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Stefan Zerbe

Restoration of Multifunctional Cultural Landscapes

Merging Tradition and Innovation for a Sustainable Future

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Dedicated to my grandchildren

Nature is, after all, the only book that offers important content on every page

Johann Wolfgang von Goethe (1787)

Preface

More than half a century ago, Rachel Carson (*Silent Spring*, 1962) stated that "the more clearly we can focus our attention on the wonders and realities of the universe about us, the less taste we shall have for destruction" (April 1952). The same feeling, I had on my numerous travels through the world, often related to international ecological research projects. I passed through impressive landscapes which reflected centuries or even millennia of human impact, thus shaping the natural towards a cultural environment. My travel routes led me from the oases of the Uighur people in NW China, along the river floodplains and lifelines in continental-arid Central Asia, across the manifold ancient and traditional cultural landscapes all over Europe, the North African semi-arid and arid landscapes with their nomadic societies, and further south to tropical West Africa. I explored the terraced landscapes in the high Andes of South America and the ancient Mayan cities and cultivation systems in Central America, just to mention a selection (Fig. 1).

Experiencing breathtaking landscapes, often a combination of natural features and a long-lasting land use mainly comprising agriculture, forestry, fishery, and small settlements embedded in the landscape, motivated me to raise my voice for the preservation, sustainable management, and restoration of traditional and multifunctional cultural landscapes. These ancient and traditional cultural landscapes have to be considered as our heritage. They might also provide an alternative option to the unsustainable, natural resource depleting, and unhealthy industrial agrobusiness which is one of the main causes of our global environmental problems such as biodiversity loss, climate change, eutrophication, soil salinization, water depletion and contamination, desertification, and erosion. Additionally, further urbanization towards megacities over-crowded with millions of urban dwellers does not seem a sustainable solution for a balanced land use and future land development on our planet.

By reading a book which focuses on traditional cultural landscapes and their preservation and restoration, one might assume that this is a plea for a return to history. However, this definitely is not what this book intends. For sure, some nostalgia might be a driver to preserve the past. This might also be stimulated by old landscape paintings, e.g., from C.D. Friedrich (1774–1840) who fixed traditional

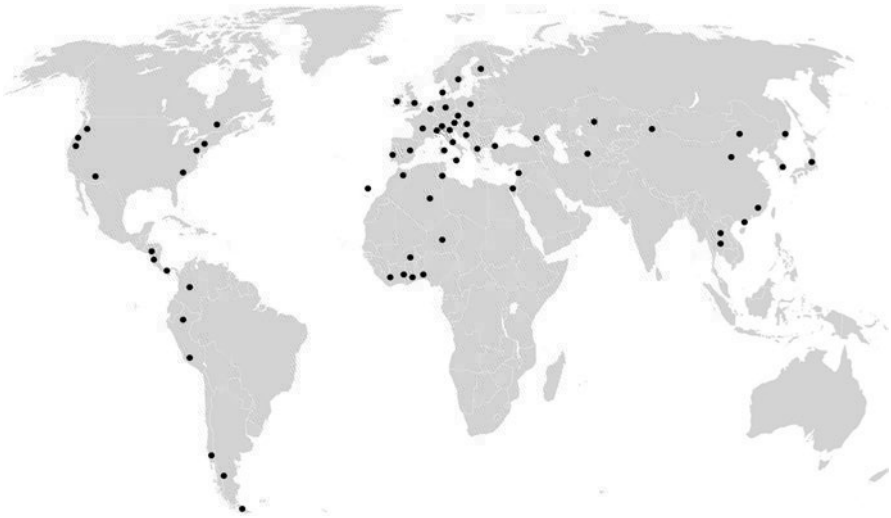

Fig. 1 Countries throughout the world, visited by the author from the 1980s to 2021, where he could study traditional cultural landscapes. Europe: Germany, Austria, Switzerland, Liechtenstein, Poland, Czech Republic, Belgium, Luxemburg, The Netherlands, Italy, San Marino, Spain (and Canary Islands), Andorra, Gibraltar, Portugal, Greece, Serbia, Croatia, Albania, Hungary, Turkey, France, England, Ireland, Denmark, Sweden, Finland; Asia: Russian Federation, China (with Hong Kong), Thailand, Laos, South Korea, Japan, Kazakhstan, Turkmenistan, Georgia, Israel; Africa: Egypt, Tunisia, Algeria, Morocco, Niger, Burkina Faso, Ivory Coast, Ghana, Liberia; Latin America: Guatemala, El Salvador, Panama Peru, Argentina (with Patagonia); North America: United States of America, and Canada

cultural landscapes of Germany in the first half of the nineteenth century on his canvasses, like so many other landscape painters did during the past centuries, later followed by landscape photographers. Keywords and key concepts such as cultural heritage, cultural identity, or sense of place connect us to history. As it will be shown in this book, "traditional" must not be taken as a synonym for, on the one hand, "old-fashioned" and "outdated" and, on the other hand, as "sustainable" and "well adapted to the natural environment." There are numerous examples throughout the world where traditional land use, practiced for many decades or centuries, has led to land degradation, e.g., deforestation, over-grazing, nutrient depletion of the soil, soil erosion, and over-utilization of water resources. However, it will be filtered out how traditional land use with its landscape patterns and processes as well as local and indigenous knowledge can serve for the implementation of strong sustainability, particularly with the restoration of diverse ecosystems, land-use systems, and whole cultural landscapes (Fig. 2). Up-to-date knowledge and technological as well as socio-economic innovation might support this with the overall aim of (re-)developing multifunctional and thus sustainable and resilient landscapes.

As stated by Bloemers et al. (2010, p.1), "the major grand challenges facing our society are embedded in landscape: climate change, energy needs, health and safety,

Fig. 2 The landscape of the Italian Island of Asinara, northwest of Sardinia, which has been shaped by humans throughout the centuries and designated as national park in 1997 because of its high biodiversity, closely related to traditional agriculture and animal husbandry, respectively, in the past. (Photo S. Zerbe, 2015).

food security, urbanisation and migration" and "landscape is a powerful, diverse and dynamic cultural resource for people" (ibd., p.3). However, landscapes all over the world are undergoing rapid and fundamental environmental and socio-economic transformations. In particular, cultural landscapes across the globe have to face the challenges "of an ongoing polarization of land use, with abandonment and rural exodus on the one hand, and intensification and (peri-) urbanization on the other" (Plieninger et al., 2014). This leads to a rapid loss of biodiversity and ecosystem services, traditional ecological knowledge, and cultural heritage. Both "special" landscapes of globally high ecological or socio-cultural value as well as "ordinary" or "everyday" cultural landscapes (Roe, 2014, p.240) are affected by these processes (Plieninger et al., 2014).

This book wants to support or pave the way for all initiatives which aim at the preservation and restoration of our natural and cultural heritage, based on the principles of strong sustainability. Unfortunately, the term "sustainability" has been continuously degraded to a buzzword in the past decades, its original concept becoming weakened by "linguistic inflation" and "conceptional shapelessness" (Ott, 2010, p.164). However, this concept has to be considered as one of the most important ones with regard to future landscape development, a wise use of natural

resources and, overall, the future of our planet and its human societies, taking care of those present for future generations.

In the introductory part, this book lays the theoretical foundation of ancient traditional cultural landscapes with their often high biodiversity and their manifold social-ecological services they provide for humans. Then, the ongoing global polarization between the intensification of land use, including urbanization, and land abandonment is qualitatively and quantitatively examined. This shall lead to a plea for a sustainable balance of low-input and traditional land use that prioritizes nature conservation on the one hand, and high-input land use and urbanization on the other hand. Then, ancient and traditional cultural landscapes are classified and described with a global perspective, pointing on the "ordinary" cultural landscapes as well as the naturally, culturally, and spiritually extraordinary cultural landscapes such as those inscribed in the UNESCO World Heritage list. After having outlined some basic knowledge of restoration ecology and ecosystem restoration, the book concludes with general strategies and case studies of how to preserve, revitalize, and restore, respectively, traditional cultural landscapes towards multifunctional and sustainable ones.

Restoration of ecosystems and landscapes is here perceived as a truly inter- to transdisciplinary challenge which takes both the natural sciences (e.g., ecology and landscape ecology) as well as the social sciences (e.g., economics, anthropology, sociology, and ethics) into account. Based on the groundbreaking research of Alexander von Humboldt (1769–1859) as one of the first "landscape ecologists" who explored the Earth's surface not only through the lens of natural sciences but also by taking into account the humans who shaped and developed the landscapes, traditional cultural landscapes and their future development are approached here in a holistic way. The bridging of the natural with the social sciences by a landscape ecologist might bear the risk that terms, concepts, approaches, and paradigms of the social sciences might not have been reflected in the necessary depth and completeness. However, it should show that sustainable landscape development can only be successful if natural scientists, social scientists, stakeholders, practitioners, and land users enter into a balanced and respectful communication and cooperation together to cope with the environmental and socio-economic challenges of our century.

Besides my travels throughout the world and on-site experiences on traditional cultural landscapes, some inspiration for this book originated in my course *Landscape Ecology* in the first semester of the international master's program *Environmental Management of Mountain Areas* (EMMA) at the Free University of Bozen-Bolzano (Italy), which was developed with my support and implemented by me as study program director from the start in 2010 until 2016. One of the focuses of this course was the worldwide land abandonment in traditional cultural landscapes and how to revitalize and restore them. The students from all over the world introduced within the seminar examples of landscape restoration and revitalization from their home countries. Thus, perceptions and approaches for the maintenance and restoration of traditional cultural landscapes from many countries all over the world were discussed and critically reflected. Similar experiences with

interdisciplinary and international student groups were made within other teaching formats such as excursions, workshops, and summer schools (Zerbe, 2020).

I started to write a major part of this book in my South Tyrolian home (N Italy) while the whole world was under shock and lockdown due to the COVID-19 pandemic in the years 2020 and 2021. In particular, Italy was struck hard, and we had to stay at home for many weeks and even months in order to minimize infections. This crisis increased my already existing doubts, whether globalization and continuous economic growth were heading into a dead-end street. However, I took benefit of the situation, slowed down my previous working and travelling activities and started to write this book.

The sources for this book comprise the available literature, mostly written in English, German, and Spanish, but, in case, also translated from other languages such as Italian, French, Portuguese, and Russian. Additionally, many online sources and my own experiences and observations from my travels (cp. Fig. 1) were incorporated into this book. More than 3950 literature sources have been studied and critically reflected, respectively. As I have already outlined in my previous book on ecosystem restoration (Zerbe, 2019a), the high number of references in the text might create some inconvenience in reading. However, I consider these references necessary in order to show that we have already a huge knowledge base for decision-making and policy towards a sustainable future of our planet. Additionally, the references support the reader in stepping deeper into certain issues of interest and to provide a sound basis for developing one's own critical opinion, the latter because scientific data and facts, respectively, are not the truth *per se* but might be interpreted in different ways.

This book aims at a readership of a wide disciplinary range in science and research, comprising, e.g., landscape ecologists, agricultural and forestry scientists, economists, landscape planners, environmental managers, sociologists as well as practitioners, stakeholders, and decision makers who are interested in traditional and multifunctional cultural landscapes, their restoration, and options and scenarios for a sustainable future. Additionally, students from the natural as well as social sciences in institutions for higher education might benefit from reading this book.

Berlin Stefan Zerbe
April 2022

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Contents

Part I
Introduction – Traditional Cultural Landscapes in the World

Chapter 1
Traditional Cultural Landscapes – A Theoretical Framework

Abstract This chapter lays out the foundations for this book regarding the concepts of "landscape" and "traditional cultural landscapes." The term "cultural landscape" is introduced from a holistic perspective and examples of operationalization are given. "Traditions" should hereby be considered as a combination of elements through which it is possible to evoke collective memories, identities, and social cohesion. Multifunctionality of landscapes is addressed here as an interdisciplinary approach integrating both environmental and socio-economic characteristics. Additional to outstanding and well-known examples of traditional cultural landscapes worldwide such as the UNESCO World Heritage Sites, also the "every-day" cultural landscapes are considered here.

Keywords Landscape · Cultural landscape · Every-day landscape · Multifunctionality · Traditional cultural landscape · Traditions

1.1 Cultural Landscape and Traditions

When speaking about "landscapes" and "traditional cultural landscapes," some clarifications are necessary. An urban resident might have a different perception of landscape from a farmer in a remote mountain area; an ecologist or geographer has a different approach to landscape as a writer or painter (Fig. 1.1). The term landscape is used within the wide range of just a physical section of the earth's surface towards a metaphor; thus, the meaning of landscape shifts by the context and by the background of the users (Antrop, 2013). Landscape ecologists define landscapes as "spatially heterogeneous geographic areas characterized by diverse interacting patches or ecosystems, ranging from relatively natural terrestrial and aquatic systems such as forests, grasslands, and lakes to human-dominated environments including agricultural and urban settings" (Wu, 2008). Accordingly, landscapes in general

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Fig. 1.1 Landscape painting "Village landscape in morning light" (1822) from Caspar David Friedrich (1774–1840), reflecting the Central European landscape before industrialization

comprise the whole range of a set of near-natural ecosystems towards a mosaic of land-use systems with various degrees of human impact.

According to the European Landscape Convention (Council of Europe, 2000, chapter 1, art. 1), landscape "means an area, as perceived by people, whose character is the result of the action and interaction of natural and/or human factors." This definition implies that the vast desert area in the Central Sahara only sparsely covered with vegetation or traditional pastureland in the Mediterranean region has to be considered just as well as a landscape as a mosaic of various land-use structures and intensities or the urban area of a big city (Fig. 1.2). **Alexander von Humboldt** (1769–1859), considered as founder of modern landscape ecology (although he did not introduce the term "landscape ecology") and biogeography (Wulf, 2015), introduced a holistic view on landscapes, integrating the natural environment and human impact (see the *Kosmos* lectures from A. v. Humboldt). He defined landscape as the "total character of a region of the Earth" ("*Totalcharakter einer Erdgegend*"). Additionally, he has to be considered as one of the founders of transdisciplinary research (Fränzle, 2001) as he integrated the natural and the social sciences into a **holistic view**. This is reflected, for example, by his study on the former Kingdom of New Spain (today Mexico and adjacent states) with the analysis of the physical geography and land use, the population, as well as the economy (Humboldt, 1813). Besides the physical structure and nature, respectively, of landscapes, Alexander von Humboldt always pointed in his writings on the cultural and aesthetic aspects of a landscape.

Leopold and Marchand (1968) start their contribution to riverscapes (Sect. 2.7) with the statement that "on property we grow pigs or peanuts," on "land we grow suburbs or sunflowers," and "on landscape we grow feelings or frustrations," and

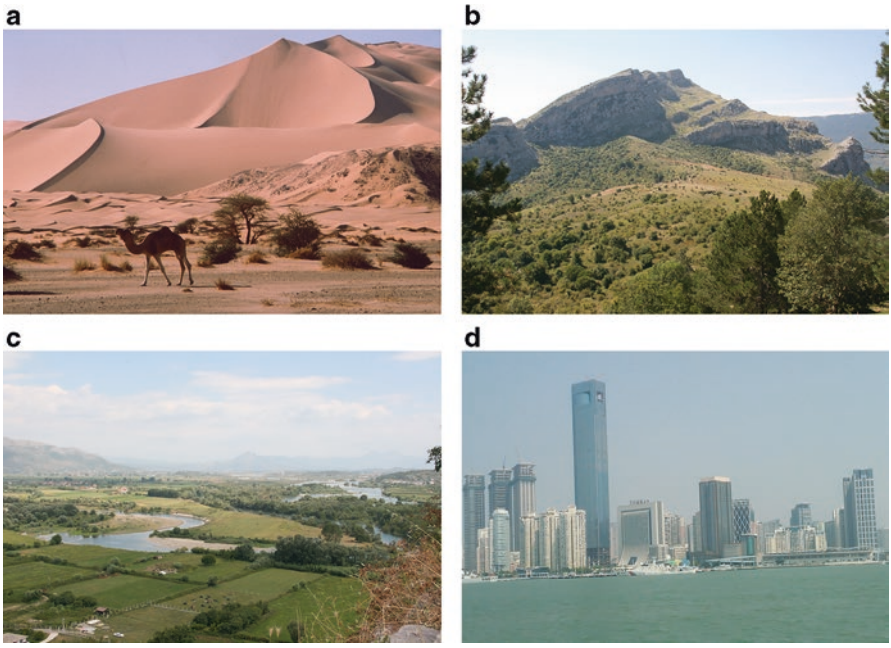

Fig. 1.2 The variety of landscapes in the world with different human impact ranging from natural and near-natural landscapes (**a**), across traditional agricultural landscapes (**b**, **c**) towards urban landscapes (**d**)
(**a**) Near-natural desert landscape in the Central Sahara (Algeria), only sparsely covered with vegetation, influenced by transhumant farmers, and crossed by traders and tourists. (Photo S. Zerbe, 1987)
(**b**) Traditional pasture landscape in the National Park Pollino, S Italy. (Photo S. Zerbe, 2018)
(**c**) Mosaic of various ecosystems and land-use structures and intensities, comprising agricultural patches, rivers (Drin and Buna) with their floodplains, and settlements south of the City of Shkodra in northwestern Albania. (Photo S. Zerbe, 2018)
(**d**) Seaside view of the fast-growing City of Xiamen in SE China with about 3.8 Mio. inhabitants. (Photo S. Zerbe, 2019)

they continue that the quality of a landscape may "remind us of what we have thrown away." Referring to historical assets of landscapes, they emphasize that "land can be used by man in such a way that it retains the essential elements of its aesthetic value, or it can be used in such a way that most of these values disappear." Lekan and Zeller (2014, p.24) conclude that "the concept of landscape was an ideal vessel for both material and aesthetic questions" and "is the nexus between the material and the visual, between appropriation and appreciation." Consequently, the **concept of landscape** integrates (1) the natural abiotic (geology, soil, geomorphology, water balance, climate) and biotic (flora, fauna, vegetation, microorganisms) preconditions within a spatial unit of the earth's surface, which (2) historically were and continuously are shaped, influenced, and organized by humans, thus forming a **social-ecological system** (Berkes & Folke, 1998; Ostrom, 2009; Cumming, 2011; Kirchhoff et al., 2012; McGinnis & Ostrom, 2014), and (3) the human perception with regard to, e.g., aesthetics, values, identity, and symbols (Fig. 1.3).

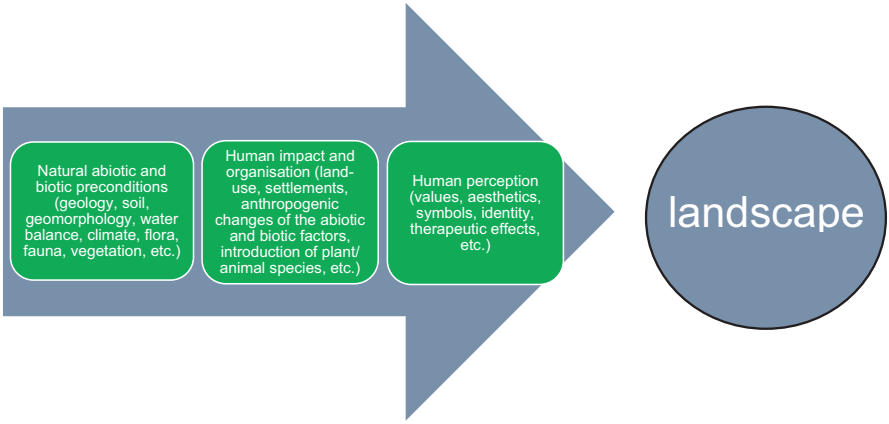

Fig. 1.3 The concept of landscape which integrates the natural abiotic and biotic preconditions, human impact and organization, and human perception

German geographers already used the term cultural landscape (*Culturlandschaft*) in the first half of the nineteenth century, first mentioned by C. Ritter in 1832, followed by C. Vogel, J. Wimmer, and F. Ratzel (Potthoff, 2013). The term "**cultural landscapes**" was brought to an international audience and defined by Sauer (1925) as "a landscape fashioned from a natural landscape by a cultural group. Culture is the agent, the natural area is the medium, the cultural landscape is the result." Groth and Bressi (1997), Antrop (2006), and Stephenson (2008) extend the meaning of cultural landscape beyond their material-physical manifestations towards the intangible values, symbols, and shared identity and diversity of the local inhabitants (see also Tan, 2017). The UNESCO (2008) Operational Guidelines for the Implementation of the World Heritage Convention define cultural landscapes as "a diversity of manifestations of the interaction between humankind and its natural environment." These cultural landscapes might have been designed intentionally such as garden and parkland landscapes, constructed for aesthetic reasons which are often associated with religious or other monumental buildings and ensembles (Ceccarelli & Rössler, 2003). Another category of cultural landscapes is comprised of **organically evolved landscapes** which reflect that process of evolution in their form and component features. This category is subdivided into "**relict**" (fossil) landscapes in which "an evolutionary process came to an end at some time in the past, either abruptly or over a period" and **continuing landscapes** as those ones which "retain an active social role in contemporary society closely associated with the traditional way of life, and in which the evolutionary process is still in progress" (Ceccarelli & Rössler, 2003, p.11). Cultural landscapes are "reflections of the evolutionary process of a social, economic, administrative, and/or religious imperative that has developed in its present form by association with and in response to its natural environment" (UNESCO, 2008; see also Rössler, 2006). Related to the inscription in the World Heritage list, the UNESCO further outlines that "cultural landscapes often reflect specific techniques of sustainable land-use, considering the characteristics and limits of the natural environment they are established in, and a specific spiritual relation to

nature." This holds also true for many "ordinary" and "everyday" cultural landscapes which are not (yet) considered of global significance.

The term "traditional cultural landscape" refers to **traditions** as "a belief, principle, or way of acting that people in a particular society or group have continued to follow for a long time" (Cambridge Dictionary, 2020). Traditions can be considered as a combination of elements through which it is possible to evoke **collective memories**, **identities**, and **social cohesion** (Presenza et al., 2019). As tradition involves the accumulation of know-how, cultural content, and practice, which is handed down over generations (Shils, 1981; Hibbert & Huxham, 2010), it is closely related to local, indigenous, and traditional knowledge, respectively (Table 3.15). Tradition, therefore, comprises tangible as well as intangible goods and resources. When applied to a traditional cultural landscape, this means a combination of building structures, land-use patterns and land-use systems, management systems, infrastructure, local governance, local education systems, regional language, local arts and crafts, music and dance, sports and games, food processing, as well as medicinal, spiritual, and religious practice. "Traditional" in the above-described sense should not be misinterpreted as the opposite of "modern" or "scientific" or as denoting simple, primitive, static, ignorant, anachronistic, or irrational, which are often stereotypes related to this term (Warren, 2004; Ellen & Harris, 2000).

Traditional cultural landscapes and its land use always reflect a certain proportion of historical continuity, independent from their location throughout the world. This historical continuity might reach back many centuries and is still practiced such as the Milpa culture in Central America (Frece & Poole, 2008). This historical continuity is comprised of landscape structure, land-use types, as well as land-use practice (Renes et al., 2019). Although periods of transformation such as land consolidation, intensification, and industrialization have often reshaped the cultural landscapes, traces of the traditional cultural landscapes can often be recognized. Renes et al. (2019, p.4) state that "there are almost no landscapes without any continuity with the past." Here, we follow Antrop (1997, p.109) by referring to those landscapes "with a long history, which evolved slowly and where it took centuries to form a characteristic structure reflecting a harmonious integration of abiotic, biotic and cultural elements." However, "tradition is a fluid and transforming agent with no real end," as Hunn (1993, p.13) states. Accordingly, a current cultural landscape with mainly agricultural and forestry use (in riverscapes, lakescapes, and seascapes, also with fishery; Sects. 2.6, 2.7, 2.8) outside the urban agglomerations can represent a range of mostly traditional features (Antrop, 1997, p.105: "landscape ensemble"), and more or less large remnants of traditional environmental and socioeconomic structures, land-use types, and land-use practices towards a modern, intensively used landscape which has broken with long-term historical continuity and is characterized by large-scale monocultures (Fig. 1.4).

With regard to the time scale, those cultural landscapes that are considered as traditional reflect, also partly, a significant historical continuity of at least one century. Concerning the spatial scale, this could be given by the whole landscape structure, despite patches of agricultural intensification, or by a certain proportion of traditional land-use types such as heathland, extensively used grassland, old hedges,

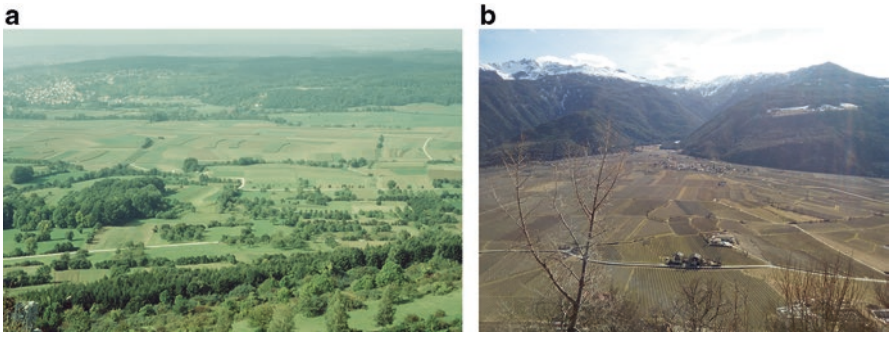

Fig. 1.4 Comparison of a traditional, multifunctional landscape ensemble (**a**) with a modern and mono-structural landscape which is characterized by large-scale monocultures (**b**)
(**a**) Traditional cultural landscape in Franconia, S Germany, with a high diversity of land-use structures and various land-use intensities. (Photo S. Zerbe, 1993)
(**b**) Modern cultural landscape with apple monocultures in the upper Etsch Valley in South Tyrol. (Photo S. Zerbe, 2019)

pastureland with grassland-forest mosaics, traditional agroforestry systems, traditional fishery in lakescapes or coastal areas, or traditional irrigation systems in semi-arid or arid regions. Accordingly, those traditional cultural landscapes which have the following characteristics are particularly addressed in the following chapters:

- The landscape has been shaped by **agricultural** and **forestry** land use (in water-shaped landscapes, together with **fishery**) throughout centuries or even millennia. From the "double role" of agriculture (Daugstad et al., 2006) as a threat to, on the one hand, and a caretaker of cultural and natural heritage, on the other hand, the focus is laid on the latter.
- The landscape is a **working**, **living**, and **continuing landscape**, which means it is still productive in terms of agriculture (e.g., Daugstad et al., 2006 on "active" and "living agriculture"), forestry, and/or fishery.
- The landscape has a considerable area of **extensive**, **low-input** agriculture or farming systems, respectively, which means that agricultural practice seeks to optimize the management and use of internal production inputs (= on-farm resources) and to minimize the use of external production inputs (= off-farm resources), such as purchased fertilizers and pesticides, wherever and whenever feasible and practicable, in order to lower production costs, to avoid pollution of surface water and groundwater, to reduce pesticide residues in food, to reduce a farmer's overall risk, and to increase both short- and long-term farm profitability (FAO, 2007c). Consequently, the landscape has no dominance of urban-industrial land use and/or high-input agriculture.
- A high **biodiversity**, **agrodiversity**, and/or **agrobiodiversity** (Sect. 3.1) on the level of species (including cultivated crops and animal breeds for animal husbandry) and ecosystems and land-use types, respectively, has evolved through traditional, extensive, and low-input farming, forestry, or fishery practices.
- The landscape has traditional, often **small settlement structures**.

- **Cultural traditions** with regard to tangible as well as intangible goods and resources are still present.
- **Traditional**, **indigenous**, or **local knowledge** (Sect. 3.5) is still actively integrated into land management and the local community or can be unlocked.
- If the landscape has been abandoned to a large extent or it has been degraded by non-sustainable land use, it has the potential to **revitalize** and **restore** traditional structures and land uses and low-input farming, forestry, and/or fishery systems.

Given this characterization, traditional cultural landscapes are not rare on a global level as stated by Renes et al. (2019), but still occur to a considerable extent, although often in fragments. Those traditional cultural landscapes which have been designated as UNESCO World Heritage sites, national parks, and biosphere reserves, which are considered as High Nature Value (HNV) Farmland and Globally Important Agricultural Heritage Systems (GIAHS), and/or which are subject to landscape conservation initiatives on the national level (Chap. 7) can be taken as examples or **reference sites** for landscape restoration, not to forget the manifold "ordinary" cultural landscapes in the world.

1.2 Operationalization and Valorization of Cultural Landscapes

Approaches have been developed with the objective to operationalize the concept of traditional cultural landscapes, also as a basis for landscape mapping and landscape planning. Antrop (1997) assessed a landscape in Flandern (Belgium) and based this study on the definition of traditional landscapes "as those landscapes having a distinct and recognisable structure which reflects clear relations between the composing elements and having a significance for natural, cultural or aesthetical values" and "which evolved slowly and where it took centuries to form a characteristic structure reflecting a harmonious integration of abiotic, biotic and cultural elements." These landscape ensembles can be seen "as anchor places to start landscape restoration from." Criteria proposed by Antrop (1997) are **context** (= the integration in the larger environment), **coherence** (= the relation of elements to each other in a structural and functional way), **completeness** (= the amount of elements characterizing the ideal ensemble), **authenticity** (= the degree by which the elements represent the original condition or its development), and **identity** (= the way the ensemble can be personalized and the degree of its uniqueness).

Taking the example of Mediterranean landscapes, Cullotta and Barbera (2011) compare features and components of traditional cultural landscapes with modern cultural landscapes (Table 1.1). With this comparison, it is also highlighted what has been lost through innovation, intensification, and modernization in cultural landscapes such as a patchy landscape configuration, corridors, traditional and low-input farming practices, rural elements (e.g., terraces, hedgerows), and semi-natural habitats as well as material and non-material cultural heritage (cp. chapter x). The hereby

Table 1.1 Landscape components and features in traditional cultural landscapes compared with modern cultural landscapes in the Mediterranean region. (From Cullotta & Barbera, 2011, modified)

Main components and features	Traditional	Modern
Landscape composition and configuration		
Patch composition	Agronomic and forestry land uses/covers	Only agronomic land uses
Patch shape	Heterogeneous (topography)	Regular (geometric)
Patch configuration	Mostly dispersed/clumped	Mostly uniform
Corridors	Mostly present	Mostly not present
Remnant natural patches	Mostly present	Absent
Traditional techniques of land management		
Mechanization	Usually not employed	Employed
Local plant varieties	Employed	Usually not employed
Crop rotation	Employed	Not employed
Crop promiscuity	Employed	Not employed
Fertilization	Organic	Chemical
Animal traction	Present (today mostly remnant/relict)	Absent
Livestock grazing	Present (in rotation)	Absent
Local animal breeds	Employed	Usually not employed
Specific and intra-specific biodiversity		
Natural species	High (plants and animals)	Absent (or very low)
Cultivated species	Medium-high (polyculture)	Low (monoculture)
Cultivated varieties	Medium-high (polyculture)	Low (monoculture)
Rural linear elements and features		
Stonewalls	Widespread (according to the presence of rock outcrop)	Absent
Terraces	Generally widespread	Absent
Dry-stone enclosures	Generally widespread	Absent
Hedgerows and ecotones	Generally widespread	Mostly absent
Green belts	Generally present	Mostly absent
Tracks and footpaths	Highly present	Present
Small ponds	Present	Mostly not present
Small animal and human shelters	Present	Absent
Material heritage features		
Old rural country houses and settlements	Present/widespread	Absent
Local agronomic and forestry manual tools	Employed	Not employed
Old tools and machines (wine presses, water mills, water tanks, etc.)	Present and mostly employed	Absent

(continued)

Table 1.1 (continued)

Main components and features	Traditional	Modern
Manuscripts	Present/widespread	Absent
Poems	Present	Absent
Historic paintings and pictures	Present/widespread	Absent
Non-material heritage features		
Toponyms	Present/widespread	Absent
Dialects	Present (words and phrases linked to rural life)	Absent
Music	Present	Absent
Other oral tradition	Present	Absent

stated differentiation "present" and "absent" has to be interpreted as a continuum as stated above. The mapping and assessment of traditional cultural landscapes need interdisciplinary approaches, e.g., by integrating landscape ecology with anthropology and ethnography, respectively, which can unlock people's historical and contemporary relationships with local environments by "cultural mapping" (Strang, 2010).

It is important to note that historical continuity might characterize a "traditional cultural landscape" but not necessarily multifunctionality, harmony of nature and culture, and sustainability. Examples which demonstrate this mismatch between "tradition" and "sustainability/multifunctionality" are abundant throughout the world. Large regions in Europe were deforested about 200 years ago with a huge expansion of nutrient-poor heathland, grassland, and even bare soils (e.g., Krausch, 1968 for NE Germany) due to long-term overgrazing and overutilization of the forests (Sect. 2.3). Increased drainage of wetlands for agriculture since the late Middle Ages led to a decrease of valuable habitats on the landscape level throughout Europe (e.g., Rubin et al., 2008; Jansen et al., 2009). The Island of Barbados in the Caribbean Sea was already fundamentally transformed from a settler society to plantation economy in the seventeenth century, an economy driven by sugar monoculture and largely based on slavery (Higman, 2000; Menard, 2006). "Traditions" and "traditional land use" might even have led to a "collapse" of human societies (Diamond, 2005; see also Cameron & Tomka, 1993).

Many strategies and initiatives aim to valorize and preserve traditional cultural landscapes which harbor natural and cultural heritage. Those strategies, agreements, and programs on the national and international level will be introduced in part III. Similar to the Red Lists of threatened species and habitats (e.g., EU, 2016a; IUCN, 2021), **Red Books of Threatened Landscapes** have been suggested by Naveh (1993) as a tool for holistic landscape conservation, taking long-termed developed and diverse Mediterranean landscapes as an example. These Red Books should present "recent, adverse biological, ecological, cultural and socio-economic changes in highly valuable and not yet irreversibly despoiled

landscapes and their future threats, and suggest alternative, sustainable land-use strategies with sounder conservation and restoration options" (Naveh, 1993, p.241). The later called **Landscape Green Books** should provide information on endangered natural assets as well as on cultural, historical, and scenic assets which "compose the total landscape ecodiversity" (Naveh & Lieberman, 1994, p.4–13). Particularly emphasizing ecosystem and landscape restoration, these books should serve as a "guideline for the political and professional decision-maker and for all those who deal directly with these landscapes such as land administrators, owners and managers, agronomists, foresters, pasture and range specialists, conservationists, regional planners, landscape architects, and environmental engineers" (Naveh, 1993, p.245). For the evaluation of threatened landscapes and cultural environments, respectively, Green and Vos (2001) suggest the criteria **diversity**, **typicalness**, and **integrity**.

Zimmermann (1981) made a plea for a systematic pictorial and other record of traditional European rural landscapes, which allows both the identification of individual elements and the interpretation of the overall landscape ensemble. A later attempt has been made to implement this proposal for a pictorial, literary, and linguistic inventory of the main traditional rural landscapes in Europe serving as an "illustrated guide […] to the rural face of Europe" (Zimmermann, 2006, p.360). Thereby, priority was given to fast disappearing traditional cultural landscapes like the ***bocage*** (hedgerow landscape, enclosed fields, *Heckenlandschaft*) in Western Europe (Lebeau, 1972; Forman & Baudry, 1984; Meeus et al., 1990), *coltura promiscua* (mixed cropping, multi-crop landscape) in Italy (Green & Vos, 2001; Zimmermann, 2006; Barbera & Cullotta, 2012), and ***dehesa*** (*montado*, multifunctional cultural landscape involving forestry, agriculture, and livestock farming) on the Iberian peninsula (Lebeau, 1972; Ramírez-Hernández et al., 2014; Álvarez, 2016).

1.3 Landscape Changes and Dynamics

A cultural landscape is nothing static but **dynamic** or, as Ingold (1993, p.163) states, landscape is "work in progress." Brown (2007, p.35) outlines "landscape is a product of change, of dynamic patterns and evolving inter-relationships between past ecosystems, history and cultures" or, as Gesler (1992, p.743) says, "landscape formation is […] a constantly evolving process, molded by the interplay, the negotiation between physical, individual, and social factors." Many cultural landscapes in the world have developed throughout millennia or centuries, thus having undergone changes driven by ecological or socio-economic factors. These changes might have occurred on the long term. Thus, changes in the cultural landscapes over time "result in a montage effect or series of layers, each layer able to tell the human story and relationships between people and natural processes" (Taylor, 2008, p.7). Accordingly, the continuity between the past and the present is often reflected by material and immaterial remains of the various historical layers. These can be, for example, old