to better understand disaster risk and climate change action for building resilience.[193] In this respect, she stated the importance of community values, traditions, knowledge, rituals, and customs in responding to severe hazards.[194] Notably, Ezcurra and Rivera-Collazo signalled the significance of current generations to learn from past climate events in their places to improve the local adaptive capacity and transfer this knowledge to the next generations.[195]

An Indian engineer, Jyoti Gautam, and others, through the analysis of non-structured interviews, detailed that vernacular dwellings elevated on wooden pillars were more resilient to floods than the structures in which the foundation started right from the

189 Plemenka Supic, "Vernacular Architecture: A Lesson of the Past for the Future," *Energy and Buildings* 5, no. 1 (1982).

190 Marcel Vellinga and Lindsay Asquith, "Vernacular Architecture in the 21st Century: Theory, Education and Practice," *Vernacular Architecture in the 21st Century: Theory, Education and Practice* (2005); Juanjo Galan, Felix Bourgeau, and Bas Pedroli, "A Multidimensional Model for the Vernacular: Linking Disciplines and Connecting the Vernacular Landscape to Sustainability Challenges," *Sustainability* 12, no. 16 (2020).

191 Priya Choudhary, "17 - Vernacular Built Environments in India: An Indigenous Approach for Resilience," in *Urban Disasters and Resilience in Asia* (Elsevier Inc., 2016).

192 Camilla Mileto et al., "The Research Project "Earthen Architecture in the Iberian Peninsula: Study of Natural, Social and Anthropic Risks and Strategies to Improve Resilience Risk-Terra Objectives and First Methodology," *ISPRS - International Archives of the Photogrammetry, Remote Sensing and Spatial Information Sciences* 44M1 (2020).

193 García, "Resilient Cultural Heritage for a Future of Climate Change."

194 Ibid.

195 Ezcurra and Rivera-Collazo, "An Assessment of the Impacts of Climate Change on Puerto Rico's Cultural Heritage with a Case Study on Sea-Level Rise."

ground in the case of Nepal.[196] The semi-structured interviews with local people identifying three types of hazards including floods, earthquakes, and cyclones revealed that inhabitants build mounds higher than previously experienced flood levels, proper sloping, and vegetation to strengthen the mounds.[197] Despite resilient features such as the extended roof of the veranda protecting the exterior façade from the excessive rainfall, the inhabitants should further enhance the resilience of these mud huts against floods and rainfalls.[198] The building resilience of vernacular heritage mainly relies on the communities and on their willingness to sustain it.

In terms of the interrelationship between disasters, vernacular, and resilience, Indian researcher and practitioner of planning, Kiran A. Shinde emphasized that vernacular settlements are often exposed to the maximum degree of damage during a disaster.[199] According to him, they also offer maximum resilience through the community's collective work in reconstruction.[200] Communities that relocated and reconstructed their settlements after an earthquake in Maharashtra failed to pursue their previous lifestyles and returned to their villages only to rebuild their houses without employing the earthquake resilient features of their traditional buildings.[201] This was a perfect illustration of the communities that forgot or dismissed the resilient methods and techniques that their former houses offered in building their new settlements. Local communities tend to disregard the traditional knowledge systems when disaster strikes.

Bilge Özel, a Turkish architect, among others highlighted the inadequate focus on utilizing the resilience of vernacular architecture in reducing the vulnerabilities in rural and urban settlements.[202] Transferring the knowledge of resilience in vernacular settlements to urban and rural development could diminish the occurrence and intensity of disasters. While looking at pre-crisis, crisis, and post-crisis phases, Dipasquale and

196 Jyoti Prajapati Dipendra Gautam, Kuh Valencia Paterno, Krishna Kumar Bhetwal and Pramod Neupane, "Disaster Resilient Vernacular Housing Technology in Nepal," *Geoenvironmental Disasters* 3, no. 1 (2016).

197 Imon Chowdhooree and Kanu Kumar Das, "Indigenous Knowledge of Mud Architecture: Experiences of Surviving against Multiple Natural Hazards," *International Journal of Disaster Resilience in the Built Environment* ahead-of-print, no. ahead-of-print (2021).

198 Ibid.

199 Kiran A. Shinde, "Disruption, Resilience, and Vernacular Heritage in an Indian City: Pune after the 1961 Floods," *Urban Studies* 54, no. 2 (2016).

200 Ibid.

201 Jennifer Duyne Barenstein and Sushma Iyengar, "India: From a Culture of Housing to a Philosophy of Reconstruction," (2010).

202 Bilge Özel, "Resilience and Intangible Heritage of Vernacular Architecture" (paper presented at the VerSus 2014: International Conference on Vernacular Heritage, Sustainability and Earthen Architecture, Valencia, Spain, 2014).

others related the environmental resilience of vernacular architecture to prevention, resistance, and adaptation.[203] Strategies of prevention can include the management of land use, ensuring appropriate choice of site and materials, considering the hydrography of the place, the management of water resources, the comprehension of meteorological and biological systems, and considering the specific characteristics of local risks. [204]

Vernacular heritage conveys the traditional knowledge and practices to improve the resilience of local communities in the face of climate change-related disasters.[205] The analysis of the statements of the local residents may highlight the know-how knowledge, failures, and success recovery stories of vernacular heritage from past to present. Strengthening the resilience of vernacular heritage against the consequences of climate change is significant in safeguarding these traditional knowledge systems. Thus, there is a need for improvement of the resilience of vernacular building cultures and practices of local communities to better prepare for climate-related disasters.

2.4.2 Managing the Integrated Climate Disaster Risks for Vernacular Heritage Sites

The concept of Disaster Risk Management (DRM) for cultural heritage focuses on the protection of artefacts or sites besides all concerns for human lives and livelihoods. Although the concept is mostly analyzed in understanding the threats of disasters on cultural heritage sites, objects, and intangible values, it has been currently picked up by scholars to address the challenges derived from changing climate. In this sense, Rohit Jigyasu, an Indian conservation architect who specialized in risk management, claims that assessments of the impacts of climate change and monitoring of the sites should be integrated into disaster risk management of cultural heritage.[206] He further elaborates on the importance of including the impacts of climate change on cultural heritage in disaster risk planning and management. [207]

203 Dipasquale et al., "Resilience of Vernacular Architecture ".

204 Ibid.

205 UNESCO, "Climate Change and World Heritage," https://whc.unesco.org/en/climatechange/; "Vanuatu's Traditional Architecture Makes a Community More Resilient in the Face of Climate Change-Related Disasters," https://en.unesco.org/news/vanuatus-traditional-architecture-makes-community-more-resilient-face-climate-change-related.

206 Rohit Jigyasu, "Managing Cultural Heritage in the Face of Climate Change," *Journal of International Affairs* 73, no. 1 (2019).

207 "Challenges and Opportunities for Disaster Risk Management of Cultural Heritage against Floods," *ICOMOS - Booklets of the German National Committee* 60 (2015).

In spite of the great influences of climate change on disaster risk management of cultural heritage, it has been long separated from disaster risks[208] both in literature and policies for building the resilience of cultural heritage, according to the Italian architect Francesca Giliberto who is specialized in heritage. It may be due to the divergences between the two approaches. Anne Gero, an Australian disaster risk specialist, and others state that climate change adaptation is viewed as long-term, political-driven, originating from science, encompassing changes to average conditions, focusing only on climate-related hazards, and with sizeable and growing funding streams.[209] Disaster risk reduction as a policy objective for disaster risk management[210] aims to reduce the disaster risks, whereas climate change adaptation by taking actions to reduce vulnerabilities to the adverse effects of climate change aims to build resilience as Sesane puts.[211] Jessica Mercer, a British consultant states that disaster risk reduction has a long record of local-level successful works in reducing vulnerabilities of communities and supporting development, which could only be achieved based on past knowledge whilst considering future threats.[212] In this regard, the climate change adaptation discourse in the local context was found to be problematic as scholars studying disaster risk reduction including climate hazards already stated this gap decades ago.[213] Recognizing these differences, the adoption of a holistic view of the integrated climate disaster risks in cultural heritage sites can provide opportunities in terms of building resilience.

Moreover, Riccardo Cacciotti, an Italian scholar in heritage studies, and others by developing a web GIS tool in disaster-prone and heritage-rich contexts in Central Europe aimed at supporting decision-making processes for integration of cultural heritage in national and regional plans for disaster risk reduction.[214] The disaster risk management of vernacular heritage has become more intricate with rising concerns about the effects of climate change. In the context of vernacular heritage, the notion of disaster risk reduction recurred the most due to the resilient

208 Francesca Giliberto, F. Heritage, Disaster Response and Resilience; 2752-7026; 2021

209 Anna Gero, Kirstie Méheux, and Dale Dominey-Howes. "Integrating Disaster Risk Reduction and Climate Change Adaptation in the Pacific." *Climate and Development* 2011, 3, 310-327, doi:10.1080/17565529.2011.624791.

210 Prevention Web. "Understanding Disaster Risk." Available online: https://www.preventionweb.net/understanding-disaster-risk/risk-drivers/climate-change (accessed on 19 May 2022).

211 Elena Sesana et al., "An Integrated Approach for Assessing the Vulnerability of World Heritage Sites to Climate Change Impacts," Journal of Cultural Heritage (2019).

212 Jessica Mercer, "Disaster Risk Reduction or Climate Change Adaptation: Are We Reinventing the Wheel?" *Journal of International Development* 2010, 22, 247-264, doi:https://doi.org/10.1002/jid.1677.

213 Jean-Christophe Gaillard, *The Invention of Disaster: Power and Knowledge in Discourses on Hazard and Vulnerability*, 1st ed.; Routledge: 2021.

214 Riccardo Cacciotti et al., "Climate Change-Induced Disasters and Cultural Heritage: Optimizing Management Strategies in Central Europe," *Climate Risk Management* 32 (2021).

features of vernacular heritage.[215] Moreover, vernacular heritage is mostly analyzed in earthquakes,[216] whereas the detrimental effects of floods and landslides are almost ignored.

Despite these disasters arising in the national context, the archaeologist Emily C. Arauz noticed the weak participation of local stakeholders in the management and preservation of urban and rural cultural sites in Türkiye at the conference "The Future of the Past: From Amphipolis To Mosul" organized jointly by the Boston University and Mosul University on April 10th and 11th in 2015. There is an ongoing disagreement between local stakeholders and the national government. With the support of NGOs such as associations, local stakeholders protest decisions such as the construction of nuclear power plant in the Black Sea region by the national government. The interest of local stakeholders is over the protection of their community and environment from the destruction brought by the development projects of the national government. Although the collaboration of these stakeholders holds significance for the public, it has few power over the change of political decisions. Furthermore, there is yet to establish more collaboration with international partners to address the loss of cultural heritage in these countries.[217]

There are several threats to vernacular sites that are not being considered by many scholars in larger city/spatial/regional planning efforts (as discussed in Chapter 2.4.2). The monitoring of the vernacular landscape as a "whole entity" with its past stories, ongoing climate changes, and human activities has not yet been adequate to plan for climate adaptation. To facilitate mitigation and adaptation responses, a participatory approach is needed by engaging a diverse range of different stakeholders, including local community members, site managers, municipal authorities, organizations, and local, regional, and national policymakers.[218]

215 Rohit Jigyasu, "Reducing Disaster Risks to Urban Cultural Heritage: Global Challenges and Opportunities," *Journal of Heritage Management* 1, no. 1 (2016); Timothy Sim, Lena Dominelli, and Jocelyn Lau, "A Pathway to Initiate Bottom-up Community-Based Disaster Risk Reduction within a Top-Down System: The Case of China," *International Journal of Safety and Security Engineering* 7, no. 3 (2017).

216 Richard Michael Johnson et al., "Community Vulnerability and Resilience in Disaster Risk Reduction: An Example from Phojal Nalla, Himachal Pradesh, India," *Regional Environmental Change* 18, no. 7 (2018).

217 Valentina Pica, "Beyond the Sendai Framework for Disaster Risk Reduction: Vulnerability Reduction as a Challenge Involving Historical and Traditional Buildings," *Buildings* 8, no. 4 (2018).

218 Gül Aktürk and Sandra Fatorić, "Roundtable Iii: Climate Change Adaptation of Cultural Heritage," in *Lde Heritage Conference on Heritage and the Sustainable Development Goals: Proceedings*, ed. S. Fatoric U. Pottgiesser, C. Hein, E. de Maaker, & A. Pereira Roders (TU Delft Open, 2021).

2.5 Vernacular Architecture as a Form of Heritage in Türkiye

Vernacular heritage emerges from the studies on the history of architecture and urban planning which refers to vernacular architecture. Before the recognition of vernacular architecture as a form of heritage by scholars, the studies of Turkish architectural history clearly contributed to the studies of vernacular architecture. The studies on vernacular architecture expanded largely but it is yet to be understood, especially in the context of Türkiye. The discussion on the concept is fuelled by Turkish literature with the introduction of similar words describing the vernacular buildings from Anatolia. The introduction of the concept of vernacular in academic discussions has been quite problematic. The titles of the works of the greatest Turkish architects highlighted the use of the terms local, rural, traditional, and village architecture interchangeably with the term vernacular architecture. Avoiding the use of the term vernacular caused controversies in understanding the concept of vernacular in Turkish literature. As architects like to put a label on the architectural style and attribution, vernacular architecture though not difficult to identify, was and still is downgraded in architectural history globally.[219] On a personal note, the systematic gap may be one of the reasons why the terminology is still confusing in Turkish literature. However, this study does not aim to come to a conclusive definition here.

Existing literature on vernacular architecture in Türkiye is based on the scholarly works of Turkish civil architecture by famous Turkish architects and scholars such as Sedad Hakki Eldem, Dogan Kuban, Cengiz Bektas, Ahmet Eyüce, and Uğur Tanyeli. In his book *Turk Evi* (Turkish House) published in 1968, Sedad Hakkı Eldem evaluates the "transnational character of Ottoman house" [220] as a Turkish identity. He explains in his book the Turkish house plan typologies and claims that Turkish houses with approximately 500 years of history are located on these lands, which are occupied by the Ottoman Empire (Figure 2.2).[221]

219 Kingston Wm Heath, "Defining the Nature of Vernacular," *Material Culture* 20, no. 2/3 (1988).

220 Serena Acciai, "The Ottoman-Turkish House According to Architect Sedad Hakkı Eldem " *ABE Journal* 11 (2017).

221 Sedad Hakkı Eldem, *Türk Evi Plan Tipleri* (Istanbul: Istanbul Teknik Üniversitesi Mimarlık Fakültesi Yayınları, 1954).

FIG. 2.2 *Cumba*,[222] also known as a bay window, was used to provide shadow in the streets. Source: Taha Toros Archives.

222 Cumba in Ottoman architecture is a significant element mostly seen in timber buildings. It is a closed balcony in the first or following floors, which can be a part of the room. See: Yagci, F. (2019) "Architectural Elements of the Wooden Houses from the Latest Period of Ottoman Period," Dergipark: pp. 66-75

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FIG. 2.3 A Turkish House, Taha Toros Archives reveals timber-built grand buildings mostly located in Istanbul but the evidence of houses outside Istanbul was very rare due to the difficulties in logistics. Source: Taha Toros Archives.

He was focusing on the High Vernacular rather than traditional Turkish houses (Figure 2.3). Dogan Kuban in 1976 *Türk Hayatlı Evi* described the term "hayatli ev",[223] in the title as the production of the authentic lifestyles of a Turkish family in the hinterland.

Eldem in 1940 examined the relationship between material, land, and climate in his piece "towards local architecture."[224] He claimed that the city coast and city hinterland cannot have the same conditions in terms of climate.[225] Kuban further divided the typologies of the houses based on the materials in addition to climatic features of seven different regions, including (1) masonry in Southeast Anatolia, (2) stone wall with bonding timber in Eastern Anatolia, (3) timber-framed in the Black Sea, (4) cubic stone in Aegean and Mediterranean, (5) masonry in Central Anatolia

223 Dogan Hasol in his book of "Dictionary : Architecture & Building" explains the notion of "Hayat" as the gallery or stoa in front of the rooms of the first floor in traditional Turkish houses. Hayatli ev is the house with this component.

224 Sedat Eldem, "Yerli Mimarîye Doğru," *Arkitekt* 3-4, no. 111-112 (1940).

225 Ibid.

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(Cappadocia), (6) adobe in Central Anatolia (7) timber frame with adobe filling also known as *hımış* in "north-eastern coastal areas and from North Taurus Mountains to the inner Aegean".[226] The pioneer of the history of Turkish art and architecture, deceased professor Haluk Sezgin revealed that the use of timber may be observed in the northwest of Türkiye, the coast of the Black Sea, Marmara, in the inner Aegean, and the Mediterranean regions but the different lifestyles nevertheless produced a diversity of the houses in each region.[227]

Ipek Tureli, an architect and a scholar, explained "the heritagisation of vernacular houses in Turkey" as a result of preservation concerns over the destruction of historic settlements in Europe after the Second World War because of rapid urbanization.[228] But the buildings in Anatolia representing the rural folk architecture is far away from what's known as "Turkish architecture." Disassociated from idealized elite vernacular buildings, these underrepresented vernacular buildings in Anatolia display simplicity, authenticity, and utility.[229] Despite its heritagisation, vernacular heritage has not been evaluated by scholars in the context of the contemporary challenge of climate change until very recently.

2.5.1 Regional Characteristics of Vernacular Architecture in the Black Sea in Response to Contemporary Issues

The vernacular architecture in the Black Sea has been conflictual as various terms are used to describe this architectural style. The ethnic culture known as *Laz* or *Lazuri* living in the districts of Fındıklı, Pazar, Ardesen was used to describe the vernacular architecture of the region. However, *Hemshin* which is yet another ethnic group related to Armenians also resides in the city. Thus, even the characteristics of the architecture in the city do not reflect the vernacular architecture of Fındıklı. The ethnic group shaping the vernacular architecture of the district of Fındıklı is Lazuri (Figure 2.4).

226 Doğan Kuban, "Türkiye'de Malzeme Koşullarına Bağlı Geleneksel Konut Mimarisi Üzerinde Bazı Gözlemler," *Mimarlik* 36, no. 10 (1966); Elif Acar Bilgin, "Rural Architectural Characteristics and Conservation Issues of Alaaddinbey Village in Bursa, Turkey," in *Conservation of Architectural Heritage: A Culmination of Selected Research Papers from the Second International Conference on Conservation of Architectural Heritage (Cah-2), Egypt 2018*, ed. Dean Hawkes, et al. (Cham: Springer International Publishing, 2019).

227 Halûk Sezgin, "Yoresel Konut Mimarisi Ve Turkiyedeki Örnekleri Hakkinda," *Tasarim Kuram*, no. 4 (2006).

228 Ipek Türeli, "Heritagisation of the "Ottoman/Turkish House" in the 1970s: Istanbul-Based Actors, Associations and Their Networks " *European Journal of Turkish Studies [Online]* 19 (2014), http://ejts.revues.org/5008.

229 Sibel Bozdogan, "Vernacular Architecture and Identity Politics: The Case of the "Turkish House"," *Traditional Dwellings and Settlements Review* 7, no. 2 (1996).

FIG. 2.4 A typical Lazuri house with its regular and modular form of façade which consists of small and rectangular frames filled with stones inside. Source: Laz, CC BY-SA 4.0 <https://creativecommons.org/licenses/by-sa/4.0>, via Wikimedia Commons

Therefore, the majority of the local terms describing the houses, rooms, and traditions around it are still in then Lazuri. Most of the scholars studied these settlements from the example of the buildings.

The regional characteristics of the vernacular heritage are based on in-depth investigations by Turkish scholars, the majority of those who were born and raised in the region but in different cities i.e. Orhan Özgüner, Mustafa Reşat Sümerkan, Cengiz Eruzun, Serap Ünal-Leloğlu, Haşim Karpuz, Seyfi Başkan, Hamiyet Özen, Erim Gazanfer, Şengül Öymen Gür, and Önder Küçükerman. The architect, civil engineer, and professor, Necati Şen in his book *Rize'den Bes Ev* (Five Houses from Rize) published in 1967 drew the schemes of these buildings and conducted a questionnaire to build the relationship between the optimum micro-climate and user comfort in living in them.[230] His drawings on the roof detailing and the air circulation scheme from the examples of five buildings were particularly significant in

230 Necati Şen, *Five Houses in Rize*, vol. 53, Itu Publication (İstanbul: Fono Press, 1967).

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understanding how the large eaves work in the protection of these buildings and the air circulation. Following his work, Orhan Özguner, a Turkish architect and a scholar, visited the site and did an analytical building survey in 1968, and presented the study in his book *Koyde Mimari*[231] (Village Architecture). His book revealed a lot of planning and architectural details about the settlements, buildings, and bridges in his sketches and drawings from the cities such as Giresun, Trabzon, Rize in the region.

The studies range variously from analytical sketches to identify the plans to customary behavioural patterns that shaped the living in these buildings. Similarly to Özgüner, a professor and an industrial designer born in Trabzon, Önder Küçükerman in his short survey of the region in 1970 gave an overview of the regional characteristics through building survey and sketches (Figure 2.5).[232] These sketches reflect the harmonious relationship between the settlements and the steep topography, which allows each building to have a view of the landscape without interrupting the view of the neighboring buildings (Figure 2.6). These observations later shaped his books such as *Anadolu Mirasinda Türk Evleri* published in 1995 and *Das Alttürkische Wohnhaus: Auf der Suche Nach der R*äumlichen Identität in 1992 on Anatolian houses which his expertise lies in addition to the industrial design, glass, and ceramics. Serap Ünal-Leloğlu, a Türkish art historian, wrote in 1987 about a building in the city of Rize to deduct analyses of the historic built environment and the interior design of the building.[233] As an architect and scholar born and studied in Trabzon, Mustafa Reşat Sümerkan, inspired by the aforementioned book of *Köyde Mimari* (Village Architecture), adopted a grid system in the region to analyse different building typologies and building techniques used in these settlements.[234] He later in an informal meeting claimed that a detailed analysis of the lifestyles of the local people or surveying small components such as the kitchen and eating habits of the local people only would be enough to draw conclusions on the planning of these buildings. This was to suggest later researchers investigate these buildings with a deeper focus rather than analysing them at a greater scale such as at the regional level. His works extend beyond the built heritage to the intangible heritage of the local communities prominently living in Trabzon. His current interest is to obtain the old-fashioned items used in the vernacular settlements and architectural photography to capture the nature and objects in the area.

231 Özgüner, "Village Architecture in the Eastern Black Sea Region."

232 Önder Küçükerman, "A Short Survey of Residential Architecture of Karadeniz Region," *Turkiye Turing Otomobil Kurumu Belleteni* 25, no. 304 (1970).

233 Serap Ünal Leloglu, “Anadolu Turk Evi’nden Yerel Bir Örnek: Rize Evi,” *Erdem Dergisi* 3, no. 7 (1987).

234 Mustafa Reşat Sümerkan, “Building Characteristics of the Traditional Houses in Respect to Shaping Factors at Eastern Black Sea Region” (Unpublished PhD diss., Karadeniz Technical University, 1990).

FIG. 2.5 Watercolor painting of the timber-framed vernacular buildings sparsely located in Sürmene in Trabzon illustrated by the architect Bülent Cetinor. Source: Taha Toros Archives.

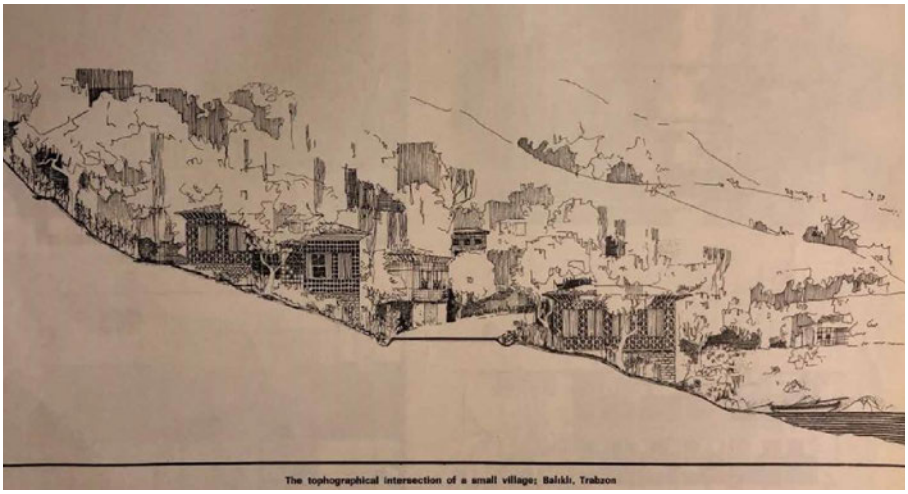

FIG. 2.6 A sketch depicting the timber-framed buildings with the shape of rectangles and triangles on the frames. Each building faces a different angle not to disrupt the view of the neighbours. Source: Türkiye Turing ve Otomobil belleteni 1970 January, March No 25/304.

Born in Fındıklı, a professor and an architect, Cengiz Eruzun as a co-author of the book *Anadolu'da Ev ve İnsan* (Houses and people in Anatolia) which is published in 1992 with Metin Sözen summarized the architectural history in Anatolia from the examples of the houses, including the factors in the evolution of vernacular architecture such as climate and terrain. In 1997, Cengiz Eruzun evaluated the sites in the region, including the *yayla* houses known as highland houses from the lens of the use of wood.[235] Şengül Öymen Gür, a professor in architecture, specifically focusing on housing at the Beykent University, edited a book in 2000 which

235 Cengiz Eruzun, "Ahsabin Kimlik Buldugu Dogu Karadeniz Mimarisi," in *V. Milletlerarasi Turk Halk Kulturu Kongresi Maddi Kultur Seksiyon Bildirileri* (Ankara: T.C. Kultur Bakanligi, 1997).

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is inspired by the previous works of scholars in the region to investigate the characteristics determining the regional vernacular architecture. She participated in the analysis of housing culture by applying the criteria of physical individual needs in combination with their social, cultural, and emotional needs.

Despite the scholarly work on building surveys of individual sites with detailed architectural drawings, there is a lack of systematic documentation of this form of heritage.[236] Due to the inaccessibility, lack of data and tools, and lack of funding, aforementioned scholars such as Ozguner and Sumerkan stated the difficulty of surveying the site extensively in the 1960s and 70s when industrialization processes destroyed some of the examples. Documentation as the primary method of understanding vernacular heritage[237] is a necessary step towards the identification of the issues and challenges of preservation.

The industrialization has caused a rapid change in the livestyles of local communities by shifting labor-intensive, traditional and handmade work to more capital-oriented mass production. This transformed the vernacular way of building into standardised building systems by the use of industrial materials that erased the traces from ancestral knowledge systems. Standardization of modern buildings also derives from the building regulations, which do not encourage the use of locally available materials and constructions with know-how skills of building techniques. For instance, the use of brick and briquette as construction material and concrete additions to these buildings cause the loss of the vernacular identity of these settlements.[238] Many development projects and works do not respect the heritage value of the vernacular settlements.[239] The construction of new buildings and infrastructures at incompatible scales, techniques, and materials deteriorates these settlements.[240] Since the 1950s, the use of new tools, workshops, and processing of wood with modern technical equipment decreased the value of artisans and artisanship. The exploitation of forests and natural resources led to the extinction of timber with its use as heating fuel. This is because the preservation of vernacular buildings does not bring additional economic value to the city's development.

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236 Hamiyet Ozen and Servet Keles, "Vernacular Building Heritage in the Eastern Black Sea Region in Turkey," in *CHRESP: 8th EC Conference on Sustaining Europe's Cultural Heritage* (Ljubljana, Slovenia2008).

237 M. N. Ashish Ganju, "Documentation and Conservation of Vernacular Architecture: Conservation and Continuity," *International Journal of Environmental Studies* 73, no. 4 (2016).

238 Ibid.

239 Ibid.

240 Mustafa Reşat Sümerkan, "Gelenekselden Betonarmeye Trabzon Kırsal Mimarlığı " *Mimarlik* 234, no. 89/2 (1989).

Among the recurring issues of preserving this form of heritage is the abandonment of the buildings by their owners due to migration from the villages to cities, resulting in rapid decay.[241] The rare examples of vernacular architecture are vanishing and the registration of vernacular architecture as heritage and legal protection and preservation of it fall short.[242] The economic conditions of the local communities do not favor the better management of the vernacular sites as the preservation of these buildings can be costly. Public awareness of the heritage value and protection of the vernacular landscape is significant and crucial for transferring the traditional knowledge of artisanship and techniques to future generations.[243] The support in projects and practice in the restoration of these buildings from the public stakeholders can help the preservation of the individual buildings.[244]

Noting the effects of globalization, industrialization, conflict, and disasters, scholars have repositioned vernacular architecture in the twenty-first century in the context of sustainability, disaster resilience, and management.[245] The building culture of vernacular landscapes highlighted the challenges of pollution, energy[246], waste, thermal comfort, and others. The expression "learning from the past"[247] is used in the concept of vernacular architecture to mainstream the environmental- friendly design for contemporary construction.[248] Local food production, self-sufficiency, self-building, and manufacturing are some of these takeaways.[249]

241 Ozen and Keles, "Vernacular Building Heritage in the Eastern Black Sea Region in Turkey."

242 Koray Güler and Ayşe Ceren Bilge, "Construction Techniques of the Vernacular Architecture of the Eastern Black Sea Region," in *International Conference on Vernacular Heritage and Earthen Architecture: Towards a Sustainable Future*, Proceedings of the International Conference on Vernacular Heritage, Sustainability and Earthen Architecture (Valencia, Spain: CRC Press, 2014).

243 Ibid.

244 Seyfi Başkan, "Traditional Houses in the Eastern Black Sea Region," *Journal of Atatürk Culture Center Issue*, no. 52 (2008).

245 Marcel Vellinga, "The Noble Vernacular," *The Journal of Architecture* 18, no. 4 (2013); Suha Özkan, "Traditionalism and Vernacular Architecture in the Twenty-First Century," in *Vernacular Architecture in the Twenty-First Century: Theory, Education and Practice*, ed. Lindsay Asquith and Marcel Vellinga (London Taylor & Francis, 2006).

246 Ignacio Javier Gil Crespo, María del Mar Barbero Barrera, and L. Ramos, "Climatic Analysis Methodology of Vernacular Architecture" (2014).

247 Bashir Kazimee, *Learning from Vernacular Architecture: Sustainability and Cultural Conformity*, vol. 113 (2008).

248 Vellinga, "The Noble Vernacular."

249 Letizia Dipasquale, Saverio Mecca, and Bilge Özel, "Productive Settlements," ed. Mariana R. Correia, Letizia Dipasquale, and Saverio Mecca, *VERSUS, HERITAGE FOR TOMORROW: Vernacular Knowledge for Sustainable Architecture* (Italy: FUP Firenze University Press, 2014).

Nevertheless, vernacular settlements affect the lifecycle of a building, with choosing a site, then building it, and its afterlife and reuse. Revival of vernacular heritage in the last two decades and utilizing some of these lessons in climate adaptation has become an aspiration of architects, planners, and researchers. [250] In these processes, the relation between climate and vernacular houses has globally received increasing interest in the literature, mostly in specific regions or countries such as Türkiye.[251] In natural harmony with the local climate, vernacular houses in the Black Sea region exemplify this strong link as a focus of these studies (see Chapter 4).[252] Taking the vernacular landscapes from this particular region as a reference, architects and planners can understand the conscious acts behind the building criteria including the climatic conditions in forming vernacular architecture. By doing so, vernacular knowledge and decisions are key to the understanding of disaster consequences, particularly within climate discourses.[253]

Climate change and disasters such as those linked to the risk of erosion are causing the abandonment of these sites in the Black Sea region.[254] The spatial changes in the landscape often increase the occurrence of disasters in the area (see Chapter 5). Profit-oriented and spatial planning decisions often disregard the cultural and natural resources of vernacular landscapes.[255] As these changes may derive from spatial planning strategies, the contributing factor of local level practices on vernacular landscapes cannot be denied. The higher decision-making systems in regional and city planning do not include the local-level processes in the preservation of vernacular heritage. Similarly, the local practices do not comply with the spatial planning decisions, such as the construction of hydraulic works.

250 Sebastien Moriset, Bakonirina Rakotomamonjy & David Gandreau. “Can earthen architectural heritage save us?.” *Built Heritage* 5, 19 (2021).

251 Vellinga, “The Noble Vernacular.”

252 Nihan Engin et al., “Climatic Effect in the Formation of Vernacular Houses in the Eastern Black Sea Region,” *Building and Environment* 42, no. 2 (2007); Faris Karahan and Sanaz Davardoust, “Evaluation of Vernacular Architecture of Uzundere District (Architectural Typology and Physical Form of Building) in Relation to Ecological Sustainable Development,” *Journal of Asian Architecture and Building Engineering* 19, no. 5 (2020).

253 Mihaela Hărmănescu and Cristina Enache, “Vernacular and Technology. Inbetween,” *Procedia Environmental Sciences* 32 (2016).

254 Koray Güler and Yegân Kâhya, “Developing an Approach for Conservation of Abandoned Rural Settlements in Turkey,” *ITU Journal of the Faculty of Architecture* 16, no. 1 (2019).

255 Emine Cigdem Asrav, “Protecting Landscape as a Network of Relations: Challenges and Perspectives in the Case of Imerhev (Meydancik) Valley,
Turkey,” *RI-VISTA. RICERCHE PER LA PROGETTAZIONE DEL PAESAGGIO* 02 (2019); Emine Çiğdem Asrav, “Re-Defining & Re-Assessing Vernacular by Reciprocal Relationship between People & Nature: The Case of Taşkale Village in Karaman, Turkey” (paper presented at the The International Seminar on Vernacular Settlements, 2014).

2.6 Land Use/Land Cover Change and Its Impact on Disaster Risks in the City of Rize

Land use and land cover planning is a significant component of integrated climate disaster risk management, especially in the selected case study area of Rize. By taking the example of Rize and other Black Sea cities, many Turkish scholars noted the contributing factors of the changes in land use and land cover to the disasters of flooding and landslides. Ali Yalcin, a scholar in natural hazards, indicated that the recurrent events of floods and landslides have adversely affected the regional economies with the loss of agricultural harvest, properties, and infrastructures along with the increasing fatalities in the Eastern Black Sea region.[256] The case-related studies heavily focused on the assessments of land use/cover and vegetation about the landslides by using GIS separately from the studies on flooding. The factors of geographical, topographical, and climatological conditions in shaping the local landscape are continuously challenged by changing climate and continuous anthropic activities which accelerate the disasters and their damage to the settlements. Increasing populations led to new anthropic activities such as industrialization, deforestation, changes in land use, and change in consumption habits.

In the literature, Fevzi Karsli, a surveying engineer, and others used GIS software and digital photogrammetric method to analyse landslide-prone areas from aerial photographs of 1973 and 2002.[257] These landslide prone areas were analysed in relation to the landslide conditioning factors of lithology, slope gradient, slope aspect, vegetation cover, land class, climate, rainfall, and proximity to roads.[258]

256 Yalcin, "Environmental Impacts of Landslides: A Case Study from East Black Sea Region, Turkey."; Veli Süme, Berrin Tansel, and Mehmet Selçuk Güner, "Doğu Karadeniz Bölgesinde Meydana Gelen Sellerin Etkilerini Ve Zararlarını Azaltmak Için Öneriler," *Doğal Afet ve Afet Yönetimi Sempozyumu* (2016).

257 Fevzi Karsli et al., "Effects of Land use Changes on Landslides in a Landslide-Prone Area (Ardesen, Rize, Ne Turkey)," *Environmental monitoring and assessment* 156 (2008).

258 Ibid.

Similarly, an architect and engineer, Aykut Akgun among others prepared landslide susceptibility maps[259] by combining GIS software with a remote sensing method.[260] Furthermore, Selcuk Reis, an engineer in geomatics, and others analyzed land use/cover changes between 1976 and 2000 by using remote sensing and GIS with the integration of LANDSAT images to depict the transformation in the landscape as a result of deforestation on greater scales.[261] Of all the extensive studies on land use and cover, Bengi Korgavuş, a landscape architect, both qualitatively and quantitatively measured, compared, and analyzed changes in the cultural landscapes of Rize through historical aerial photos from 1955, 1989, and 2009 by using GIS and face-to-face interviews with relevant stakeholders.[262] This latter study examines the separate components of the cultural landscape of Rize i.e. roads, urban settlements and buildings, rivers, forests, and farmlands.

As Rize comprises forested areas in mountainous ranges, the spatial and temporal changes in land use and forest cover were also investigated by Alkan Gunlu, a forestry engineer, through analysis of maps from 1984 and 2007 in combination with GIS and FRAGSTATS™, which calculates a number of spatial metrics for quantifying landscape structure.[263] By using the scattering technique with Sentinel-1 SAR data, Esra Erten, an engineer in geomatics and Cristian Rossi, an Italian scholar in environmental engineering detected land reclamation and monitored it mainly in the city centre and one rural area.[264] In the context of sustainable ecotourism as a part of rural heritage, Mustafa Atasoy a scholar studying geomatics, and others identified an increase in the number of buildings in Ayder highland in Rize through the maps from 1974, 1989, and 2008.[265]

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259 Aykut Akgun, Serhat Dag, and Fikri Bulut, "Landslide Susceptibility Mapping for a Landslide-Prone Area (Findikli, Ne of Turkey) by Likelihood-Frequency Ratio and Weighted Linear Combination Models," *Environmental Geology* 54, no. 6 (2008).

260 Selçuk Reis et al., "Remote Sensing and Gis-Based Landslide Susceptibility Mapping Using Frequency Ratio and Analytical Hierarchy Methods in Rize Province (Ne Turkey)," *Environmental Earth Sciences* 66, no. 7 (2012).

261 Selçuk Reis, "Rize İlinin Arazi Örtüsündeki Zamansal Değişimin (1976–2000) Uzaktan Algılama Ve Coğrafi Bilgi Sistemi Ile Belirlenmesi," in *TMMOB Harita ve Kadastro Mühendisleri Odası Ulusal Coğrafi Bilgi Sistemleri Kongresi* (KTÜ, Trabzon2007).

262 Bengi Korgavuş, "Rize Merkez Ilcesi KültüRel Peyzaj Alanlarında Zamansal Degisimin Cografi Bilgi Sistemleri Ile Belirlenmesi," *Artvin Çoruh Üniversitesi Orman Fakültesi Dergisi* 15, no. 2 (2015).

263 Alkan Günlü et al., "Spatiotemporal Changes of Landscape Pattern in Response to Deforestation in Northeastern Turkey: A Case Study in Rize," *Environ Monit Assess.* 148, no. 1-4 (2009).

264 Esra Erten and Cristian Rossi, "The Worsening Impacts of Land Reclamation Assessed with Sentinel-1: The Rize (Turkey) Test Case," *International Journal of Applied Earth Observation and Geoinformation* 74 (2019).

265 Mustafa Atasoy, Selçuk Reis, and Cenap Sancar, "Sürdürülebilir Turizm Gelişmesi Ve Yayla Turizme: Ayder Yaylası," in *TMMOB Harita ve Kadastro Mühendisleri Odası 12. Türkiye Harita Bilimsel ve Teknik Kurultayı* (Ankara 2009).

Many of the examples quantify the landslides and their susceptibilities along with changes in land use/ cover, vegetation, tea plantation, and coastal developments without giving consideration to their implications for the vernacular heritage in the hinterland. There are no studies that detect the risk-prone cultural heritage sites and link them to changes in land uses and river transformations in the selected case area.

The vernacular heritage including natural and intangible aspects in Fındıklı is under the threat of rapid landscape changes with an expanding monoculture of tea plantations, and regional development plans i.e. implementation of hydro-electrical power plants, according to Aylin Alisan, a landscape architect.[266] Inland areas were transformed by human-initiated changes in land use with the cultivation of tea crops, hazelnut, and cornfields which enhanced the consequences of climate change. Aside from the local's attempts to produce tea, and hazelnut in their small gardens, national and regional policies and projects encouraging high rates of urbanisation and deforestation of hills speeded the degradation of cultural and natural heritage by exposing these heritage resources to landslides. Identification of vernacular heritage sites which are prone to direct and indirect impacts of flooding and landslides can fill gaps in an official dataset of relevant stakeholders, literature interpretations, and policy recommendations on the management of heritage sites.

2.7 Conclusion

Vernacular landscapes are constantly evolving and adapting due to the interventions at various scales. In studying the vernacular landscapes, the documentation of vernacular buildings is not enough. In terms of methodological approaches, spatial analysis can help in focusing on a particular area facing risks, while narratives of local people can complement the analysis of disaster risk in vernacular landscapes by presenting evidence on loss and damage. Loss and damage at individual building level is not visible in spatial analysis. Therefore, the narratives of local people can help down-scaling the issue of climate change by identifying the material loss and damage along with other issues at a building scale. The insights of local communities

266 Aylin Alisan, "Tea: A Touchstone for Understanding Fındıklı Transformations in Agricultural Landscapes: A Cultural Landscape Case Study for Fındıklı-Rize, Turkey" (masters diss., Ankara University, 2013).

play an important role in the methodological approaches in the analysis of land use changes as well as the maintainance practices of the vernacular buildings. Drawing on the qualitative and quantitative data, the consequences of bottom-up and top-down actions and decisions can come together to develop disaster risk assessment of vernacular heritage sites. Historical approach and oral histories support this assessment by investigating vernacular heritage in different timescales. Changing climate and landscapes require the analysis of vernacular heritage sites in different levels and time scales.

A methodologically similar study was conducted on the spatial analysis of the transformation of tea landscapes since 1976 by incorporating the interviews with local people.[267] Although it emphasizes the urgent need of landscape conservation approach, it does not detect the vernacular heritage sites at risk in Fındıklı. Studies on land use and cover changes in the city can contribute to the approaches in managing vernacular heritage sites. Therefore, the combination of historical approach, interviews, and spatial analysis is required, especially in the analysis of vernacular heritage sites located in the hinterland.

267 Ibid.

3 Overview of the Case Study Area

3.1 Introduction

Having analyzed the theoretical discussions, chapter three provides the characteristics of the selected case study from a regional to local scale. The objective is to describe the administrative, historical, geographical, climatic, topographical, and socio-economic factors taking place today to help a better understanding of the nature of vernacular settlements in the hinterland of Fındıklı. As mentioned in Chapter 2.2., the vernacular landscapes, constructions, and representations are shaped by laypeople as a result of their intrinsic relationship between the natural and built environment, and its economic, social, and cultural values. This chapter also provides an understanding of the characteristics of vernacular architecture of the city and the district and the differences in techniques and materials used in construction through the analysis of literature.

3.2 Administrative Structure

The administrative structure of the cities is set differently in Türkiye than in European countries. The Republic of Türkiye has seven regions, including Marmara, Black Sea, Mediterranean, Aegean, Eastern Anatolia, Central Anatolia, and Southeastern Anatolia. These regions are divided into 21 sub-regions due to geographic, demographic, and economic conditions. The country has 81 cities, and each city is divided into different districts. The district of Fındıklı of the city of Rize is in the sub-region of the Eastern Black Sea region of Türkiye. It is governed by the local administration, including the municipality and district governor of Fındıklı.

3.3 Historical Overview of the Planning of the Rize and Fındıklı

FIG. 3.1 The number of scattered houses on the map of the city of Rize in 1896 at the scale of 1/4.000 was prepared by the engineer Mehmed Hulusi Bey. Source: Presidency of the Republic of Türkiye Directorate of State Archives.

The administrative system and with it, the governance of the cities such as Rize was very different from today. According to this former administrative system, Trabzon Sanjak (1461-1924) first became a state at the end of the 16th century and then a province, which included the aforementioned sanjak. Thus, at the end of the 19th century, Rize with its districts i.e. today known as Hemşin, Pazar (Atina), and Ardeşen

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(Batum Sanjak) was formerly included in Lazistan Sanjak. (Figure 3.1)[268] When Batum was occupied by Russian, the capital of the sanjak was moved to Rize.[269] Rize gained city status one year after the foundation of the Republic of Türkiye in 1924.[270]

Fındıklı, formerly known as Vitze, was a small fishing village until 1886 and later it became an administrative sub-district in 1984.[271] It then reached the status of a district of the city of Artvin in 1947[272] until 1953 when it became a district of the city of Rize. [273]

Rize as the trading partner of Trabzon was once a port city in the 19th century when maritime was in demand (Figure 3.1). In the city center of Rize, there were 36 neighborhoods, 161 villages and 3 sub-district (nahiye) in 1891.[274] The population of the city in this period was 74.778 and only 647 were Laz and Greeks in Rize. At the beginning of 1900, the population of the city of Rize grew to 140.000. The number of residents in the city doubled in a decade. Until the middle of the 20th century, the population was more present in the hinterland than on the shoreline[275] despite the wealth gained from maritime activities.

Local communities planned pre-industrial settlements, including vernacular settlements under the administration of the Ottoman Empire (1299-1923). In the 200 years of history of these buildings, state control has shifted from the Ottoman Empire to the Republic of Türkiye. There is little known about the act of rural planning in the Ottoman Empire[276] since the government of the time only started planning rural settlements in the mid-19th century as a proposed solution for immigrants.[277] The immigration to the Russian cities of Soci, Rostov, Poti, and Sohum for trade was very common, particularly in Crimea and Batumi which were formerly within Ottoman borders until 1878. The immigrants ran stores, coffeehouses and bakeries.

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268 Süleyman Demirci and Hüseyin Saraç, "XIX. Yüzyılda Trabzon Eyâleti'nin İdarî Birimi Olarak Atina/Pazar Kazâsı," *Süleyman Demirel Üniversitesi Fen-Edebiyat Fakültesi Sosyal Bilimler Dergisi* 2012, no. 27 (2012).

269 Orhan Naci Ak, *Rize Tarihi* (Rize: Rize Halk Eğitim Müdürlüğü Yayınları, 2011).

270 T.C. Rize Valiliği, "Rize'nin Tarihcesi," http://www.rize.gov.tr/tarihce.

271 Hamdi Yazıcı, *Fındıklı* (İstanbul: Karadeniz Matbaası, 1984).

272 Koray Güler, "Doğu Karadeniz Kırsal Mimarisi Örneklerinden Rize-Fındıklı Aydınoğlu Evi Restorasyon Projesi" (master's thesis, Istanbul Technical University, 2012).

273 Yazıcı, *Fındıklı*

274 Musa Çadırcı, *Tanzimat Surecinde Turkiye Anadolu Kentleri* (Ankara: Imge Kitabevi, 2011).

275 Eruzun, "Ahsabin Kimlik Buldugu Dogu Karadeniz Mimarisi."

276 There are very few historical encounters on the formerly small coastal town of Fındıklı and Rize which derive mostly from geographical surveys and traveller observations.

277 Zeynep Eres and Nur Akın, "Osmanlı İmparatorluğu döneminde kurulan planlı kırsal yerleşmeler," *Itü dergisi* 9, no: 1 (2010).

However, with the Russian occupancy, they returned to the city of Rize in 1915 when their properties were held by the government in Batumi and Neva in Russia. Those whose lands and properties were taken reclaimed their property ownership from Ottoman institutions upon their return. After the Russian Revolution of 1917 and following the civil war, most immigrants nevertheless returned to their hometowns. Then, Rize was confronted with an overpopulation crisis in addition to financial problems due to the failure of the main export crops i.e. fruits and hazelnuts in 1920.

Small-scale fishing in the city of Rize (Figure 3.2) as well as in the district of Fındıklı (Figure 3.3) has been the main regional economy along with the agricultural industry and animal husbandry. Due to its mountainous topography, industrial activities were difficult and impractical considering particularly with the transportation of the goods in trucks, trains or ships. Similarly, the population of Fındıklı was settled far from the central neighborhood, scattered one by one with orange or hazelnut, or corn and tobacco lands surrounding them[278] because the coastal bay did not allow expansion due to the small land coverage. Before tea cultivation, corn plantations comprised more than 90 percent of land use; however, the production of corn became inadequate due to land division and an increase in population in villages.[279]

FIG. 3.2 Fishermen and fishing boats in Rize in 1928. Source: https://tr-tr.facebook.com/tarihtarihsayfasi/photos

278 Hamit Inandik, "Doğu Karadeniz Bölgesinde Köy Hayatı," *İÜ Coğrafya Enstitüsü Dergisi* 5, no. 9 (1958).

279 Zeki Arslantürk, "Doğu Karadeniz'de Çay Mono-Kültürü Ve Sosyo-Ekonomik Değişme," *Sosyoloji Konferansları* 103, no. 21 (1986).

FIG. 3.3 The boats known as “pereme” in Fındıklı. Source: Tarihi Rize Fotoğraflı Arşivi. https://www.facebook.com/Tarihi-Rize- fotoğrafları-arşivi-1513801182222088/photos

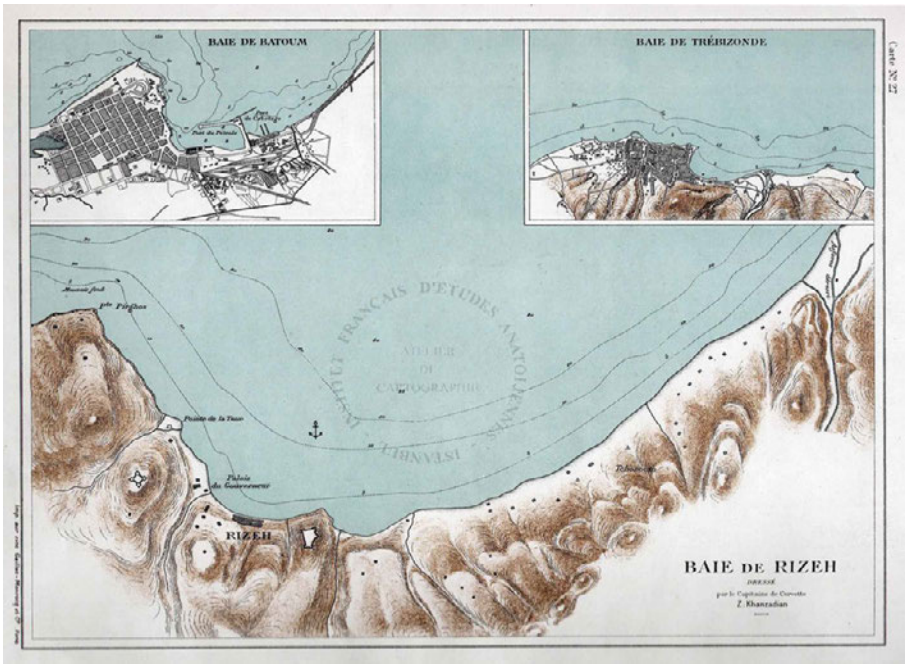

FIG. 3.4 Baie de Rizeh. Dressee par Z. Khanzadian. Imp. Gaillac - Monrocq et Cie, Paris. (to accompany) Atlas de geographie economique de Turquie : par Z. Khanzadian. Editeur L. de Bertalot. 1924. Source: Ifea Map Archives.

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The investments in agricultural developments in the Anatolian cities helped the growth of the country as part of the new nation's development plan after the foundation of the Republic of Türkiye in 1923 (Figure 3.4). Joseph C. Grew, who was appointed as an American ambassador to Türkiye in 1927, observed that the city of Rize was one of the poorest cities in the region.[280] During his visit to the coastal cities of the Black Sea in the middle of August 1929, he tried to find methods to improve economic trade relations between Türkiye and the USA.[281] Because it was not industrially developed at the beginning of the foundation of the new nation, the majority of the people in Rize were employed in the city of Trabzon.[282] In this period, the population and especially the men in search of additional sources of income migrated to the western cities, which led many women to carry the workload, particularly in agricultural farming.[283] Visiting the plantation garden that was opened by the Ministry of Agriculture in Rize, Grew observed that modern farming methods were taught to the local people to safeguard natural forestry as well as increase agricultural productivity.[284] This was generating income for local communities to support the local economy.

The first identified tea factory was founded in 1947 with 60 ton/day capacity in the coastal neighborhood of the city of Rize (Figure 3.5).[285] The richness of fauna was not always an advantage but rather a disadvantage due to the rapid growth of weeds and grass, which required hard labor. Corn plantations required much manual labor, so it was easy to shift to a tea-based economy (Figure 3.6). When local communities started growing tea in the mid-1950s, they realized that the physical labor was much easier than corn collection and it was easier to grow tea on the hilly slopes.[286]

280 Hakan Güngor, "Us Ambassador Joseph C. Grew's Black Sea Trip and His Observations," *Ordu University Journal of Social Science Research* 8, no. 3 (2018).

281 Ibid.

282 Ibid.

283 Özgüner, "Village Architecture in the Eastern Black Sea Region."

284 Güngor, "Us Ambassador Joseph C. Grew's Black Sea Trip and His Observations."

285 T.C. Rize Valiliği, "Rize Çayı," http://www.rize.gov.tr/; Çaykur, "Çaykur'un Tarihçesi: Türkiye´De Çay Tarımının Başlangıcı," http://www.caykur.gov.tr/AnaSayfa.aspx.

286 Alisan, "Tea: A Touchstone for Understanding Fındıklı Transformations in Agricultural Landscapes: A Cultural Landscape Case Study for Fındıklı-Rize, Turkey."

FIG. 3.5 The first tea factory in Rize in 1956 was a signal of the commercialization of the tea.Source: http://www.rize.gov.tr/

FIG. 3.6 Women work in the collection of tea crops in their traditional outfits. Source: http://www.rize.gov.tr/rize- cayi

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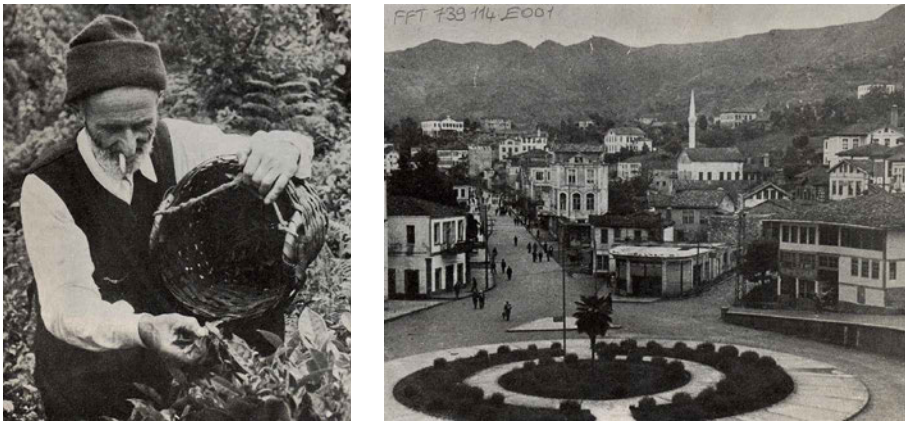

FIG. 3.7 The collection of tea with a straw basket is typical of the local culture in the city of Rize. The city centre of the Rize on a postcard from the 1980s shows the main square and modern buildings with streets on the diagonal axis. Source: https://archives.saltresearch.org/handle/123456789/29200

State-supported initiatives drew local people into the cultivation of tea in search of a new source of livelihood,[287] thus increasing the fields to be able to meet the needs of tea in the country (Figure 3.7).[288] Although Rize became the first and foremost producer of tea in the nation, it never competed with the global tea market due to its high production costs and energy efforts.[289] Nevertheless, the tea factories employed the local people.

Tea cultivation lost its significance in the early 1980s and people migrated to the western cities of Istanbul, Ankara, and Trabzon.[290] Local people hired Georgian workers to collect the tea from their gardens. Since then, the income from tea cultivation rose again immensely. Law number 3092 on 4th December 1984 turned tea production from a public entity to a private enterprise, which signalled the deregulation of the tea.[291] With it, the tea sector gained competition from an increasing number of tea firms elsewhere in 1985.[292] Basing the local economy on tea brought capital and problems along with it. The accessibility that the tea sector

287 E. J. Brill'S, "Encyclopaedia of Islam 1913-1936," *Journal of Arabic Literature* 19, no. 1 (1988).

288 Ali Rıza Saklı, "Türk Çay Sektöründe Yasal Gelişim Ve 1984 Serbestleştirmesi," *Eskişehir Osmangazi Üniversitesi İİBF Dergisi* 14, no. 2 (2019).

289 Ibid.

290 Brill'S, "Encyclopaedia of Islam 1913-1936."

291 Çaykur, "Çaykur'un Tarihçesi: Türkiye´de Çay Tarımının Başlangıcı".

292 Ibid.

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provided for the local people with the permission of using their lands for growing tea caused major changes in land use and land cover. These policies which paved the way for uncontrollable changes in the land use in the city of Rize have been a milestone in the acceleration of disasters today.

3.4 Geography, Climate, Topography, Social-economic, and Social Structure

3.4.1 Black Sea

The Eastern Black Sea region, one of the three sub-regions of the Black Sea (Western, Middle, and Eastern Black Sea region), is located in the northeast part of Türkiye and borders the Republic of Georgia in the east (Figure 3.8). It is constituted of seven provinces, including the five cities of Ordu, Giresun, Trabzon, Rize, and Artvin along the coast and the two inland cities of Gümüşhane and Bayburt. The geographical position of this part of the Black Sea region has become an advantage to the communities in the area because of its surrounding forestry and existing water resources and combined with the disadvantage of living in secluded areas.

Pontic mountains of the Eastern Black Sea define the regional landscape, which runs parallel to the Black Sea with undulating highlands in the southern ranges of the mountains.[293] The northern mountain slopes rise abruptly from the Black Sea shorelines and the coastal lowland is narrow. The mountain ranges become steeper, higher, and narrower towards the east. For this reason, the Eastern Black Sea is the most mountainous, humid sub-region of the Black Sea region.

293 Mehmet Somuncu et al., "Land use Change in Yaylas of the Eastern Black Sea Mountains, Turkey" (paper presented at the Managing alpine future II. Proceedings of the Innsbruck conference, Innsbruck, Austria, 21–23 November 2011).

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FIG. 3.8 The boundaries of the Eastern Black Sea region in Türkiye, which covers a large area between the city of Ordu in the west and the border with Georgia in the east. Source: ArcGIS online.

The regional climate varies greatly from the coast to the inland. The coast has a typically oceanic climate with high humidity and rainfall. It is a mild climate with warm, humid summers; and cool and damp winters. The prevalent winds are in the range of southwest–north directions.[294] In winter snowfalls are quite common in December and March. In the hinterland, on the contrary, there is a transition from an oceanic to continental climate. Summers are warm and dry, whereas the winter is cold and humid. In this type of climate in the hinterland, the moderating effects of the temperature of the seas are not any more visible, and instead, prevailing winds blow overland.[295] Continental climate is more prevalent in the hinterland.

The mountain highlands are between 1500 and 2200-meter-high and they are at the centre of natural, cultural, and recreational touristic destinations. The settlements in these ranges substantively differ from the traditional vernacular houses in terms of their simplicity. Seventy percent of the regional population lives in the hinterland. The rough and uneven pathways and foggy and rainy climate forced people to live in harsh conditions with the transportation of goods and foods between the mountain tops and highlands. The harsh topography limits access to the remote areas of the region.

294 Mustafa Reşat Sümerkan, *Doğu Karadeniz'de Geleneksel Yapı Kültürümüzün Açık Hava Müzesi Fındıklı Köy Evleri, Rize'de Fındıklı Ve Güneysu Kırsal Mimarisi* (İstanbul: Umur Basım, 2008).

295 Kihika Joseph Kanyi, "Continental Climate Changes on the Occurrence of Aflatoxin Producing Aspergillus Species: Review," *Austin J Microbiol* 4, no. 1 (2018).

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The highlands of the Eastern Black Sea region are dense with various types of trees, i.e. pine, alpine, chestnut, and juniper, depending on the elevation. For instance, coniferous trees are seen between 1000 to 2000 meters in elevation. Alder trees are more abundant in the Eastern Black Sea region with lime, chestnut, and beech trees on the mountain slopes. Northern mountain slopes in the central and eastern Black Sea region between 1000–1500 meters comprise mixed trees, including both beeches from broad-leaved and fir, and scotch pine from coniferous trees, which bear the humidity.[296] The abundance of timber in the forestry allows people to find creative solutions for the use of timber in trade, construction of public facilities such as mosques, schools, infrastructures, furnishings, objects, and artisanship.

Similarly, stone quarries from the rivers provided stones to be used as local construction materials. Black sea has low salinity. Water sources of the region—the Eastern Black Sea Basin—are a significant source of water for the country because of the substantial amount of rainfall it receives annually. It feeds from the major rivers of the region, namely the Coruh River. Rivers flow from the mountains toward the Black Sea. The Pontic Mountains split these larger rivers into many tributaries which have small drainage areas.[297] Uzungol and Seragol in Trabzon are significant lakes in the region. These water resources become natural heritage sites. For instance, waterfalls, forests, lakes, natural parks, sites, and recreational areas are prominent examples of this type of heritage. These sites have a high tourism potential in terms of health and thermal tourism, winter tourism, summer pasture tourism, and nature sports activities; river tourism, i.e. rafting, mountain tourism, i.e. climbing, parachuting, river- rafting, and bird observation.[298]

Having comprised of Lazuri, Hemshin, Kurdish, Armenian, Greek, and Georgian ethnicities, the demographic structure of the region is quite diverse. Different ethnicities, languages, and dialects create a cultural mosaic. This is visible in how local communities express their trading and crafting practices in their settlements. Local communities value the position of women who contribute to the household economy.[299] Local women are known to be hardworking as they work in the crop collection. Local people prioritize education much more both in the coastal area and in the hinterland in the district of Fındıklı than in the other districts of the

296 Gürbüz. Mızrak, *Türkiye Iklim Bölgeleri Ve Haritası*, Orta Anadolu Bölge Zirai Araştırma Enstitüsü Tarla Bitkileri Islahı Bölümü Teknik Yayınları No: 2 Genel Yayın No: 52 (Ankara: Orta Anadolu Bölge Zirai Araştırma Enstitüsü Tarla Bitkileri Islahı Bölümü, 1983).

297 John C. Dewdney and Malcolm Edward Yapp, "Turkey," https://www.britannica.com/place/Turkey.

298 Republic of Türkiye Ministry of Culture and Tourism, "Turizm Çeşitleri," https://www.ktb.gov.tr/TR-96269/turizm-cesitleri.html.

299 Fındıklı Kaymakamlığı, Fındıklı (Fındıklı, Rize: Fındıklı Kaymakamlığı, 2017).

city of Rize.[300] Historically, the local people worked as governmental officials and teachers.[301] The lifestyles of the people in the region, especially linked to reglious or moral beliefs, were not, however particularly influential in the district of Fındıklı.[302] Unlike in Camlihemsin mansions, there are no strict privacy concerns regarding religious or moral beliefs in the planning of the houses in Fındıklı.

3.4.2 City of Rize

The city of Rize has boundaries with the cities of Cayeli and Guneysu in the east, Ikizdere in the south, Derepazarı, and Kalkandere in the west, and the Black Sea in the north. It is situated on the edge of a small bay in the Eastern Black Sea region. It has a territory of 3922 km^2 with 88 people per km^2, one of the smallest surface areas in the country. [303] The population in the city is 344.359 in 2020.[304] It has the Eastern Black Sea part of Kaçkar mountains, with the highest elevation of 3937 meters, whereas the high range of mountains and hills lose elevation towards the south of Fındıklı.[305] As the mountains range parallel to the sea, the city expanded in a linear way in the direction of east-west along the sea.[306] The districts of the city of Rize are Ardeşen, Çamlıhemşin, Çayeli, Derepazarı, Fındıklı, Güneysu, Hemşin, İkizdere, İyidere, Kalkandere, Pazar (Figure 3.9).

With its coastline width of between 20 m-150 m and its coastal length of 80 km, it is divided by several streams.[307] The major rivers in the city are Çağlayan (34.7 km), Arılı (31.5 km), Fırtına (68.0 km), Hemşin (38.5 km), Sabuncular (46.0 km), Taşlı Dere (34.0 km), and İyidere (78.4 km) and all directly meet the Black Sea.[308] Among

300 Ibid.

301 İlker Şevketbeyoğlu, Doğu Karadeniz'de Bir Aile Hacıbeyzadeler (Istanbul: Dergah Yayınları, 2017).

302 Ibid.

303 Idris Bostan, "Rize," in *Islam Ansiklopedisi* (Turkiye Diyanet Vakfi).

304 "Rize Nüfusu," https://www.nufusu.com/il/rize-nufusu.

305 Rize İl Tarım ve Orman Müdürlüğü, "Coğrafi Yapı," https://rize.tarimorman.gov.tr/Menu/12/Cografi-Yapi.

306 Gülizar Çakır Sümer, "Rize'de Kentleşme Süreci" Ekonomik ve Sosyal Araştırmalar Dergisi, Vol. 10, Year 10, No. 1 (2014).

307 Ibid.

308 T.C. Kalkınma Bakanlığı Doğu Karadeniz Projesi Bölge Kalkınma İdaresi Başkanlığı, "Rize İl Raporu," (Giresun2013); Rize İl Tarım ve Orman Müdürlüğü, "Coğrafi Yapı".

these rivers, the river of Firtina has the highest flow rate and speed.[309] The rivers of Rize are short, fast-flowing and their bed slopes are relatively steep.[310] Aside from the topographic setting, the fast-flowing rivers of Rize in the Eastern Black Sea region played a significant role in the formation of rich forestry and vegetation with spruce and chestnut trees which were used by local people in the construction of the houses in the hinterland.

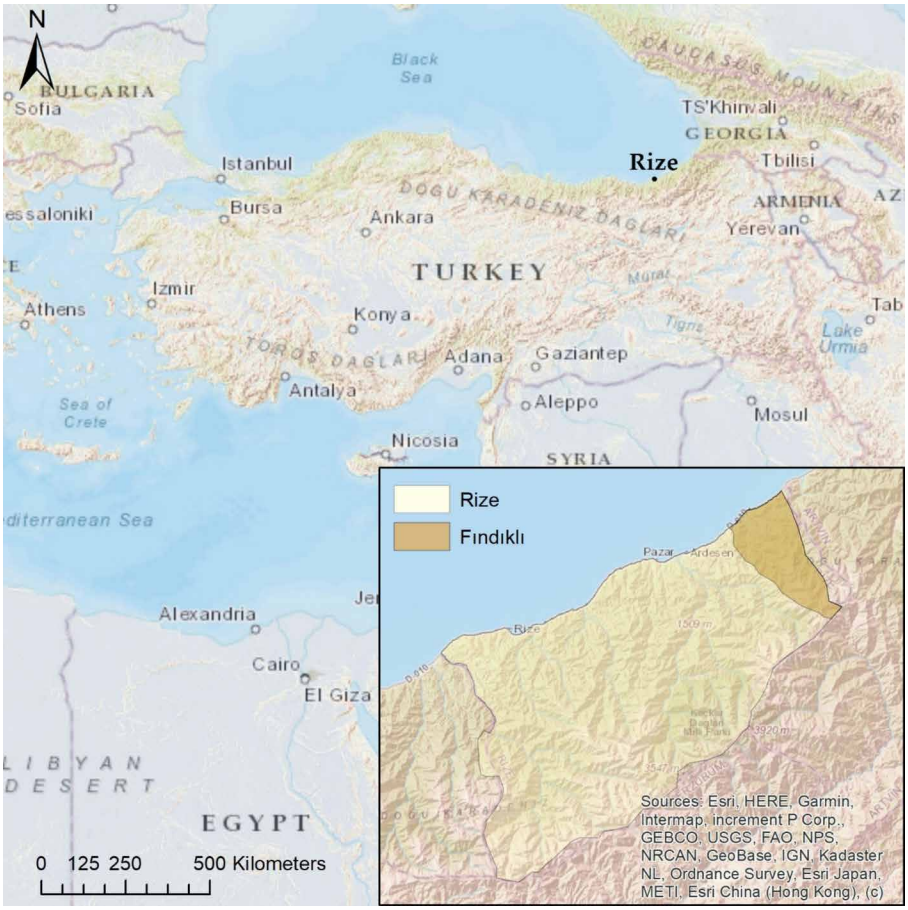

FIG. 3.9 The boundaries of the district of Fındıklı and the city of Rize in Türkiye. Fındıklı is one of the twelve districts of the city of Rize. Source: author, based on ArcGIS.

309 "Coğrafi Yapı"; T.C. Kalkınma Bakanlığı Doğu Karadeniz Projesi Bölge Kalkınma İdaresi Başkanlığı, "Rize İl Raporu."

310 "Rize İl Raporu."

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The city of Rize receives the highest levels of humidity and precipitation all year round, which are underlying effects of the recurrent events of floods,[311] and landslides. The total annual mean rainfall amount reaches 650 mm, which is close to four times the average amount in the country.[312] Similar to the regional climate characteristics as mentioned before, the prevalent winds usually are from the northwest direction, especially in the winter, while the west wind brings the most humidity and therefore extreme rainfalls. Strong winds that come off the Black Sea batter the coastal strip. This can sometimes erode the coastline. However, the construction of settlements on steep terrains in the hinterland diminishes the effects of strong winds from the Black Sea. January is the coldest month and the warmest month is July. The average annual temperature is 14°C. The lowest recorded temperature is -7°C, and the highest is 38°C. Combatting the high humidity, which is above % 75, the annual rainfall is recorded above 2300 mm in the city by the meteorological station. The city receives the least rainfall in spring, whereas it is highest in fall. Depending on the time of melting of snow cover, the rainfall seasons change. Their combination can make river flooding more catastrophic, especially in the mountainous regions in the hinterland.

Villagers own small farmlands and they economically rely on agricultural activities and animal husbandry. Recently, with financial help from European Union projects, local residents in Fındıklı switched to organic farming, which is also encouraged by the local institutions for farmers and women workers for sustainable farming practices. The main cultivation activities include tea, hazelnut, corn crops, fruit growing, fisheries, and beekeeping. Villagers store nuts, corns, and grains in timber cupboards in their storage houses, which stand on four to six timber pillars. The local populations' search for an additional source of income for tea crops such as kiwi, citrus fruits, and Concorde grapes though changing climate forces them to consider other sources of agricultural products.

Tea productivity depends on humidity, rain, soil fertility, and temperature. Tea plantation, as a recent development, is avoided in windy areas. High precipitation levels allow citrus fruits to grow well as well as tea. The tea plantation in Rize supplies the need for one-third of the total tea consumption of the nation and a part in exportation.[313] Citrus fruits are as important as tea production for the growth of the local economy. However, growing fruits such as cherries, mulberry,

311 Ömer Yüksek, Murat Kankal, and Osman Üçüncü, "Assessment of Big Floods in the Eastern Black Sea Basin of Turkey,"*Environmental Monitoring and Assessment* 185, no. 1 (2013).

312 Gürcan Gürgen, "The Maximum Rainfalls in the Eastern Black Sea Region and Their Importance in Terms of Floods," *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi* 24, no. 2 (2004).

313 Sait Tahsin Tekeli, "Naturliche Grundlagen Fur Den Teeanbau in Rize," *Turk Cografya Dergisi* 1 (1943).

grapes, figs, walnut, chestnut, quince, medlar, and pomegranate do not have enough economic value.[314] To ensure the productivity of these fruits, local residents used beehives. Hence, beekeeping has also become an important source of income in the hinterland of Rize.

FIG. 3.10 Fish farming in Fındıklı exports fishes such as salmon and trout to many countries, including Nordic countries and Japan, as it proved the high quality of production of fisheries. Source: author.

314 Arslantürk, "Doğu Karadeniz'de Çay Mono-Kültürü Ve Sosyo-Ekonomik Değişme."

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Alternatively, fishing, fish farming of trout and salmon, and beekeeping served as an additional source of local income (Figure 3.10). Additionally, mountain grasses have become suitable for livestock husbandry, particularly in the summer seasons. This economic activity led to seasonal migration for pastures of sheep and hay-making in the preparation for the winter season.[315] People dealing with agricultural activities in the villages spend two months in their temporary residency on the higher highlands, namely *yaylas* for "summer pasture" also known as "mountain highland."[316] At the beginning and the end of this movement, they have a transition period of approximately twenty days spent in *mezra* which locates in terraces between the villages and highlands.[317]

3.4.3 District of Fındıklı

The main study area covers part of the district of Fındıklı in the province of Rize (Figure 3.11) in the sub-region of the Eastern Black Sea region of Türkiye. The district is 64 kilometres far from the city centre of Rize. As the farthest district from the city, the socio-economic structure of Fındıklı differs from the city. It has a population of 16.678[318] and covers an area of 409 km^2.[319]

Fındıklı has 23 villages and eight neighborhoods in which many settlements are scattered and sparse in the hinterland because of its narrow coastal strip. The topographies of the hinterland vary in the villages. For instance, the village of Çağlayan which was founded in the early 1800s and 6 km far from Fındıklı centre, is at the altitude of 252 m. Fındıklı has river plains and valleys that were formed by the main three rivers, from west to east, Arılı, Çağlayan, and Sümer. The rivers of Çağlayan, Arılı, and Sümer shape the landscapes of the villages in the hinterland. Since the completion of the Black Sea Road in 2007, the highway provided transportation to Fındıklı (Figure 3.12). It connects the coastal cities throughout the region.

315 Mehmet Somuncu et al., "Land use Change in Yaylas of the Eastern Black Sea Mountains, Turkey."

316 Sezgin Özden, Erdogan Atmis, and Kayhan Menemencioglu, "Negative Effects of Recent Unplanned Expansion on Highland Ecosystems in Turkey," *Mountain Research and Development* 24 (2004).

317 Gül Devrim Demirel, "Development and Conservation of Cultural Properties in Rural Areas of Eastern Blacksea Region: A Case Study in Karacakaya Village" (Middle East Technical University, 2010).

318 TUİK, "Adks Sonuçları," https://biruni.tuik.gov.tr/medas/?kn=95&locale=tr.

319 T.C. Fındıklı Kaymakamlığı, "Fındıklı'nın Coğrafi Yapısı," http://www.findikli.gov.tr/cografi-konum-ve-temel-zellikler.

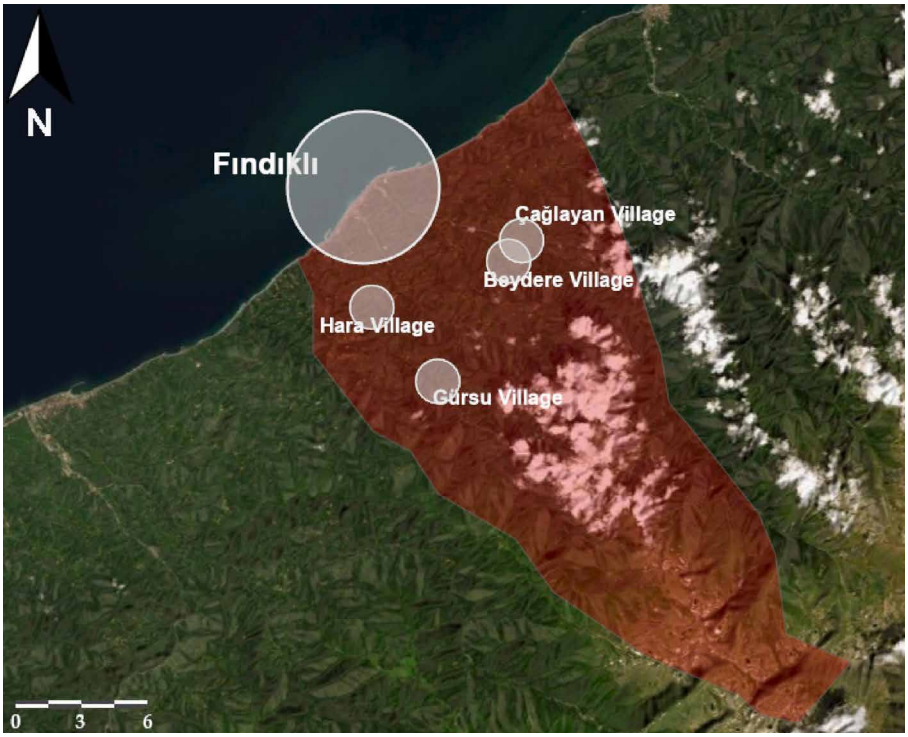

FIG. 3.11 The borders of the city of Rize in the map of Türkiye and a close-up view of the district of Fındıklı and the villages where the interviews were conducted in 2019. Source: author, based on ArcGIS online.

FIG. 3.12 The narrow strip of coastline, also known as the centre of the Fındıklı district is dense with rapid urbanization. The majority of public places such as mosques, public administration, education centre, library are located in this area. Source: Erkan Aksu Photography Archives.

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FIG. 3.13 The topography model of the district of Fındıklı. Source: author, based on QGIS with the basemap from ESRI Satellite (ArcGIS/World_Imagery), and the Digital Elevation Model from the European Union's Earth observation programme Copernicus.

Most of the vernacular heritage is concentrated along the Çağlayan and Arılı valleys. The topography of the selected villages of Çağlayan, Beydere, Hara, and Gürsu vary greatly (Figure 3.13). For instance, Çağlayan village has 252 meters elevation whereas the village of Beydere has the highest elevation with an altitude of 508 meters.[320] Çağlayan village is the biggest village in Fındıklı.[321] Çağlayan village is located 7 km inland from the coast.[322]

320 Fallingrain.com, "Beydere, Turkey Page.," http://fallingrain.com/world/TU/53/Beydere.html.

321 İlker Şevketbeyoğlu, *Doğu Karadeniz'de Bir Aile Hacıbeyzadeler* (Istanbul: Dergah Yayınları, 2017).

322 Mustafa Reşat Sümerkan, "Fındıklı – Çağlayan'da Ahşapla Dokunmuş Evler," *Mimarlık* 358 (2011).

The local population working in farming cannot earn enough to afford a living and therefore there is more employment outside this field, including as civil servant, worker, and artisan. Historically, the district has had a population of well-educated civil servants[323] who held the ownership of these large-scale lands and mansions. Despite various artisanship in the district, there is a depopulation in the district as the young population does not show any interest in the master/apprentice system. To describe the depopulation of the rural areas, a local mentioned that half of the village population remained in the villages.

Agricultural activities annually bring approximately 32 thousand tons of tea crops, 750 tons of hazelnut, 1350 tons of milk, 60 tons of meat, 200.000 eggs, and 10 tons of honey, while 40 tons of various different fisheries were caught from coastal fishing.[324] Small-scale farming, considering the hard work of collection of the crops, do not worth the effort as it does not endorse the economy. The hardships in the local economy pushed local people to live in the same household for a long time. The construction of the typical houses was easier with the large family structure. However, over time, Fındıklı people switched from large households living in one house with multiple rooms arranged for locating the daughter and son-in-law to small family structures.[325] Therefore, the local people have not used the majority of the rooms in today's conditions. The values of local communities on kinship, religion, morals, status, hierarchy, and authority have affected both their private life and public life. Although elders still practice their religious rituals and family gatherings, there is an abandonment in the continuation of these ceremonies in the current generations.

323 Şevketbeyoğlu, *Doğu Karadeniz'de Bir Aile Hacıbeyzadeler*.

324 Vikipedi, "Fındıklı," https://tr.wikipedia.org/wiki/F%C4%B1nd%C4%B1kl%C4%B1.

325 Fındıklı Kaymakamlığı, *Fındıklı*

3.5 Characteristics of Vernacular Architecture in Rize and Fındıklı

The regional environment determines the site selection, the layout of a walking path, the location and orientation of buildings, the design of building elements, and building typologies. Concerning the surrounding nature, the local people constructed their buildings on a variety of scales, including grand *mansions*, village houses, and storage houses also known as *serander* or *nayla*. Depending on the wealth of the families, some of these houses are considered to be *mansions*; in other words, they are grand in scale as opposed to the village houses. These are *mansions* with sometimes more than ten rooms. However, these mansions differ greatly from the simple and modest vernacular houses in the villages (Figure 3.18). The vernacular houses of the region have other components of rural life i.e. mills, storage houses, and barns with fruit gardens and land holdings as a part of the traditional landscapes. When a service is provided for the "village house" such as barns and outdoor ovens, this facility becomes a separate entity and hence called "house."[326] Oven house (Figure 3.19), bride house, bread house (bakery), barn house, courtyard house, and storage house are examples of the places when rooms have a function of their own within the houses thus inheriting the name of "house."

Private-owned small landholdings include building plots, arable land with corn, tea, and hazelnut fields, and livestock as a part of the rural landscapes. Local people can dismantle and reconstruct the timber-built *serander*, located next to the vernacular buildings, which creates flexibility. This s*erander* stands on four to six timber pillars and contains timber cupboards to store grain, corns, dried vegetables, and fruits (Figure 3.26). The wide overhangs of the *serander* specifically aim to keep the food secure from rain and high precipitation. The planning decision behind the timber wheels on the pillars and the interrupted timber stair of the freestanding storage house is to prevent animals from climbing up. Built with the construction system of using no studs, it can endure the prevailing winds.

326 Mehmet Uysal Uğur Tuztaşı, Fatih Akdeniz, "A (Forgotten) Vernacular from Anatolian Villages: Guestrooms in Sivas/ Turkey," *Folklore* 56 (2014).

FIG. 3.14 The traditional roof construction of the vernacular buildings is visible at different levels of the steep topography in Arılı village of Fındıklı in Rize. Source: author.

The buildings are located in the mid-section of the land, along with a storage house next to it. The rural settlements of the region are scattered with sometimes kilometres of distance between building in rural surroundings and the built-up core of the villages.[327] In these scattered settlements, kinship and collective living styles have resulted in the formation of clusters within the villages (Figure 3.14). The inclination of the land caused the formation of a certain prototype in the region. Stone walls of the foundation and basement floors which are used as storage or barn protect the living rooms on the upper floor from minor landslides.[328] These two or three-floored buildings are usually constructed on the slope to be able to regularly control and manage the farmland lying in front of their buildings.[329] The high-end of the building lot is preferred the most for the construction of a building. [330] Because the strong winds blow over the crest valleys, the buildings located at the top of the lot may decay faster.

327 Özgüner, "Village Architecture in the Eastern Black Sea Region."

328 Küçükerman, “A Short Survey of Residential Architecture of Karadeniz Region.”

329 Ömer Faruk Bayram, "Doğu Karadeniz Bölgesinde Geçmişten Günümüze Vernaküler Mimari"(master›s thesis, Yıldız Teknik Üniversitesi, 2014).

330 Ozen and Keles, “Vernacular Building Heritage in the Eastern Black Sea Region in Turkey.”

The steep topography allows houses facing the north to have a view of the landscape.[331] However, in the lowlands, the climate has become more determinant in shaping the settlements. Shadows, flood-prone areas, and prevalent winds were avoided in the site's selection.[332] Local people planted trees in front of the building façade, to protect the house against the damages from prevailing winds that carry precipitation.[333] The proximity of valley plains to rivers exposes the settlements to floods; therefore, these areas are not desirable for construction.[334] In some areas, there are small and compact neighbourhood units such as in Çağlayan village, which consist of a couple of buildings and storage houses next to each other.[335] This type of settlement contributed to the formation of small streets in between these buildings.[336]

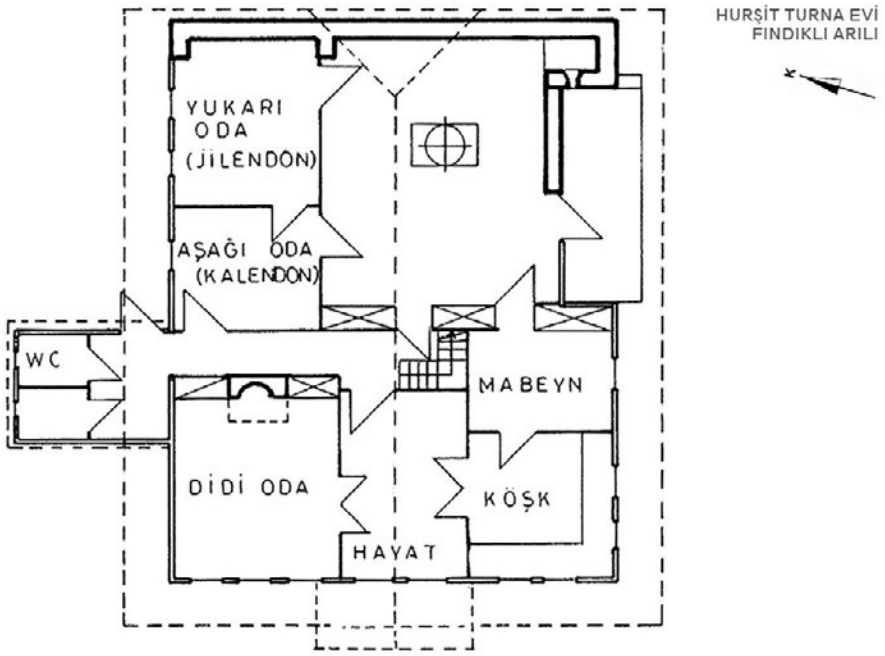

FIG. 3.15 Layout plan of a typical vernacular house in Arılı village. Source: Drawing by Mustafa Sümerkan.

331 Cengiz Eruzun, "Kültürel Süreklilik Içinde Türk Evi," *Mimarlik* 27, no. 4 (1989).

332 Tülay Zorlu and Serap Faiz, "Ekolojik Mimarlık: Doğu Karadeniz Kırsal Konutu," *Mimarlık* 367 (2012).

333 Ibid.

334 Ozen and Keles, "Vernacular Building Heritage in the Eastern Black Sea Region in Turkey."

335 Ibid.

336 Ibid.

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The foundation and the basement floors are usually covered with 50-60 cm thick stone walls to break the relationship between the humid soil and the timber walls on the upper floor.[337] Rural houses are generally built with two floors in which the ground floor is used as a barn or storage and the first floor is dedicated to living space (Figure 3.15). In some cases, the building is partially under the slope that covers half of the surface of the upper floor. In this condition, the thickness of the stone facing the side of inclined terrain reaches over 100 cm thickness to bear the weight of the soil.[338] Therefore, from the rear façade facing the slope, the building looks one-floored, whereas the front façade has two floors.

The construction types differ according to their external façade systems, filling, and warping of the frame.[339] These construction systems are divided into three: (1) timber masonry (Figure 3.26), (2) timber frame (Figure 3.25), and (3) stone masonry systems (Figure 3.18).[340] Timber frame systems expand into three with wooden infilling (Figure 3.21), cell infilling (Figure 3.24), amulet filling (under the plaster of the building illustrated in Figure 3.20), and *cakatura* (Figure 3.20)."[341] In Anatolia, the timber-framed walls with infillings are known as *hımış* though this term is not used in the region itself.[342] In addition, the buildings with two or more construction systems can be found and are mixed or composite construction systems (Figure 3.16).[343]

Timber masonry constructions system are built without the use of studs in the forestry areas at high altitudes. Instead of studs, different joint systems on the corners i.e. notched and neck joints are used in this type of construction.[344] In this

337 Sümerkan, *Doğu Karadeniz'de Geleneksel Yapı Kültürümüzün Açık Hava Müzesi Fındıklı Köy Evleri, Rize'de Fındıklı Ve Güneysu Kırsal Mimarisi.*

338 Ibid.

339 Güler and Bilge, "Construction Techniques of the Vernacular Architecture of the Eastern Black Sea Region."

340 Sümerkan, "Gelenekselden Betonarmeye Trabzon Kırsal Mimarlığı "; Özgüner, "Village Architecture in the Eastern Black Sea Region."; Güler and Bilge, "Construction Techniques of the Vernacular Architecture of the Eastern Black Sea Region."

341 "Construction Techniques of the Vernacular Architecture of the Eastern Black Sea Region."

342 Sümerkan, *Doğu Karadeniz'de Geleneksel Yapı Kültürümüzün Açık Hava Müzesi Fındıklı Köy Evleri, Rize'de Fındıklı Ve Güneysu Kırsal Mimarisi.*

343 Güler and Bilge, "Construction Techniques of the Vernacular Architecture of the Eastern Black Sea Region."

344 Koray Güler and Ayşe Ceylan Bilge, "Construction Techniques of Vernacular Architecture of the Eastern Black Sea Region," in *Vernacular Architecture and Earthen Architecture: Contributions for Sustainable Development*, ed. Mariana Correira, Gilberto Carlos, and Sandra Rocha (London: Taylor& Francis Group, 2014).

construction system, the interior and exterior walls are bonded and built together.[345] This system is mostly seen on the mountain highlands, and will not be taken into consideration because these structures are simply designed for temporary stay in times of summer pasture activities.

The wooden infilling system consists of 3-5 cm width wooden elements which are placed between horizontal and vertical timber elements that are located above the stone foundations.[346] This is usually common in internal partition walls. When the stone was added to this timber frame construction system, the last two types of construction emerged.

The cell infilling, which is also known as stone-infilled timber frame construction, is using stone and timber. This type is more prominent in the coastal cities of the region, particularly in the eastern part of Rize. With overexploitation of timber from local forests, the timber buildings were replaced with stone-infilled timber-framed construction technique, which is known as *göz dolma* in the local dialect.[347] This modular system dates back 150-200 years.

Amulet filling— a timber-framed construction technique—is built with triangular-shaped timber frames filled with small stone pieces and mortar. Locally known as *muskali dolma*, this technique sometimes reveals itself without the use of any filling materials which may result in the loss of the filling material in time.[348] Ç*akatura,* also known as *bagdadi,* (Figure 3.16 and Figure 3.20) is the plastering of the wall with mud and stone which is vulnerable to deterioration. This type of construction is usually used in combined techniques (Figure 3.16) and therefore, it is rare in the region.

Stonemasonry is usually seen in grand mansion constructions, especially in the districts of Camlihemsin (Figure 3.18), Hemsin, and Trabzon. In the western part of Trabzon, rubble stone and rough-cut stone walls are the most preferred, whereas, towards the east, hammer-dressed-masonry is the most common.[349] These mansions were built with the money earned money from the bakery and pastry. Far from the vernacular style of village houses inland both in scale and artisanship, these mansions are the works of immigrant vernacular builders (Figure 3.18).

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345 Özgüner, "Village Architecture in the Eastern Black Sea Region."

346 Güler and Bilge, “Construction Techniques of Vernacular Architecture of the Eastern Black Sea Region.”

347 Cengiz Eruzun, “Ahşabın Kimlik Bulduğu Doğu Karadeniz Mimarisi” (paper presented at the The V th Turkish Folklore Congress, Ankara, 1996).

348 Bayram, “Doğu Karadeniz Bölgesinde Geçmişten Günümüze Vernaküler Mimari.”

349 Sümerkan, “Gelenekselden Betonarmeye Trabzon Kırsal Mimarlığı “.

FIG. 3.16 The mixed construction on the façade of O.T. House in Hara village of Fındıklı. The stone and stone-infilled technique on the ground floor and the wooden and plastered façade of the first floor as an example of the *cakatura* technique.Source: author

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FIG. 3.17 Several interventions from different generations on the building are visible on the facade from wooden, stone-infilled timber, *cakatura*, stone, and brick materials.Source: author.

FIG. 3.18 Deliemet mansion in Makrevis in Çamlıhemşin of Rize belonged to a wealthy family (with *Hemshin* ethnic background) who designed the beautiful ornamentation and iron details adopted from Russia.[350] The construction of this grand mansion was adopted from Russia along with the use of Russian terms in daily life. The mansion with stonemasonry work has a bay window and a large brick chimney with large rooms. Source: author.

350 U. Biryol, *Gurbet Pastası: Hemşinliler, Göç Ve Pastacılık* (İletişim Yayınları, 2016).

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FIG. 3.19 There is a large bakery oven in the kitchen that connects to the brick chimney. Source: author.

The distance between the city centre of Rize to its surrounding villages varies from 2 to 30 km, which explains the distinction in architectural styles of the urban and rural built heritage. Even the city centre itself is approximately 200 meters inland from the sea.[351] Far from the hinterland, the construction techniques that are used for the coastal mansions are not very common in rural houses. Coastal buildings were called *yali*, which defines the two or three-floored waterfront houses (Figure 3.23). In the construction of coastal mansions, the eye-filling method was prevalent but this method was later replaced with a triangular infilling system also known as *muska dolma,* and a plastered timber frame system called *cakatura* (Figure 3.20) techniques in the Eastern Black Sea region.[352] The chestnut tree is used in the construction of coastal buildings while in the hinterland the use of pine trees was more common.[353] In addition, in the construction of coastal buildings, less available trees such as walnut, oak, and elm were also used as construction material. [354]

351 Leloglu, "Anadolu Turk Evi'nden Yerel Bir Örnek: Rize Evi."

352 Eruzun, "Ahsabin Kimlik Buldugu Dogu Karadeniz Mimarisi."

353 Ibid.

354 Muhammed Said Fidan, Şekip Şadiye Yaşar, and Elif Alkan Mehmet Yaşar, "Features Design and Traditional Architecture of the Turkish Eastern Black Sea House," *Mugla Journal of Science and Technology* 2, no. 2 (2016).

FIG. 3.20 A mansion built with *cakatura* construction system is located in the coastal district of Çayeli in Rize. The two mansions in Çamlıhemşin and Çayeli are examples of different construction systems.Source: author.

For the construction of the roof and chimneys of coastal buildings, brick, roof tiles, and terracotta were used.[355] The roof is constructed in a way to drain the rainwater. In the hinterland, a thin timber plate known as *hartama* was used as a roof cover (Figure 3.21), whereas pantile roofing is preferred in coastal buildings.[356] It is acquired by axing spruce trees thinly. *Kara sacak* is used to describe when there is no timber-covered overhang under the roof construction whereas *debren* refers to the timber overhang.[357] *Kara sacak* is observed in the hinterland, whereas *debren* is prevalent on the shoreline.[358] But the difference between the two may have to do with the protection of the building against strong winds and heavy rain as the shoreline buildings were more prone to the strong winds and heavy rains.

355 Eruzun, "Ahsabin Kimlik Buldugu Dogu Karadeniz Mimarisi."

356 Ibid.

357 Leloglu, "Anadolu Turk Evi'nden Yerel Bir Örnek: Rize Evi."

358 Ibid.

FIG. 3.21 Block-wooden technique extinct in the coastal part still exists in more inaccessible inland areas.[359] The thin, long, and narrow wooden slabs known as *hartama* are either used as roof tiles or as a support to roof construction laid under the roof tiles. Source: İsa Karaca Yeşilpınar Köyü, Yağlıdere / Giresun. Facebook Giresun köşe bucak https://www.facebook.com/giresunkosebucak/photos/

FIG. 3.22 The houses were defined by similar roofs and window arrangements in 1925 in Tophane of Rize (Rize city centre). Source: https://www.facebook.com/1513801182222088/photos/pb.100064694436097.-2207520000./1535015560100650/?type=3.

359 Eruzun, "Ahsabin Kimlik Buldugu Dogu Karadeniz Mimarisi."

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FIG. 3.23 The coastal mansions with small shops on the ground floor were lined up at different elevations on the narrow coastline with a wide street. Source: Rize Ministry of Culture and Tourism https://www.facebook.com/photo/?fbid=1869707819720303&set=a.1869706483053770

FIG. 3.24 The rare coastal mansions left along the coast after the reclamation of the coast of Fındıklı, Rize. Source: author.

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These sea-front mansions on the coastal part of the district (Figure 3.22 and Figure 3.23) were destroyed during the reclamation of the coast in the region (as explained in Chapter 5.3.) during the construction of the coastal road. The interviews with coastal mansion owners revealed that their ancestor, the owner of the coastal mansion, was a fisherperson and earned money from the sea trade. According to the statements of the local people, the old coastal mansions were built with timber, except the wealthy families had the means to build their mansions with brick. And in the case of the two mansions in Figure 3.24, the mansion was grand not only in scale but also with its grand circular stairs. These types of mansions, aside from a view of the Black Sea, were not similar to the folk architecture in the hinterland. The servants and the seasonal workers were not part of this wealthy lifestyle.

The hinterland and the listing of its settlements have gained more significance after the demolition of coastal heritage sites due to rapid urban development. The local economy grew with agricultural activities in the hinterland. This inequality in the distribution of economic development was reflected in the typology of cultural heritage in this specific location. The number of the listed urban cultural heritage of the city did not outgrow the number of listed rural cultural heritage (Table 3.1). This has to do with the fact that the hinterland remained untouched, while the urbanization in the coastal areas destroyed much of the urban heritage (Figure 3.24). With touristic income, the highlands brought more touristic attention to the rural built heritage.

TABLE 3.1 Preserved cultural heritage in the city of Rize (The Republic of the Türkiye Ministry of Culture and Tourism)

Types of Listed Immovable Cultural Properties	Number in Rize
Streets	1
Administrative Buildings	6
Monuments	148
Military Constructions	8
Industrial and Commercial Buildings	3
Religious Buildings	60
Cemeteries	34
Civil architecture	354
Ruins	5
TOTAL	619

FIG. 3.25 Typical vernacular heritage in the region with a stone-infilled timber mansion. Source: author.

FIG. 3.26 Timber house, storage house, and a *bageni*.[360] Source: author.

360 Bageni is known to be a granary for drying corns. Unlike in steep terrains, in lowlands there is no steep topography which allows the construction of a barn in the basement. In these cases, the barn is located outside the house.

FIG. 3.27 Timber built mosque in Meyvali village. Source: author.

FIG. 3.28 Stone bridge in Çağlayan village. Source: author.

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Fındıklı in Rize is particularly rich with vernacular built heritage, such as mosques (Figure 3.27), stone bridges (Figure 3.28), traditional stone-infilled timber houses (Figure 3.25), mills, barns, kilns, storage houses (Figure 3.26), and archaeological sites; natural heritage, such as waterfalls, highlands, and forests; and intangible heritage, such as timber artisanship, stone masonry, coppersmithing, basket making, weaving, hawk-eagle raising, and cornbread making, in addition to other representations of the area's food culture.[361] This type of vernacular settlement in Fındıklı, as will be later further elaborated in relation to local climate (see Chapter 4) with various examples, began to extinct. While the influence of rural depopulation (see Chapter 6) is undeniable in heritage loss, disasters in recent years, exacerbated by spatial planning decisions and practices, speeded up the heritage loss.

3.6 Conclusion

The chapter presented the role of local conditions in depicting the common construction techniques and details used in the construction of vernacular buildings in Fındıklı with references to the city and regional variations to different typologies. It describes the emergence of different typologies but among all these, how one type of construction system known as stone-infilled timber building became most commonly seen in the hinterland of Fındıklı. By understanding these different construction materials, methods, and techniques, this chapter gives insights into the distinctive features of the vernacular architecture of the chosen case study area of Fındıklı. It reveals the reason why coastal heritage has been lost due to the developments and why mansions, which were once constructed by tradespeople, were abandoned in other districts of the city. While some of the regional and urban characteristics present similarities with rural vernacular architecture in Fındıklı, certain aspects of vernacular buildings in the district (e.g. stone-infilled construction system and small-scale village houses) diversify from the rest of the city.

361 Hasim Karpuz, *Rize*, Tanitma Eserleri Dizisi 48 (Istanbul: Kultur Bakanligi Yayinlari, 1993).

4 Climate Responsive Planning of Vernacular Landscapes in Rize

1800-1923

4.1 Introduction

The planning and construction practices reveal the living preferences of communities and their connection to their local environment. Local communities have been sheltering themselves in response to the surrounding environment, including climate, topography, and water resources to fulfill their needs according to their customs, traditions, and cultural practices for centuries. The practices and experiences of 250-300 years ago reveal the know-how skills of local builders and management strategies on landscape, settlement, and building scales.[362] Considering the conditions of this period, the local residents and laypeople decided on the selection of the site, the layout of the construction, along with other design considerations. Local climate (see Chapter 3.4.)— characterized by solar radiation, wind, rain, and snow—has played a key role in the emergence of vernacular settlements among all the determinants shaping these buildings such as culture, traditions, social structure,

362 Annalisa Caimi and Olivier Moles, *Assessing Local Building Cultures for Resilience & Development. A Practical Guide for Community-Based Assessment* (CRAterre Editions, 2015).

and economic. Climate was a dominant determinant of the physical environment that shapes cultural behaviours, expressions, and customs.

Knowledge of local climate is embedded in the planning of vernacular settlements. Certain cultural activities of rural communities such as livestock and farming take place at a certain time of the day. To illustrate this point, farmers start their days early to put animals in pastry, feed and milk animals, and care for crops when the sun rises. These daily activities defined the needs of buildings, storage houses, and kilns while giving the end-users the power of shaping the hinterland through agricultural land management. So, they have constructed their buildings, and farmlands, and directed water sources to their farms and building needs. In construction processes, they realized that some of the construction techniques failed and some others survived in harsh environment. This trial-and-error method in construction revealed the various self-crafted buildings with distinctive characteristics according to the needs of the household.

Hence, this chapter analyses the vernacular settlements and buildings in the climatic conditions, in which they were created, around the mid-19th century. Through the analysis of archival sources, literature, and interviews with local people, it aims to identify the climate-adaptive factors in which the local lay population shaped the vernacular landscape in the area. It then further investigates the key features of this form of heritage through the lens of climate resilience. It asks questions of in which way vernacular settlements are climate-adaptive in nature and how local communities managed them in the past. This chapter reveals the wisdom of local inhabitants, constructors, and artisans in building vernacular settlements as a response to local climatic conditions. These findings highlight the traditional local knowledge and skills that have played a role in the construction in the pre-industrial period but are no longer respected by the constructors, architects, and planners in the current planning decisions and practices. Thus, the results explain the reasons why some buildings with interventions considering climatic conditions of the time have survived in today's conditions.

4.2 Local Climatic Conditions as Determining Factor in the Creation of the Vernacular Landscapes in Fındıklı

The climatic parameters of the city are different from those of the hinterland; therefore, it is difficult to trace back to the local climate of 250 years past, especially in the city of Rize, as the meteorological sources do not date back before the foundation of Türkiye. However, it is still possible to observe the role of climatic factors in the formation of vernacular settlements and buildings from the way of their planning and design. Adaptation to local conditions, notably to climate, is visible from the site selection, the orientation, and planning of the houses, materials and techniques, structuring, and interior furnishing (Figure 4.1). Past knowledge shaped the life cycle of a building which starts with choosing a site, then the construction, and after-life and the reuse of it.

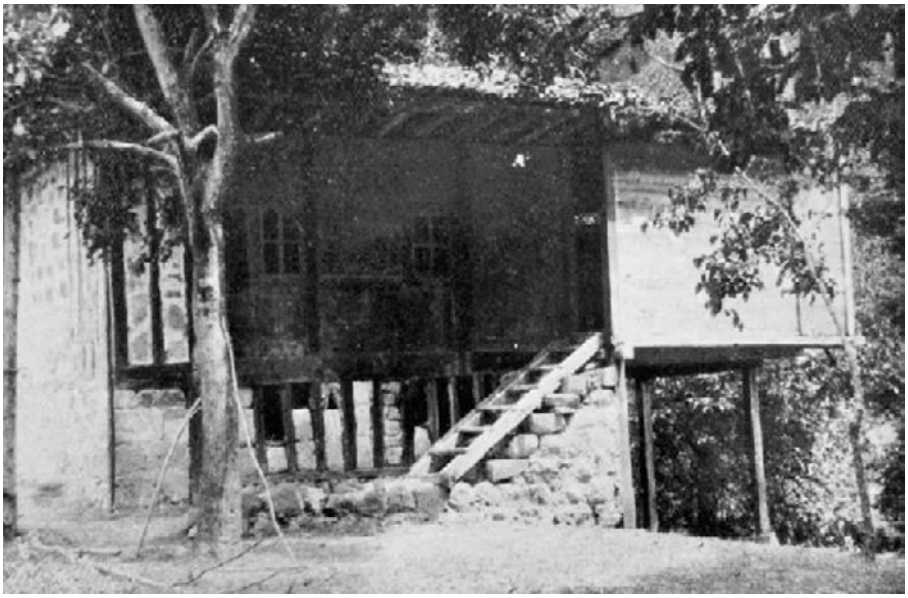

FIG. 4.1 A village house in the Lazuri region depicts a different image of this architectural style because its balcony is elevated on stone whereas the entrance is elevated on wooden pillars. Source: Lazistan and Ajaristan: A paper read at the Evening Meeting of the Society on I4 May 1934, by W. Rickmer Rickmers.

Local people carefully select the site for construction and determined the lot configuration in line with climatic conditions and constructed their buildings with materials resistant to the local climate. They reused the materials of their buildings even after a disaster struck. At the time of a fire, they sorted fire-damaged timber by classifying it according to the degree of damage and possible reuse. After the removal of damaged or decayed materials, they reused the old timber, which is still durable, in the construction of their next building. They even reused the interior design elements such as the ceiling roses in their newly built vernacular house. These circular construction methods and planning practices revealed how local people in the past preserved the typical vernacular buildings in the region.

Laypeople, unlike the architects of grand monuments, constructed these buildings with materials available in their direct surroundings, and techniques that were passed down from previous generations. These techniques were replicated across the region with slight differences depending on personal needs, customs, and preferences. Due to the slow economic development in the hinterland, the rural cultural heritage remained untouched until the 1950s. As people returned from the cities of Istanbul, Ankara, and other major cities to their homeland in Fındıklı in Rize, the rural built heritage was replicated in the construction of new buildings. These village houses became fashionable again with the sustainability movement in the early 21st century when the young generation returned to their hometowns to grow their own conventionally and take part in the community for supporting agriculture. It is their interpretation of their cultural heritage which reveals the generational difference in the value and management of vernacular settlements. Their parents adopted recent building materials and techniques and denied the intricate value of these vernacular buildings. They left their hometowns for the major cities for work only to return later to enjoy the rural lifestyle.

4.2.1 Choosing a Site and Building Orientation

In the Ottoman period, Fındıklı, especially the shoreline of the district, was not a preferred place for settlement. Despite the marine culture on the coastline, residing at the seaside was not common due to piracy, according to historical narratives.[363] Due to attacks from the sea, some local communities preferred to reside in the hinterland more than in the coastal area. Regarding the coastal settlements, Y.Y.—the project manager for the EU-funded project "Training Masters for Rural Built

363 Eruzun, "Ahsabin Kimlik Buldugu Dogu Karadeniz Mimarisi."

Heritage in the Eastern Black Sea Region"— emphasized that "there was a risk of malaria due to a bite of a swamp mosquito as the district was a wetland in the past."[364] Referring to the year of 1600s, a building owner, Y.G. agreed:

"Back then Fındıklı was a swamp. In other words, no one would have settled in the city centre due to the mosquitoes and swamps... Then there was domestic hostility. Our Suleyman grandfather took their grandfather [referring to the family of Şevketbeyoğulları] with him and came here [to the Çağlayan village]. They built their home there." [365]

The landowners in the hinterland; on the other hand, owned private properties including arable land with buildings and additional units such as a barn, storage house, kiln, water-well, and houses, as seen in Figure 4.2. Some of these lands were more extensive than others, thus difficult to manage by the household alone. This required temporary/seasonal farmland workers called *yarıcı,* who came from the western cities of Giresun and Ordu in the region. 5 out of 25 were local people and the remaining 20 were farmland workers, as mentioned by a truck driver and a villager. Homeowners hired *yarıcı* to collect the tea crop and take their share of the collection. These workers lived inside these houses with their families and now there are separate entities outside the mansions to house them and their families.

Before the tea crop areas, corn plantation on small landholdings was more common, and these corncobs were used as animal feed.[366] The villagers of the land preferred to sleep near their arable lands to protect corn, hazelnut, and tea fields[367] from theft. Corn plantations comprised more than 90 percent of land use; however, the production of corn became inadequate and could not meet the demands of the local residents.[368] The excessive rainfalls damaging the leaves of corn crops could be one of the reasons why they became scarce compared to tea crops.[369] Already small landowning became smaller with increasing land division due to the rising population in villages.[370] These corn then tea fields lay in front of the dwellings that are located on the highest point of steep terrain. This arrangement provided better control for the homeowner over the land.

364 Y.Y., interview by Gül Aktürk, Çağlayan Village, January 11, 2019.

365 Y.G., interview by Gül Aktürk, Çağlayan Village, July 5 2019.

366 C.K., interview by Gül Aktürk, Hara Village, July 3, 2019.

367 Sümerkan, "Gelenekselden Betonarmeye Trabzon Kırsal Mimarlığı "; , 8 January 2019.

368 Arslantürk, "Doğu Karadeniz'de Çay Mono-Kültürü Ve Sosyo-Ekonomik Değişme."

369 Serhat Zaman and Mehmet Cerrah, "Dogal Ve Kulturel Ortamla Etkilesimi Yonuyle Surmene'de Çay, Findik Ve Misir Tarimi," *Eastern Geographical Review* 16, no. 26 (2013).

370 Arslantürk, "Doğu Karadeniz'de Çay Mono-Kültürü Ve Sosyo-Ekonomik Değişme."

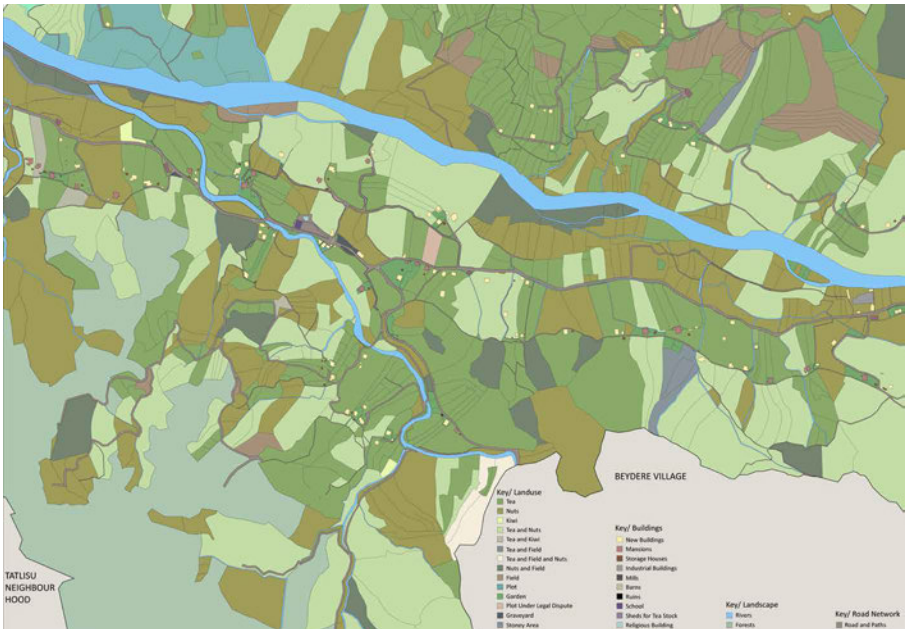

FIG. 4.2 Vernacular landscape of Çağlayan village with barns, kilns, storage houses, and vernacular buildings in the southern part of the river, which is a lowland. Source: author, based on the Autocad file provided by the municipality. .

FIG. 4.3 A rectangular form of elevated storage house of the Okman family on wooden poles has eight wooden pillars with three on the opposite sides. Source: author.

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FIG. 4.4 The layout of the land and construction sitting in Çağlayan village, from the personal photography archives of Erkan Aksu in January 2019.

Furthermore, additional structures such as storage houses were constructed around the building to reap, lay, dry, store, and process the cultivated crops of tea, fruits, and corn.[371] Keeping the food sources away from humidity was therefore significant, and this was provided by elevating considerably the storage house from the ground (Figure 4.3).

The scattered settlements were built in the areas suitable to farm the land and construct a building (Figure 4.4).[372] These places were easily accessible, close to water sources, protected against winds and landslides, and had a view of the natural landscape.[373] C.K., an elderly local, portrayed that "here the houses are distant but now they are building the house below the field of corn."[374] According to his

371 Gülay Usta, Dilara Onur, and Burcu Efe Ziyrek, "The Impact of Physical and Socio-Cultural Factors on Structuring Vernacular Dwellings in Eastern Black Sea Region " *Scientific Research and Essays* 7, no. 8 (2012).

372 Sümerkan, *Doğu Karadeniz'de Geleneksel Yapı Kültürümüzün Açık Hava Müzesi Fındıklı Köy Evleri, Rize'de Fındıklı Ve Güneysu Kırsal Mimarisi.*

373 Ibid.

374 C.K., interview by Gül Aktürk, Hara Village, July 3, 2019.

statement, which was repeated by Ş.S., "in the past, the mansions were built above the cornfield so that the rainwater carried the scat of animals down to the slope and fertilized the land."[375] Hence, local builders carefully used the excessive water from rainfalls for their benefit. They located their houses on the higher end of the slopes to control not only their property but also the water flow on their lands. A sloping for rainfall and drainage is necessary to carry surface water away for hygiene. Local communities set up a system to channel water through wooden channels to their gardens and houses for irrigation. Similarly, they dug canals—locally known as "hark" or "ark"—to channel the rainwater away from the building to the farm fields or the toilet pits. The channelling of water by local people in the past was according to their needs, but public institutions today do not consider these local practices in the management of water resources. This leads to conflicts between the local communities and public institutions (further developed in Chapter 5.6.). The use of water is getting problems with the expected drought in the country. Therefore, the implications of the past management of water in understanding climate-resilient communities matter greatly.

The type of orientation of the settlement was also suitable for the collective but respectful living of the local communities (Figure 4.5). Distanced from the river, these buildings are located on lowland and oriented in different directions for not to cut the view of the neighbours. Each building has a storage building and loft. Both entrances in opposite directions of buildings number 3 and 4 are facing east-west, while buildings number 1 and 2 are facing north-south direction. Anonymous—the local administrator—explained the reason behind this decision:

"The settlements are distant from each other due to the privacy aspects. One person's yard, which is built slightly higher than his or her neighbours, rarely faces the neighbouring property."[376]

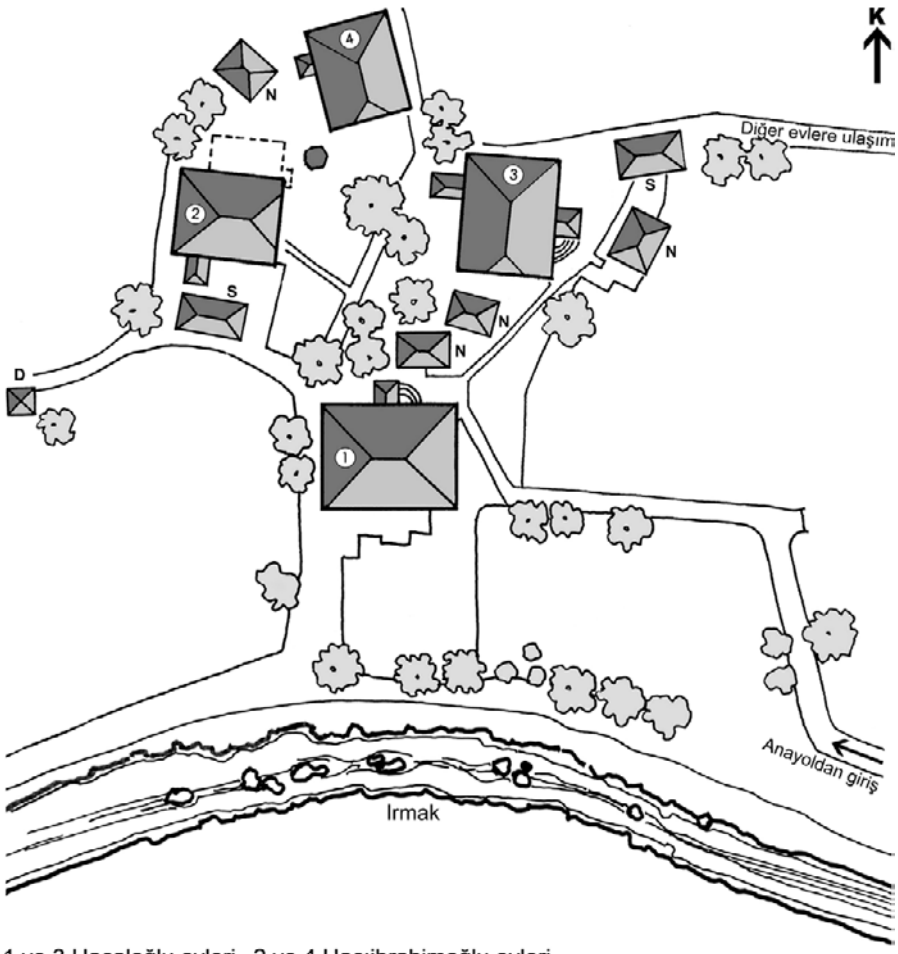
The local residents used to follow a certain custom of local climate in determining the building lot according to a folk story. The local administrator also mentioned, "in the past, on the rocks local people determine the location of *ocak,* which means cooker, but it is a local term to describe *home*."[377] He further explained the decisions of local communities behind the location of their houses:

375 Ş.S., interview by Gül Aktürk, Fındıklı, January 14, 2019.

376 Anonymous., interview by Gül Aktürk, Fındıklı, January 11, 2019.

377 Ibid.

"The place of the cooker in the living room is thus called home. Before construction, they sacrificed an animal (usually a cow) and pieces of the meat were hung on defined spots. If the meat is not rotten after waiting for three months, this location was selected for the construction of the house. By doing so, the rotten part of the meat signalled that the area received humidity, which could deteriorate the timber."[378]



1 ve 3 Hacaloğlu evleri, 2 ve 4 Hacıibrahimoğlu evleri
N: Nayla / Serander S: Samanlık D: Su değirmeni

FIG. 4.5 The plan of the settlements located in Çağlayan village, from the personal drawing collection of Mustafa Reşat Sümerkan obtained in January 2019.

378 Ibid.

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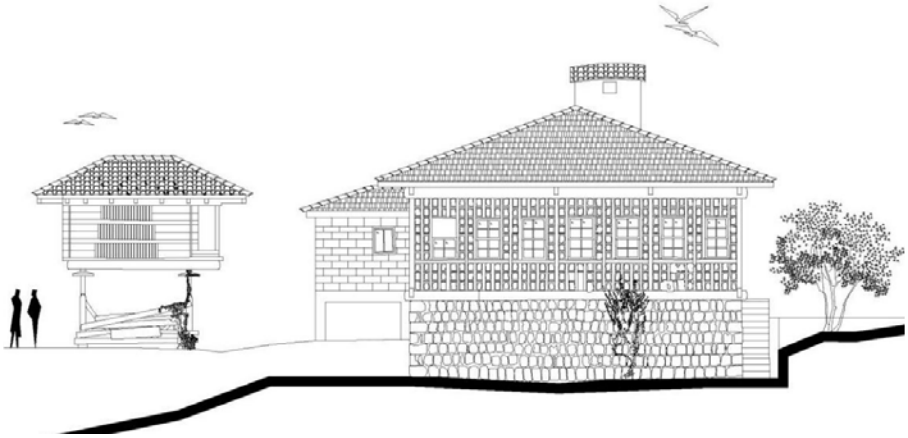

FIG. 4.6 The schematic section of Aydınoğlu House and the storage house. Source: Güler, Koray. Doğu Karadeniz Kırsal Mimarisinden Bir Örnek: Rize-Fındıklı Aydınoğlu Evi. 8. Uluslararası Sinan Sempozyumu. Edirne: Trakya Üniversitesi, 2013.

This ingenious method derived also from the religious and mythical customs in constructing a site. Sacrificing livestock before constructing a building was and still is a practice in constructing buildings. Its use in understanding the direction of the wind and precipitation is genius. Above all the determinants, the local artisans did not construct the buildings along the river valleys to avoid the prevalent winds and floods. In the past, the settlements were built in the places where the economic value that land and building could bring[379] were not the main concern according to the interview with a local truck driver on a construction site of Fındıklı (Fındıklı İl Özel İdaresi).[380] Y.Y. further elaborated on the flood-resilience of these mansions in the valleys of Sümer and Arılı:

"Approximately over 100 buildings are protected. These houses were not built in random places. They have a culture and past experiences. The places where the houses were built would not be affected by disasters like floods. Since the structures here are exposed to humidity, it is this thing that caused their [referring to the vernacular buildings] decay."[381]

379 The phenomenon has to do with the notion of *rant*, which means an income without making any effort. It is mostly used in the context of lands. Lands gain value in a period with the investments and taxation from the governments on natural resources.

380 Anonymous., interview by Gül Aktürk, Fındıklı, January 11, 2019.

381 Y.Y., interview by Gül Aktürk, Çağlayan Village, January 11, 2019.

The planning of a site for the construction of the building was a significant decision from the beginning. It anchored the presence of the local knowledge of climatic conditions, notably precipitation and rainfalls, of the area at the time. This knowledge is also reflected in the building design decisions, including the construction systems, material choice, flooring, openings, roofs, and partition of the rooms (Figure 4.6). This localized knowledge of climate-adaptive solutions and strategies is hidden in oral statements from local people. It is not accessible widely outside the district. The literature on the vernacular buildings rarely highlights evidence behind the passive design. Moreover, the translation of this knowledge into construction and planning practices is often missing. Today, even the climate change policies reveal the gap of learning from the past communities but often cannot bridge it by building climate-resilient cities. Inspired by the local knowledge of the planning of the vernacular settlements, urban and rural planners, design professionals, and constructors should make full use of it in the integration of nature in the construction of contemporary settlements.

4.2.2 Constructing Facades of the Building

In viewing the relationship between climate and the building design, a former professor in architecture at the Karadeniz Technical University, a scholar stated that "the foggy, rainy weather with a short period of sunshine affected the decisions of openings, the height of ceilings in the building as well as harvesting time."[382] The local artisans constructed these buildings in great harmony with the activities of the building occupants.[383] He further highlighted:

"The entrances of the historical structures in Çaglayan village are facing south, east, or southeast as the homeowner wakes up for daily routines such as working in the farm field together with the first rays of the sun."[384]

Correspondingly, C.K. revealed the harsh conditions of agricultural practices concerning climate due to lack of sunshine and radiance, the local communities have difficulties growing vegetables and fruits depending on the season.[385] In Rize, the

382 Anonymous., interview by Gül Aktürk, Rize, June 29, 2019.

383 Faris Karahan and Sanaz Davardoust, "Evaluation of Vernacular Architecture of Uzundere District (Architectural Typology and Physical Form of Building) in Relation to Ecological Sustainable Development," *Journal of Asian Architecture and Building Engineering* 19, no. 5 (2020).

384 Sümerkan, *Doğu Karadeniz'de Geleneksel Yapı Kültürümüzün Açık Hava Müzesi Fındıklı Köy Evleri, Rize'de Fındıklı Ve Güneysu Kırsal Mimarisi*; Anonymous., "Interview with a Scholar."

385 C.K., interview by Gül Aktürk, Hara Village, July 3, 2019.

highest average of solar radiation is in June. Due to the short period of receiving solar radiation, solar gains in June are impactful for the growing of the crops. In this sense, his statement on "the soil is fertile but there is no abundance of sunshine"[386] supports the adaptation and design of the vernacular structure in order to receive the most solar radiation. In discussing the relation between the local climate and crops, As quoted by Y.G.: "In the past, the rain was more excessive, but there is still rain otherwise the tea crops would not grow."[387] Supporting this statement, B.U. further emphasized:

"There was no snow last year. It used to snow on the hills. It was sunny 20 days in the summer, but now the snow has decreased. They [the local residents in the past] did not water the garden in the past. Now, they are constantly watering their gardens. It always rained."[388]

North and northwest winds bring precipitation and rain, whereas south and southwest winds carry cold, especially in winter.[389] As such, the positioning of the entrances of the buildings protected them from the prevailing winds from north and northwest directions.[390] The entrances are pulled inside and protected against rainwater.[391]

Hospitality and respect towards guests, as are important to the culture, are deeply rooted in the exterior and interior design of the building. Before entering the house, the homeowner washed his hands and his face after a long day of work in the farmland before presenting himself to the household and guests either by using the toilet on the entrance on the opposite side of the main entrance or by using the small fountain in the property (Figure 4.7).

The walls facing the prevailing winds are built with stone or chestnut as "it is resistant to moisture."[392] Emphasizing its resilience, Y.Y. detailed that "the chestnut timber is most commonly used as the decay cause of the structures is mainly due to humidity and precipitation."[393] The wooden construction, however, was neither resilient against extreme rainfalls nor sustainable considering the deforestation of the forests. Before the introduction of the stone-, eye-, cell-filling method, people

386 Ibid.

387 Y.G., interview by Gül Aktürk, Çağlayan Village, July 5, 2019.

388 B.U., interview by Gül Aktürk, Çağlayan Village, January 10, 2019.

389 Engin et al., "Climatic Effect in the Formation of Vernacular Houses in the Eastern Black Sea Region."

390 Ibid.

391 Ibid.

392 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

393 Y.Y., interview by Gül Aktürk, Çağlayan Village, January 11, 2019.

used the wooden construction technique, which disappeared due to the overuse of timber in construction, furnishing, and trade. To illustrate this point, C.K. explained:

"Chestnut is a long-lasting timber. The chestnut tree used in home construction has a long life span. It lives 500 years. No other tree type was used to construct a house outside of that tree. When the chestnut tree became less available, this type of building technique [stone-infilled timber construction] became prevalent. It came out of the needs of the local communities."[394]

The local laypeople ended up constructing these buildings with the stone-filling method and wooden framework because of the rarefaction of wooden materials (Figure 4.8). Firstly, they collected grey, blue-colored granite stones from the nearby river streams cut into the size of 17x22 small rectangles (Figure 4.9 and Figure 4.11). Laypeople carried the long timber logs and stones to the steep slopes. H.Ş. mentioned that "the stones in the size of 16-17 cm width and 22-24 height were cut and the back stones were filled in between chestnut timbers."[395] They subsequently laid these stones within the timber frames to fit into the framework and plastered the spaces between the stones and timber frames (Figure 4.10) with clay to ensure insulation. Giving an example from his house, C.K. said that "the interior of the stone-infilled timber is always covered with timber."[396]

FIG. 4.7 The quarter-circle-shaped stairs reach the main entrance. There are irregularly placed windows in each timber frame. Source: author.

394 C.K., interview by Gül Aktürk, Hara Village, July 3, 2019.

395 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

396 C.K., interview by Gül Aktürk, Hara Village, July 3, 2019.

FIG. 4.8 Babalik mansion before its renovation already had some interventions done. Source: Family archives of Babalik mansion house.

FIG. 4.9 The local stonemason Ş.S. shows the sizing of the stones used in the construction of cell-filling used in the construction. Source: author.

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FIG. 4.10 The stones are removed one by one and each of them is given numbers to remember where the pieces belong in the frame. Source: Family archives of Babalik mansion household.

FIG. 4.11 The local stonemason Ş.S. draws the method cell-filling method. Source: author.

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FIG. 4.12 Stone-built façade is facing the steep slope in Çağlayan village. The barn is covering half of the ground floor.Source: author.

The ground floor was built with stone to endure the humidity of the soil, while the upper floor was constructed with timber and started after a certain height.[397] The construction material of the façade was chosen according to the direction it faces. For instance, if it faced a steep slope, it was built with stone to endure the weight of the soil. This façade did not have any openings as it faced the slope (Figure 4.12).

Unlike in desert climate regions, the buildings in this area did not have terraces, nor inner or outer courts, as it would expose the building to extreme humidity and precipitation. To protect the building against the winds, it is surrounded by perennial trees.[398] In addition, the south and east sides have larger windows and are warmer as they receive more light while there are fewer and smaller windows in the parts exposed to the cold.[399] In the living rooms, there is through the window a view of the forestry and tea landscapes. Moreover, in rare examples, one or two *cumba(s)* (bay windows) allow natural light into the rooms, especially in the living rooms (Figure 4.13). Contrarily, there are fewer windows facing north and northwest winds.

397 Engin et al., "Climatic Effect in the Formation of Vernacular Houses in the Eastern Black Sea Region."

398 Ibid.

399 Ibid.

FIG. 4.13 Satiroglu family mansion, which is the only building with two bay windows. These two bay windows create an extra dimension to the living room with a view of the landscape. This is why this building differs from the others in the village of Çağlayan and even in the district of Fındıklı. Source: author.

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FIG. 4.14 The wooden shutters are not only placed on one façade. The façade on the opposite entrance to the main entrance has no wooden shutters as it does not receive enough sunlight. The arced shape roof though renovated extends widely. Unlike others, the building is located in a lowland. Source: author.

There are some buildings which have windows facing these directions with wooden shutters to keep the cold and wind from entering the houses (Figure 4.14).[400]

Woodworking in the past required a great deal of effort, from the process of collection to shaping and carving it. It was especially difficult to cut up the timber from the 10-meter-high trees before the introduction of sawmills in the area. From the construction of houses to cooking habits, all activities involved the collaboration of neighbours at every stage. The difficulty of the entire process was outlined by one of the house owners, T.H., remembering the sound of the mason's adzes, "everything was made by hand."[401] Having no workshops or sawmills made the process of ornamentation, carving, and shaping long timber long and hard labour. Unlike the current carpentry practices, "the trees were cut and grated"[402] by hand and with handmade devices. Apprenticed to his father, the local stonemason, Ş.S., said:

400 Engin et al., "Climatic Effect in the Formation of Vernacular Houses in the Eastern Black Sea Region."

401 T.H., interview by Gül Aktürk, Gürsu Village, July 2, 2019.

402 Ibid.

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"Generally, most of the stones used in these houses were brought from the Çağlayan river. We used those stones which come rolling down from the Kackar mountains ... There are granite deposits ... The stones roll down naturally."[403]

From obtaining the material to shaping and carving it, the artisans worked at every stage of the construction of these settlements. Concerning traditional practices, Ş.S. observed that in the construction of the cell-infilled houses, the stones were laid in the timber frame set back by 1 cm.[404] This was to fit the stone well by leaving the remaining 1 cm for the plaster. The uneven side of the stone was then covered with timber or plaster. Stone/timber mason A.S., who started work at the age of 13, described the process of 'forming' the timber:

"I brought the trees from Murgul, Şavşat, and Hopa in Artvin in Türkiye then I cut them here in my workshop. For instance, we were using a long wood plane called a *küstere* to shape the wood. By using *yonma balta* (a chopper), timber was peeled or whittled... Then we checked whether both sides of the timber were of equal size or whether they had any bumps. After flattening them, we used an *ayak keser* (a device to cut logs) to drill a hole for the horizontal timber frame, because it cannot be opened with a woodworking *rende* or *planya* (both are types of plane)."[405]

Regarding the conservation of timber, Y.Y., who was once a house owner himself, talked about the natural drying of timber. As the grandson of a local craftsperson, he recollected that his grandfather "would cut the chestnut trees when they were dry after a while."[406] He explained that "if the dryness was starting from the bottom, once it was cut, it would grow again."[407] This method is also known as a natural seasoning and wood drying is the traditional way of exposing wood to the air to evaporate the excess moisture to prevent damage to wood.[408] Wood is air-dried or dried in a purpose-built oven (kiln).[409] Y.Y. thus explained the maintenance of chestnut trees by using this method to resurrect them from their roots and reuse them in construction work. Today, the legislation prohibiting the cutting of trees prevented local people to cut them and using them in the construction of their

403 Ş.S., interview by Gül Aktürk, Fındıklı, January 14, 2019.

404 Ibid.

405 A.S., interview by Gül Aktürk, Beydere village, January 11, 2019.

406 Y.Y., interview by Gül Aktürk, Çağlayan Village, January 11, 2019.

407 Ibid.

408 Wikipedia, "Wood Drying," https://en.wikipedia.org/wiki/Wood_drying.

409 Ibid.

buildings. Eventually, it has led chestnut tree trunks to become completely dried out in the forests. Even though it may be due to diseases, the tree that is cut sprouts again from the root.

4.2.3 Climate Responsive Roof Structure and Covering

The roof eaves extend to 150 cm, particularly in Çağlayan village, to prevent the decay of the façade against the rainfalls. The substantial space between the roof and the windows prevented water from permeating inside the building. The local people aimed to remove rainwater from the roofs as quickly as possible. For this reason, the roofs were formed in an arced shape that allowed rainwater to fall far from the facades.[410]

To avoid snow melted water and rainwater reaching the foundation of the houses on the hills, the sloping of the roof is not highly inclined. [411] *Hartama*, a traditional roof cladding, is constructed with 1 cm thick timber of fir, spruce, or oak, 2 cm thick timber if made of chestnut. It is built with 1-2cm woods as a board-on-board roof installed vertically.[412] In roof construction, the four-ridge structure is preferable to the three ridged roofs due to its resistance to wind and snow load. The wood is left to dry otherwise when the thin wood dries it bends.[413] This is why the wood board loses its function. The roof tiles used today do not cover the roof well as they are not as wide as the wood boards used in the roof construction in the past.[414] Moreover, its underneath remains humid as the sun cannot dry this part, leading to its deterioration.[415]

Even the chestnut timber gets darkened in time due to high humidity, the smoke from coal burning in the houses, or the wood is painted. However, according to Y.G., one of the house owners in the district, “the black color on chestnut timber is a natural reaction of the wood to humidity.”[416] Preserving the material against humidity requires natural drying. If not properly dried, timber, particularly chestnut, starts ‘moving’ - shrinking or swelling. To avoid this, carvers prefer to use a natural drying process. In

410 Bayram, “Doğu Karadeniz Bölgesinde Geçmişten Günümüze Vernaküler Mimari.”

411 Ibid.

412 Özgüner, "Village Architecture in the Eastern Black Sea Region."

413 Bayram, “Doğu Karadeniz Bölgesinde Geçmişten Günümüze Vernaküler Mimari.”

414 Ibid.

415 Ibid.

416 Y.G., interview by Gül Aktürk, Çağlayan Village, July 5, 2019.

an attempt to minimize the 'movement' of the timber, Ş.S. recommended the use of the *daraba* system (timber boarding or a partition) –"we drill the massive timber with another type of timber on both sides."[417] According to him, the use of this system does not leave any gaps or fluctuations between the joints, but today the use of epoxy in filling the cracks and holes speeds up the process of degrading the timber. Glue line delamination in glued members of timber or the durability of epoxy adhesives against temperature, humidity, and other determinants could potentially affect the timber.[418] Evolved from the need of keeping the building dry, homeowners paid attention to the roof construction, as much as the buildings' envelopes. The roofs of these buildings are particularly designed to protect the exterior façades of the buildings against extreme precipitation and rainfalls while allowing natural air circulation inside.

The roof overhangs, ridge, and tiling were selected carefully by local people according to the climatic conditions of the district of Fındıklı. Although the roof structure in the area is not high-pitched, it is questionable how the current three to four ridged low-pitched roof structure could carry the snow load. The explanation lies in the size of the timber beams that were strong enough to carry the snow weight. In support of this argument, H.Ş. mentioned:

"The roof structures here usually have a 4-ridge. The roof is supported by the poles and trusses to be able to carry the snow load. Unlike the high-pitched roof, the 3,4,5-ridged roof has a pleasant image (Figure 4.15)."[419]

Alongside its aesthetic view, the roofs were rigid enough to bear against the wind and snow load. Regarding its durability, T.H. explained:

"Timber trusses hold the roof (Figure 4.16). In addition, there are timber beams that stand next to each other to hold the roof tiles. Poles under the trusses provide full support. I know with the help of the neighbor that we could clear the snow from the rooftops when the snowload was very heavy. The neighbors would step in the clearance of snow from the rooftop."[420]

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417 Ş.S., interview by Gül Aktürk, Fındıklı, January 14, 2019.

418 Helena Cruz and José Saporiti Machado, "Epoxy Resins Used for the Repair of Timber Structures: The Problem of Short- and Longterm Performance Evaluation ", ed. C.A. Brebbia, vol. 66, *Structural Studies, Repairs, and Maintenance of Heritage Architecture VIII* (Wessex Institute of Technology, UK: WIT Press Transactions on the Built Environment 2003), www.witpress.com.

419 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

420 T.H., interview by Gül Aktürk, Gürsu Village, July 2, 2019.

FIG. 4.15 The roof is low pitched and a nice image with its 3-4 ridges. Every room has a fireplace and the stone chimneys connected to these fireplaces extend clear over the peak of the roof. Source: author.

FIG. 4.16 Underneath the roof construction, there are pillars and trusses. The wooden boards are laid on them. Source: author.

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Dealing with such harsh climatic conditions reflected on collective neighborhood relations. H.Ş. pointed out that "1.5-2 meters high snow would cover the village and villagers would help each other out to shovel the snow off the roofs with the help of stairs."[421] F.H. agreed by saying that "I remember clearing the front of the doors from the snow with a help of buckets 2 years ago, at the funeral of my father."[422] Accordingly, H.Ş. added:

"The roof would make loud sounds due to the heaviness of the snow. Excessive snow would be cleared from the roof so that the roof structure did not collapse. Now it doesn't snow like that."[423]

The majority of the local communities revealed that the snowfall and cover were greater in the past than today. As the owner of a historic building in Gürsu Village T.H. noted:

"When I saw the first great snowfall in our village in 1948, I saw 3 meters high of snow cover. Two meters and a half. It did not snow in the last two years, including this year... No snow has fallen for the last two years."[424]

Or as Y.G. put it:

"Here it used to be 2 meters of snow. Now it doesn't snow that much, a year ago, I measured 85 cm of snow in the garden."[425]

The statements on the decreasing snowfall were repeated by H.Ş. "in the past, excessive snow was shovelled from the roofs"[426] and F.H. "it used to snow more before."[427] Despite these harsh climatic conditions in the past, local people managed to maintain the roofs of their buildings. It also appeared that the local climate determined the land use, land tenure, and cropping pattern of the past, which are now facing the consequences of climate change.

421 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

422 F.H., interview by Gül Aktürk, Çağlayan Village, January 12, 2019.

423 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

424 T.H., interview by Gül Aktürk, Gürsu Village, July 2, 2019.

425 Y.G., interview by Gül Aktürk, Çağlayan Village, July 5, 2019.

426 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

427 F.H., interview by Gül Aktürk, Çağlayan Village, January 12, 2019.

FIG. 4.17 The openings on the rooftop floor allow light inside and airflow inside. A difference in this building is the half floor elevation from the ground to have the barn underneath the building in a lowland area in Çağlayan village. Source: author.

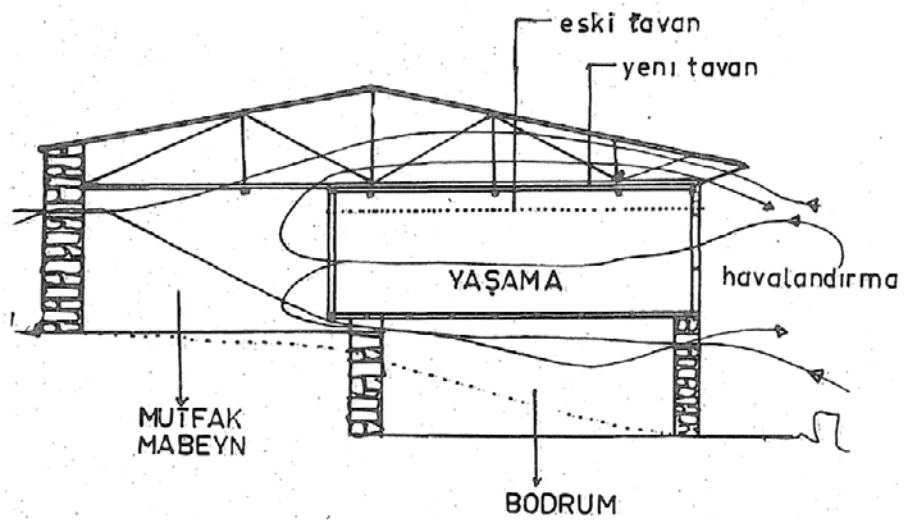

FIG. 4.18 Natural ventilation scheme under the eaves of the rural houses in the Eastern Black Sea region in order to allow the polluted and heated air to leave the house. Source: Şen. N., 1967, Rize'den Beş Ev, Istanbul.

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The lanterns on the roof were provided to lighten the attic.[428] These lanterns do not have glass to permit the release of smoke from the open fire (Figure 4.17).[429] Natural ventilation in the house is provided in many ways. The entrances on the opposite side allow natural airflow (Figure 4.18).[430] Similarly, small and narrow openings in the barn are used for the same purpose.

Traditionally, occupants incorporated the local knowledge of the local climate in every design element of the buildings, including the interior. This connection is, however not as predominant as in the exterior of the buildings. Because other determinants, such as food culture, as mentioned earlier, have more paramount influence over the interior design of the buildings.

4.2.4 Climate Comfort and Interior Design

Water management was particularly important for local people to do their daily work such as watering their plants, washing the vegetables and fruits, and doing their laundry by hand (Figure 4.19). They carried their water through wooden channels in the interior of their buildings. The small openings between the timber frames were wide enough for wooden channels to reach the inside of the buildings. Local people were washing their fruits and vegetables and laundry on these wooden countertops. Water was drained through the filter on the slightly sloped floor in the shower in the building (Figure 4.20). In some cases, there was a wooden seat in the bathrooms (Figure 4.21).

The choice of interior flooring materials was done for regulating the temperature in the house. Soil flooring in the living area would allow natural heating by keeping the heat from the open fire (Figure 4.22). The body temperature of livestock in the barn kept the barn and soil flooring of the living room warm enough during winter. Soil flooring was also functioning as insulation for the ground floor. In this part of the room, under the roof, there was no ceiling for the smoke to leave the building. But to the entrances to the rooms, there was wooden flooring and ceiling and most of the time the flooring was elevated one step in order to separate the living room space from the bedrooms. Similarly, the location of the barn and animals in the basement facilitated the heating of the flooring of the living space, particularly in the winter months (Figure 4.23). The flooring of the living room was convenient for keeping the warmth of the open fire in the area.

428 Engin et al., "Climatic Effect in the Formation of Vernacular Houses in the Eastern Black Sea Region."

429 Ibid.

430 Ibid.

FIG. 4.19 Local people channelled the water through wooden channels to use in washing the laundry and doing the dishes on their timber countertop. Source: author.

FIG. 4.20 The filter on the floor for water to be drained in the shower in B.T. house in Gürsu village. Source: author.

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FIG. 4.21 Former bathroom with seating in B.T. house in Gürsu village is preserved unlike other buildings in the area. Source: author.

FIG. 4.22 There is still an open fire in the kitchen of B.T.'s house in Gürsu village with a chain to hang the pots to heat meals. Source: author.

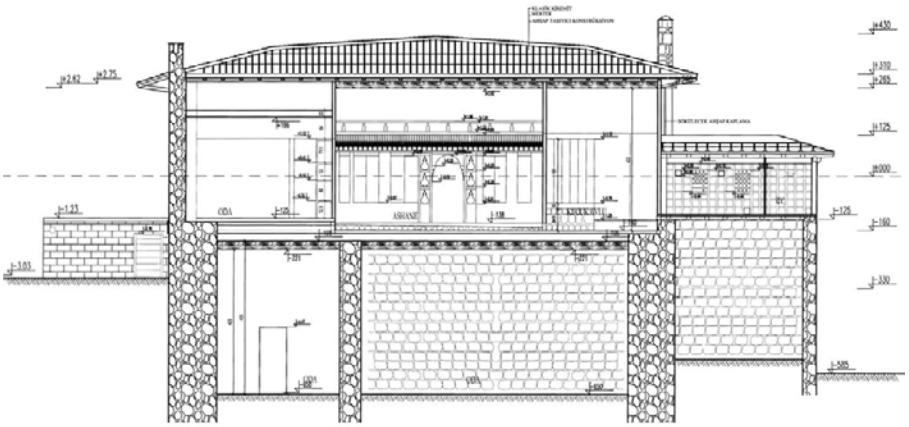

FIG. 4.23 A section of a mansion as a representation of the materials used in the interior of the vernacular buildings. Source: the Regional Conservation Council in Rize.

Without using heaters and consuming energy, airtight timber frame buildings offer thermal comfort. The local artisan Ş.S. argued that "90% of the building is formed by the joints holding timber frames together, otherwise cold air enters."[431] Therefore, the old houses receive a little bit cold. According to the construction master, if it does not take the cold air from the sides or joints, it takes it from the flooring or ceiling.[432] Emphasizing the importance of thermal comfort in the houses, he described:

"In the past, it [the open fire in the living room] was always on, the fire would burn our face, and the cold would burn our back. We got used to sitting around the open fire."[433]

Considering the high precipitation levels of the local area, regulating the humidity gained significance in the choice of materials. Supporting the statement of Y.Y. on the humidity in the house, B.U. explained that the "rotten month is July".[434] She further added that "formerly, the month of July used to receive excessive rain." Referring to the dampness, she mentioned, "this is why the month of July is known to be the rotten month".[435] Despite the high precipitation and humidity, the thermal comfort in these stone-infilled timber buildings is steady. The dampness is less in these buildings as they are built with timber. As "the house is breathing,"[436] C.K. claimed that "sleeping here is more comfortable".[437] He revealed that "because the interior was plastered, the rooms would not be cold".[438] The clay plaster provided insulation in these houses.

Despite the existence of storage houses, there was always a need for storage in the buildings. The items which were stored by the local people usually consisted of bedcovers and duvets, food, and many other items. The functional use of the closets underneath the seating in the living room, kitchen, and partition were mainly for storage purposes. There are usually timber closets on both sides of the elevated entrance door that function as a hall to lead to the interior rooms. This hall helps keep the rooms warm by allowing the heat from the open fire in the living room.[439] The timber cupboards have ornamented small holes known as the *medina,* (Figure 4.24) which are used to keep food sources such as flour (Figure 4.25 and Figure 4.26).

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431 Ş.S., interview by Gül Aktürk, Fındıklı, January 14, 2019.

432 Ibid.

433 Ibid.

434 B.U., interview by Gül Aktürk, Çağlayan Village, January 10, 2019.

435 Ibid.

436 C.K., interview by Gül Aktürk, Hara Village, July 3, 2019.

437 Ibid.

438 Ibid.

439 Karadeniz Kultur Envanteri, "Rize Halk Kulturu," https://karadeniz.gov.tr/yoresel-mimari-7/#nesne0.

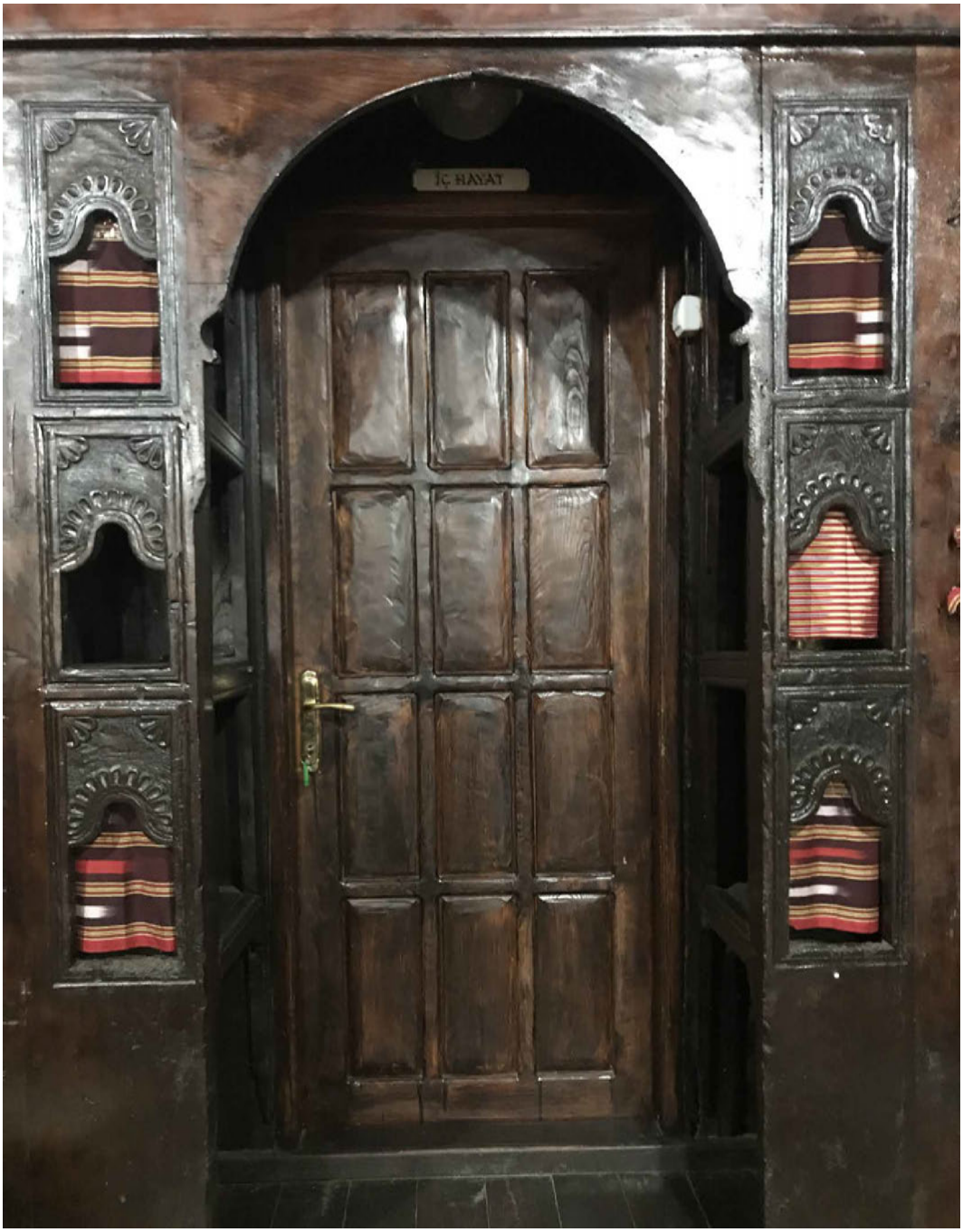

FIG. 4.24 Medina are the small openings with ornamentations on each side of the hall entrance door used as part of the timber closets lined up. Source: author.

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FIG. 4.25 Small openings within timber closets are used for storage purposes. Every little component in the building has a function. Interior furnishing is representing the everyday need of the household. Source: author.

FIG. 4.26 The covered small openings with small details on them reveal the beauty of the timber artisanship and hidden corners with function. Source: author.

FIG. 4.27 In Okman house the seating is located in the bay window facing the view remained intact and restored with wooden furnishing. The seating includes several comparted storage areas. Source: author.

FIG. 4.28 The partition in Okman house was common for the use of storage of the food until the 1950s. Source: author.

This has more to do with the importance of the food in the culture than climate, although keeping the food products dry was important in this area. As can be seen in Figure 4.27, the interior is covered with timber cupboards even under the seating places. Even the small spaces left for storing mostly food products such as flour and legumes. The decorated interior elements reflect practical concerns such as storing food (Figure 4.28).

FIG. 4.29 Built-in cupboards in an abandoned building are a humble version of timber cupboards in the area. Source: author.

The built-in cupboards separate the living room from the inside room for privacy. Even the most modest village houses illustrate these built-in cupboards with simple woodwork (Figure 4.29). From wooden floors to cupboards, the excessive use of locally sourced materials was once a common local practice due to the abundance of forests. One can observe the labour-required skills and works with the use of good quality timber even in these village houses. These elements became the characteristics of the buildings.

4.3 Conclusion: Lessons for Climate Resilience from Vernacular Heritage

Long building tradition, that has developed to deal with the local climate, has revealed solutions in the choice of design of vernacular settlements with slight variations. Utilizing the steep terrains, natural light, and the durability and resistance of chestnut timber for the planning of the settlements improved the lifespan of these settlements. The climatic determinants such as solar radiation, wind, and rain have played a significant role in the building configuration, layout, orientation, and the use of materials and techniques. While some of these solutions derive from the literature, the narratives of local people provided insight into the reason why.

Climate narratives and stories of indigenous practices (used as a method as mentioned in Chapter 2.4.) enable access to local knowledge of climate adaptive solutions and can be taken as a methodological approach to identify the risks and damages to vernacular heritage globally. Narratives of climate and vernacular heritage through the landscape can link different temporalities, people, and places to encourage a more ground-up approach to managing vernacular heritage sites in today's conditions.[440] There is a need for more storytelling methods to identify the reasons behind the design of the vernacular settlements as a part of traditional landscapes. This information is getting lost in the transmission and translation of the know-how knowledge and skills. Considering the insufficient historical documentation of vernacular heritage sites in archival sources, oral stories from local communities and historical photos can reveal a lot about the traditional knowledge of climate and culture embedded into the construction of these buildings. The result of such analysis can be useful as a learning tool to deduct climate-adaptive design solutions and planning decisions for the future. Architects and engineers can reconsider these decisions in their practices for designing, constructing, and operating buildings and connect them to past cultural practices.

440 Rose Ferraby and Dominic Powlesland, "Heritage and Landscape Change: Recording, Archiving and Engaging with Photogrammetry on the Jurassic Coast World Heritage Site," *Proceedings of the Geologists' Association* 130, no. 3 (2019).

The preservation of vernacular heritage sites is mostly focused on the documentation of single buildings and the inventories are lacking oral stories about the passive design solutions,[441] the great role of climate in shaping the built environment, and how we can learn to reconnect with nature in designing our settlements. This is to find out what building decisions need to be made to construct buildings climate-resilient. Vernacular built heritage and customs of dealing with local climate are interconnected. These buildings are not only designed for the local climate but also for the needs of society at the time. Revising the use of land and building vernacular settlements of the past illustrates the resilience of localised solutions in construction.

The main characteristics of these houses are their modularity, flexibility, adaptability, transformability, and reusability in a landscape that is dynamic in nature. The knowledge of vernacular heritage is beyond the understanding of the material, a construction technique that exceeds the culture and lifestyles of the users. At the time of their creation, the traditional local knowledge served their needs of insulation and illumination in the winter period, for storage areas for their foods and crops, as well as created natural ventilation. The works of highly skilled artisans in creating these settlements revealed the utility of every decision including keeping food ingredients dry in storage units, securing facades from rainwater via wide roof overhangs, draining water, and more.

Vernacular settlements, despite the climate-responsive planning decisions behind their constructions, became extremely vulnerable to development projects in their surroundings. The national, regional, and city planners in public institutions did not anticipate how their spatial planning approaches and decisions in favor of economic development since 1950 could increase exposure to catastrophes. Planning for disaster risk reduction conflicts with their investments in urban growth and development plans, which they opt for. As a result, the integrity of the vernacular landscapes was lost and damaged by the hazards along with some of the buildings and storage houses.

441 The questionnaire that Necati Sen conducted in “Rize’den Bes Ev,” he asked building owners the questions regarding the internal climate comfort of the buildings. The answers reveal the direction of the wind, climate comfort during the summer and winter seasons, and the dampness in the buildings.

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5 Spatial Planning Decisions as a Hindrance to the Preservation of Vernacular Heritage

1950-1990

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5.1 Introduction: Improper Spatial Planning Interventions as a Driver of Climate Change

Having discussed the climate-resilient features of these settlements in the previous chapter, this chapter highlights the spatial planning of the city in the period between 1950 and 2019 through the lens of planning decisions at the national and regional scales. Consequently, these planning strategies accelerated the effects of changing climate on vernacular heritage sites. Within this scope, the destruction of the vernacular settlements will be evaluated on a broader scale.

A great number of vernacular heritage sites are considered to be extremely resilient and are expected to sustain well in a changing climate (see Chapter 2.4.1.). However, some of these vernacular settlements will not be able to recover from the damage caused by climate change together with anthropic influences. Formerly, these sites have not been considered at risk as they were built in harmony with the local environmental conditions, such as climate, topography, and water sources. In time, the local conditions of the environment have transformed drastically with urbanization, river correction, reclamation of the coast, deforestation of the hinterland, and development plans. Each of these interventions imposed by the spatial planning decisions exposed the heritage sites to climate risks by multiplying the effects and frequency of the rainfalls, river flooding, and landslides. Given this, city and regional planning strategies have so far failed to tackle climate change mitigation and adaptation.

Implementing climate change adaptation in urban and regional planning strategies is not new. The adoption of nature-based solutions such as urban greening and lessening unconscious planning policies and strategies such as urban sprawl can enhance climate resiliency. However, existing literature on the land use and -cover, and vegetation changes in the city of Rize reveals the susceptibilities of the city to land reclamation, subsidence, and flooding by using remote sensing in combination with GIS technologies (Chapter 2.6.). The hinterland of Fındıklı, though quantitatively measured in terms of landslide susceptibility requires taking heritage sites as a focal point in the disaster risk assessments. In this sense, the existing literature regarding the case of Fındıklı lacks culturally and naturally significant sites under the threats of changing climate and landscape.

Vernacular sites, particularly in mountainous regions, are under several threats which are often overlooked in the planning of the larger spatial/regional scales. The aim of this chapter is to determine the vernacular built and natural heritage sites in the hinterland of Fındıklı in Rize that are vulnerable to river floods and landslides due to climate change and interventions by the national and regional public authorities. Furthermore, it targets to grasp the relation between the locations of vernacular settlements and the historical transformation of their surrounding on the district scale. Through the analysis of archival sources and literature, the location of vernacular heritage sites is identified while georeferencing and overlapping aerial images on contemporary satellite pictures through ArcGIS are used to track the changes in land use. The method of identifying the issues and site-specific solutions can be transferred to vernacular built heritage in other locations by a similar approach. The findings of this chapter will highlight spatial planning decisions, including urbanization, river corrections, deforestation, and urban-rural development plans in the acceleration of the risks of flood and landslide disasters in traditional vernacular landscapes of Fındıklı.

This chapter is organised as follows. First, Chapter 5.2. reveals how the urbanization and population increase since 1950 in the city led to the rising interest in the developments through the analysis of historic aerial images and historic images as well as archival documents. When urban growth does not assist climate change, it can provoke disasters by negatively affecting the local climate. It then focuses on the river correction and coastal changes between 1969 and 2019 in Chapter 5.3. to explain the effects of these developments on the hinterland by overlapping the maps and aerial images georeferenced on a single map on ArcGIS. In addition, the growing scale of deforestation and the reason behind this is explained and detected from this map in chapter 5.4. Chapter 5.5. takes a closer look at the rural tourism plan of the "Green Road Project" which had resulted in significant modifications in rural landscapes with the vernacular heritage sites. Although the majority of the destruction of this project was done to the houses which are located in the highlands, these houses are outside the scope of this research. The loss of forestry in the hinterland exposes vernacular heritage sites at risk. With the planning of dam constructions as a national development strategy, the influence of hydropower plants over vernacular landscapes is discussed in Chapter 5.6. Of the many intertwined relationships between development plans and the effects of changing climate, the last two sub-chapters investigate the existing literature in terms of the implications of these projects on vernacular heritage sites. This chapter finalizes the site-specific threats on vernacular settlements in Chapter 5.7. by presenting the results from the analysis of the map (as discussed in Chapters 5.3. and 5.4.) on which heritage sites are at risk. The results of this chapter will inform decision-and policymakers about the site-specific climate-induced and anthropic threats to cultural heritage sites in order to promote policies on the disaster management of vernacular and natural heritage and offer practical solutions for the preservation of these sites (see Chapter 5.8.).

5.2 Urbanization and Population Increase (1950-2019)

Fındıklı, despite being a small port city, had a population of 11.467 of which 2.988 were located in the district centre along the coast in 1955.[442] At the time, the population of the city of Rize was 211.967[443] and the number of the buildings was 10.361,[444] including public buildings, schools, tea factories, and residential buildings. Among these buildings, 431 were located in the urban areas, while the rest of 9.930 were located in the hinterland of the city.[445] The majority of the city and the district population, therefore, resided in the hinterland.

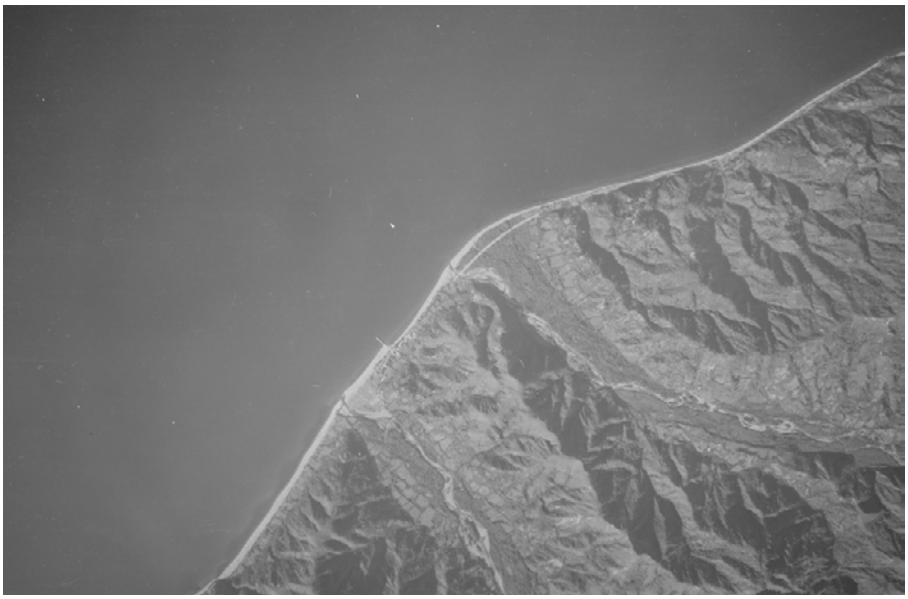

FIG. 5.1 Freestanding buildings run along the narrow coastline with tea gardens lying on the front. Source: Rize Directorate of Environment, Urban Planning and Climate Change.

442 Sinan Başaran, "Cumhuriyet Dönemi Rize Nüfusu" Fırat Üniversitesi Sosyal Bilimler Dergisi 30, No. 1 (2020).

443 Ibid.

444 Korgavuş, "Rize Merkez Ilcesi Kültürel Peyzaj Alanlarında Zamansal Değişimin Coğrafi Bilgi Sistemleri İle Belirlenmesi."

445 Ibid.

The spread of urban living on the coast was taking over the riverine areas of the district, especially surrounding Çağlayan and Arili rivers. It is not surprising that the rising tea cultivation and migration of the agricultural workers to the city of Rize slightly contributed the growth of the population in the district in 1960 which was then 13.002 with 3.701 urban district residents. There was only one row of buildings along the coastal street nearby Arili valley in 1959 (Figure 5.1). Meanwhile, the riverbed of Çağlayan on the shore was inhabitable (as supported by the evidence from the local residents in section 4.2.1). This area, which was described as a "swamp," or marshland, in fact, was a riverbed. There were no settlements on both riverbeds. Equally important, coastal developments due to population rise have not begun accelerating until 1960.

FIG. 5.2 The construction of the Black Sea coastal road 1960s in the city of Rize caused the irreversible destruction of seafront mansions. Source: https://www.tarihtarih.com/

There was a great need for infrastructure for easier access not only to the district but also to other coastal cities. The route, which was built by Russians in the Ottoman Era in the city, was changed and taken to the coast in 1967 (Figure 5.2). This coastal route was connecting the two valleys of Arili and Çağlayan in 1969. In ten years, there had been an increase in the construction of the buildings in Arili valley. On the 1969 map, there were 871 buildings, excluding the historic buildings in the area (Figure 5.3). The conflictual coastal road was a sign of rapid urbanization in the next years to come. In four years, the construction of buildings grew in amount and scale in the coastal area causing deforestation (Figure 5.4). Similarly, between the two rivers, the number of buildings increased. This growth was rather gradual in comparison to the changes in 1975 (see section 5.2.).

The former river bed of Arili in 1973 (Figure 5.4), was already occupied by the construction of new buildings in 1982 (Figure 5.5). On the map of 2019, the number of only newly built houses rose to 3227. The riverbed which is later narrowed allowed the creation of a space for the construction of more buildings. The rehabilitation of the rivers, reclamation of the sea, and urbanization were the part of "urban transformation" project of the government. But this was going to be criticized later by the public and NGOs for the damage that they brought at the times of flooding and landslides. Because the existing coastal infrastructure and settlements are not resilient enough against the disasters, the effects of the modifications on the coast and rivers are reconsidered.

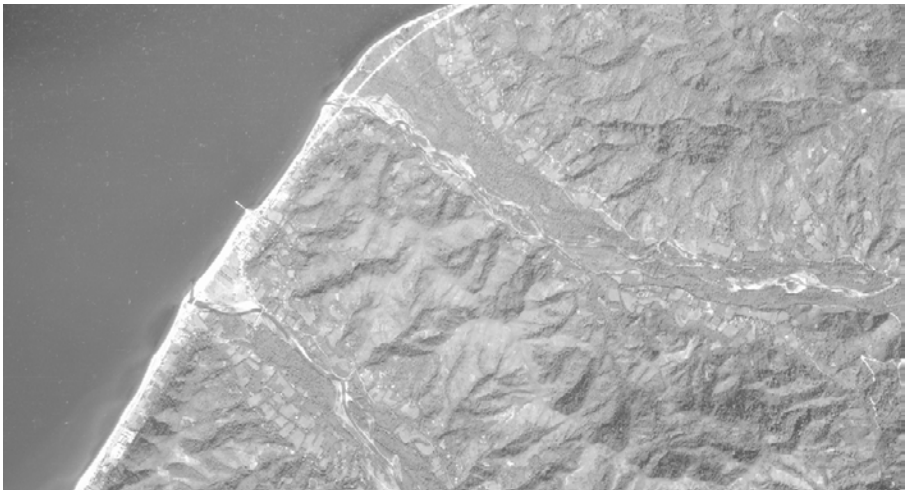

FIG. 5.3 The extension of the coastal infrastructure in the 1969s reveals the coastal developments in Fındıklı. Source: Rize Directorate of Environment, Urban Planning and Climate Change.

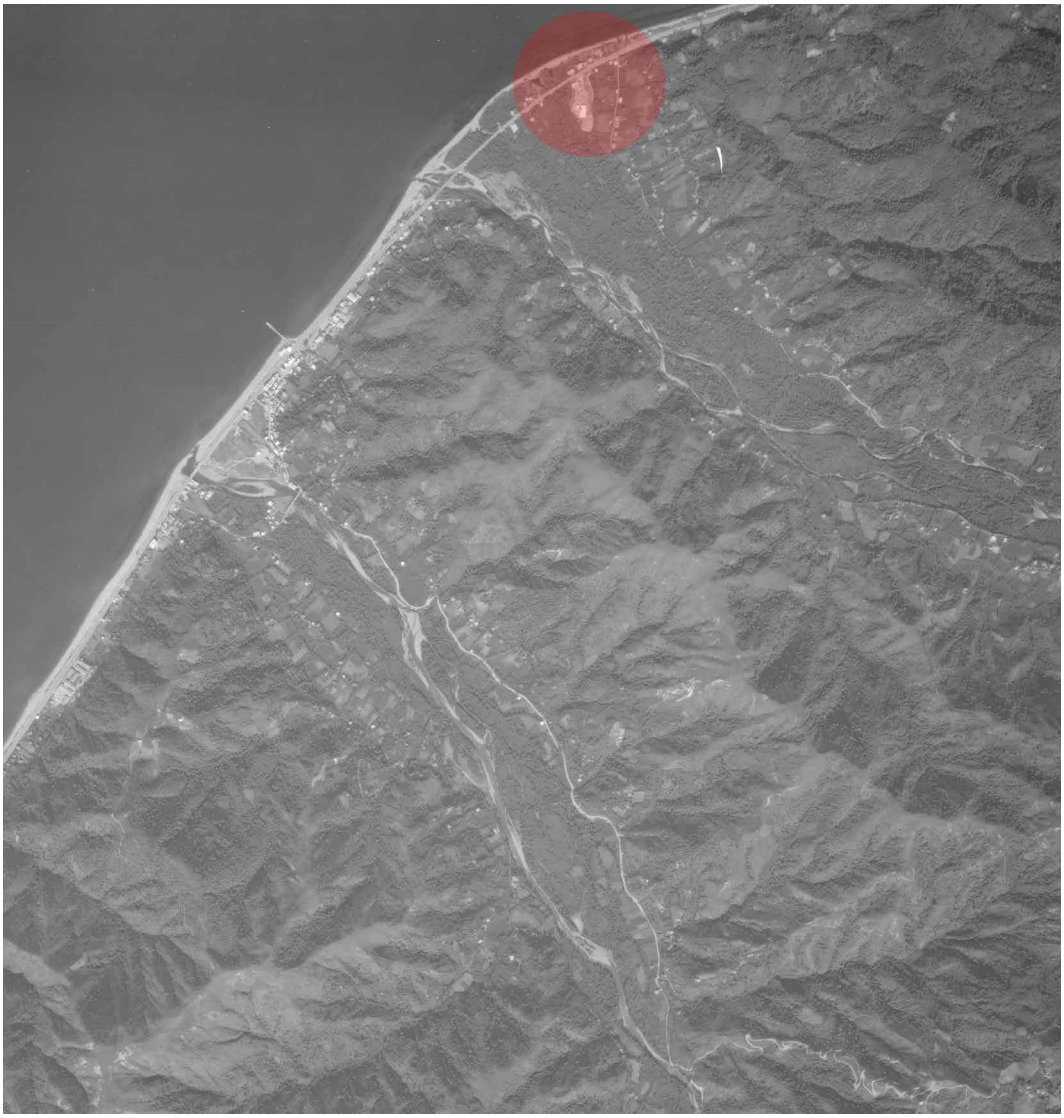

FIG. 5.4 The extensive construction site on the coast in 1973 highlights the start of the large-scale deforestation in the area. Source: Rize Directorate of Environment, Urban Planning and Climate Change.

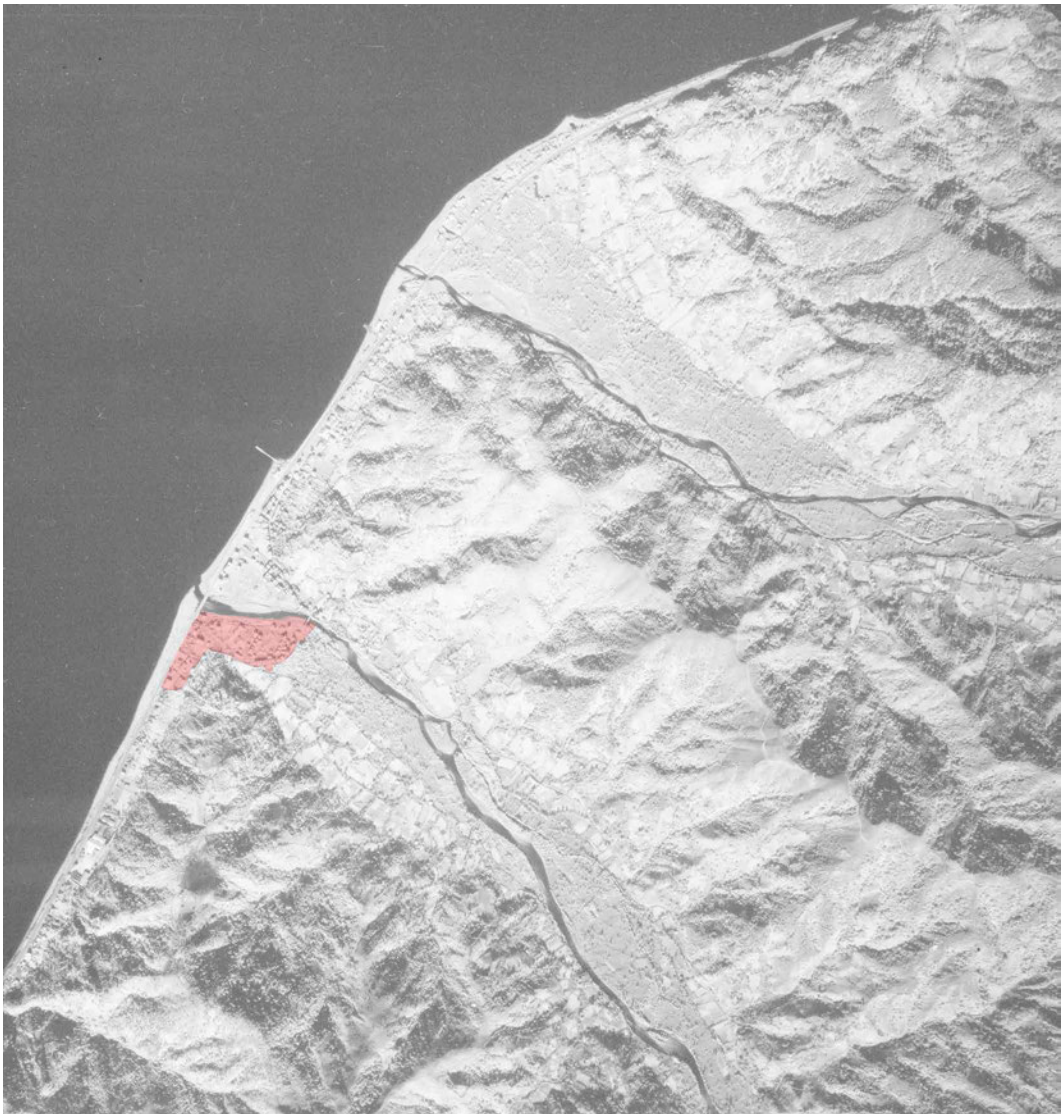

FIG. 5.5 The riverbed is later opened for development. Source: Rize Directorate of Environment, Urban Planning and Climate Change.

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5.3 River Correction and Coastal Change (1969-2019)

The historical records of the Watershed Management in the General Directorate of State Hydraulic Works (DSI 22. Regional Directorate in Trabzon) revealed that the flooding history of Fındıklı's major rivers of Abu (Çağlayan) and Arılı only dates back to 1974.[446] From 1990 onwards, historical records reveal the lists of villages, districts, and neighborhoods in the city of Rize, which are listed as disaster-prone areas with an increase in the frequency of the events in 1997,1998, and 1999.[447] The village of Çağlayan in Fındıklı experienced 24 flood events in June 2002[448] whereas 23 river flooding events occurred in September 2012. An increase in precipitation, rainfalls, and humidity in recent years accelerated the frequency and severity of river flooding.[449] The river flooding and the following landslides emerged subsequently in June and September over the past 46 years. These events resulted in fatalities and evacuation of many villages[450] in addition to the damages to both newly constructed and historically significant buildings.

Riverine areas are exposed to human intervention and local scale modifications implemented to rivers may influence the up-and downstream fluvial processes.[451] Often, river alterations change the natural water flow regime and velocity. For example, by enlarging the water channels and increasing the diversity of cross-sections where stream restoration is limited, the velocity of the river flow and discharge capacity of the river will be more natural. These river plains are now exposed to major developments of infrastructures and new buildings supported by policies opening these areas to construction. Since 1969, there have been major interventions to the rivers of Çağlayan and Arılı. In 1969, the river estuaries of Arılı and Çağlayan were narrower but allowed an expansion towards the centre of the district.

446 General Directorate of State Hydraulic Works, "Records of Floods and Landslides in Fındıklı," Watershed Management (2019).

447 Disaster and Emergency Management Presidency, "Bazı Yerleşim Yerlerine Ait Alanların Afete Maruz Bölge Olarak Ilanı," (1991).

448 General Directorate of State Hydraulic Works, "Records of Floods and Landslides in Fındıklı."

449 Yalcin, "Environmental Impacts of Landslides: A Case Study from East Black Sea Region, Turkey."

450 Aytekin Kalender and Adem Akatin, "Rize'de 332 Noktada Sel Ve Heyelan Meydana Geldi, 56 Ev Boşaltıldı.," *Hürriyet* 2018.

451 Severin Hohensinner, Christoph Hauer, and Susanne Muhar, "River Morphology, Channelization, and Habitat Restoration," in *Riverine Ecosystem Management: Science for Governing Towards a Sustainable Future*, ed. Stefan Schmutz and Jan Sendzimir (Cham: Springer International Publishing, 2018).

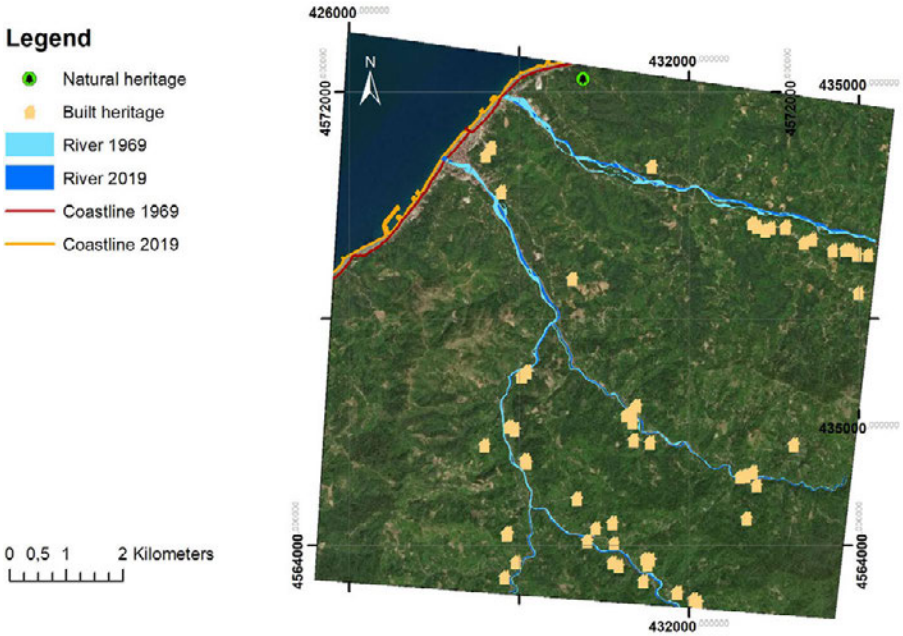

FIG. 5.6 An image of the coastline and major rivers of Fındıklı, Arılı, and Çağlayan, along with the locations of natural and built heritage sites in 1969 and 2019. Source: Source: G. Aktürk, & Hauser, S. J., "Detection of Disaster-Prone Vernacular Heritage Sites at District Scale: The Case of Fındıklı in Rize, Turkey," International Journal of Disaster Risk Reduction 58, [102238] (2021).

Later, the river estuaries of both rivers expanded in comparison to the narrowing of river channels. Although the river course was not altered, its converging tributaries were narrowed and realigned with the downstream channel causing seasonal flooding to become more extreme. However, the morphology of Arılı has been slightly modified on two diverging streams.

The river of Çağlayan used to have diverging tributaries—comprised of a large watershed—that have been substantially realigned and corrected (Figure 5.6). According to the current map, the division of the streams was altered completely by making a straight channel which increased the pressure of the water flow. One implication of this was the densification of flood plains, which eventually put these newly built houses under the pressure of river flooding. Concrete buildings with many stories were constructed near the riverbeds and then the urban densification increased. The major reason behind the river flooding according to DSI reports is the throwing of rubble into the riverbeds during the construction of new houses (Figure 5.7). This led to the blocking of the water flow, particularly in curves and under bridges. Although this is an important fact to consider, the influence of extreme shifts in channel shape cannot be overlooked.

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FIG. 5.7 The construction of infrastructure in Çağlayan village and rubble were thrown into the river. Source: author.

The riverbeds of Çağlayan were branching out and widening to a larger area where only one vernacular house is located. Unlike the river in 1969, today the river flows rather straight, allowing access to cars through bridges and roads along the river. The site selection of vernacular houses was not arbitrary, they were built far from river flood plains. Away from the flood plains, the majority of these buildings survived the flooding disasters, while the district centre was flooded multiple times. In 1973, there was not yet any rehabilitation of the river of Çağlayan and its converging tributaries (Figure 5.8). In 1975, the river of Arılı was narrowed (Figure 5.9) and the former riverbed area on the coast was opened to the construction of settlements. The rehabilitation of the river extended beyond the coast to the rural areas.

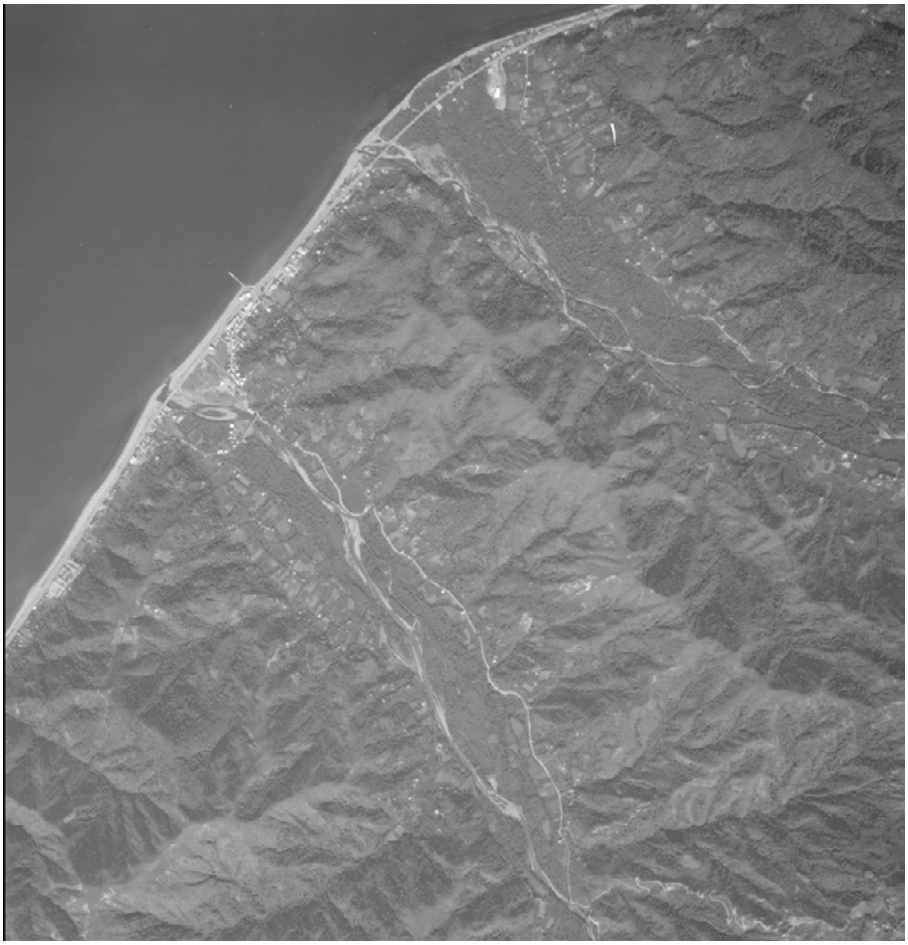

FIG. 5.8 The converging tributaries of Arılı and Çağlayan were not yet modified in 1973. Source: Rize Directorate of Environment, Urban Planning and Climate Change.

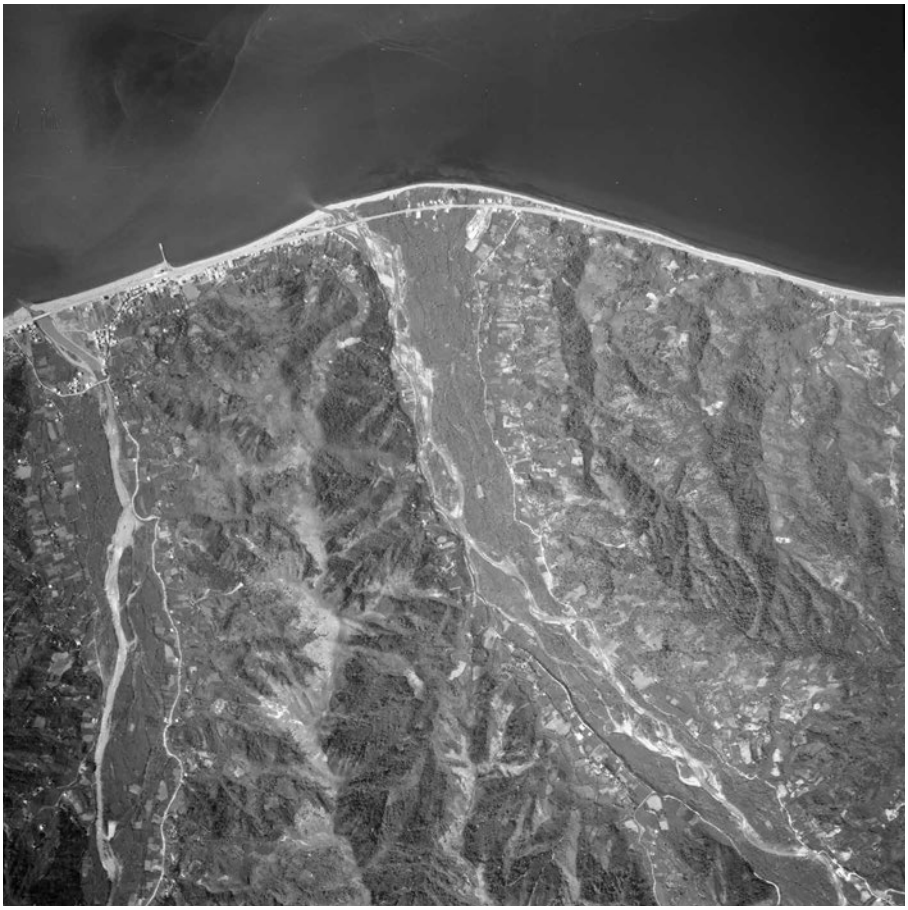

FIG. 5.9 The river of Arılı on the coast was narrowed in 1975. Source: Rize Directorate of Environment, Urban Planning and Climate Change.

The construction of a sea wall in the east on the map of 1989 (Figure 5.10) revealed the extent of the coastal developments on this side of the Çağlayan river. These coastal defence structures built against coastal flooding and erosion in the past become a topic of the critics in today's coastal management, which favors soft engineering solutions. As they may disrupt the natural shoreline habitats in the long term, nature-based solutions such as "room for the river"[452] and providing recreational areas along the coast seem to be more sustainable. But in the past, these hard engineering solutions, though cost relatively high, were provided to minimise the effects of damage to properties and infrastructures.

452 The government design project of "Room for the river" in the Netherlands aims to provide more space for the rivers to manage the floods.

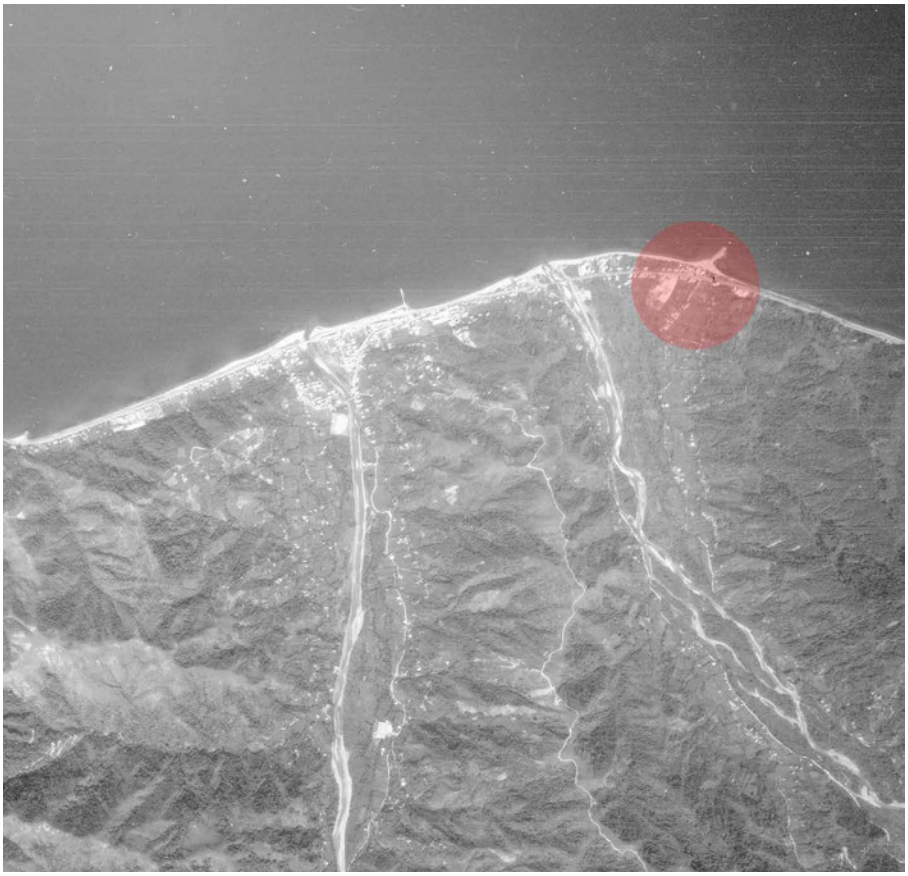

FIG. 5.10 The construction of a sea wall in the east part of the Çağlayan river in 1989. Source: Rize Directorate of Environment, Urban Planning and Climate Change.

The infilling project of the coastline of the Black Sea known as Karadeniz Sahil Yolu (Black Sea Seaside Highway) connects the coastal cities of the Black Sea region in Türkiye.[453] With it, the Black Sea Coast Way became a highway with the underfilling of the road in 1990 (Figure 5.11). This highway officially opened in 2007. The construction of the highway not only cut the direct access of local people to the sea but also destroyed historically important coastal settlements. As part of this project, the city grew toward the sea and used rocks to claim new lands. A new coastline was created to support the creation of additional public spaces.[454]

453 Seda Nur Alkan and Fatih Yazicioglu, "City Center and Coastal Relations in Terms of Public Spaces through Black Sea Highway: Rize," *Intercultural Understanding* 7 (2017).

454 Ibid.

FIG. 5.11 The Karadeniz Sahil Yolu (Black Sea Seaside Highway) today with its two-way road cuts the coast as the district centre and the sea. Although now there is a public park for recreational purposes, the infrastructure is often flooded. Source: author.

This road was built to reclaim the sea to expand the land along the small coastal strip. By doing so, the land was later going to become invaluable and sold for the construction of new buildings. The mayor of the city of Rize, Ekrem Orhon, was later going to be known as the person who turned the sea to land, and land to money as he allowed the legalizing of the construction of three and more floored buildings on the reclaimed land.[455] The controversy between the public, the Chamber of civil engineers in Rize, and the government reached its peak when the reports of the public institutions revealed that the buildings in this area cannot be consolidated.[456] Because these buildings lean on each other and their foundations eroded in the salty water of the sea, they would have to be destroyed.[457]

455 Muhammet Kacar and Aytekin Kalender, "Denizi Kara, Karayı Para' Yaptılar Ama Önemli Uyarı Geldi: Binalar Kendiliğinden Çökebilir," Karadenizisyandadir, http://karadenizisyandadir.net/denizi-kara-karayi-para-yaptilar/.

456 Ibid.

457 Ibid.

FIG. 5.12 Nearby the river defence wall in Beydere village, there are public buildings such as the mosque. Source: author.

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In this new territory, the maps reveal the extension of harbour facilities with new seawalls along the coast. The erosion of rocks underneath the infrastructure has become a problem for land reclamation in the coastal area of Rize.[458] Coastal planning and developments due to river modifications increased the risks of flooding on coastal lowlands and riverine areas. Both coastal flooding and inland flooding are affecting the surrounding settlements and infrastructure (Figure 5.12). Although the geographical location of the vernacular heritage of the hinterland seems to be far from these developments, the pressure of the coastal and central area reflected on the hinterland i.e. construction in the hinterland due to land scarcity on the coastline, and the drastic reduction of the river bed to allowed urbanization. By allowing the construction of the new buildings with up to twelve floors along the rivers and the coast, the area became extremely vulnerable to the damages of the river floodings. Conversely, vernacular buildings with only two or three floors located further inland and away from the riverside were less threatened by these events. The government's plans to grow economically on the coast did not stop there but only spread to the inland areas with the construction of infrastructures and settlements, though on a smaller scale than on the coast. Yet, the inland flooding was effective in the hinterland almost as much as on the coast. The economic value of the hinterland also grew with the projects of the government on highland tourism.

5.4 Growing Scale of Deforestation (1969-2019)

Mismanagement of wood resources in rural areas is also an important phenomenon to analyse as deforestation is not its prime consequence. The local disappearance of forests is affecting biodiversity, which protects other resources and many livelihoods. In the rural area of Fındıklı, the urban expansion started in 1969. The exploitation of forests in Fındıklı exist since the 19th century as timber was used as a means for trading. Chestnut timber was particularly used for the construction and furnishings of the vernacular houses. Along with the growth of sparsely populated areas, planned and unplanned large-scale clearings took place, particularly in forests. However, as the increasing number of houses went hand in hand with an increasing demand for wood, the depletion of forest areas grew in scale. Large areas cultivated with tea and hazelnut fields in support of the local economy increased the risk of landslides on the hillslopes.

458 Erten and Rossi, "The Worsening Impacts of Land Reclamation Assessed with Sentinel-1: The Rize (Turkey) Test Case."

FIG. 5.13 A similar type of settlement along the Arılı valley to the Çağlayan valley. Source: the Cadastre Directorate of Fındıklı district Governor.

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Vernacular house owners who hold private land ownership of small-scale tea, hazelnut, and vegetable gardens deforested small areas to open roadways for their vehicles and grow pastures and crops (Figure 5.13). These unplanned decisions and practices had consequences on the land use and change of landscape resulting in the emerging risks. Heavy rain in 2010 which caused landslides in the city destroyed the farmlands and crops of an elder tea grower Ali Boyama.[459] Most of the local people like him blame dam construction and the increasing demand for land for the change in regional weather patterns.[460] Interviews with local people reveal that the plantation of tea could not prevent soil erosion. It is said that it increased the number of events of soil erosion in addition to the construction of the roads in the rural areas. Aside from the agricultural activities, economic and political interests in the area also played a significant role in deforestation.

The great deforestation of vast expanses of forests (Figure 5.14) started with selling forests in auctions to private companies who depleted the area for economic developments with big profits, i.e. large-scale building of houses. This type of major destruction cannot possibly be caused by the actions of local communities at the bottom level but only by planning policies at the top level. One example is the national project of 'Green Road' that started in 2016 to connect the high highlands in the hinterland and support rural and nature tourism. It led to vast deforestation of lands in the district and the region.

FIG. 5.14 The patches of deforested areas are visible in the 'well preserved' areas such as in Çağlayan village on January 14, 2019. Source: author.

459 Stephen Starr, "For All the Tea in Turkey," https://modernfarmer.com/2015/01/tea-turkey/.

460 Ibid.

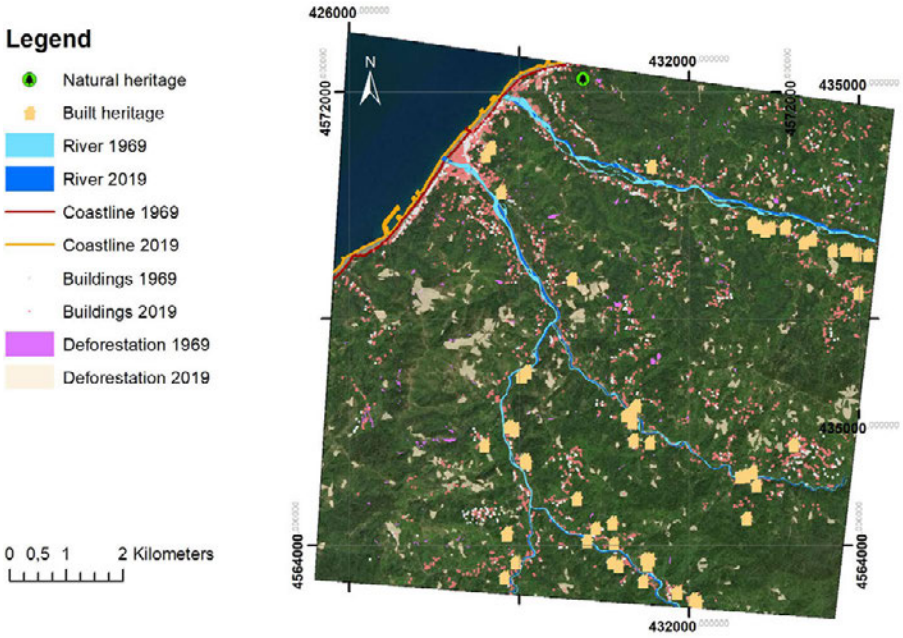

FIG. 5.15 Image of the coastline and major rivers of Fındıklı along with the locations of natural and built heritage sites, and buildings in 1969 and 2019. The map identifies areas of deforestation in 1969 and larger-scale deforestation in 2019. Source: G. Aktürk, & Hauser, S. J., "Detection of Disaster-Prone Vernacular Heritage Sites at District Scale: The Case of Fındıklı in Rize, Turkey," International Journal of Disaster Risk Reduction 58, [102238] (2021).

The overlay of the maps of 1969 and 2019 reveals that most of the deforested areas are matching and growing in scale in the recent one at an alarming rate (Figure 5.15). The distribution of these small patches was sparse in 1969 while in 2019 the deforested areas were densified in the northwest direction. Many settlements located around these patches will likely disappear because of landslides, including the vernacular houses (Figure 5.16). There are already observable damages, such as the destruction of vernacular houses and storage buildings, which are not documented. The snow cover on top of the mountains melts in the summer season accelerating the flow of the rivers. In combination with heavy rains in June and July, river flooding becomes more and more intense which pushes residents of historic buildings to abandon their houses, according to the interviews with local people.

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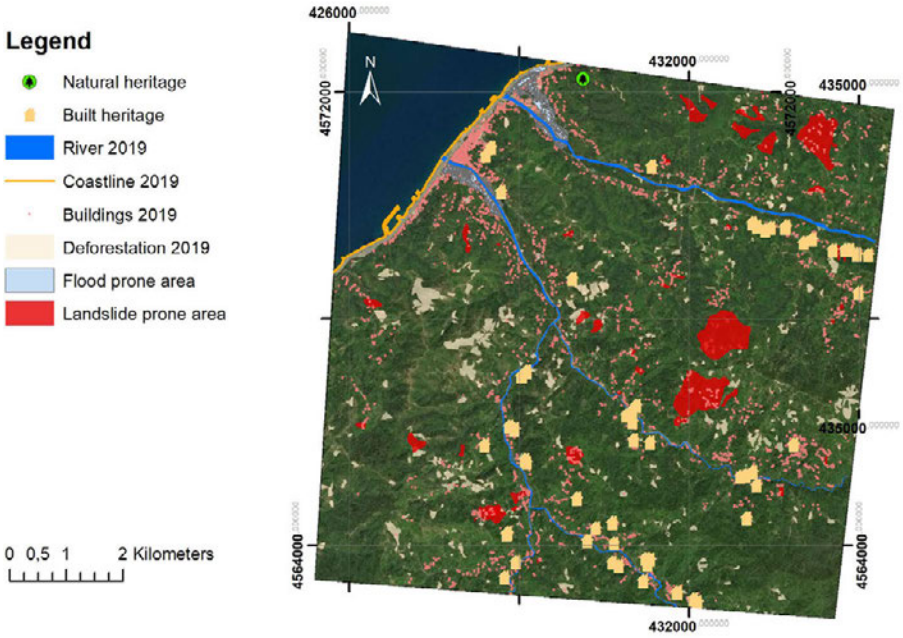

FIG. 5.16 The flood- and landslide-prone and deforested areas in the selected area of Fındıklı in 2019. Source: G. Aktürk, & Hauser, S. J., "Detection of Disaster-Prone Vernacular Heritage Sites at District Scale: The Case of Fındıklı in Rize, Turkey," International Journal of Disaster Risk Reduction 58, [102238] (2021).

While climate projections signal an increasing trend of humidity and a growing amount of rainfall in the area, the rising effects of floods and landslides due to anthropic interventions call for attention to cultural heritage sites. Landslides frequently accompany floods, similarly heavy rains trigger floods. Following the heavy rainfalls and river flooding, tea plantations, and deforested areas cannot hold the soil anymore provoking landslips in the hinterland, which can have detrimental effects on vernacular houses. But no later planning decisions in the name of development take planning for climate adaptation into an account, including the National tourism strategies.

5.5 Green Road Project and Tourism from 1990 till 2019

Between 1980 and 1990, highland tourism gained momentum with the arrival of services of new infrastructure, electricity, water, and health.[461] In 1990, the Ministry of Culture and Tourism emphasized its strategy regarding highland tourism with the Corridor of Yayla (highland) tourism. The seven thematic corridors mention sustainability and promotion of touristic activities, including winter tourism, cultural, food, and coastal tourism spots. In the case of the Eastern Black Sea region, this encompasses a tourism corridor of highlands from Samsun to Hopa in Artvin in the east of Rize. Opening the summer pasture activities in highlands for tourists increased the number of hospitality services on top of the mountains. This did increase the number of tourists; however, it led to a decrease in the number of local visits due to disruption in the natural environment.

FIG. 5.17 The connection of the Green Road between the cities and their hinterland. The construction of such infrastructure is not only costly but also is causing the depletion of natural resources such as forests and rivers. Source:https://140journos.com/ye%C5%9Fil-yol-projesi-ve-i%CC%87klim-%C3%BCzerine-etkisi-c9b01f66fed

461 Mehmet Somuncu and Ahmet İnci, "Balancing Protection and Utilization in Overcoming Inaccessibility: A Rural Development Model in Mountainous Area of Turkey," *Mountain Research and Development* 24, no. 4 (2004).

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The Green Road Project is mentioned as the corridor of the highland tourism development according to the report of the Ministry of Culture and Tourism with the title "the Tourism Strategy of Turkey 2023 Action Plan 2007-2023" (Türkiye Turizm Stratejisi 2023 Eylem Plani 2007-2023).[462] It was planned to start in 2009 and took four years long. This project connects the highlands' roads of nine provinces in the region from Samsun to Hopa to ease transportation, enhance the physical infrastructure, and raise the regional economy (Figure 5.17).[463] It is driven by the Eastern Black Sea Project Development Programme (DOKAP) for rising tourism potential of the region.

The potential of country tourism in the city of Rize with its highlands has only been recognized recently. Deficiencies in the number of hotels and other services in the city, including direct air routes so far signalled the abscence of interest in public and private investments in tourism. Nonetheless, the small-scale local tourism of the city of Rize rapidly changes the city into a greater capitalist centre with the construction of its first airport in May in 2022 and a growing number of hotels on the high highlands in the recent years. As a part of this development plan in the hinterland, the tourism strategy report of DOKAP mentions the diversification of the highland tourism with adventure sports, such as camping, skiing, caving, and paragliding.[464] To help the development of tourism infrastructure, DOKAP look for ways to create new tourism destinations and activities.

As helpful as the tourism infrastructure was by bringing capital, the environmental dimensions of a large infrastructure-related project such as this cannot be simply overlooked by the aforementioned actors. Despite the strong emphasis on eco-tourism, there will be major environmental pitfalls of this Green Road project and the Eastern Black Sea Master Plan, according to the research of a media and news company known as 140journos that produces visual stories and documentaries about Türkiye. Although there was a 4 °C temperature difference between the rural and urban areas of the city, these projects will urbanize the rural areas. For instance, the construction of 38 tourism centres will increase the temperature in the hinterland in addition to the carbon emission in the atmosphere. Considering that the majority of the high highlands are located in the city of Rize, this project will have unequal effects on the region.

462 T.C. Kültür ve Turizm Bakanlığı, Türkiye Turizm Stratejisi 2023 Eylem Planı 2023 Eylem Planı 2007-2023, (Ankara: T.C. Kültür ve Turizm Bakanlığı Yayınları, 2007), https://www.ktb.gov.tr/TR-96696/turkiye-turizm-stratejisi.html.

463 Ibid.

464 DOKAP, Doğu Karadeniz Turizm 2023 Stratejisi (Artvin, Giresun, Gümüşhane, Ordu, Rize, Trabzon), (DOKAP), https://www.doka.org.tr/dosyalar/editor/files/dogu-karadeniz-turizm-2023-stratejisi-04_04_2012.pdf.

Some cities and communities will be affected more than others. In addition, these incompatible structures with historic settlements and the growing number of tourists polluted the area. As part of this mass tourism, not only destroys the natural, and cultural heritage of the Kackar mountains but also the intangible values of local communities, such as the transhumance tradition of moving up to the mountains in the summer.

The spots on the map show the locations of the high highlands, which are dominant in the city of Rize (Figure 5.18). Opening the roads for a car to reach the villages increased the deforestation of inaccessible areas for tourism purposes. So-called rehabilitation of the roads meant 2600 km road between Samsun and Artvin, which aimed an increase in nature tourism. Due to the steep mountains, the excavation of the sites for road construction will be greater in addition to the construction of set walls. The disposal of greenery and the cover of asphalt roads will increase the carbon release.

FIG. 5.18 Orange circles identify the locations of the highlands and Green Road is pinpointed with the green lines. It is a project of 2600 kilometres of the road which will destroy the forestry and the timber along with it. Source: http://infografiknedir.com/yesil-yol-haritasi-infografik/

With the changing climate, the Black Sea region will be a desirable summer tourism destination. The Mediterranean regions will face drought which will no longer be preferred as a summer tourism destination due to the increasing air and sea temperatures. In this respect, the government invests in the recreation of new tourism revenues for the Black Sea region to become the most suitable place for summer tourism activities. An implication of this is according to the 2023 tourism strategy, fishers' shelters of Rize and Fındıklı in Rize will open for yacht tourism.

The policies for sustainable tourism and the title of the project (Green Road Project) contradict each other. Yet, this extreme deforestation is done to pursue economic development rather than sustainable development. So far, the expansion of road networks together with the construction of buildings along the roads and rivers increased the threat of floods and landslides in the area. Burning coal for heating is also part of the unsustainable growth of the city, as it is not only rising air pollution but also affecting the ozone layer.

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Hydraulic Works often emphasize in their reports that the rivers are blocked by the construction of buildings in the nearby areas where local peoples' intervention in nature created this environmental chaos with intense floods and landslides. However, the construction of the buildings and material disposal cannot be compared to the disposal of excavation for such a long asphalt road. Moreover, the construction of touristic centres on a great scale is signed off by the municipality. Without the public consultation, these spatial planning decisions often lack transparency and ignore the local's view on how they want to use their built environment. The regional climate action for the Black Sea region which is announced by the Ministry of Environment, Urban Planning, and Climate Change does not compensate for the destructions done by the development decisions that transform landscapes and the cities.

5.6 Role of Small Hydropower Plants in Landscape Change 1996-2019

The spatial planning decisions not only operated on the land but also on the water sources in the rural landscapes with the planning of hydropower plants by the government in search of alternative energy sources. Hydro-electrical power plants convert the energy of flowing water to generate electricity. They began operating globally in the late 19 century in the US as a renewable source of electricity.[465] Given the current rate of energy demand, the government of Türkiye was not too late to follow the trend of using this energy source.

A hydroelectrical power plant consists of a system of three parts including a power plant that produces electricity, a dam with control of water, and a storage area.[466] The largest power plant producers are China, Russia, the US, Brazil, and Canada.[467] Hydro-electrical power plants can supply large amounts of electricity and they provide fuel clean and renewable water-generated energy.[468] The reservoirs collect

465 Christina Nunez, "Hydropower, Explained," National Geographic, https://www.nationalgeographic.com/environment/article/hydropower.

466 Ibid.

467 Ibid.

468 Ibid.

the snow and rainwater for irrigation and consumption.[469] These large-scale projects have a great benefit to the economy and development by bringing electricity to the infrastructure, industries, commerce, and communities.

Scholars, NGOs such as chambers (Union of Chambers of Turkish Engineers and Architects), and local communities are in dispute with the national government over the construction of the Green Road and hydropower plants. Yet, the reliance of the country on its hydraulic capacity continues to grow. The issues revolved mainly around the disruption of the flow of water resources[470], ecology and natural habitat,[471] the displacement of the surrounding communities,[472] greenhouse gas emissions,[473] and the loss of arable lands.[474] The consequences of the construction of the hydropower plant do not only refer to the migration of human populations but also marine populations. For riverine communities whose income relies on seafood, this results in the loss of fisheries and a decline in the local economy. In the context of climate change, scholars recognize the consequences of hydropower plants and propose the need for an environmental assessment of them.[475] Most importantly, the destruction of local cultures and historical buildings in the geography that these structures are built is clearly visible.

The production of electricity through a hydropower plant in Türkiye dates back to 1902 when a 2 kW hydropower system was connected to a water mill in Tarsus.[476] Türkiye is now the second-largest hydropower producer after Norway in Europe.[477] The region offers a lot of advantages for constructing hydropower plants due to its

469 Ibid.

470 David Anderson et al., "The Impacts of 'Run-of-River' Hydropower on the Physical and Ecological Condition of Rivers," *Water and Environment Journal* 29, no. 2 (2015).

471 Tarcísio L. S. Abreu et al., "River Dams and the Stability of Bird Communities: A Hierarchical Bayesian Analysis in a Tropical Hydroelectric Power Plant," *Journal of Applied Ecology* 57, no. 6 (2020).

472 Ali Van Cleef, "Hydropower Development and Involuntary Displacement: Toward a Global Solution," *Indiana Journal of Global Legal Studies* 23, no. 1 (2016).

473 Ilissa B. Ocko and Steven P. Hamburg, "Climate Impacts of Hydropower: Enormous Differences among Facilities and over Time," *Environmental Science & Technology* 53, no. 23 (2019).

474 Chandy Thomas et al., "Impacts of Hydropower Development on Rural Livelihood Sustainability in Sikkim, India: Community Perceptions," *Mountain Research and Development* 32, no. 2 (2012).

475 Paul Breeze, "Chapter 9 - Hydropower Plants and the Environment," in *Hydropower*, ed. Paul Breeze (Academic Press, 2018).

476 Harun Kemal Ozturk, Ahmet Yilanci, Oner Atalay "Past, Present and Future Status of Electricity in Turkey and the Share of Energy Sources," *Renewable and Sustainable Energy Reviews* 11, no. 2 (2007).

477 Daniel Sweet, "Turkey Grows Hydroelectric Capacity," Valve World, https://www.valve-world.net/webarticles/2021/01/19/turkey-grows-hydroelectric-capacity.html.

characteristics, such as extreme rainfalls and a high slope of runoffs.[478] The first project of hydrological electric power in the city of Rize was on the Firtina Highland in 1996 by the BM Holding.[479] The rivers of the city of Rize are important in reaching the needs of the electrical energy of the nation.[480]

The conflict over the construction planning of hydropower plants in the district of Fındıklı dates back to 2007. Ayen Energy Inc., a Turkish energy company, planned the construction of the Fındıklı Pasalar Regulator and Hydroelectric Power Plant in 2006 in Çağlayan valley. But this initiative has received a backlash from rural populations, including farmers, and villagers (particularly women), in support of NGOs, associations, activists, and scholars. In 2007, the energy company of Zeki Enerji planned a hydropower plant in the Arili valley. But upon the applications of the local communities, the Arili valley was registered as a first-degree protected site. Despite the company's application for its deregistration, the local residents won the lawsuit case. Similarly, the designation of Fındıklı valley as a first-degree natural protected site in 2008 helped the conservation of the area from these development projects. The designations of these valleys helped local residents to prevent the construction of 16 planned projects of hydropower plants in the area.

The spatial planning decisions and local practices have continued their conflict through the legal battles in the courts. The companies pressured the deregistration of the sites for implementing the projects. The private energy and construction company of İSTYAP planned to implement the project called "Gül HES" on the Solarez river stream of Çağlayan river on 7th August 2019. But the location of the planned project encompassed forest areas. Based on a law (decision number 6831 of August 31, 1956, "Orman Kanunu"), the company has to obtain special permission from the Ministry of Environment and Forestry.

The reason behind the local people's opposition to these projects is that the area may be flooded and the land may be degraded in addition to the risks multiplied by changing climate. For instance, in the case of the flood of Trabzon in June 2019, the construction of the hydrological power plantation was held responsible. Water resources may dry and tea cultivation may become at risk. As vegetation cover

478 Ergun Uzlu, Adem Akpınar, and Murat İhsan Kömürcü, "Restructuring of Turkey's Electricity Market and the Share of Hydropower Energy: The Case of the Eastern Black Sea Basin," *Renewable Energy* 36, no. 2 (2011).

479 Senem Atvur, "Baraj Politikalarına Karşı Toplumsal Tepkiler: Hindistan Ve Türkiye'deki Toplumsal Hareketlerin Karşılaştırılması," *Yonetim ve Ekonomi* 21, no. 1 (2014).

480 Rize İl Tarım ve Orman Müdürlüğü, "Coğrafi Yapı," https://rize.tarimorman.gov.tr/Menu/12/Cografi-Yapi.

is under threat, loss of food is a possible result of this. Furthermore, fishes may migrate, which is an important industry and mean of income for the local residents in the area. Following this, displacement of rural communities is a possibility.

In the case of the application of the stopped or cancelled projects or the new ones, there is a greater risk for meadows, villages, valleys, rivers, and forests.[481] The majority of the water resources, settlements, and forests are preserved by the regional cultural heritage agency. Therefore, the legal battle between the local communities and the public-private institutions is likely to continue. There is a need for consideration on how to approach the conservation of the area at a landscape scale, as the damage does not only affect vernacular heritage but also its surrounding.

Taking into account the vulnerabilities and exposure to natural risks, these areas must be preserved. The spatial planning decisions allow interventions that could jeopardize the ecological integrity of the area by planning land reclamation and water dams. A hydro-electrical power plant (HES) is planned for the Solarez riverbed along the Çağlayan river. The construction of a water dam in this area will likely exacerbate the current issues of river flooding.[482] The planning of the hydropower plant in the area is ongoing and the threats resulting from its construction grow, especially in the hinterland. The mapping of the threatened vernacular sites does not reveal the unrealized projects of small hydropower plants, but the flood risk as a result of it is noteworthy in the vernacular landscapes.

481 Asrav, "Protecting Landscape as a Network of Relations: Challenges and Perspectives in the Case of Imerhev (Meydancik) Valley,
Turkey."

482 Aktürk, "Detection of Disaster-Prone Vernacular Heritage Sites at District Scale: The Case of Fındıklı in Rize, Turkey."

5.7 Site-specific Threats on the Vernacular Settlements

The results obtained from the maps indicate that not many vernacular and natural sites are under threat of floods and landslides, compared to the relatively new buildings. The results also suggest that the growth of the unplanned spatial development can aggregate existing risks of deterioration of some of the sites. The greatest disaster-prone surface is located between the valleys of Arılı and Çaglayan and the northeast part of the Çaglayan River.

Flooding data provided by DSI does not cover the areas beyond the coast although the Beydere Village is highly affected by the floods and landslides (as explained further in Chapter 7.2.1). Beydere Village along the Çaglayan valley is one of the villages which lost its vernacular characteristics with the construction of new buildings. Flood defences previously focusing around Beydere Village (Figure 5.12) were now extended to Çaglayan Village due to the increasing and intensifying effects of floods. The DSI 22nd Regional Directorate determined these extensions based on an estimation of the construction cost and the material and the height of the flood protection and control structures according to the slope and width of the streambed.[483] Vernacular houses near the flood defences in lowland villages such as Çaglayan reveal that grand mansions–such as the one in Figure 5.20 are also in danger.

FIG. 5.19 (a) Sulak house (b) Sevket Atac and Sevketbeyoglu houses under threat of landslides.Source: G. Aktürk, & Hauser, S. J., "Detection of Disaster-Prone Vernacular Heritage Sites at District Scale: The Case of Fındıklı in Rize, Turkey," International Journal of Disaster Risk Reduction 58, [102238] (2021).

483 Ali Kerim and Veli Süme, "Floods, Flood Protection and Control Structures; Case Studies in Rize," *Turkish Journal of Hydraulic* 3, no. 1 (2019).

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FIG. 5.20 The degradation of the rear façade of the Şevket Atac House due to landslides in Çağlayan Village in Fındıklı of Rize. Source: author.

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The deforested areas in some cases intersect or precisely overlap with the risk-prone areas (Figure 5.19), supporting the argument of being a multiplier risk through, for instance, landslides. One natural heritage site known as Saricam Forest, which has not been listed, is part of the deforested area. In addition, the clusters of newly built houses are located in landslide-prone areas shown as red patches (Figure 5.16). It is especially visible in a close-up view of the map that one historic building, namely Sevketbeyoglu House, is positioned at the intersection of the deforested and landslide-prone area (Figure 5.19b), whereas a few houses, such as Sulak Village House (Figure 5.19a) and Sevket Atac House, remain in close proximity to landslide-prone areas (Figure 5.19b). The two houses of Sevket Atac and Sevketbeyoglu are located side by side in the deforested and landslide-prone area. As shown in the figure, the threatened sites are located in Çağlayan and Sulak villages. Three out of 58 vernacular built heritage were situated in the landslide-prone areas (Table 5.1).

TABLE 5.1 The locations of the most endangered vernacular houses at risk of landslides.

Heritage sites	Latitude	Longitude
Sulak Village House	41.217700	41.203300
Sevket Atac House	41.255300	41.222500
Sevketbeyoglu House	41.255300	41.221500

TABLE 5.2 Risk impact/probability analysis Source: Mariusz, Tichoniuk. "Safety and Quality of Non-Food Products." In Product & Process Management Vol Ii. Product Design and Management, 155-83: Poznań University of Economics and Business, 2018. Modified by the author.

Analysed Risks		Severity / Consequence				
		Very Low	Low	Medium	High	Very High
Likelyhood	Very High	Medium	High	High	Very High	Very High
	High	Low	Medium	High	High	Very High
	Medium	Low	Medium	Medium	High	Very High
	Low	Very Low	Low	Medium	Medium	High
	Very Low	Very Low	Very Low	Low	Medium	High

The vernacular heritage was built with consideration for the local climate, topography, and other factors, which is why these sites are considered to be disaster resilient. Most were constructed upstream on high grounds to avoid damage from river flooding. It is clear that the builders of the vernacular houses knew about the environmental risks of the place and adapted to it, rather than trying to adapt the environment to their needs. However, as deforestation grows in scale, flooding will trigger more regular landslides and more historic buildings will become exposed to disasters (Table 5.2). As historic sites are not the priority in spatial planning decisions, AFAD maps do not

refer to these areas in disaster risk mapping. Therefore, the data on heritage sites and their surroundings is important for an integrated climate disaster risk mapping.

In addition to the growing construction pressure and the settlement of hydroelectric plants along the river, there is also an increasing demand for land for the construction of new buildings through the opening of roads that surround the historic sites. This combination of interests makes it difficult to safeguard the areas. All of these factors contribute to the artificialization of the land and the creation of buildings or urban areas in risk-prone zones. According to the calculations in ArcGIS, the deforestation areas in 1969 cover an area of 0.325789 km^2, whereas they expanded to an area of 2.598385 km^2 in 2019. Landslide-prone areas determined by AFAD and DSI reveal that a total of 3.367975 km^2 are identified as at-risk areas. It can be easily seen that one house from the first image (Figure 5.19a) and two houses from the second image are located nearby the landslide-prone areas (Figure 5.19b).

The interviews with local people (see Chapter 7) supported the results of the maps with the statements on damages to vernacular buildings, e.g., façade deterioration and loss of materials (Figure 5.20). The villages of Derbent and Beydere, which are known by local people to be located within disaster areas, are indeed confirmed to be disaster prone areas on the maps. Karaali Village along the Arili valley does not seem to be within a disaster-prone area, although interviewees mentioned that historic houses in the village were also severely affected by the damages (see Chapter 6). As spatial analysis does not show the loss of buildings or damage to them, the map may not comply with these statements from the interviews. Thus, the commonalities and discrepancies between the results of mapping and interviews can be useful in detecting threats on vernacular heritage sites at various scales.

5.8 Conclusion: Spatial Planning Decisions for Adapting Vernacular Heritage Sites to Climate Change

The analysis of this case study depends on the availability of data from the relevant stakeholders' databases regarding the locations of the heritage sites, floods, and landslide-prone areas. The challenge of gathering data and aerial pictures of high enough quality to effectively map the area was an obstacle for this research. Since aerial images were mainly focused on the coastal area, few images beyond the coastline were available to map and analyse the hinterland where threatened historic buildings are located. In addition, data on contemporary disasters or changes in land use were inconsistent with the official sources of various institutions as they were not accordingly overlapping, complementary, completed, or explained. Despite these limitations, maps produced from a diversity of sources provided an overall picture of the existing landslide risk to the natural sites and vernacular settlements. Prior studies regarding the area have overlooked the disasters affecting vernacular heritage sites; thus, thorough research needs to be done for this selected case area at the city and regional levels to identify the site-specific risks.

The accelerating rate and scale of deforestation in the district put additional pressure not only on the newly built facilities but also on the resilience of vernacular buildings. As emphasized earlier, the builders of vernacular houses more than two hundred years ago planned their construction in line with the humidity and precipitation levels of the area and their knowledge of regularly flooded lands. The result was that these structures are considered to be more resilient to natural hazards. The analysis of the maps reveals that three out of 58 of these vernacular buildings are now located in disaster-prone areas and the homeowners are now left to deal with pre-and post-disaster situations.

Construction of the new houses both in the flood-prone and landslide-prone areas has caused an increase in the number of hazards in the city. The northern estuary of the two rivers studied is a good example, since public authorities allowed the urbanization of most of its land. This already dangerous area became densely populated and limited any available space next to the rivers. The modifications to the rivers by public authorities (involving concretization and artificialization) did not consider the risks inherent to river flows in mountainous areas near the sea. Further incentives came from the construction of new roads and bridges along and across rivers which is not only channelling the rivers but also putting obstacles

in the riverbed. When heavy rainfall occurs, the decreasing forest cover enhances landslides and river flows, creating more violent streams that carry materials like wood and rock, which can easily block rivers around bridges. These obstacles and blocked paths in turn increase water levels upstream, aggravating the flooding of newly built areas along rivers. By supporting the urban development of the coastal area and the settlement of buildings along the river, authorities neglect the effects of their modifications on the river flow rather than accept that these areas could be dangerous.

Development-driven land clearance aggravates the occurrence and intensity of landslides. The maps and the data from other resources show an overlap or closeness between deforested lands and landslides. The link to increasing floods is indirect but present considering the impacts of forests on the capture of water during rainfalls and its slow release into rivers. Forests contributed to the regulation of river flows on top of preventing landslides.[484] Thus, considering the current state of the forests, development plans should ensure the sustainable forest management in landslide-prone areas.

Regarding the detection of the vulnerable heritage sites, the results obtained from the assessment of vernacular heritage sites in Fındıklı reveal that three vernacular buildings are now exposed to the risks of landslides due to urbanization, deforestation, and the modifications along rivers and coastal areas. Although the spatial data show that there are a few sites that are directly and indirectly affected by the landslides and flooding in this specific area, onsite observations and interviews reveal the extent of damage to the vernacular sites. Today's inconsiderable decays and deteriorations on vernacular heritage sites are likely to increase considering the unplanned spatial development decisions as a driving factor of climate change.

There are fundamental issues to overcome the barriers, gaps, and challenges on the way to safeguarding vernacular heritage, particularly in the case of Fındıklı in Rize. The data of the geographical locations, character attributions, historical background, and past and present images should be correctly, consistently, and precisely documented to develop a complete database of vernacular heritage sites. The heritage value of vernacular sites should be reassessed to prioritize the significant elements in times of climate crisis. Based on the studies on the site, the present and expected hazards should be identified and a database for hazard monitoring and mapping should be created through the use of GIS and/or remote sensing technology. As an integral part of cultural landscapes, vernacular heritage, along with natural

484 Avantika Bhaskar and Muthu Karthick, "Riparian Forests for Healthy Rivers," *Current Science* 108 (2015).

heritage sites, should be included in mapping and monitoring plans. In addition, there is a need for creating awareness about cultural heritage in the context of disaster management among various stakeholders, including local communities. In addition, conservation plans should include potential risks and hazards and the susceptibility of the vernacular sites to landslides and floods. The building capacity to recover from the hazards can be determined as a result of such disaster risk management plans. Geospatial analysis such as this can also be replicated in similar risk assessments for vernacular heritage. For the future of these sites, it is critical to adapt vernacular heritage sites and their environment to the presented risks.

Importantly, after landslides, retaining walls were built in some of the vernacular sites in Fındıklı, although a majority of the buildings remain unprotected. There is a need for the construction of terraces around sites where landslides pose risks. The controlling and management of the construction of new buildings, infrastructure, tea plantations, deforestation, and rural and natural tourism in the development of the hinterland is needed to prevent further damage, while the objectives of policies should be reassessed. The contribution of local communities to reforestation is equally important. However, it is clear that public and private institutions at regional and city scales cause the most environmental damage through deforestation. Collaboration between these groups and local communities in the implementation of policy to help protect vernacular structures is therefore critical to preserving and protecting these important sites for the future.

As such, the ongoing challenges of local communities since the 1950s in preserving their buildings play a significant role in understanding the new exposures to the effects of climate change. Having become unfashionable and outdated since then, many people struggle with their maintenance. The local practices, including the interventions of building owners to their lands and buildings, increase the vulnerabilities of the site. When incompatible with the characteristics of these buildings, these practices became examples of maladaptation in today's context. Hence, the challenges that local communities face should be considered in the strategies for climate and disaster risk management.

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6 The Local Challenges to Preserving the Vernacular Buildings

1950-2019

6.1 Introduction: Recurring Issues in Maintaining Vernacular Buildings

Vernacular heritage as a reflection of the ordinary lives of local communities was abandoned and disappearing at an increasing speed since the industrialization period in the 1950s in Türkiye.[485] Spotting the threatened sites at a landscape scale caused by spatial planning decisions and practices in chapter 5, chapter 6 focuses on the recurring issues in the preservation of vernacular buildings derived from the practices of local residents since the 1950s when industrialization started to erase the legacy of vernacular heritage.

485 Elif Var and Hirohide Kobayashi, *Disappearing Unique Vernacular Houses in Rural Villages in Trabzon, Turkey* (2016).

The wooden vernacular architecture is particularly vulnerable to maladaptation, abandonment, and loss of artisanship, which resulted from the users' practices of preservation at the local level. It is mainly because the local people do not prefer to live in these buildings (as further elaborated in this chapter). With the abandonment of the buildings in the hinterland, transferring of local traditional knowledge, skills, and practices was interrupted as the next generations' left their hometowns to find more opportunities in the cities. The local communities rarely observed the role of the loss of traditional buildings and practices in the destruction of vernacular heritage. However, towards the beginning of the 2000s, many local people returned to their hometowns to reclaim their heritage. The listing of these sites showed local communities that there is an economic benefit to restoring one's building. This may have increased the awareness among the local population but it has also caused an increase in the price of once inexpensive work of folk craft, which was used by anonymous artisans in the creation of these landscapes. While some building owners received funding for the maintenance of their buildings, others renovated their buildings according to their needs without respecting the regulations imposed by the designation of the sites. The improper interventions of local residents affected the buildings and landscape and resulted in maladaptation.

If not for modernization and rural development, the degradation of the sites due to abandonment certainly caused some of the vernacular buildings to decay irreversibly. If not maintained, demolished, or recycled, the waste of the building remains, and the construction knowledge and innovation are lost. Although the recycling of the materials of vernacular buildings in the past led to the construction of another, the consumption-oriented lifestyle adopted by the next generations stopped this healthy trend. This is because the reuse of the materials requires effort and time to select, categorize, and evaluate the study materials. But the next generations adopted cheaper materials such as brick and concrete and fastened the construction time. These generational differences in vernacular living style reflected upon their settlements, buildings, agricultural practices, artisanship, and customs, which deviated from the original purpose of the building's function and use. Over time, each generation has implemented its interpretation of preservation which increased the fragility of these structures to the effects of changing climate. In this sense, the practices at a local level in decision-making should be more considered in the construction of strategies and policies. Hence, local-level approaches to heritage management play a key role in understanding the climate vulnerability of vernacular heritage.

This chapter first gives an overview of the process of change and then looks into the current challenges, issues, and threats to the preservation of vernacular heritage brought by the local management of vernacular sites through the analysis of the narratives of building owners and on-site observations. It then suggests potential

solutions for overcoming the challenges of the local preservation of vernacular heritage. The discrepancy in the local perception of the preservation of these sites is likely to hinder climate adaptation of vernacular heritage in the near future. Since vernacular heritage is under threat all over the world, the problems and suggested solutions in the case study are transferable to global examples. The analysis of the interviews with local people can capture the local practices and challenges of preserving the vernacular heritage sites. The understanding of site-specific challenges can contribute to a local, regional, or national decision-making process by involving the perceptions of villagers about their own sites and buildings.

6.2 Changing Lifestyles and Building Plans in the Hinterland

The widespread economic activity of the rural population was mainly focused on animal husbandry before the 1950s. From spring to summer, local residents were going up to high mountain pastures with their herds of livestock and would return to their villages in autumn. In 1950, the job opportunities increased due to the foundation of tea factories, and the openings of roads between urban and rural spurred rural-urban migration. The lack of economic resources other than animal husbandry left local residents with no other choice but to move to the urban area.[486] Agricultural technologies on farms have increased towards the 1960s and reached to its today's level of mechanisation, irrigation, and the use of chemical fertilizer with a sharp increase.[487] In the 1980s agricultural policies were not in the favour of livestock production, so it was replaced with crop production of hazelnut and tea.[488]

486 Mehmet Somuncu, "Tourism and the Commodification of Cultural Heritage in the Eastern Black Sea Mountains, Turkey," ed. Boian Koulov and Georgi Zhelezov, 1 online resource (xvi, 268 pages) : illustrations (some color) vols., *Sustainable mountain regions : challenges and perspectives in Southeastern Europe* (Cham: Springer, 2016).

487 Harun Tanrivermis and Bulbul Mehmet, "The Role of Agriculture in Turkish Economy at the Beginning of the European Union Accession Negotiations," *Journal of Applied Sciences* 7 (2007).

488 Somuncu, "Tourism and the Commodification of Cultural Heritage in the Eastern Black Sea Mountains, Turkey."

The changes in the socio-economic and social structure of the district due to globalization and national agricultural objectives and strategies have affected the spatial planning of the vernacular landscape along with the local identity. Foremost, the manual labor, which helped the local creation of furnishings, cable car transportation (Figure 6.1) between the mountains, and ornamentations, lost its significance in these geographically challenging sites. The elements of vernacular landscapes relying on the manual labor of agricultural activities are left unused.

FIG. 6.1 The cable car system is still used for the transportation of tea bags. Source: author.

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FIG. 6.2 The tools in the making of molasses, are not used anymore but are kept in the storage buildings. Source: author.

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FIG. 6.3 The local people keep the collected tea in the bags laid in the tea field shack before their collection by the tea factories for packaging or by the landowner to share the crops between the shareholders. Source: https://pixabay.com/photos/tea-field-shack-rize-country-side-1785803/

Mechanisation replaced the handmade production of furnishings, objects, and goods with consumerism via the use of the engines. For instance, people used to make molasses in self-made wooden pots (Figure 6.2), but now mass production of molasses decreased the effort in its manual production. The usage of storage houses ended with the start of the use of refrigerators in the villages. While these advancements transformed rural communities into contemporary societies, traditional practices along with objects and furnishings and settlements were abandoned by the local people.

Instead of stone steps to climb the steep terrains, people opened up roads to their properties for their convenience. As the tea income continued to become the primary source of revenue, the tea field shacks continued to be used (Figure 6.3). As a result, many components of this vernacular landscape have been transformed, and if not, left to decay. These patterns of behaviors reveal the evolution of the need and appeal toward modern comfort and the economic burden that preservation entails.

FIG. 6.4 In the case of this building the *yancı* household coming from Erzurum (a city in the east) was living inside it because the landlord is mostly away. Source: author.

FIG. 6.5 The building, owned by the Okman household, was not only extended but also had improper units. A closed balcony with a wide opening is added in contrast to the bay window, which was constructed in line with the local climate in Çağlayan village. Source: author.

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The whole entity of the site, including the building, storage buildings, and *bageni* is in some cases under the management of the seasonal farmers known as *yan*ıcı. *Yan*ıcı used to live with the household in these vernacular buildings (as mentioned in Chapter 4). However, the additional structures for *yarıcı* outside the authentic buildings are constructed for safety reasons. With the migration from the nearby cities, the mutual trust between the *yarıcı* and the homeowner has changed. The *yan*ıcı household used to live in the rooms allocated by the homeowner for them in the building (Figure 6.4). While some of them worked seasonally and left for the western cities in search of work, some others stayed in the buildings to keep the safety of the land in the absence of the landlord. The need for the construction of new buildings for *yarici* households caused the planning of improper buildings next to the vernacular settlements.

Vernacular building owners refurbished their buildings according to their actual needs and lifestyles by adding extra rooms, dividing rooms, and/or changing the function of the rooms (Figure 6.5). While the restoration of the vernacular buildings derives from necessity, some of these contemporary interventions led to issues such as thermal discomfort, the disintegration of construction and materials, incompatible replications, and value loss. The concrete addition of rooms and floors not only caused disproportionate scales of these buildings but also decreased their resilience to micro and macro-climate. The additions and interventions made by the next generation of homeowners made these buildings even more vulnerable to the changing climate.

The reasons behind the deterioration of the buildings, mainly from issues brought by the industrialisation are explained in detail through the analysis of interviews with local people in the following subsections. In addition, the analysis of the interrelations between these reasons reveals some of the continuous challenges of the preservation of the vernacular settlements globally even today. Some of these obstacles are more prominent than others in local practices at the bottom level.

6.2.1 Conflicts Among Many Heirs

A few local people (n=3) referred to many heirs as an issue in the preservation of vernacular houses. The ownership of the land and houses is sometimes shared between multiple heirs. Each heir has a different view on the maintenance of the buildings. In most cases, the abandonment of these houses results from conflicts between the stakeholders and their heirs (Figure 6.6). Because they cannot resolve the conflicts such as the ownership of the house or investment of money in the repairs, they leave the building to its fate and with that decay. H.Ş. gives an example of this barrier by stating that:

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"We did not divide the house among heirs, I built a new house at the bottom, but I renovated it here too… For example, three brothers, who are heirs, did not care about the old house [in a property in Çağlayan village], they conflicted, and each constructed a concrete building. This [old] house was left to decay."[489]

FIG. 6.6 The abandoned house due to inheritance issues.Source: author.

Similarly, Y.G. claimed that their house is not shared although there are houses with many heirs.[490] When one of the heirs can afford the restoration of it and wants to buy the other shares, the remaining heirs rarely want to sell their shares. As the economic value of the building and with it the site increases drastically with its restoration, the heirs keep their shares for future investments. This entails that there needs to be a mutual agreement between the heirs in determining the ownership of the house and most importantly the investments in it for better management of the site, as pointed out by the interviewees.

489 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

490 Y.G., interview by Gül Aktürk, Çağlayan Village, July 5, 2019.

The fact that this problem occurs not only in the villages but also in the region reveals the scale of it. The observations in the nearby cities highlight the extent to it which heirs of the greater mansions abandoned their properties because of similar disagreements. In some cases, the issue is resolved by giving ownership to one heir.

6.2.2 Abandonment of the Sites

Abandonment is the second most reported challenge with eleven mentions (n=6). The urbanization in the city of Rize (discussed in Chapter 5.2.) caused people to leave their lands and buildings inherited from their predecessors to migrate to big cities in the 1950s to search for jobs. But this behaviour seems to reverse in the late 2000s with increasing awareness of slow and sustainable living. Living in the villages, growing crops, and manual labour became trendy again in the face of challenges that globalisation brought.

The depopulation of the villages since the 1950s was a growing concern. H.Ş. observed that "as the young generation got more educated, they left here for the cities, and more land became available."[491] "When grandmother died, there was no chance to preserve the house, so it decayed,"[492] said Ş.S., echoing the sentiments of H.Ş. The next generations left for bigger cities and better opportunities as they did not appreciate the rural life and buildings until very recently.

The historic buildings survive as long as they are occupied. Y.Y. testifies that the unoccupied houses are deteriorating faster.[493] Once the homeowner abandons their buildings, there is no one to protect the site against natural causes of decay. Only occupants can keep the building up to date through continuous adjustments for the purpose of the current use and repair. This is difficult if the occupants do not hold for information on the maintenance of these buildings.

491 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

492 Ş.S., interview by Gül Aktürk, Fındıklı, January 14, 2019.

493 Y.Y., interview by Gül Aktürk, Çağlayan Village, January 11, 2019.

6.2.3 Loss of Traditional Building Knowledge and Practices

Local people rarely reported the loss of traditional building knowledge and practices (n=3). Abandonment of the buildings disrupted the transmission and protection of traditional knowledge, experiences, and practices of construction to the next generations. Local residents have forgotten the legacies of prior knowledge on land management, building materials, and construction techniques over time. This loss of traditional artisanship and techniques is preventing building owners to take initiative in the compatible restoration work of the buildings.

The building owners could not transfer their knowledge of the traditional building construction because their heirs preferred to live in the new buildings that they constructed. As a result, the next generations could not adopt these techniques at the time of their return to these buildings in the 2000s. When they wanted to renovate their buildings respecting the originally constructed buildings, the forests and rivers were legally protected by the national legislation.

The regulations prevented local inhabitants to collect chestnut timbers from the forests and stones from the rivers. The Ministry of Agriculture and Forestry designated forests as a natural heritage in the 1950s in order to restrict deforestation and protect natural resources. Meanwhile, the General Directorate for Protection of Natural Assets under the Ministry of Environment, Urbanization, and Climate Change listed the rivers as natural resources. This meant that local communities were no longer entitled to use the forests and rivers to collect construction materials. These restrictions in obtaining these materials made the construction materials unavailable. Another problem is that timber is also not available in the forests in size and thickness for use in the construction of vernacular buildings. This encouraged the new roof construction with materials (Figure 6.7) such as zinc instead of the traditional way of roof construction with *hartama,* which required the use of timber.[494] These parameters influence the buildings beyond the aesthetic view that they once had.

The loss of the traditional knowledge of construction decreases the historic value of the building as well as its structural integrity to withstand extreme weather events. After spending a night in one of the concrete additional rooms, one realizes the cold humidity in the room. This is a sign of poor insulation in winter. In contrast, with no interventions, the buildings are not providing the comfort of modern living. This was mentioned as part of the negative values the local communities give to their buildings.

494 Sümerkan, *Doğu Karadeniz'de Geleneksel Yapı Kültürümüzün Açık Hava Müzesi Fındıklı Köy Evleri, Rize'de Fındıklı Ve Güneysu Kırsal Mimarisi.*

FIG. 6.7 An example of a maladaptation from a building with a metal roof construction as opposed to the traditional roof of *hartama*. The arc-like roof curve and detailing have disappeared with the change of material. The roof cover does not allow air circulation and solar gain anymore due to the material change. Source: author.

6.2.4 Increasing Awareness of the Financial Value of Vernacular Buildings

The well-protected buildings are in most cases designated by the public institutions of conservation bureaus. The well-preserved buildings sometimes rely on the awareness of the occupant in the preservation of historic buildings. So, the cause of maladaptation is not necessarily a lack of funding but also a lack of awareness. A few interviewees (n=2) shared their views on the awareness that "the homeowners will preserve their houses if they give value to nostalgia."[495] A homeowner who has money and awareness of the safeguarding of vernacular heritage can preserve it. According to H.Ş., until 10 years ago people have not paid attention to these buildings.[496]

495 C.K., interview by Gül Aktürk, Hara Village, July 3, 2019.

496 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

Local people considered them a burden due to the absence of many facilities and the pricey maintenance. In addition, they encountered problems of insects and scorpions attack in the buildings.[497] Altogether, these issues if not solved by the homeowners can discourage them to carry on with the maintenance of their buildings.

Owner-occupied buildings stand longer as people appreciate their historical value. Y.Y. explained that "after the people (the occupants) are gone, they (the historic buildings) disappear."[498] Now, they are more conscious of their historic and more importantly, economic value. Facilitating this form of heritage can bring economic income and also educate the next generations for better preservation and adaptation of these buildings. Remembering the traditional knowledge in the creation of cultural heritage, some local people continue the customs of reusing them in the present time. This attracts the attention of tourists and the value of investing in these buildings. These buildings are promoted through the distribution of the brochures handed out in the city centre by the homeowners (Figure 6.8).

FIG. 6.8 The use of the vernacular building as a guest house with a promise of guided nature tours. Source: author.

497 F.H., interview by Gül Aktürk, Çağlayan Village, January 12, 2019.

498 Y.Y., interview by Gül Aktürk, Çağlayan Village, Jarnuary 11, 2019.

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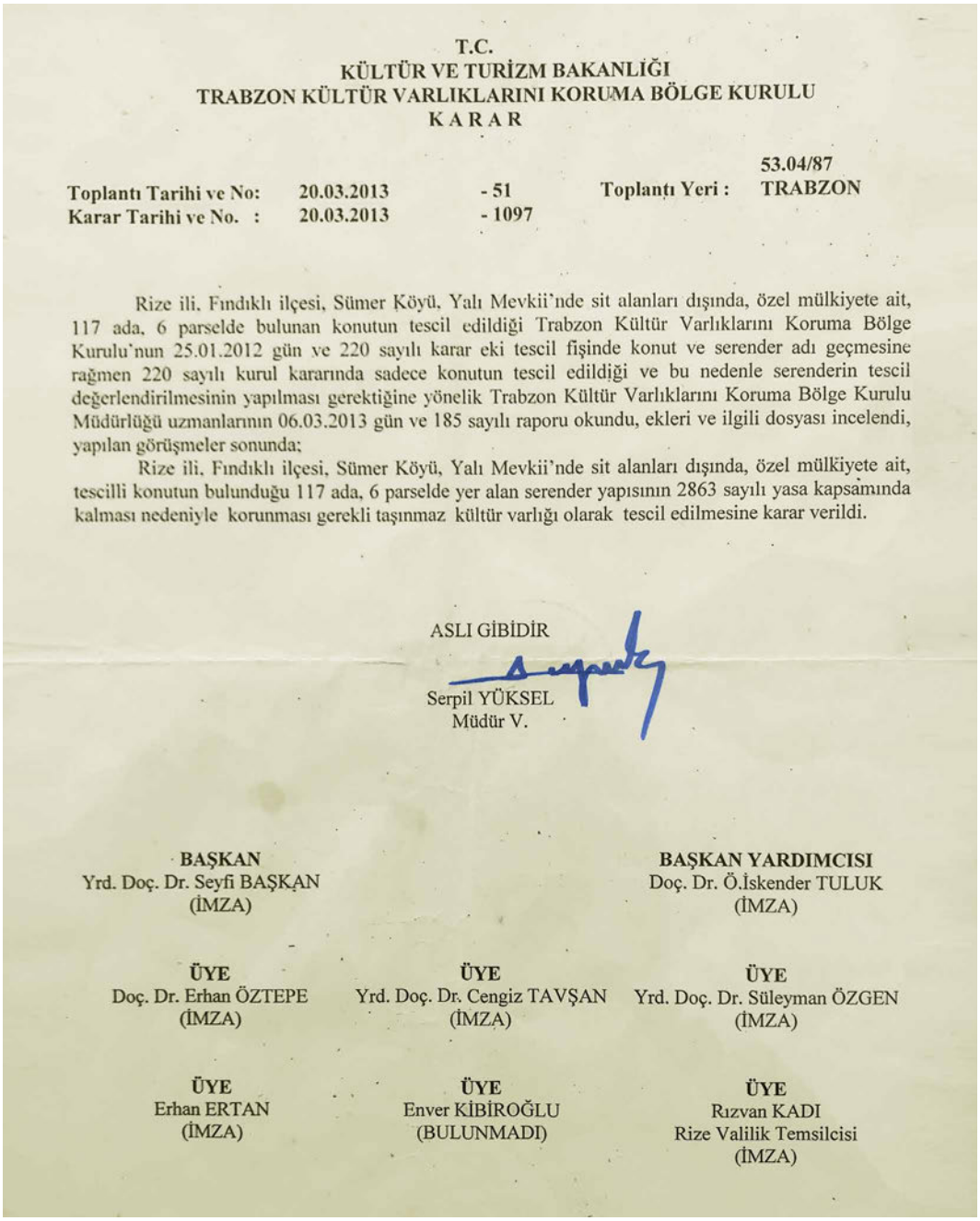
These buildings receive a lot of attention from the tourists— and rightfully so— because there are a rare number of hotels available in the centre of Fındıklı. Due to the promised activities such as offering traditional food underneath the storage buildings, the price of one night in these guest houses reaches 1000 TL, which cost 65.45 euro. One of the interviewees uses his buildings as an open museum to welcome younger generations and for them to discover the forgotten customs and items. The listing of the buildings by public institutions increased the significance of safeguarding these buildings.

6.2.5 Restrictions in the Restoration of Listed buildings

The conservation of cultural heritage in Türkiye is based on a law (decision number 2863 of 21 July 1983, "Kültür ve Tabiat Varlıklarını Koruma Kanunu"). Based on this law on the cultural heritage protection act, under the authority of the Ministry of Culture and Tourism, the Regional Board Directorate for Preservation of Cultural Assets in Trabzon (Trabzon Kültür Varlıklarını Koruma Bölge Kurulu) listed the vernacular buildings according to conservation status (Figure 6.9). The conservation status of the heritage sites relies on their listing. The natural and archaeological sites are listed as first, second or third degree. whereas the buildings are listed as first or second degree. 1st-degree heritage sites largely retains the original form and design of their architectural elements, thus, the interior and exterior must be kept intact and cannot be modified. The 1st degree listed heritage assets are usually grand mansions and buildings, whereas the village houses are listed as 2nd degree.[499] Local residents of historic buildings can modify the interior of 2nd-degree buildings but not the exterior, whereas recent developments are flexible in the 3rd-degree sites. The vernacular homeowners apply for the listing of their houses to receive money from the government to restore their houses by sending the documents on their property and its surrounding. If the vernacular building is not designated, the destruction and damage of the building do not bind the building owner legally.[500]

499 Eres, "Türkiye'de Geleneksel Köy Mimarisini Koruma Olasılıkları."

500 Ibid.



T.C.
KÜLTÜR VE TURİZM BAKANLIĞI
TRABZON KÜLTÜR VARLIKLARINI KORUMA BÖLGE KURULU
K A R A R

53.04/87

Toplantı Tarihi ve No: 20.03.2013 - 51 Toplantı Yeri : TRABZON
Karar Tarihi ve No. : 20.03.2013 - 1097

Rize ili, Fındıklı ilçesi, Sümer Köyü, Yalı Mevkii'nde sit alanları dışında, özel mülkiyete ait, 117 ada, 6 parselde bulunan konutun tescil edildiği Trabzon Kültür Varlıklarını Koruma Bölge Kurulu'nun 25.01.2012 gün ve 220 sayılı karar eki tescil fişinde konut ve serender adı geçmesine rağmen 220 sayılı kurul kararında sadece konutun tescil edildiği ve bu nedenle serenderin tescil değerlendirilmesinin yapılması gerektiğine yönelik Trabzon Kültür Varlıklarını Koruma Bölge Kurulu Müdürlüğü uzmanlarının 06.03.2013 gün ve 185 sayılı raporu okundu, ekleri ve ilgili dosyası incelendi, yapılan görüşmeler sonunda;

Rize ili, Fındıklı ilçesi, Sümer Köyü, Yalı Mevkii'nde sit alanları dışında, özel mülkiyete ait, tescilli konutun bulunduğu 117 ada, 6 parselde yer alan serender yapısının 2863 sayılı yasa kapsamında kalması nedeniyle korunması gerekli taşınmaz kültür varlığı olarak tescil edilmesine karar verildi.

ASLI GİBİDİR
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(İMZA)

ÜYE
Doç. Dr. Erhan ÖZTEPE
(İMZA)

ÜYE
Yrd. Doç. Dr. Cengiz TAVŞAN
(İMZA)

ÜYE
Yrd. Doç. Dr. Süleyman ÖZGEN
(İMZA)

ÜYE
Erhan ERTAN
(İMZA)

ÜYE
Enver KİBİROĞLU
(BULUNMADI)

ÜYE
Rızvan KADI
Rize Valilik Temsilcisi
(İMZA)

FIG. 6.9 The decision of the listing of the Babalık guest house with its *serander* in Sümer village by Trabzon Kültür Varlıklarını Koruma Bölge Müdürlüğü. It is listed as an "immovable cultural property" since 2013. Source: author.

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Those who listed their buildings applied for the listing based on this former law. In Fındıklı, as Y.Y. stated, "at the time there were only 20-30 listed buildings, the number of the listed buildings is now around 100."[501] With the increasing interest in rural tourism, including highlands, natural sites, and cultural heritage routes, more people from ahead search for a place to stay for holidays. Therefore, some of the building owners (S.Ş. and B.U.) opened their houses to visitors by offering bed and breakfast and tours of the historic environment. While the listed buildings were restored following the strict rules of the law, the interior of the 2nd degree and unlisted ones were renovated heavily. Thus, the later interventions vary considerably depending on the heritage listing of the houses.

Some local people mentioned the listing status of their houses (n=5) and only two of them explained the heritage status of their buildings, while one interviewee was not aware of the listing of his house. H.Ş. described the heritage status of his building as 1st or 2nd Degree protection area.[502] Similarly, S.T.'s house is also listed as the house is maintained well. As the legal protection of heritage assets emerged later (in 1934), the occupants by that time already made small interventions to their buildings. As a result, only the buildings that respected their condition were designated as 1st or 2nd degree. The house of C.K. has not been listed as the building lost its authenticity due to major changes to the façade of the building done by his family. This revealed that the conservation techniques, practices, and maintenance by these generations determine the listing or not and whether they receive public money for restoration. It should be also noted that not only cost of repair and restoration is high but also the cost of the preparation of the restoration projects is too high for the house owners.

Building owners are often discouraged from applying for the designation of their site due to the deterrent processes of listing. For instance, the restrictions brought by the preservation law of 1st and 2nd grade listed buildings require rigorous works of restoration. F.H. explained the reason behind why she did not follow the application for listing:

"When you apply for it [a listing of the property], you cannot get around, you cannot renovate as you please. You will have to follow the strict guidelines, we did not want it."[503]

501 Y.Y., interview by Gül Aktürk, Çağlayan Village, January 11, 2019.

502 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

503 F.H., interview by Gül Aktürk, Çağlayan Village, January 12, 2019.

In the case of 2nd grade listed buildings, the interior can be modified, but the exterior has to be renovated according to the original state of the building. The original state is found from the available sources of images, plans, drawings, or letters describing its state in the past. These sources are usually found in the personal archives of the current homeowners. These limited restoration permissions make it difficult for homeowners to modify, alter, and renovate. From what he experienced, H.Ş. highlighted:

"According to the restrictions of the listed buildings, we can renovate the interior but the renovation of the exterior façade was done according to their guidelines, including the roof and its surroundings."[504]

Even though some of these decisions to refurbish the house to its original stage seems unreasonable, it is still applied to the current planning. Because it is usually impossible to trace its original state and the original state can be its renovated version in the 1900s. It is also unreasonable to expect local people to live in the living conditions of 150 years ago with single glazed windows and soil flooring in the living room. H.Ş. further explained that "the house, which is registered, cannot be sold or damaged,"[505] because it is under the management of the public institution. Listing the alterations at his house, he claimed:

"We renovated it according to its original state 200 years ago. For example, this place was closed [meaning that the entrance of the building at the time was a room], I requested it to be opened [referring to the entrance of the building] and they did it. Sash windows are the same as the original. My mother had it done before. The architect accepted one window [the window in the corner] as it is. I could not cancel it. It is not symmetrical, it stands alone (Figure 6.10). They said this window exists in its original project, so it will stay this way."[506]

Having said that, local people agree on the incompatibility of some of the interventions. They are willing to make an effort to respect the original use and function of the house. As T.H. puts it:

"Buy a single sash window! You will not ruin the original look. They let me do this. Other than that, I also do not want to do any artificial changes."[507]

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504 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

505 Ibid.

506 Ibid.

507 T.H., interview by Gül Aktürk, Gürsu Village, July 2, 2019.

FIG. 6.10 The standalone window on the corner of the façade of the ground floor was accepted as original by the conservation architect. Source: author.

As a result, the strict rules of listing impede local residents to decide on maintenance. Local people avoid receiving public money as it means limitations on how they want to renovate their buildings. It may seem like support but in the end, without it, the cost of renovation can be even cheaper by avoiding the listing and its strict rules. The public money is a burden for local communities, as there are cheaper and quicker ways to renovate their buildings without having to obey restrictions of a listing. In addition, there is no definition for the designation of rural site or cultural landscapes in the preservation law. Since 2011, the protection of natural heritage sites is no longer under the responsilibility of the Ministry of Culture and Tourism, which caused many issues in the preservation of cultural and natural heritage sites together. The protection of natural heritage sites are under the responsibility of the Ministry of Environment, Urban Planning, and Climate Change.

6.2.6 Rising Material and Skilled Labour Prices

The cost of maintenance is the most mentioned challenge (n=8) in the interviews. Restoration work of these houses is very expensive as the materials and construction techniques are not available anymore. There is a need for money to hire skilled craftspeople and materials. The skilled artisan Ş.S. does restoration works based on contracts and explained the difficulties for the homeowners. In most cases, "80 percent of the works, the owner is responsible for the payment of the construction material,"[508] as he claims. Thus, he does not include the money of the material in the price he suggests for his works. Despite the common use of materials such as briquette and concrete over locally available resources, some local people invested greatly in the renovation of their buildings with respect to their authentic character (Figure 6.11). Yet, extra costs emerged from the removal of incompatible materials and extensions during the restoration work (Figure 6.12). For instance, S.T. complained about the renovation cost of the toilet:

"It was built with a briquette. The cost of renovating the toilet included two different expenses because the stone façade was renewed on the exterior, whereas the interior was refurbished." [509]

"They have left their mansions but saved a budget to restore their mansions. But the small-sized houses of the poor local people collapsed onto their heads. Because of the convenience of the use of concrete, people abandoned those houses."[510]

He further elaborated:

"One cubic meter chestnut tree or three meters of pine tree cost 700-800 Turkish Liras (at the time of writing which is approximately 70-80 euros). One ordinary person cannot afford to construct 100 square meters of building. The prices of labor work and materials are expensive."[511]

508 Ş.S., interview by Gül Aktürk, Fındıklı, January 14, 2019.

509 S.T., interview by Gül Aktürk, Gürsu Village, July 2, 2019.

510 Y.Y., interview by Gül Aktürk, Çağlayan Village, January 11, 2019.

511 Ibid.

FIG. 6.11 Restored building in Gürsu village for the use of the staff of the public institution to stay during their visit to the area. The restoration projects of this building were done by Koray Güler, who is a scholar studying the vernacular settlements in the region. Source: author.

The wealthy owners of grand mansions such as those who reside in the village of Çağlayan can restore them, whereas villagers suffer from living under the roof of unmaintained houses. Capital plays a role as Y.Y. also emphasized:

Increases in the cost of construction, especially with the loss of value in the Turkish Liras have made it more difficult for homeowners to restore their buildings. In line with the statements of Y.Y., Y.G. added "they sell one stone for 12 to 15 Turkish Liras (0.78 euro at the time of writing)."[512] Ş.Ö. calculated the restoration cost that "it will cost 15 million lira for our children to live with us."[513] Because they want to allocate rooms for their children and it means the restoration of the entire building.

512 Y.G., interview by Gül Aktürk, Çağlayan Village, July 5, 2019.

513 Ş.Ö., interview by Gül Aktürk, Çağlayan Village, July 6, 2019.

FIG. 6.12 The contrasting view of the original part of the building versus the imitation of stone and stone-infilled timber structure and PVC doors. Source: author.

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The incentives of the government for listed buildings lightened the financial burden to a certain extent, although it was binding people to the restrictions of the listing. But local communities found this financial support insufficient. It does not even cover the renovation of the roof, which is the most important part of the building as it protects the house decaying from the rainfalls. If it does not even cover the restoration of the roof, why do local residents even apply for the listing of their buildings? There is no benefit for them.

F.H. remarked the cost of the complete renovation of her house, was "estimated at 500 thousand Turkish Liras (32 thousand euro)."[514] She further explains that "the government provides 90 thousand out of 500 and the homeowner has to cover the rest."[515] This reveals that the homeowner does not even have one-fifth of the restoration cost from the government. The financial aid is very little and yet imposes limitations on what can be done to the houses. Therefore, many homeowners, including Ş.Ö., avoid applying to get their properties listed, in order to be able to freely make alterations to their houses.

Due to increasing labour costs, the old woodworking practices have been replaced with cheaper imitations (Figure 6.13). Today, the problem in continuing the tradition lies in finding a master who will charge an affordable rate for both his labour and the material used in accordance with the traditions. The following detailed description is from the stonemason, Ş.S.:

"We cannot get anything from the forests anymore. We rely on material from the timber merchants and the lumbermen. They obtain it from the forests. They cut the auctioned trees in the big workshops legally not like the illegal practices of the past. We use the cut timber in house construction. We usually buy logs and cut them to suit our needs."[516]

514 F.H., interview by Gül Aktürk, Çağlayan Village, January 12, 2019.

515 Ibid.

516 Ş.S., interview by Gül Aktürk, Fındıklı, January 14, 2019

FIG. 6.13 Akyasarlar mansion in Çağlayan village grew with the concrete addition. The front façade is plastered, and the addition of stone-infilled timber and the painted addition at the very end with concrete addition reveals the later incompatible constructions. Source: author.

FIG. 6.14 The grand construction of a stone-infilled timber building on the coast by S.S. for the staff of the public institutions to stay during their visit to the district. Source: author.

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While the unavailability of traditional materials makes it difficult for accurate construction and renovation of vernacular buildings (Figure 6.14), energy saving in these buildings becomes a rising interest. Even in today's context, the buildings seem to receive attention for further installments such as solar panels. "They said that we would receive energy from the sun in the case we want to do all the restoration,"[517] as G.A. puts it to refer to the integration of sustainable technological solutions to the existing buildings. The high cost of it is a logical constraint for local residents to implement solar panels. Local communities relate the issue to the lack of institutional support in enforcing laws and legislations for the preservation and adaptation of these buildings and giving subsidies. The local communities have the building capacity for resilience but they do not have the resources. Downscaling the issue to smaller scale is also cheaper than large-scale interventions.

6.2.7 Lack of Institutional Support and Law Enforcements

Planning and energy policies and projects are often in conflict with laws and legislations on the preservation of cultural and natural heritage preservation. The Trabzon cultural and natural heritage preservation board designated Çağlayan valley 1st degree and Arılı valley 1st and 3rd-degree natural heritage sites in Fındıklı in 2008 upon the requests of local communities to prevent the construction of a hydroelectric power plant.[518] In the case of protection of the rivers and forests, local people are not allowed to collect the materials, whereas these lands are sold by the government to the big corporations. Y.Y. highlighted the fact that the Ministry of Forestry sells the forest lands at auction and lets them be destroyed.[519] Chestnut trees were once abundant but are now rare, just like the juniper trees, which were mostly used in water mills and storehouses as they were tall. He disapproved of the current methods of timber collection from the forests in that the good quality timbers are not valued and are sold at a low price.[520] More fundamentally, it has become clear that manufacturing processes have effectively caused the abandonment of traditional woodworking. Even when confronted with the destruction of the natural environment, no amount of law enforcement seems able to prevent the loss of resources.

517 G.A., interview by Gül Aktürk, Hara Village, July 3, 2019.

518 Republic of Türkiye Ministry of Environment, Urbanization and Climate Change, "Rize İli Doğal Sit Alanları, Tabiat Varlıkları Ve Anıt Ağaçlar," https://rize.csb.gov.tr/rize-ili-dogal-sit-alanlari-tabiat-varliklari-ve-anit-agaclar-i-4430

519 Y.Y., interview by Gül Aktürk, Çağlayan Village, January 11, 2019.

520 Ibid.

Due to the over-exploitation of natural resources, the ministries have taken control of the management of rivers and forests. Today, the Ministry of Forestry no longer permits individuals to cut down trees. Y.Y. described the benefits of this policy:

"With the EU-funded program (as mentioned above), there was an increasing awareness of cultural heritage. At the time, the number of listed buildings was around 20-30 and today it has risen to 100, and now people construct new buildings using this stone-infilling technique. In other regions, such as the Aegean region, the builders construct these types of houses. Most of these houses are transferable and are handed over several times to different owners."[521]

Ş.S. argued that the Public Education Centre in Fındıklı should increase awareness of the traditions, but is not supported by any bureaucratic or official institutes.[522] Y.Y. and Ş.S. mentioned institutional barriers, such as financial incentives and education.[523] The national, regional, and primarily local organizations could, if they wanted, function as public education centres to make training in woodworking more accessible to the public.

In 2008, the Fındıklı Public Education Centre and the Architecture Faculty at the Black Sea Technical University started the project called "Training Masters for Rural Built Heritage in the Eastern Black Sea Region." Following 80 hours of theoretical education over 20 days, students completed 200 hours of practical work over 40 days. The first practical application of the knowledge was the reconstruction of a stone-arched bridge in Derbent village. Then the community members who participated in the program erected stone-built toilets for public use, and most recently they constructed a stone-infilled timber building which now operates as a café. With the construction of this café, decision-makers realized the importance of community participation projects. Following the project, other initiatives, such as school construction by NGOs and universities emerged. The aim of these projects was to involve as many people as possible from the communities, including artisans, women, and students.

521 Ibid.

522 Ş.S., interview by Gül Aktürk, Fındıklı, January 14, 2019.

523 Y.Y., interview by Gül Aktürk, Çağlayan Village, January 11, 2019.

The continuation of the master-apprentice relationship is a priority in safeguarding traditional craftsmanship.[524] There have been attempts to increase the number of skilled labourers able to continue the traditions and Ş.S. encouraged his colleagues to attend the courses offered under this project in which he worked as an instructor.

The program paved the way for a series of publications documenting the built heritage, as well as for documentaries and advertisements for the program on several media platforms. It also illustrated to local people the importance of restoring according to their original building techniques. Many now conscientiously renovate their houses rather than repairing them haphazardly.

Funded programs to train highly skilled craftspeople are bringing scholars, masters, apprentices, and ordinary people together to collaborate in a project to revive the tradition of woodworking. However, one-off projects are not sufficient to preserve and promote the intangible heritage sustainably if the community members are not also supported by local institutions. Discouraged by the local administration, some people have stopped teaching and exhibiting their work. Crucially, communication and collaboration are needed between elder craftspeople, young practitioners, academics, and government officials to recognize the importance of the traditional craft of working in wood.

6.2.8 Generational Differences in the Use of the Buildings

Local people (n=11) mentioned renovations by previous generations in different periods. Approximately six to eight generations occupied the buildings since the time of their construction. The interior of the buildings has changed greatly compared to the exterior, which is rather untouched due to restrictions in the renovation of a 2nd-degree listed building. Nonetheless, in the case of unlisted houses, there are expansions and interventions at greater scales and sizes built with incompatible materials and aesthetics (Figure 6.15). Furthermore, a lot of replicas in these valleys emerged. These artificial-looking apartments were built to sell flats by using the vernacular image of the district.

524 Özlem Karakul, "An Integrated Methodology for the Conservation of Traditional Craftsmanship in Historic Buildings,"*International Journal of Intangible Heritage* 10 (2015).

FIG. 6.15 A building house with a front façade being plastered is facing the road that is constructed to connect the district centre with its hinterland. Source: author.

FIG. 6.16 One of the houses of 5 evler is renovated including the stairs, toilet, and an additional unit. Fındıklı Çağlayan Village 5 evler Parcel no 110 and 111. Source: author.

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The incorporation of contemporary construction materials and techniques into the facades of vernacular buildings caused differences between their original and current view. Along with the facades, there have been major interventions to the plans and functions of the vernacular buildings. Today, in most the buildings, the toilet that is located on the opposite side of the main entrance is not used as a toilet anymore. It is either converted to another room or renovated entirely by installing the currently used facilities (Figure 6.16). In time, the clay plasters dried and fell off in some houses that were abandoned.

Main changes have been done to the exterior with the roof tiles and the interior with the walls and ground flooring. Referring to the difficulty of tile work, T.H. claimed that "I bought 1500 tiles 10 or 15 years ago, but it still penetrates the water."[525] Single glazed windows were replaced by a double. H.Ş. lowered the levelling on the floor in the living room.[526] F.H. gives the order of restoration work stating that:

"When you first renovate this house, you will start from the roof (Figure 6.17). It won't rain inside the house. After that, you need to renovate the windows and then implementation of electrical wiring."[527]

As the families became smaller in size, the need for the rooms decreased. Similarly, the instalment of kitchen facilities such as sink, refrigerator, and oven transformed the arrangement and configuration of the houses. The typical timber cabinets, which were used as storage in the houses, were removed. Additionally, an electrical system was installed and walls were painted. The building is not functioning anymore in the same way as it was in the past with the closed fireplaces in the rooms and empty cabinets. Contemporary life brought the need for spaces such as a veranda (Figure 6.18) or the conversion of storage houses to pergolas for meetings. These are some of the solutions that the next generations came up with. However, the challenges remain unresolved. Occupant behaviour is a critical component in the maintenance of the buildings. Also, it is important to promote and raise awareness of the preservation of vernacular landscapes.

525 T.H., interview by Gül Aktürk, Gürsu Village, July 2, 2019.

526 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

527 F.H., interview by Gül Aktürk, Çağlayan Village, January 12, 2019.

FIG. 6.17 Babalik mansion before and after its renovation shows the skeleton of the timber-framed building. The construction and deconstruction of it always start from the roof, as mentioned in section 3.5. Source: Family archives of the Babalik mansion household.

FIG. 6.18 Sevketbeyoglu building is majorly transformed with the opening of a terrace in the entrance and the plastering of the façade. Source: author.

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6.3 Conclusion: Overcoming the Challenges in the Preservation of Vernacular Buildings

This chapter highlighted the challenges of safeguarding vernacular heritage from the perspective of the end-users. While acknowledging the 200-year history of vernacular buildings in the case of Fındıklı, the changing lifestyles in the countryside hint that occupants are dealing with several important issues when preserving it. There have been many indicators in the way of interpreting vernacular heritage by its owners. As the vernacular building ownership is handed down from father to son, the maintenance practices of the buildings have changed greatly. In some cases, the buildings survived with several modifications, while some others were completely left to decay. Many of those who inherited the buildings demolished them to live in contemporary and more conveniently built houses, particularly in the 1950s. Those who decided to keep their inherited building, constructed in some cases a new building next to it to live in permanently. Finally, building owners who decided to preserve their buildings had to find material, master, and money to conduct the project.

Through apprenticeship, vernacular buildings and the building knowledge that has been transformed through observation, information by word, and replication can be handed down. The construction of knowledge of the past shows the generational differences in living practices. Every generation interprets its vernacular heritage in its way in response to technological advancements, financial, social, cultural, and individual needs. Manufacturing and industrialization made the traditional knowledge of vernacular landscapes less important, though it does give the strongest connection between nature and culture. Traditional knowledge and practical skills go hand in hand. When manufacturing imposes a threat on the availability of timber masters, the knowledge of timber making will go extinct along with the skills required for it.

Local people used to be self-sufficient - S.Ş.'s parents only brought sugar and water from outside the district. Y.Y., who was the project manager for the EU-funded project 'Training Masters for Rural Built Heritage in the Eastern Black Sea Region', confirmed that "in the old houses, people did not buy anything - they made all their furniture, cupboards, etc. excluding glass."[528] With the adoption of modern lifestyles,

528 Y.Y., interview by Gül Aktürk, Çağlayan Village, January 11, 2019.

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industrial manufacturing replaced home production. Faced with technological advances, woodworking has been manufactured, but the economic benefits from its commercialization did not grow at the same rate. This has led to a loss of circularity of this form of architecture and the self-reliance of the communities in building it.

Since the 1950s, the influence of industrialization shaped the way of construction of buildings. Many people left the city of Rize for the western cities while those who stayed started building houses with brick and concrete. Many design interventions were done to the vernacular buildings that were incompatible with the original state of the houses (Figure 6.19). The old kitchen, living room, and toilets were not functional anymore with the introduction of new appliances and utensils. Storage houses, barns, and storage cabinets became unused due to the abandonment of agricultural activities.

The introduction of materials such as brick (Figure 6.20) and then concrete (Figure 6.21) speeded the construction of the new buildings in this period. Aside from the replications of these buildings, the regular form of stone-infilling façade was visually reproduced in today's apartments by painting. The modular design of these buildings is replicated in the construction of new buildings to attract tourists to the region without paying attention to reusing the existing buildings. The local inhabitants recognize the economic value of the vernacular buildings but the lack of institutional support and high cost of maintenance leave them no choice but to abandon them.

FIG. 6.19 The fast deterioration of the traditional vernacular buildings. Source: author.

FIG. 6.20 The abandoned brick-built building was a recent building. Source: author.

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FIG. 6.21 The Municipality of Fındıklı restored this house to use as a guesthouse. Source: author.

In theory, vernacular heritage holds significant knowledge for an environmentally friendly living but in practice, it is challenging to live in the way that past societies did in these buildings. In addition, there are many difficulties in preserving and restoring these buildings according to today's conditions. Through the analysis of the statements of building owners, it can be concluded that there are many challenges in the preservation of these houses that relate to the many heirs, abandonment, loss of traditional knowledge and practices, value, listing rules, cost of maintenance, lack of institutional support, and generational differences in the use of the buildings.

Generational conflicts in practice proved to be the most pressing issue (n=11), while institutional support (n=2) is the least mentioned factor as a challenge. Following that, the cost of maintenance (n=8) is the next most mentioned issue. The issues derive from institutional support, listing of the buildings, and cost of maintenance consider spatial scale decisions, whereas the problems regarding many heirs, loss of traditional knowledge and practice, and generational differences in heritage preservation concern local level practices. According to local communities, abandonment (n=6) is the next common challenge, despite the rural repopulation. The local people mentioned issues related to the listing of the buildings (n=5) for quite some time, while they referred to the loss of traditional building knowledge and

practices (n=3) relatively few times. This reveals the integrated issue from spatial and local level practices. Although the majority of these determinants stay at the local level, awareness seems to influence the spatial decisions as it increases the existing economic value of the settlements. Then the government institutions use this as an opportunity to invest in projects in tourism.

These challenges are sometimes interconnected. For instance, when people value their buildings less, they do not invest in their maintenance or when there are many heirs, buildings are often abandoned. Designation of the buildings and institutional support go hand in hand with their preservation. Because the listing provides national recognition, institutional support favours its maintenance through financial help. Loss of traditional building knowledge and practices causes high maintenance costs as there are few artisans to do the restoration works and they charge much. It will enable opportunities for local residents to better manage sites if they overcome these barriers.

The degree to which construction trends change over time largely depends on the environment. The local people become specialists in their own environment and what it offers to them. Materials and techniques may become old-fashioned and eventually be abandoned, but the stories and memories associated with them live within people, in their collective memories. As long as the buildings survive, the value of woodworking remains, but as they decay over time, it becomes increasingly difficult to revive the manual skills related to their construction. This is when the documentation of oral testimony becomes more crucial than written history. One-time projects such as EU-funded project of increasing awareness for timber artisanship seem to attract the attention of the public for the significance of preserving their heritage assets. But these initiatives are not enough for their long-term preservation, especially in today's conditions. The collection of oral accounts and narratives provides an insight into traditions and the evolution of these customs over time. This tells us about the contemporary bottom practices and their influence on the deterioration of these buildings. The forgotten knowledge and practices behind the planning of vernacular heritage are now invaluable more than ever but local people do not appreciate them.

The lack of funding is the greatest barrier in the way of adapting these buildings properly. Since the local people started building new buildings next to the historic ones, the abandonment has become a major problem. The fact that they can afford to construct a new building but not the preservation costs say a lot about the erasing of vernacular heritage. Only with the rise of sustainable living that the revival of the rural living style in the 2000s highlighted the importance of these settlements but it was too late for some buildings to be reused. Maintaining the old practices in modern

times became problematic, but the physical presence of stone-infilled timber-framed dwellings reminds people of the long-lost customs associated with this tangible legacy. Despite official listings of the buildings or the intangible heritage, these processes are not enough to protect these rural customs from degradation. Since young people cannot make any profit from the woodwork, the nostalgic assets become the memories of older people and a burden for the next generations.

The local institutions such as the education centre could encourage artistry and experimental knowledge by supporting local communities with incentives for them to embrace their tradition of vernacular housing. Creating an inventory of such practices can increase the number of jobs, qualified individuals, and studies in the field of preservation, and can enhance the diffusion of expertise. Local achievements in the preservation of woodworking skills may lead to a rise in the transmission of knowledge among local artisans, and encourage them to interpret their heritage for future generations and adaptations.These issues are often reflected at regional and even national scales. In the case of Artvin Savsat in the region, the issues such as few qualified artisans and material inavailability and improper interventions have been mentioned as part of challenges in preservation of vernacular heritage at building scales.[529] Changing lifestyles and values have also been emphasized as one of the challenges at a national scale.[530]

To conclude, adding to these existing issues, the implications of changing climate on these settlements will worsen and speed up the decaying of these buildings. The return of young generations to their homeland starting from the 2000s is and has been an opportunity for rural development, especially in initiating organic farming activities. This could lead to the reclaiming of their lands, reviving of their customs, and occupying terrains with sustainable farming and living. Most vernacular heritage relies on its occupants and their understanding of how to maintain it. For instance, when to use the wooden lattices to cut the solar gain or when to give space for a veranda are based on the decisions of the occupants. It is and will particularly be challenging to live in these houses when the occupants do not understand which rooms to use in which parts of the day or season, the function or work of shelves or storage areas. The mismanagement of the houses can increase the vulnerability of the houses to climate change. Therefore, the local level practices need to be considered and weighted in spatial decisions, including the climate and disaster risk management strategies as these adjustments (that are sometimes considered

529 Duygu Göçmen and Deniz Mazlum, "A Typical Example of the Vernacular Architecture of Artvin-Şavşat: The Zurabet House," *Türkiye Bilimler Akademisi Kültür Envanteri Dergisi* 9. (2011): 49-76.

530 Zehra Eminağaoğlu, " Ecological Approaches in Rural Settlement: A Case of Turkey," *International Journal of Ecosystems and Ecology Science* (IJEES) 8, no: 2 (2018): 401-408.

to be maladaptation examples) cause the increase in the vulnerabilities of these structures in times of climate change. Thinking about the future of these settlements, the insights, experiences, and perceptions of local people on changing climatic conditions and their effects on their sites can depict a conclusion on how these narratives can help in managing the disasters and building climate resilience in vernacular landscapes.

7 Narratives of Changing Climate and Vernacular Landscapes

7.1 Introduction: Statements, Perceptions, and Insights of Local Communities on Climate Change

Building on the existing challenges homeowners have faced since the 1950s in chapter 5, this chapter analyses the changing climate parameters in the city and their effects on the vernacular landscapes in the district in line with the statements, insights, and perceptions of the local people. The views, perceptions, and experiences of local people in current and future threats reveal the extent of the disasters and climate resiliency of these buildings. The chapter sometimes elaborates on the notion of the climate resiliency of vernacular landscapes for the future, as mentioned in chapter 3 in terms of the past settlement, while revealing their vulnerabilities against disasters. Because of all these changes, the location and orientation of these settlements may no longer be ideal for their resilience. With the support of secondary sources of government reports and meteorological trends, the analysis of the interviews highlights the local challenges of changing climate and its associated risks in managing the vernacular landscapes that are confronted by the local communities.

The future-forward view of vernacular landscapes aims to bring forward the perceptions of end-users on the changing climate in the area and the challenges they are expecting the future to face in the preservation of these settlements. While the sole perceptions of local people may not be considered evidence of climate change, this distinctive traditional knowledge serves as a testimony of the additional pressure brought by the changing climate that they may face in the future. Local communities are most affected by these changes facing crop failures, loss of buildings, biodiversity, and livelihoods. Their intimately connected experiences with their surrounding can contribute to climate science greatly by giving important lessons on climate resiliency in addition to the extent of the damage. In light of these events, it is significant to understand the different responses from both local and national levels to these disasters.

The statements by local people will reveal what exactly makes these buildings vulnerable or resilient. To better understand the intensity of flooding, landslides, and rainfalls, changing climatic conditions are evaluated in terms of temperature, humidity, rainfalls, and wind patterns. More than half of the interviewees (n=8) mentioned flooding, landslide, and extreme rainfalls as major challenges induced by climate change, whereas the others linked these events to then human interventions and disasters (Table 7.1). Five interviewees out of fourteen confirmed the impacts of climate change on the vernacular heritage sites. Among these interviewees, the majority stated the effects of climate change on their crops as their sites consist of tea gardens. One of the interviewees mentioned disasters' effects on his building mainly due to rockfalls. Five interviewees did not mention the impacts of climate change, whereas nine interviewees reveal these effects even though some do not associate the risks directly with vernacular sites.

TABLE 7.1 The table shows the themes, codes, example quotations, and number of quotations. Note that the number of quotations shows the number of times the quotes were mentioned.

Themes	Codes	Example Quotations	No. of Quotes
Current Problems Future treats	Flooding	"When the rivers flooded, no one is around."	14
	Landslide	"Here is a landslide zone."	16
	Rainfall	"But what rain, I have not seen anything like. It again rained like this last year."	3
	Climate-resilience	"The native tiles are water-resistant and durable."	17

Having encountered the challenges, local communities often stand alone in facing the disasters and their management. Future threats include the statements, which inform about the climate resiliency of these settlements. This section partly overlaps and partly conflicts with the findings from the spatial analysis in Chapter 5. In this regard,

the interviews reveal more villages with vernacular heritage sites under the threat of changing climate. Drawing on the results, the recommendations can guide and inform relevant stakeholders in disaster management of vernacular landscapes for the future.

7.2 Weather Trends and Changing Climate

In line with local weather conditions, views, perceptions, and experiences of local residents support the changing climate. However, the cause of these changes is often interlinked with development projects in the surrounding by the local people. The constant seeking for profits of villagers led to the creation of winter tourism activities in the mountains, as the summer season is too short to capitalize on sea tourism and investment in hotels along the coastline of the Black Sea. The Mediterranean region, known as the best summer holiday destination, experiences droughts, and wildfires.[531] Rising temperatures, heatwaves, and flash floods throughout the country force the government to take action on new climate policies. Thus, the Black Sea region, as potential new revenue for becoming the next summer destination in the future, displays the shift of the economic investments from the south to the northern coasts and highlands. This may lead to the infilling projects on the coast for creating space for hotel construction. While the coast will be more exposed to the development projects, the inland landscape will transform with changing vegetation.

There is a slight trend from a continental climate toward the Mediterranean climate. Monthly maximum temperatures demonstrated that July 2016 had the highest temperature of the past 38 years with 36.1°C. This may result in the adoption of diverse crops, with increasing solar radiation in the future. Despite the lands in the Black Sea region being fertile, the lack of sunshine and solar gain disrupted the growth of fruits and vegetables in the area. Pasture tourism may slightly be affected by these increasing temperatures, thus the migration of transhumance, which takes place between mid-April and the end of October,[532] may slightly shift due to the melting of the snow cover on the highlands.

531 Emre Çolak and Filiz Sunar, "Evaluation of Forest Fire Risk in the Mediterranean Turkish Forests: A Case Study of Menderes Region, Izmir," *International Journal of Disaster Risk Reduction* 45 (2020).

532 Harun Tunçel et al., "Transhumance on the Eastern Black Sea Mountains in Turkey / Doğu Karadeniz Dağlarında Yaylacılık," 14 (2003).

The rise in maximum and minimum temperature annually (Figure 7.1 and Figure 7.2), though at the city scale, seems to affect agricultural activities negatively in Fındıklı. In the Çağlayan village, S.Ş., a homeowner, revealed that the maturation time of the oranges has decreased and that this year's oranges fell off the trees prematurely due to the changes in temperature. The positive trend line of annual maximum temperature (Figure 7.1) verifies the increase in temperature of 0.66°C per decade. In addition, the annual average temperature seems to rise 16°C over the years (Figure 7.3).

Extreme precipitations are recorded in October, while March is the least humid month of the year. The humidity in the hinterland of Rize is greater than on the coast of Rize due to its high altitude. The humidity in the region, particularly in the east, is above average, which induced the richness of the fauna in the region. Essentially, large bodies of water, such as the main river of Çağlayan and the Black Sea, have a greater effect on the humidity ratio of the district. The trend line of the annual precipitations indicates a rise of 0.098 % of the humidity per year (Figure 7.4).

Precipitation has not changed significantly in Türkiye except in the northeastern part, where rain and snow indicate a consistent increase by reaching 850 mm along the coastline on an annual basis (Figure 7.5). Most of the snowfalls are observed in February and March.[533] The number of snowfalls is expected to decline, as a result of global warming. Figure 7.4 shows the fluctuating trend of annual relative humidty for the period 1980-2018 with the lowest value of 69% in 1982 and the highest value of 82% in 2018. Seasonally, in October, the relative humidity has the highest value of 88.7% while in August the maximum precipitation value is 86.6% for the period 1980 to 2018. Concerning the annual relative humidity analysis, the year 2018 has the highest annual relative humidity values in February, May, and December from 1980 to 2018. The linear trend line with an increase in humidity level confirms the climate projections regarding the rise in precipitation in the region. These changes will cause the decay of the construction materials of timber and stone. The hillside of the province of Rize experiences more rainfalls than the other provinces in the region. In the highlight of the rainfall regime in the hinterland, the floods intensify along with the coastal areas accompanied by catastrophic events, such as the collapse of a bridge.

533 T.C. Kalkınma Bakanlığı Doğu Karadeniz Projesi Bölge Kalkınma İdaresi Başkanlığı, "Rize İl Raporu."

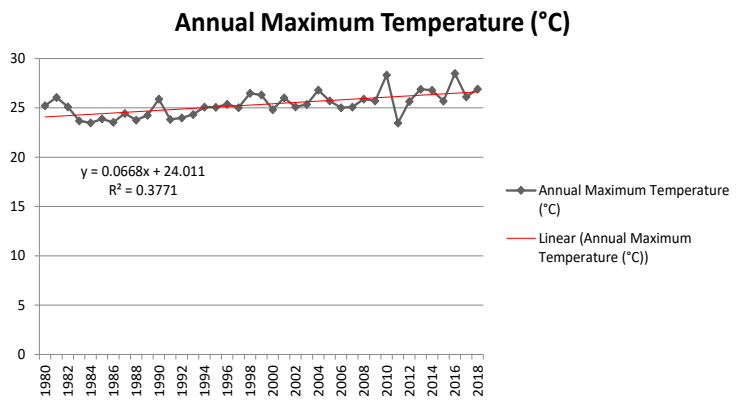

FIG. 7.1 Annual maximum temperature (°C) of the city of Rize between 1980 and 2018, station number 17040, the city centre latitude 41.0400 longitudes 40.5013 altitude 3 meters. Source: author, based on the monthly data was obtained from the 11th Regional Directorate of Meteorology in the province of Trabzon.

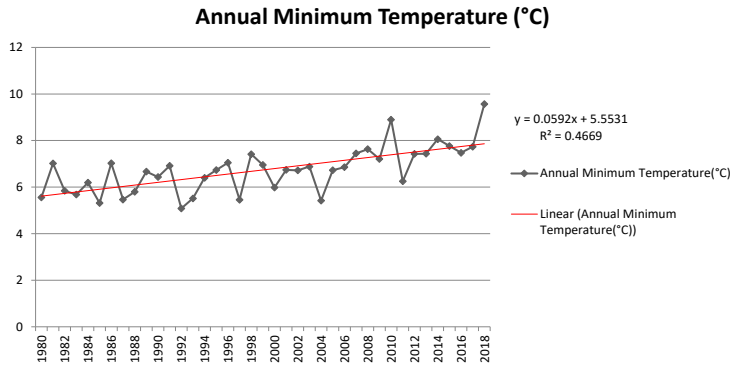

FIG. 7.2 Annual minimum temperature (°C) of the city of Rize between 1980 and 2018, station number 17040, the city centre latitude 41.0400 longitudes 40.5013 altitude 3 meters. Source: author, based on the monthly data was obtained from the 11th Regional Directorate of Meteorology in the province of Trabzon.

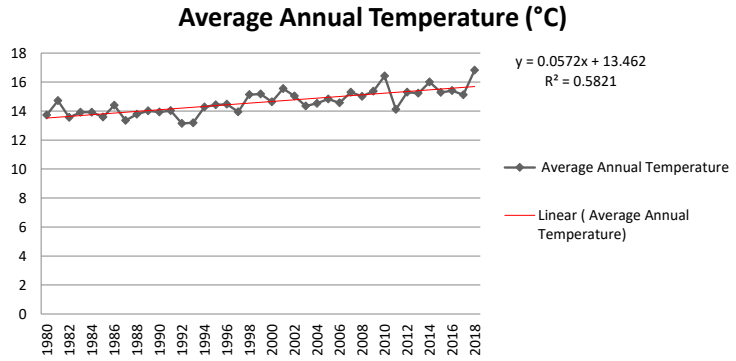

FIG. 7.3 Average annual temperature (°C) of the city of Rize between 1980 and 2018, station number 17040, the city centre latitude 41.0400 longitudes 40.5013 altitudes 3 meters. Source: author, based on the monthly data was obtained from the 11th Regional Directorate of Meteorology in the province of Trabzon.

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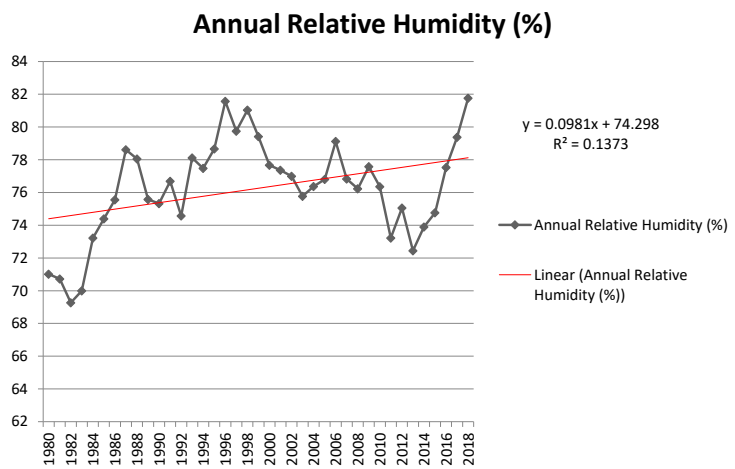

FIG. 7.4 Annual relative humidity (%) of the city of Rize between 1980 and 2018, station number 17040, the city centre latitude 41.0400 longitudes 40.5013 altitude 3 meters. Source: author, based on the monthly data was obtained from the 11th Regional Directorate of Meteorology in the province of Trabzon.

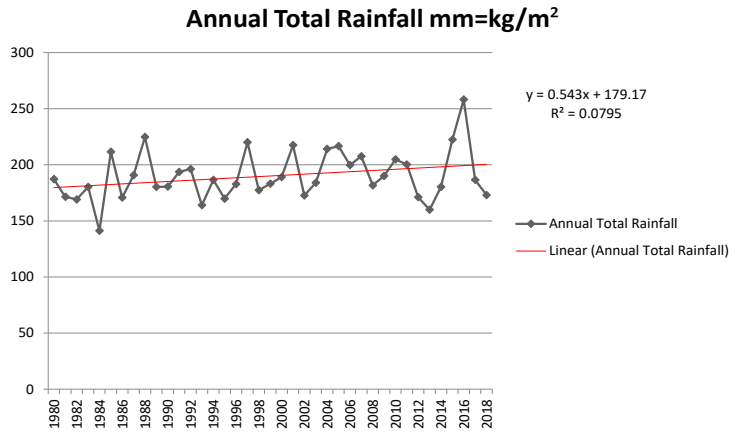

FIG. 7.5 Annual total rainfall (mm=kg/m^2) of the city of Rize between 1980 and 2018, station number 17040, the city centre latitude 41.0400 longitudes 40.5013 altitude 3 meters. Source: author, based on the monthly data was obtained from the 11th Regional Directorate of Meteorology in the province of Trabzon.

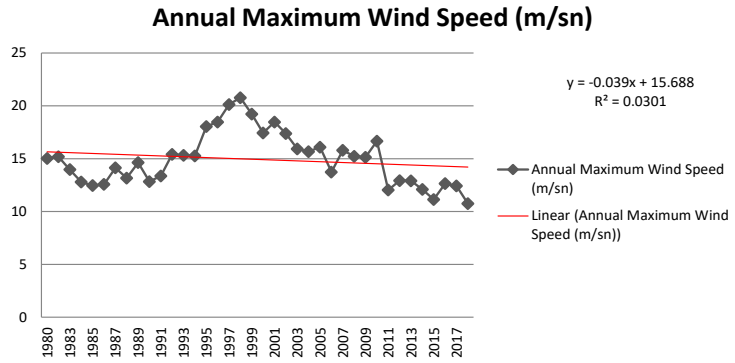

FIG. 7.6 Annual maximum wind speed (m/sn) of the city of Rize between 1980 and 2018, station number 17040 the city centre latitude 41.0400 longitudes 40.5013 altitude 3 meters. Source: author, based on the monthly data was obtained from the 11th Regional Directorate of Meteorology in the province of Trabzon.

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Over the past 38 years, the wind directions have mostly been south, west and north. The northwest direction usually goes with a strong wind, especially in the winter, while the west wind brings the most humidity and therefore extreme rainfalls. The northern east wind, also known as "bora," is mainly felt in June, August, and October. According to the chart, the east wind was only prevalent in July for five years in a row 1997, 2002, 2007 and in January 2013. The construction of settlements on steep terrains in the region diminishes the effects of strong winds. Once in two or three years in Rize, a type of dry, warm and downslope wind which is also known as föhn, becomes prevalent,[534] particularly, in the hinterland, where winds from the north and east directions.[535] The extreme rainfalls in coastal areas and highlands indicate that there is no dry season. The stone facades of the structures are facing towards the northwest to resist the destructive effects of these most prevalent winds.

Rise in temperature, humidity, and rainfall, while wind power is decreasing (Figure 7.6), which contrasts with the indications globally. This may be due to the change in the location of the station. This goes against the original purpose of the design of these buildings, as the wind power was higher in the past. The air circulation to keep the house cool in summer will not work as much, especially with rising temperatures and humidity. The construction material of wood and the structural integrity will also decay faster with hotter and more humid weather.

7.2.1 Flooding

Flooding happens mostly in March, April, and May due to the melting of the snow on top of the hills and mountains. The historic building owners do not stay in their houses and escape to the western cities when the floods occur, according to the statement of F.H. Being aware of it, the local residents, even with all the knowledge around their construction, are still concerned about their safety during the times of flooding. This is alarming for the people living in new urban areas nearby the rivers. Six interviewees mention the accounts of damages induced by flooding.

The loss of lives, infrastructure, and settlements has still not yet mobilized the government to take any action against the disasters. Flooding seems to be a great threat in the city centre, whereas the loss and damages to the hinterland are not recorded adequately. Regarding the loss of lives and settlements, Ş.S. explained

534 Ibid.

535 Ibid.

that severe flooding twenty years ago destroyed a house in the village nearby and a mother with two kids was swept away.[536] An 11-year old boy who was dragged away in the 2018 flooding still cannot be found. Recognizing the extent of the hazard in the hinterland, Ş.Ö. stated:

"There was a flooding 50 years or 45 years ago but the most serious one was in 2016... The damage in the Beydere village was more severe. A child was drowned. few storage houses that went as such, some houses in Aslandere and Beydere villages were damaged by floods... The upper villages [referring to the villages at higher altitudes and distant from the district centre] were affected more severely."[537]

Based on this statement, highlands such as Beydere seem to be affected more than lowlands such as Çağlayan village. Another factor is that Beydere village has fewer untouched traditional buildings than other villages. Therefore, the new buildings in this village may be damaged more severely. Aside from the mansions, the storage houses which are lighter in material drifted away in floods and were destroyed by the landslides. According to the statements of Y.G. and Ş.S., the floods caused the collapse of the biggest storage house in the village, one of the few in the region that had a double door.[538] The loss of storage buildings, as explained by M.A.:

"There was a beautiful old storage house on the side. It [referring to the flooding] damaged the storage house too...They came to us while they [referring to the owner of the storage house] escaped from the disaster, they sheltered here, I was here."[539]

Though expected, the areas at risk of flooding grew. According to B.U., the Çağlayan river was similarly flooded and the road to the village was closed in 2016.[540] During the first field survey, local people repeatedly mentioned that Beydere village was a flood and landslide zone but the observations on the second site trip revealed that even though the Çağlayan village had a relatively low risk, it now carries a higher risk of the river flooding. River flooding usually triggers landslides in the area. As Çağlayan village is a lowland, there are very few landslide risks in the village

536 Ş.S., interview by Gül Aktürk, Fındıklı, January 14, 2019.

537 Ş.Ö., interview by Gül Aktürk, Çağlayan Village, July 6, 2019.

538 Y.G., interview by Gül Aktürk, Çağlayan Village, July 5, 2019; Ş.S., interview by Gül Aktürk, Fındıklı, January 14, 2019.

539 M.A., interview by Gül Aktürk, Çağlayan Village, January 12, 2019.

540 B.U., interview by Gül Aktürk, Çağlayan Village, January 10, 2019.

compared to the hilly areas. Today, there is a concrete flood defence, which was constructed by the Hydraulic Works along the river of Çağlayan in 2019, although the area was relatively safer in comparison to the other villages. This reveals that the relatively low-risk area now carries a higher risk of hazards, as agreed by H.Ş.:

"The land facing the rear façade eroded twice. We were affected by it. It eroded two years ago, and the rear façade degraded twice. North facade. There are a lot of landslides happening here and this is why this area of Çağlayan village is announced as a landslide zone... A very big storage house has gone down below."[541]

Even the largest-scale structures could be damaged depending on the scale of the events. But in the light of these events, Çağlayan and Aslandere villages, which consist of the majority of cultural and natural heritage sites, are now situated in flood zones. The disaster database of the DSI and AFAD does not extend to the hinterland in locating the sites under the threat. Oral testimonies of interviewees though gave information on the existence of the disaster-prone vernacular buildings that were not precise enough to exactly locate them. To complete this missing data, these areas that were mentioned by the interviewees were then mapped with the help of the data on their locations (as explained in Chapter 5). In line with earlier findings (in Chapter 5), the analysis of the interviews and observations complemented the map by presenting Çağlayan village as one of the flood-prone areas, in addition to Beydere village. Associated with the risk of flooding, landslides also threaten the sites, but mostly in hilly terrains.

7.2.2 Landslides

Beydere village is, in a more elevated topography, concurrently named in the interviews of local people as the most affected area by floods and landslides. It is referred to as a disaster region due to the frequency of these events. There are very few original remnants of the historic buildings in this village, while the remaining ones are extensively modified (Figure 7.7). Seven interviewees emphasized the damage to the vernacular buildings caused by landslides. In addition to the Beydere village, which was previously mentioned as a risky area (Figure 7.7), Karaali village was also reported by C.K. as a landslide zone where historic buildings were damaged.[542]

541 H.Ş., interview by Gül Aktürk, Çağlayan Village, July 30, 2019.

542 C.K., interview by Gül Aktürk, Hara Village, July 3, 2019.

FIG. 7.7 The hazard area of Beydere village, where an entire cliff collapsed, with mostly new settlements. Source: author.

Public places such as the school in the village of Çağlayan according to B.U. were eroded by the landslide in 2018 and as a result, the land was detached.[543] Although in some instances, a landslide is associated with the deforested field that is dedicated now to tea fields, it was not the case in the site owned by Ş.Ö.:

"The land there was eroded. It shook the storage house but did not demolish it. But this time, it destroyed the trees... There was a landslide at the back of my house, even though it is not dedicated to a tea field..."[544]

Local people cleared forestry areas to dedicate the areas to tea fields. The roots of the tea crops could not hold the soil anymore. This is why, in mentioning these disasters, local residents link these events to the land use and land cover.

543 B.U., interview by Gül Aktürk, Çağlayan Village, January 10, 2019.

544 Ş.Ö., interview by Gül Aktürk, Çağlayan Village, July 6, 2019.

But even though land use changes are visible in the lowlands in Çağlayan village, the occurrence of landslides is less compared to the sloppy areas.

Even though most of the houses survived disasters, the rear facades of some of the buildings were damaged due to the landslides. Particularly, in the case of the house of Ş.Ö., the main entrance of it faces the rear façade. He reacted that:

"Could not these [referring to the design decisions of where to settle, build a house, and which materials and techniques to use] be thought of when these structures were built? The storage house is 250-200 years old. Why did they build it here? If I knew, I would dismantle it and rebuild it in another place... I sometimes think whether I should change the position of the main door this way?"[545]

Most of the buildings are not orientated to face the slopes where landslides pose a threat; however, the house of Ş.Ö. is an exception. This building was rebuilt with the remaining materials of a historic building that was destroyed by bombs during the Russian invasion of the region in 1916. Another time, it was destroyed by a fire, which was started by thieves. Afterward, the successive generations lost the original building knowledge and experiences of this house built 250 years before. When it was rebuilt again by the successive generation, the reconstructed building has aspects of modern Turkish architecture. During its reconstruction in this period, the entrance of the building is constructed facing the hilly site, which is now facing landslides. The differences in generational construction practices present future threats to local construction knowledge and experience with the local environment. This highlighted that the maladaptation examples by local people even date back to before the 1950s.

Among other changes, local residents observed that there are human interventions to the landscape which may have contributed to the changing climate. One major impact is the deforestation of forest conversion to tea plantations, one of the favoured crops in the region (see Chapter 5.4.). Forested areas with abundant trees prevent the risk of landslides and rock falls. Rockfall is only referred to once by T.H. as one of the disasters.[546] His house is facing a slope of 70 degrees perpendicular to the rear façade, this façade was specifically built with stone to prevent the damage of a rock fall rather than a landslide (Figure 7.8).

545 Ibid.

546 T.H., interview by Gül Aktürk, Gürsu Village, July 2, 2019

FIG. 7.8 T.H. house is vulnerable to rock falls, which is why the rear façade was built with stone with no openings. Source: author.

Today, the rear façades of the village houses are surrounded by retaining walls. In the past, there was no need to construct a retaining wall behind these houses as the walking pathway behind the buildings did not exceed 1 and a half meters. Therefore, the rear façade of the building was constructed to lean to the slope. Together with the opening of the roads to vehicles between the houses and the slopes, villagers also cleared the slopes either for tea plantation, through deforestation, or for the parking of personal vehicles. This led to an increase in landslide risks around the houses. On the other hand, some of the local inhabitants experienced landslides in areas where there was no deforestation or tea plantation. To give an example, M.A. shows the direction of the landslide that happened in 2019 and explained the cause of it:

"It is not because it rained a lot here. Here, there was a natural water discharge that drained the water there. The excessive water maybe came from the sea as a hose… So the rainwater damages something along the way. But in this case, there was no place to accumulate water."[547]

547 M.A., interview by Gül Aktürk, Çağlayan Village, January 12, 2019.

In the case of these hazards, the Disaster and Emergency Management Presidency (AFAD) helps communities to recover from them, as H.Ş. stated.[548] They document and report the damage to the buildings after these events. If the retaining wall is already built by the house owners before the hazards, they do not receive reimbursement from the institution for its construction. The incentive is only for the preservation of the historic building if it is damaged by the landslide. This institution helps local residents in the post-recovery.

The retaining walls are not only a later intervention, as there are prior examples of the construction of these structures. For instance, the retaining wall behind the building of T.H. was initially constructed for the prevention of rockfall risks (Figure 7.8), whereas behind the building of Ş.Ö. is a later intervention. These walls have become an integral part of the vernacular landscapes in today's conditions. However, there is no attempt to reforest these deforested areas for disaster risk prevention. By constructing the retaining walls high enough, local people consider that they can prevent the damage of landslide risk in the future.

Another implication of these findings from the statements on landslides, Karaali village in Arili valley was found to be one of the landslide-prone areas, although it did not appear in the spatial analysis as a site at risk (see Chapter 5.7.). That said, community awareness of highly vulnerable places could inform government decision-makers to take anticipatory actions in disaster risk preparation and management.

7.2.3 Rainfalls

Three interviewees mentioned the severity of the rainfalls and the consequences of these events on their environment. The dampness and changes in temperature cause crop failures. As a part of this integrated historic environment, Y.G. noted that pears do not grow anymore,[549] similarly, H.Ş. mentioned that cherries used to grow in the past but now only very few of them are growing.[550] Although some of the local people emphasized the effects of chemical fertilizers and the construction of dams as external factors, they could not deny the effects of changing climate. Concerning the crop failure, S.Ş. marked an increase:

548 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

549 Y.G., interview by Gül Aktürk, Çağlayan Village, July 5, 2019.

550 H.Ş., interview by Gül Aktürk, Çağlayan Village, June 30, 2019.

"Now even the crops are not growing. The environment is decaying. We do organic farming with pigeon manure, but the weather pattern has changed. For example, orange drops timelessly, but it should not fall from its tree so early. It has just matured. We produced the orange in 2017 but it is not ripening this year...But now the fruits do not mature enough and fall from the trees earlier."[551]

The local people who were born and raised in the area are well-aware of the local climate. However, the disruptive incidents in the area recently proved that climate change is showing its impacts more seriously. Reflecting the disruption brought by the rainfalls in their lives, Ş.Ö. remembered:

"We took the car and waited inside the car in the school garden. Rain falls, and then the rain level goes up to 25 cm as if a movie is directed. It is lightning up and blinding white snow, trees are shaking, the wind is blowing, and raining. It was raining in the past too, but I have not seen anything like that. Now that we experienced it, we are afraid."[552]

The roof eaves of most of the vernacular buildings originally extend to 150 cm to protect the façade from the rainwaters in the past such as in the case of Çağlayan village. But the roof eaves, in some cases, failed to protect the façade from intensifying effects of rainfalls. For instance, the house of C.K. located in Hara village with less than 100 cm eave was hit by rainwater, which led to the decay of the facades of the upper floor. The house of C.K. located in Hara village degraded faster because the roof eaves were not large enough to protect the façade from the rainwaters anymore.

As the area has always received extreme rainfalls, the effects of rainfalls are as apparent as the disasters of flooding and landslides. The local residents emphasized the damage of extreme rainfalls on the historic houses that are abandoned. If the homeowner neglected the historic building, a drop of water could destroy it according to C.K. Even though some of these historic buildings were renovated, they decayed again. He further explains:

"Both this part of the façade and wooden windows are decayed... Çakatura type of construction technique could not survive."[553]

551 S.Ş., interview by Gül Aktürk, Çağlayan Village, January 11, 2019.

552 Ş.Ö., interview by Gül Aktürk, Çağlayan Village, July 6, 2019.

553 C.K., interview by Gül Aktürk, Hara Village, July 3, 2019.

The reason why Çakatura type of construction is disappearing is that it is not climate-resilient. Thus, local people stopped using this technique in the construction of their buildings. But the later generations who plastered the facades of their buildings in the 1950s admitted the damage of the rainfalls today. Local residents, who recognized that this technique failed, removed the plaster and stopped applying it in the renovation of their buildings. The old ways of building that relied heavily on cutting trees for the use of construction and furnishing may have been found to be unsustainable in today's context. But it is also regenerative as the cut tree can grow, whereas modern materials used in the construction of buildings are not reusable and are often put into landfills.

7.3 Future Threats to Building Climate Resilience

The climate stories of individuals highlight the severity of the issue in the context of vernacular landscapes which climate policies underscore. As mentioned earlier (see Chapter 1), the Minister of Environment, Urbanization, and Climate Change (formerly the institution known as the Minister of Environment and Urban Planning) in Türkiye, Murat Kurum announced the Regional Climate Action Plan for the Black Sea region on 12 July 2019.[554] He explained the active role of NGOs and the universities in mitigating the climate change effects. The 15 actions to be taken that concern the city of Rize *inter alia* include several practices in the building sector. The most relevant to cultural heritage is that the 13th article encourages the use of local materials in construction for climate resiliency.[555] One important implication of such a decision in the use of local materials and techniques is the legal exemption from any type of fees or taxes in the construction of houses.[556]

554 Türkiye Cumhuriyeti Çevre ve Şehircilik Bakanlığı, "Karadeniz Bolgesi İklim Degisikligi Eylem Plani."

555 Ibid.

556 Ibid.

The eaves of the historic buildings extend between 80 cm to 180 cm, keeping the facade secure from the precipitation and rainfalls. The local roofing tiles, known as Ottoman tiles, make a resilient roof covering. Y.Y. notifies that the native tiles are more water-resistant and durable than modern replacements.[557] Sheet, corrugated roofing aluminium sheets known as *Onduline*, and European tiles are not allowed by KUDEB in the restoration of the listed historic buildings. The native tiles were made slightly wider so that they can cover the roof more efficiently than any other type of tiles. Thus, the major difficulty is to renovate the roofs of the village houses as it costs more money.

The main government stakeholder of disaster management, AFAD, focuses only on post-recovery, whereas pre-disaster management falls on the shoulders of the local communities. The governmental reports of institutions such as Hydraulic Works referred to the issues of flooding as a result of man-made activities, whereas local people point out more insight into climate change. Engaging with local issues such as mismanagement and maladaptation of or around vernacular heritage under climate change can teach us a lot about tackling climate change in a broader sense. The floods caused by maladaptation practices are not only damaging the vernacular buildings but also the newly built and dense areas along the rivers.

The spatial planning decisions on the narrowing down the rivers with concrete walls to allow the construction of new houses along the river exposed the vernacular heritage to the effects of climate change. This increased the vulnerabilities of the vernacular houses along the river by changing the location of flood-prone areas. Thus, the threats to vernacular heritage should also be considered as a threat to new constrictions, especially at a time when disasters increase in scale and number. Furthermore, it led to the destruction of many newly built houses and infrastructures on both sides of the river where the river modification was major.

557 Y.Y., interview by Gül Aktürk, Çağlayan Village, January 11, 2019.

7.4 Conclusion: How Narratives of Local People Can Build Climate Resilience of Vernacular Heritage Sites

Taken together the narratives of local people on the impacts of climate change, government reports, and meteorological indicators represent a conjunction of local knowledge with the spatial analysis of the sites at risk. These narratives highlight more sites under threat and issues in the disaster risk management of vernacular settlements, considering their surroundings. The method used to complement spatial mapping with narratives is applicable and transferable to other geographical locations facing similar issues, such as flooding and landslides. While climate-induced disasters can extend to regional, national, and global borders, disasters remain local issues, affecting inhabitants and houses around regions sensitive to these effects.[558] Localized impacts of climate change may differ in various other geographical locations; however, there are similar patterns, challenges, and concerns over the local implications of the impacts of climate change. Thus, it is important to understand the impacts on heritage assets and knowledge at the local scale and how people were and are responding to disasters.

It becomes clear that the decision-making processes need to include spatial planning decisions and local practices. The knowledge network of cultural heritage and its interdependencies rely on the engagement and inclusion of users, artisans, local administrators, and other beneficiaries. Investigation of such indigenous practices of underrepresented communities will allow access to specific climate knowledge and adaptation practices. The value of this knowledge should not be undermined in the creation of climate change policies and planning, as they mention incentives for the use of local construction materials and techniques. Though the regional climate action plan advocates it, it does not work in practice because the regulations protecting forests and rivers limit the use of local materials. Poorly informed top-level decision-makers cannot respond to the needs of the local communities, which leads to mismatches between the spatial planning decisions and local practices. If not lack of information on the challenges of local communities, too slow and vague regulatory processes are yet another obstacle in the way of preparing for the disasters in the future.

558 Jigyasu, “Managing Cultural Heritage in the Face of Climate Change.”

The documentation of vernacular heritage should not focus only on capturing the authentic state of the cultural asset but also on the later interventions which are essential in understanding the maladaptation or best practices of climate adaptation. Cultural heritage is not fixed; thus, heritage professionals should embrace the constant changes. The proactive approaches of heritage professionals should deviate toward reactive practices such as reforestation, proper modifications, and interventions in the vernacular buildings considering the climate comfort. In present circumstances, the changes in local climate and environmental conditions should be analysed in the maintenance, preservation, and adaptation of the vernacular heritage sites. The increase in the rainfalls requires the additional treatment of the rainwater for its reuse.

These catastrophes highlight that the government helped the recovery of the community with very little financial support. The official authorities at all levels (national, regional, and local) such as AFAD rarely mention the loss of cultural heritage in their database of the disasters. This is because the database focuses on the buildings and not necessarily on cultural and natural heritage. At this point, the integration of the database of Trabzon cultural and natural heritage preservation board in disaster planning is a “must” to understand the vulnerabilities of these buildings.

In the emergence of the disasters in the past and present, post-disaster recovery measures become inefficient as there is a lack of anticipation and consideration of the management of disaster risks in the area. The current political effort in joining the global fight against climate change builds on the past failures in addressing the disasters and recovery. Without the incorporation of the views, experiences, insights and perceptions of local communities, the attempts of tackling climate change and managing disasters remain only at the top level. The years of struggling with the disasters in the area reveal the short-sighted decisions at the national, regional, and local levels.

8 General Conclusion

Integrated Climate Disaster Risk Management of Vernacular Heritage Sites

This research aims to reveal the influences of spatial planning decisions and local practices on the climate and disaster risk management and preservation of vernacular heritage sites. The objective is to present the conflicts between these decisions and practices, which negatively affect the preservation of vernacular heritage sites in times of climate change. The interdisciplinary approach between history, heritage, urban planning, and environmental studies is used, while the adoption of mixed methods allowed for handling the preservation issues of vernacular heritage sites on different scales.

There are several findings yielded from this research due to various methodologies and approaches used at different scales. The historical approach taken in the analysis proved the planning practices embedded into the construction of vernacular landscapes once proved to be climate-resilient (see Chapter 4). However, the spatial planning decisions were not used by the national government for reducing climate and disaster risks (see Chapter 5), which in return, brought many challenges to the preservation of vernacular heritage sites. Therefore, the spatial planning decisions do not take awareness of the past into account for building climate resilience. In addition, local people are faced with numerous challenges in preserving their sites (see Chapter 6) even less managing their sites against risks faced with climate change today (see Chapter 7). This emphasized the need for scaling down the issues of changing climate in the context of the preservation of vernacular heritage by including the statements of local communities in identifying the challenges of preservation of heritage sites at the local level (see Chapters 6 and 7) in addition to spatial analysis (see Chapter 5).

Spatial analysis revealed that only three sites were at risk (Chapter 5), whereas interviews demonstrated that more sites were declared as disaster-prone areas (such as the village of Karaali) than in the disaster risk database of AFAD as mentioned in Chapter 7. The comparison of these results both derived from spatial analysis and interviews suggests the need for incorporation of narratives into spatial mapping to understand how spatial decisions and local actions interact in the understanding of the disaster risks on vernacular heritage sites.

Drawing on the qualitative and quantitative data together is important and crucial. Spatial analysis helps scaling down the issue in a particular area where the analaysis of lived experiences of local communities, policy, and local information systems present fine-grain materials. Heritage preservation stakeholders in this selected case have taken the "one policy fits all" approach. This traditional view of heritage preservation only focuses on the physical protection of the building against external threats such as climate change, according to the official preservation policy in Rize. This top-down approach is inherently conservative and inflexible, which in practice, fail to respond to the complex challenges that end-users face currently. Thus, bottom-up approach coming together with spatial analysis benefits to this type of work.

The ongoing challenges of preservation of these sites since the industrialization period such as abandonment and loss of traditional knowledge systems make it difficult for local communities to adapt their buildings to shifting climatic conditions. Although these structures no longer represent the full extent of rural lifestyles local people once had at the time of their construction, local people try to do design interventions with respect to the reminiscences of their inheritance. However, it is not in the capacity of the local communities to invest largely in upgrading these buildings, unless the local and regional public institutions and NGOs help local communities in funding the renovation of their buildings (see Chapter 6). New practices in the renovation of these buildings should consider energy challenges. The renovation of these buildings can include the implementation of solar panels by respecting the vernacular construction techniques and materials. Preserving vernacular buildings and landscapes now needs to go along with the new renewable energy tools and infrastructure. But competing interests in climate adaptation and a lack of funding to settle between the various stakeholders are preventing decisions regarding the adaptation of vernacular buildings.

As such, the analysis of the interviews also highlighted that a number of vernacular heritage buildings were already lost or damaged, including storage houses. One significant implication of the analysis of the interviews and observations on the case study area is that the most common damages on the vernacular heritage sites are

the deterioration of the rear façade and material loss. One of the three sites at risk from the spatial analysis was in fact matching with one of the interview statements on Sevket Atac house. Indeed, this site appears as a landslide-prone area according to the analysis of ArcGIS mapping and the statements regarding the rear façade loss. As for the other two sites were found to be at risk as a result of ArcGIS mapping did not appear in the statements of the local people. This may be due to the fact that the interviewees have no information on the possible damage to these two buildings.

An intriguing finding from the analysis of interviews and spatial mapping is that both spatial and local level decisions and practices overlapped in terms of the underlying cause of these destructions such as the land use changes with deforestation of forests for tea crops. However, these decisions at the spatial scale and practices at the local level also contradicted at times, especially regarding the greater scale spatial decisions such as hydroelectric power plants which are planned against the protests of the local communities. Although spatial decisions brought disasters at a greater scale, the maintenance practices of local communities played a role in the deterioration at the building scale. The extent of the damage caused by spatial planning decisions overweight the local practices.

Another element of the scale discussion is the need of downscaling, which appreciates the authenticity and value of "bottom-up" work and different knowledge systems around it. The specifities of local area by recognising site specific skills and processes as reflected by community relations enable resiliency more than central planning decisions in the cities based on aggregated quantitative data such as annual rainfall data. Analysing factors such as communical relations, hospitality, privacy, and food cultures (see Chapter 4) implies the need for shift our approach away from major interventions towards local, cheaper, and more robust solutions.

In addition to scale, there is timescales dimension to the study which refer to the diurnal experiences (e.g. the location of doorways for the benefit early morning work), seasonality, the intergenerational changes, as well as changes occurring over a number of years, or a lifetime. These changes reveal how lived experiences that have been witnessed over the last century, and longer were able to tap into genealogical knowledge. In other words, people living in the area now were able to make decisions based upon the experiences and sometimes direct narratives from their grand- or greatgrandparents. Oral history allows a better understanding the processual nature of heritage and its preservation.

The online database from Istanbul metropolitan municipality yields results from the disasters that happened in the city of Rize.[559] According to it, Meyvali village in Fındıklı was flooded and 2 buildings were damaged on 2nd October in 2020 and similarly, on 27th July in 2021 the Arili river in Meyvali village was again over flooded. However, this disaster risk database or the one from AFAD does not provide enough information on the precise locations of these buildings, if these are heritage sites, and if there is a common pattern on where the events take place. The missing information on if in their surroundings there is any exposure due to land use change or development projects that can exacerbate the disasters. A fundamental gap is that "there is no department that is in charge of the protection and evacuation of cultural heritage sites in the event of a disaster," as Hatice Ayatac also suggests in her article on "Accessibility in disaster-resilient cities."[560] Knowledge transfer is needed not only between the institutions but also among local communities and people to increase the awareness of the disaster risk management of vernacular heritage sites.

Often, the documentation of vernacular heritage sites is used as a basis of a layout to be used in the disaster risk database to extract information on site location, history, images, and surveys. However, the missing or conflicting data provided by the Ministry of Culture and Tourism, KUDEB in Trabzon, and DOKAP as an NGO does not give the full extent of the vulnerable sites. Similarly, data provided from DSI as a water work institute on river flooding does not reveal the over flooded areas in the hinterland, therefore it does not consider the disaster risks in the hinterland, where most of the vernacular heritage sites are located. In addition, the data and database from AFAD do not comply with DSI in terms of detection of flooding and landslides events. Therefore, a shared database between AFAD, the Ministry of Environment, Urban Planning, and Climate Change, and the Ministry of Culture and Tourism is needed to have up-to-date information on disaster risk prone areas for heritage sites that can better serve as information for end users.

The missing data and information is also driven by the fact that the decisions at spatial scales are not inclusive of local communities' experiences, insights, and notions. The transparency is required between these stakeholders through a multi-actor collaboration in the management of climate and disaster risk management of vernacular heritage sites. Learning from the past climate practices (Chapter 4), which gives great detail on how the societies shelter in a harsh environments, can guide local communities and authorities in terms of planning for reducing risks.

559 Istanbul Buyuksehir Belediyesi, "Akomas," https://akom.ibb.istanbul/Akomas/Akom_Sorgu.aspx?sp=1&au=1&as=53&ai=-1&at=-1&t1=01.09.2018&t2=20.04.2022.

560 Hatice Ayataç, "Accessibility in Disaster-Resilient Cities," *Journal of Design for Resilience in Architecture and Planning* 2 (2021).

Notably, local level practices should be integrated into spatial decisions via developing strategies. For instance, local knowledge of the suitable construction sites, the most vulnerable construction technique, and the prominent wind direction that can bring damage caused by rainfalls should be taken into an account in the spatial planning of the city by local and regional actors.

There is a paradox between spatial decisions and local actions in terms of planning for climate change adaptation and resilience. The decisions for development of surrounding vernacular landscapes do not comply with regional climate action plans. Furthermore, the local communities bear the consequences of the extreme events with exceptions to financial help for disaster recovery by the government, including building a wall behind the bildings to prevent landslides. Local actions regarding the intervention to vernacular landscapes such as land use changes are found to be complementing with spatial decisions. However, the insights of local communities also revealed their intentions to build climate resilience of their buildings. In this sense, both spatial decisions and local actions contributed to the degradation of vernacular landscapes. But the strategies for integrated climate disaster risk management of vernacular heritage sites should be coordinated along with other sectors at top levels, where heritage stakeholders are included in decision making processes.

Governmental institutions such as Hydraulic Works reveal the issues related to man-made activities, whereas local people point out more insight into climate change. Engaging with local issues such as mismanagement and maladaptation of vernacular heritage under climate change can teach us a lot about tackling climate change in a broader sense. While some of the heritage will be irreversibly lost, others will be recovered as ruins, remnants, or as a whole with their surroundings. This will change the perceptions of decision-makers and people about their heritage, legacy, and intangible values. The climate-resilience of vernacular heritage will feed climate adaptation practices by revealing the strengths and failures of indigenous building decisions and traditions.

The findings reveal the need for more attention and dedication to vernacular heritage and traditional landscapes that are vulnerable to climate change. Using the local knowledge in building resilient constructions can reduce the effects of new exposures and disasters on the settlements. The non-expert dialogues through vernacular constructions based on local materials and climate-adaptive construction techniques can inspire architects and constructors about successful innovative solutions. Revisiting the forgotten knowledge of vernacular heritage, we can learn more about climate-resilience communities.

8.1 Reflection

The number and availability of the studies regarding this area are quite limited and mostly concentrated on history and vernacular buildings in some places, which are listed within regional registration but mostly abandoned. An analysis of vernacular buildings is challenging, as it is often undocumented. Moreover, archival sources in this area are very limited. In terms of meteorological data, data from the meteorological station in the district dates back five years ago. It is not enough to analyse the meteorological trends in the district. The meteorological data in the city of Rize covers a large period but is not a representation of the climate in the hinterland. At the time, the political discourse on the disasters in the region was not supporting the argument on impacts of climate change. The political discourse, however, shifted over time at the time of writing the dissertation. Another limitation of this study is the language and sometimes dialect barrier derived from the Lazuri language, which is still used in the district of Fındıklı in Rize. This barrier was overcome by asking local people the meaning of some words and phrases to communicate more effectively. Despite the travel limitations brought by COVID-19 pandemic, the engagement with stakeholders remained strong throughout the research. The long distance archival and field work contributed to this research with a series of approaches from several angles.

8.2 Recommendations for Future Research

This research started with an interest in the emerging field of climate change and cultural heritage studies, most specifically vernacular heritage sites. Vernacular heritage sites dating back to the pre-industrial period require re-evaluation in times of climate change crisis, as there are invaluable lessons that can be drawn from them. But this form of cultural heritage site is also under the threat of changing climate and as a result of its loss, future generations will deprive of this indigenous knowledge.

The advancement of the study further in the identification of the disasters and lessons for climate resiliency can help us to look into the climate adaptation issues in heritage preservation. Vernacular heritage is vulnerable as much as it is resilient to climate change, as this dissertation states throughout. Thus, the examination of

undetected damages on these sites on different scales, including landscape, city, and local can become a model for future planning of our cities through the analysis of archival sources, mapping, secondary sources, and narratives.

The issue of climate change has multiple facets that encompass the anthropic influences, while vernacular heritage also extends from building technologies and construction details to intangible values, customs, and landscape practices. Considering all the dimensions of the problem of climate change, this study only contributes to a small part of the matter by adopting mixed methods and an interdisciplinary approach. It is especially presented as a contribution to rapidly growing literature in climate change and heritage studies. Recognizing the deficiencies in conducting the research, including the remoteness of the case area, undocumented vernacular heritage, and lack of meteorological data, this research can be later used as a database for integrated climate disaster risk management for the vernacular heritage sites in the selected case area. Future studies can expand this database to a larger scale in the region to address future risks of floods and landslides. Oral statements of local people should be used in decision-making processes for participatory approaches in integrated climate disaster risk management of vernacular heritage sites.

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TOC

Interviews

A.S. Interview by Gül Aktürk, Beydere Village, 11 January 2019.
Anonymous. Interview by Gül Aktürk, Fındıklı, 11 January 2019.
———. Interview by Gül Aktürk, Fındıklı, 11 January 2019.
———. Interview by Gül Aktürk, Rize, 29 June 2019.
B.U. Interview by Gül Aktürk, Çağlayan Village, 10 January 2019.
C.K. Interview by Gül Aktürk, Hara Village, 3 July 2019.
F.H. Interview by Gül Aktürk, Çağlayan Village, 12 January 2019.
G.A. Interview by Gül Aktürk, Hara Village, 3 July 2019.
H.Ş. Interview by Gül Aktürk, Çağlayan Village, June 30, 2019.
M.A. Interview by Gül Aktürk, Çağlayan Village, 12 January 2019.
Ş.Ö. Interview by Gül Aktürk, Çağlayan Village, 6 July 2019.
S.Ş. Interview by Gül Aktürk, Çağlayan Village, 11 January 2019.
Ş.S. Interview by Gül Aktürk, Fındıklı, 14 January 2019.
S.T. Interview by Gül Aktürk, Gürsu Village, 2 July 2019.
T.H. Interview by Gül Aktürk, Gürsu Village, July 2, 2019.
Y.G. Interview by Gül Aktürk, Çağlayan Village, July 5 2019.
Y.Y. Interview by Gül Aktürk, Çağlayan Village, January 11, 2019.

Curriculum Vitæ

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Education

09/2018 – Present	**Ph.D. Candidate –** TU Delft, Faculty of Architecture, Chair of History of Architecture and Urban Planning
09/2012 – 09/2013	**MSc Architectural Conservation –** the University of Edinburgh, Edinburgh School of Architecture and Landscape Architecture, Edinburgh College of Art, Scottish Centre for Conservation Studies
09/2006 – 09/2011	**BArch Architecture –** Bahçeşehir University, Faculty of Architecture and Design GPA: 3.05-4.00 Graduated as an honours student

Research Experience

11/2022 – Present

Postdoc Research: I-Tree 2.0 NL, Workpackage 3, Faculty of Industrial Design, TU Delft

09/2018 – 01/2023

Tentative Dissertation Title: *Climate Change and the Resilience of Collective Memories: The Case Study of Fındıklı in Rize, Türkiye.* [Draft]
Research: The dissertation focuses on the management of vernacular-built heritage at the spatial and local scales under the changing climate. The analysis of archival sources, observations from the case study area, and unstructured interviews with various stakeholders including mansion owners, farmers, laypeople, and constructors give insights into the management of vernacular heritage under the threat of climate change at the local level. Through the analysis of the land-use changes with GIS mapping, the vernacular heritage sites that are located in the landslide- and flood-prone areas are detected. The findings of the dissertation reveal how the conflicts between these decisions and practices at spatial and local levels negatively affect the preservation of vernacular heritage sites in times of climate change.
Dissertation Advisors: Prof. Carola Hein, Associate Prof. Herman van Bergeijk

09/2012 – 09/2013

Master Thesis: The Conservation of Ottoman Era Neighbourhoods in Istanbul: A Case Study of Arnavutkoy, Besiktas, Funded by Türk Petrol Vakfı- Turkish Petroleum Foundation (TPV) Available in Edinburgh Research Archive https://discovered.ed.ac.uk/permalink/f/1njkql8/44UOE_DSPACE1842/8717
Research: This study aims to enlighten the characteristics of the Ottoman settlements in the Arnavutköy neighborhood and their evolution throughout time within the urban planning and how conservation is interpreted in Turkey and international charters. The urban formation and development in the area were comprehended with mapping analyses. The socio-economic, historical, and architectural characteristics of the neighborhood were used as a guide to determine which areas to be conserved

and how to designate urban sites and implement urban sustainability in the district.
Thesis Advisors: Dr. Ruxandra-Iulia Stoica, Prof. Miles Glendinning

Publications

- **Aktürk, G.** (2023). Impacts of Climate Change on Vernacular Landscapes and Cultural Heritage. In Preparation for Routledge Explorations in Environmental Studies.
- **Aktürk, G.** (2022). A Systematic Overview of the Barriers to Building Climate Adaptation of Cultural and Natural Heritage Sites in Polar Regions. *Environmental Policy & Practice*, 136. https://doi.org/10.1016/j.envsci.2022.05.016.
- **Aktürk, G**; Fluck H. Vernacular Heritage as a Response to Climate: Lessons for Future Climate Resilience from Rize, Turkey. Land. 2022; 11(2):276. https://doi.org/10.3390/land11020276
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- Yerli, D., **Aktürk, G.**, & Dolgun, E. (2022, Jan 10). A New Shipping Canal for Istanbul? Water, History, Economy and 'Crossroads'. https://www.portcityfutures.nl/news/a-new-shipping-canal-for-istanbul-water-history-economy-and-crossroads
- **Aktürk, G.**, & Dastgerdi, A. S. (2021). Cultural Landscapes under the Threat of Climate Change: A Systematic Study of Barriers to Resilience. *Sustainability*, *13*(17), [9974]. https://doi.org/10.3390/su13179974

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- **Aktürk, G.**, Lerski, M. Intangible cultural heritage: a benefit to climate-displaced and host communities. *J Environ Stud Sci* (2021). https://doi.org/10.1007/s13412-021-00697-y
- **Aktürk, G.**, & Hauser, S. J. (2021). Detection of Disaster-Prone Vernacular Heritage Sites at District Scale: The Case of Fındıklı in Rize, Turkey. *International Journal of Disaster Risk Reduction*, 58, [102238]. https://doi.org/10.1016/j.ijdrr.2021.102238
- **Aktürk, G.**, & Fatorić, S. (2021). Roundtable III: Climate Change Adaptation of Cultural Heritage. In U. Pottgiesser, S. Fatoric, C. Hein, E. de Maaker, & A. Pereira Roders (Eds.), *LDE Heritage Conference on Heritage and the Sustainable Development Goals: Proceedings* (pp. 521-523). TU Delft Open.
- **Aktürk, G.** (2020). Learning from the Climate Narratives of Cultural Heritage. https://www.globalheritage.nl/news/learning-from-the-climate-narratives-of-cultural-heritage
- **Aktürk, G.** (2020). Remembering Traditional Craftsmanship: Conserving a Heritage of Woodworking in Rize, Turkey, *International Journal of Intangible Heritage* vol 15.
- **Aktürk, G.** (2019). The Rural Landscape as Heritage in Turkey Under Changing Climate. Poster session presented at ICOMOS Advisory Committee Scientific Symposium , Marrakesh, Morocco. https://doi.org/10.7275/ak7n-z606

Professional Experience

08/2017 – 05/2018

Job Title: Architect/ Restoration Specialist
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Projects:

- The Project of Direklerarası Stores – Istanbul, Turkey
- The Project of Sehzade Mehmet Mosque Complex – Istanbul, Turkey

Client: Yüksel Proje, Ayazağa Mah. Mimar Sinan Sk. Seba Office Boulevard No: 21/B Giriş Kat Ofis No: 1 Sarıyer / İstanbul / Turkey
E-posta: yproje@yukselproje.com.tr
As project manager duties included:

- Building survey of **Şehzade** Mehmet Mosque
- Restitution and restoration projects
- Writing report of art history and restoration

06/2016 – 06/2017

Job Title: Architect/ Restoration Specialist
Company: Koç University, Çınar, Gürkan Sk. No:4, 34841 Maltepe/Istanbul, Turkey
+90 216 388 83 18 https://kyap.ku.edu.tr/?q=tr
Project: Küçükyalı ArkeoPark – Istanbul, Turkey
As an architect and restoration specialist duties included:

- Documentation
- Archiving drawings of the Cistern
- Using Total Station to identify locations of archaeological findings
- Public participation in the education of locals on the urban archaeological site
- Preparation and presentation of posters to bachelor students at Koc University

06/2015

Job Title: Architect/ Restoration Specialist
Company: Tures Mimarlık, TURES Turizm Planlama ve Restorasyon San. Ve Tic. Ltd. Sti
Yildiz Posta Cad. Vefa Bayiri Sok. Is Bankalilar Sit. A Blk. D.3 34349 Gayrettepe,
+90-212-2749079, info@tures.com.tr
Project: Tarlabasi Complex – Istanbul, Turkey
As an architect and restoration specialist duties included:

- AutoCAD drawings for building survey
- Writing a report
- Working with design team

12/2013 – 06/2015

Job Title: Architect/ Restoration Specialist
Company: Lera Architecture, Semsettin Gunaltay Street No:152/12 34736 Erenköy/ISTANBUL, 02163868443, info@leramimarlik.com
Projects: 4. Levent Mosaics (19 Mosaics)

- Panagia Apartment
- Tombs of Abdulbaki Mosque
- Ibrahim Aga Mosque
- Tarlabasi Reconstruction Project
- Bebek Apartment
- Moda Sekmen House
- Galata Greek Primary School

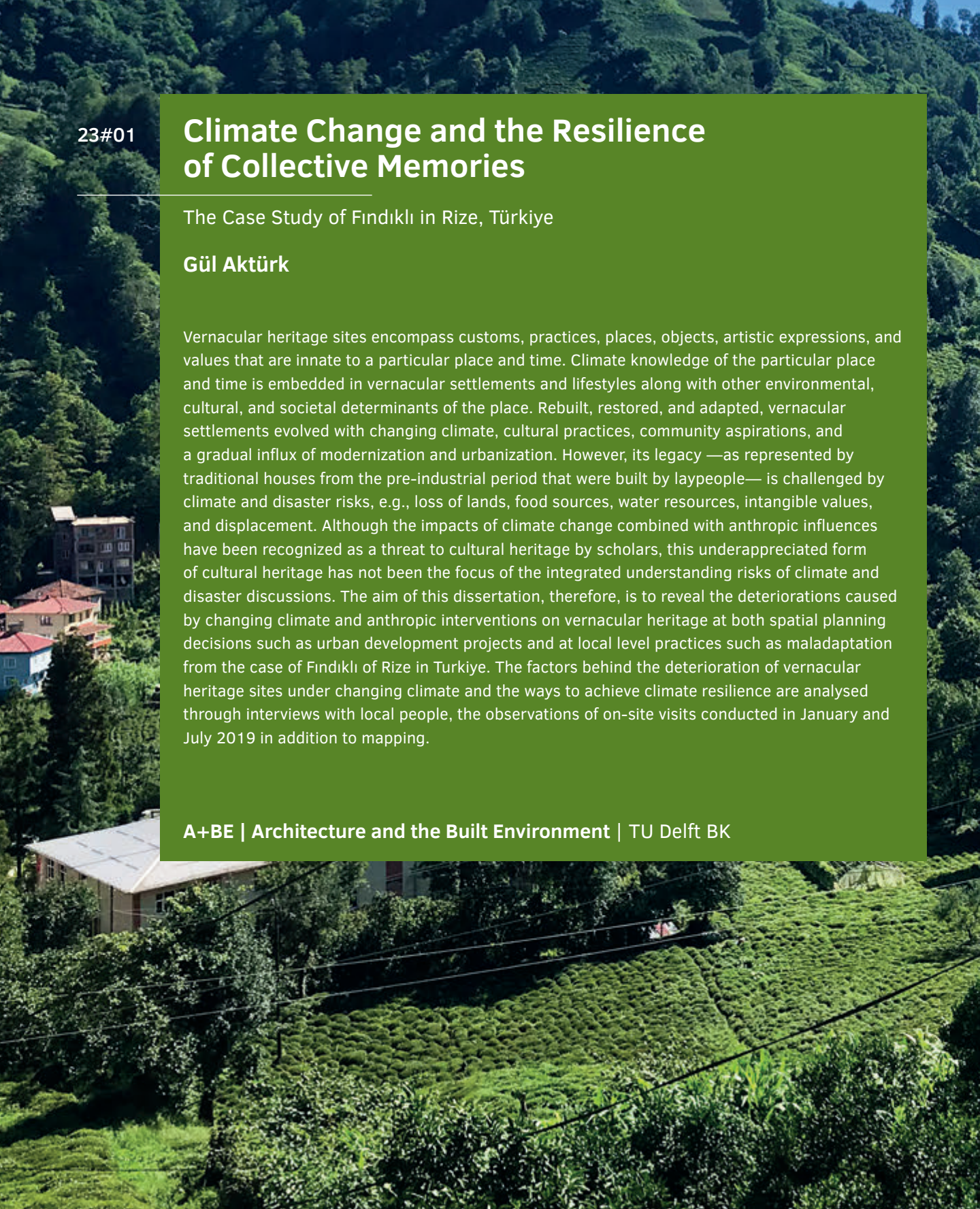
As an architect and restoration specialist duties included:

- Survey of mosaics
- Restitution and restoration projects
- Photography taking for building survey
- Photoshop templates for an exhibition in Besiktas Municipality

List of Publications

- **Aktürk, G.** (2023). Impacts of Climate Change on Vernacular Landscapes and Cultural Heritage. In Preparation for Routledge Explorations in Environmental Studies.
- **Aktürk, G.** (2022). A Systematic Overview of the Barriers to Building Climate Adaptation of Cultural and Natural Heritage Sites in Polar Regions. *Environmental Policy & Practice*, 136. https://doi.org/10.1016/j.envsci.2022.05.016.
- **Aktürk, G**; Fluck H. Vernacular Heritage as a Response to Climate: Lessons for Future Climate Resilience from Rize, Turkey. Land. 2022; 11(2):276. https://doi.org/10.3390/land11020276
- **Aktürk, G.** (2022). Investigating the Barriers to Building Climate Adaptation of Cultural and Natural Heritage Sites in Polar Regions. The Arctic Institute. https://www.thearcticinstitute.org/investigating-barriers-building-climate-adaptation-cultural-natural-heritage-sites-polar-regions/
- Hauser, S. J., & **Aktürk, G.** (2022). Investigate past polluting activities on public health and land uses. *Cities*, 123, [103599]. https://doi.org/10.1016/j.cities.2022.103599
- Yerli, D., **Aktürk, G.**, & Dolgun, E. (2022, Jan 10). A New Shipping Canal for Istanbul? Water, History, Economy and 'Crossroads'. https://www.portcityfutures.nl/news/a-new-shipping-canal-for-istanbul-water-history-economy-and-crossroads
- **Aktürk, G.**, & Dastgerdi, A. S. (2021). Cultural Landscapes under the Threat of Climate Change: A Systematic Study of Barriers to Resilience. *Sustainability*, *13*(17), [9974]. https://doi.org/10.3390/su13179974
- **Aktürk, G.** (Author), & Hauser, S. J. (Author). (2021). Blue Paper #5: Sea snot as a visible sign of climate change. Web publication/site, Port City Futures. https://www.portcityfutures.nl/news/blue-paper-5-sea-snot-as-a-visible-sign-of-climate-change
- **Aktürk, G.**, Lerski, M. Intangible cultural heritage: a benefit to climate-displaced and host communities. *J Environ Stud Sci* (2021). https://doi.org/10.1007/s13412-021-00697-y
- **Aktürk, G.**, & Hauser, S. J. (2021). Detection of Disaster-Prone Vernacular Heritage Sites at District Scale: The Case of Fındıklı in Rize, Turkey. *International Journal of Disaster Risk Reduction*, 58, [102238]. https://doi.org/10.1016/j.ijdrr.2021.102238
- **Aktürk, G.**, & Fatorić, S. (2021). Roundtable III: Climate Change Adaptation of Cultural Heritage. In U. Pottgiesser, S. Fatoric, C. Hein, E. de Maaker, & A. Pereira Roders (Eds.), *LDE Heritage Conference on Heritage and the Sustainable Development Goals: Proceedings* (pp. 521-523). TU Delft Open.

- **Aktürk, G.** (2020). Learning from the Climate Narratives of Cultural Heritage. https://www.globalheritage.nl/news/learning-from-the-climate-narratives-of-cultural-heritage
- **Aktürk, G.** (2020). Remembering Traditional Craftsmanship: Conserving a Heritage of Woodworking in Rize, Turkey, *International Journal of Intangible Heritage* vol 15.
- **Aktürk, G.** (2019). The Rural Landscape as Heritage in Turkey Under Changing Climate. Poster session presented at ICOMOS Advisory Committee Scientific Symposium , Marrakesh, Morocco. https://doi.org/10.7275/ak7n-z606



23#01

Climate Change and the Resilience of Collective Memories

The Case Study of Fındıklı in Rize, Türkiye

Gül Aktürk

Vernacular heritage sites encompass customs, practices, places, objects, artistic expressions, and values that are innate to a particular place and time. Climate knowledge of the particular place and time is embedded in vernacular settlements and lifestyles along with other environmental, cultural, and societal determinants of the place. Rebuilt, restored, and adapted, vernacular settlements evolved with changing climate, cultural practices, community aspirations, and a gradual influx of modernization and urbanization. However, its legacy —as represented by traditional houses from the pre-industrial period that were built by laypeople— is challenged by climate and disaster risks, e.g., loss of lands, food sources, water resources, intangible values, and displacement. Although the impacts of climate change combined with anthropic influences have been recognized as a threat to cultural heritage by scholars, this underappreciated form of cultural heritage has not been the focus of the integrated understanding risks of climate and disaster discussions. The aim of this dissertation, therefore, is to reveal the deteriorations caused by changing climate and anthropic interventions on vernacular heritage at both spatial planning decisions such as urban development projects and at local level practices such as maladaptation from the case of Fındıklı of Rize in Turkiye. The factors behind the deterioration of vernacular heritage sites under changing climate and the ways to achieve climate resilience are analysed through interviews with local people, the observations of on-site visits conducted in January and July 2019 in addition to mapping.

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