

# Chapter 21

## Historic Gardens as a Cultural Task: Climate Adaptation Strategies and Understanding of Nature



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**Abstract** The cultivation and preservation of gardens, parks and cultural landscapes as fine art have been expressions of culture for millennia and are becoming essential tasks of cultural property protection in times of climate change. This is because the visible effects of climate change are increasingly threatening the historical aesthetics and current uses of historic gardens. Strategies for climate adaptation require not only thorough and networked experiential knowledge in the field of conservation and restoration sciences but also specific and interdisciplinary research expertise. Gardens as cultural assets must become scientific model laboratories to understand cultivation and conservation as essential cultural tasks of our societies. These challenges must lead to a new understanding of nature that initiates and perpetuates a responsible, humane sense of life through the gardens.

**Keywords** Climate change · Gardens · Garden art · Garden preservation · Cultural task · Nature

### 21.1 Gardens as an Expression of Cultural History

Carl Friedrich von Weizsäcker emphasized the importance of cultural landscapes and the role of the natural sciences as mediators between culture and nature in his historical anthropology more than 40 years ago, in 1977, a year after the Federal Republic of Germany ratified the *Convention Concerning the Protection of the World Cultural and Natural Heritage* (UNESCO, 1972). Man had “discovered too late how his silent hostility to nature has undermined the natural foundations on which his culture also rests” (Weizsäcker, 1977, p. 68). At the time, he meant “environmental damage, famine catastrophes, loss of freedom, war” (Weizsäcker, 1977, p. 69), to which the effects of increasing climate change must be added today.

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Weizsäcker countered this with the perception of the beautiful “as a mode of appearance of the good” (1977, p. 105). If man in the technical age perceives ecological balance – sensually represented in the example of the meadow with flowering plants and bees – as beautiful, he perceives harmony, without which he cannot live: “How magnificent are the old cultural landscapes [...], where for centuries every tree and every house stood where people with a sense of beauty wanted it to be” (Weizsäcker 1977, p. 105).

In 1992, the World Heritage Committee reviewed cultural criteria to ensure recognition of “combined works of nature and man” of “outstanding universal value” (UNESCO, 1992). With the associated recognition of cultural landscapes as protected properties and the newly formulated categories, “castles and gardens” were also defined as cultural heritage. In the Directive for the Implementation of the World Heritage Convention at that time, Article 1 stated, “The most readily identifiable is the clearly defined landscape, intentionally designed and created by man. This includes garden and park landscapes produced for aesthetic reasons and often (but not always) associated with religious or other monumental buildings and ensembles” (UNESCO, 1972). Individual historic gardens and smaller ensembles have now been included within cultural landscapes (Rössler, 2003, 220–227; UNESCO 2019; Dornbusch, 2017, 196–200) (Fig. 21.1).

The palaces and parks of Potsdam and Berlin belong to these very cultural properties, which are recognized “as a masterpiece of human creativity” and “for a period of time or in a cultural area of the earth, demonstrates a significant intersection of human values in relation to the development [...] of landscape design” (ICOMOS, 1990; Giersberg, 2000, p. 17). Currently, in the context of Agenda 2030s holistic approach to the protection of cultural and natural heritage for sustainable



**Fig. 21.1** Drought in Sanssouci Park as an outstanding example of architectural creations and landscape designs, UNESCO World Heritage Site since 1990. (Note: Photo by Michael Rohde, June 2020)

development, it is being discussed whether the pre-1992 World Heritage site “Potsdam-Berlin Cultural Landscape” should also be classified as a cultural landscape (Ringbeck, 2020, p. 143–145). Examples of cultural landscapes include Sintra, Lednice-Valtice (Eisgrub-Feldsberg) and Aranjuez, as well as the Garden Kingdom of Dessau-Wörlitz and Muskauer Park (Park Muzakowski).

Culture, derived from the term *colere* of the Latin *cultura*, encompasses the creative and preserving power of man. It means *nurturing, cultivating and educating*, broadly defined, everything that man himself has brought forth in a formative way in contrast to the surrounding, unchanged nature, including spiritual goods.

Since the differentiation of early societies around 5500 years ago and the process of human civilization that began with the first advanced civilizations in cities, the formal design and diverse use of gardens have been part of the cultural world of man. With the handing down of garden art, including newer inventions such as irrigation or planting techniques, knowledge and culture or cultural skills unfolded. Traditions were handed down through the active preservation of gardens as well as orally and pictorially, from the discovery of writing to digitalization. Tradition formation is a social expression and can be understood “as a cultural construction of identity set in perpetuity” (Assmann, 1999, p. 60).

Garden art generally refers to the artistic shaping of limited green spaces into specific functions through woody plants, flowers, meadows, orangeries or other plant furnishings, paths, stones and water installations, modelling or ground reliefs, architectural elements, and pictorial works that bear witness to a respective historical relationship between man and nature. As with other works of art, green spaces can be understood as carriers of meaning and thus have not only aesthetic but also historical, allegorical and symbolic significance.

## 21.2 Climate Impacts Threaten Historic Gardens

Published in August 2021, the first part of the Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, Intergovernmental Panel on Climate Change) is alarming. Global warming could already exceed 1.5 degrees in ten years. The consequences of climate change – extreme heatwaves, floods and hurricanes – are becoming more intense and more frequent. As living, dynamic cultural monuments, historic gardens and parks around the world are more affected by these increasing weather extremes of human-induced climate change than any other art form.

The *summer dry periods with high temperatures* increasingly cause water shortages with simultaneously reduced groundwater recharge. These conditions not only cause woody plants to die in a relatively short time but also weaken the entire flora through further phenomena. The vegetation period is lengthened, leaf development and the beginning of flowering start earlier. In connection with late frosts, this leads to an additional weakening of the woody plants. Furthermore, parameters such as vegetation duration, temperature minima and maxima, and precipitation amounts

affect oak dieback or beech bark disease via new pests (Kehr & Schumacher, 2014, pp. 64–69).

*Storms and hurricanes* occur more frequently as weather becomes more extreme, damaging and destroying not only structural assets but also trees in historic gardens. For example, at the beginning of October 2017, Storm Xavier recorded gale-force winds of around 150 km per hour in Berlin-Brandenburg, the second-highest since records began; the last similar event was in November 1972 (Rohde, 2018). However, since the trees were still in full leaf and soaked, they offered particularly large attack surfaces. In the “Prussian Gardens” (SPSG), in addition to soil erosion, there was uprooting and a total loss of around 1000 large trees and, thus, sensitive disruption of the historic park image. The task of tree control and traffic safety (removal of dead branches, fencing off park areas, etc.) in the historical gardens has increased in the meantime.

*Heavy rainfall events* are also becoming more frequent. The devastating flood disaster in the Ahr Valley in July 2021 demonstrated some of the most serious effects of these events. The Potsdam Institute for Climate Impact Research (PIK) predicts that storms and extreme rainfall events will intensify by 2040 and not just in the USA, parts of India, Africa and Indonesia (Willner et al., 2018). Heavy rainfall events will also increase sevenfold in Central Europe, especially in Berlin-Brandenburg. For historic gardens, the risk of destruction by flooding will increase, as was seen in Thuringia (Hagner & Seidel, 2014, pp. 80–85) and the castle gardens of Het Loo, Netherlands in 2009 (Dulk, 2014, pp. 110–111). In the future, there will be an increase in flooding in the winter and spring as soils become oversaturated, while there will be more extreme heat storms in the summer months (Gerstengarbe, 2014, pp. 48–51).

### 21.3 The Tasks of Garden Conservation Science

As predominantly living monuments, historic gardens and parks represent a unique cultural asset with a special monument character, in contrast to works of art made of solid matter such as buildings, castles, sculptures, furniture or paintings. They are particularly dependent on the environment and, due to competing public interests, are more easily subject to misuse and damage that is alien to their nature. In Germany, historical gardens represent cultural monuments according to the respective monument protection laws of the federal states due to special characteristics.

The artistic criterion can be traced back to an artistic personality as well as stylistic direction due to the design according to form and function. The historical criterion identifies, protects and documents sources and evidence of human developments. This includes diverse fields of historical knowledge, including art or social history, intellectual history, religious or economic history and technological history. Scientific and urban planning criteria also play a major role, with the latter meaning urban architecture, ground plan architecture or the evolved structure as an expression of intellectual creation or significance for the townscape or landscape.

For more than 100 years, the specific discipline of garden monument preservation has stood for the methodical effort to research historic green spaces, gardens, parks and plant remnants that represent cultural monuments in the public interest because of their historical, artistic, scientific and urban planning significance, and to preserve and, if necessary, repair them through administrative, planning, and gardening measures (Rohde, 2008).

Monument status requires a thorough analysis of the respective historic gardens and parks, ideally, based on a monument concept (Rohde, 2010, pp. 221–227). This includes a) the analysis of the historical design phases up to the present, b) the presentation of the current inventory including the overlaps or comparisons with the formerly completed design phases, c) a monument evaluation addressing the formerly and currently existing inventory, and d) a concept to be carefully justified in the future handling of the garden monument.

There are basically two options for the monument methodology, which must be professionally implemented, documented and communicated to the public:

- Conservation or preservation and maintenance: gardens must be professionally maintained on a permanent basis. This also applies to neglected, converted, altered or even partially destroyed gardens.
- Restoration: as complete a return as possible to earlier design conditions, i.e. structures that are demonstrably still (partially) present. This requires a careful monument evaluation beforehand.

## **21.4 Climate Adaptation Strategies for Gardens in the Context of Conservation Science**

In Germany, the state and municipal garden administrations have traditional, extremely diverse empirical knowledge. However, responding to climate damage involves not only promoting technical and personal equipment for garden maintenance but also incorporating science and research, which has to be more networked. Additionally, interdisciplinary knowledge must be integrated into the maintenance and repair measures and scientifically accompanied. This requires a greater understanding in politics, administration and science

- for garden monument preservation as an academic and craft discipline of the “conservation and restoration sciences” of landscape architecture, as is now common practice in building monument preservation and restoration;
- for gardens as “living monuments” – the only category of valuable cultural assets that can be regenerated in their authentic formal artistic expression through replanting and constant expert care; and
- for the need to generate the necessary knowledge from special sciences to sustainably preserve the historical gardens as cultural assets in terms of experiencing testimonial, historical and artistic values – also with regard to climate adaptations.

The management of climate impacts for historic gardens and parks is now developing into a core task within the framework of the aforementioned monument methodology. In Europe, different analyses and strategies are being discussed on the topic of water scarcity or woody plant replacement, which are in the area of tension between possible adaptation and preservation of the historical and testimonial value. For example, in the United Kingdom, the University of Sheffield, in cooperation with the National Trust, has developed examples of optimized irrigation or composting methods for climate adaptation in “climate adaptation plans (for garden and plant collection),” among others (Dix, 2019; Woudstra, 2019). In Italy, the example of archaeological parks in Rome shows how experience from history combined with the possibilities of modern techniques can lead to optimized water use or drought-resistant replacement plantings can be used (Fallani, 2019) (Fig. 21.2).

Among the most important climate adaptation strategies for gardens are “water management plans” that aim to retain precipitation to minimize stormwater runoff. The goals of these plans include the necessary provision of surface water (service water) or the use of groundwater, as well as the use of new irrigation options such as drip or night irrigation (Sellinger, 2014, pp. 168–173; Schröder, 2014, pp. 186–191). The dike reinforcements and mobile protective dikes made of plastic tubes of the Dessau-Wörlitz Cultural Foundation represent exemplary protective measures against flood hazards (Trauzettel, 2014, pp. 158–161).

*Soil management*, including the handling of biomasses in the context of optimized composting, will (re)gain importance in the future. Soil sites for replanting and, in some cases, existing tree sites need attention in terms of fertilization and



**Fig. 21.2** The Royal Botanic Gardens, Kew (Kew Gardens), UNESCO World Heritage Site since July 2003, formerly pleasure gardens, since 1759 as botanical gardens. Pictured is the Chinese Pagoda designed by Sir William Chambers in 1762. Professionals of the “Capability Brown” congress led by Jonathan Finch and Jan Woudstra. (Note: Photo Michael Rohde, June 2016)

irrigation options. To improve the water and nutrient balance of the soil, mulching offers a variety of advantages (Schneider & Hüttl, 2014, pp. 140–143).

*Trees and shrubs* create the actual spatial images of historic gardens. The existing, formerly artistically used plant material at respective historic sites should not only be respected but preserved as far as possible. Vegetation will build up a stronger resilience through plant associations, i.e. woody plant lots as opposed to solitary woody plants, and will also promote biodiversity. As early as the 1990s, the Eberswalde State Competence Centre developed a practicable indicator system for forest monitoring that records the physiological performance of trees and evaluates it in terms of stress tolerance, adaptation and vitality. This so-called biomarker concept can also be applied to historic gardens (Kätzel & Löffler, 2014, pp. 152–157).

Plant selection for future replanting needs to be carefully reviewed to counteract susceptibility to drought stress. For example, the DBU-funded TU Berlin research project on the future management of woody plants using the example of the SPSG's World Heritage Gardens (2015–2017) provides recommendations on woody plant selection for replanting: Self-sown woody plants or those from park stands of genetically adapted natural regeneration are more resistant than additional purchases (Kühn et al., 2017; Butenschön, 2014, pp. 210–213).

The gardens, parks and cultural landscapes of state and municipal garden administrations increasingly represent scientific model laboratories in the context of climate adaptation. At the end of 2020, for example, the “Protecting cultural assets from extreme climate events and increasing resilience (KERES 2020–2023)” research project was launched under the leadership of the Fraunhofer-Gesellschaft (FhG), in cooperation with the Climate Service Center Germany (HZG-GERICS) and the SPSG – funded by the German Federal Ministry of Education and Research (BMBF). Using the example of the “Prussian Gardens” (and buildings), the stability and branch breakage risk of trees (vitality) or risk potentials of park paths (traffic safety) are being investigated. A variety of measures are planned to improve the understanding of the acute threat scenarios caused by extreme weather events among decision makers and all stakeholders in the cultural heritage sector. Examples of such measures include detailed climate forecasts for selected cultural heritage sites in different climate zones in Germany, using high-resolution regional climate models for IPCC climate scenario RCP 8.5 (“Climate Fact Sheets”). Sustainable, i.e. long-term and resource-saving, water supplies and sufficient nutrient supplies for woody plants will also play an important role. Model measures of these adaptation strategies will be published on a knowledge platform by the end of 2023.

## 21.5 The Preservation of Historic Gardens Promotes a New Understanding of Nature by Humans

“The preservation of historic garden artworks is a societal task by which our willingness not to accept cultural losses due to anthropogenic climate change can also be measured,” according to Roland Bernecker (2014, p. 14), on behalf of UNESCO (also Sanssouci Declaration, 2014).

In 1983, Hermann Lübke also linked social issues with the preservation of cultural assets from the perspective of cultural philosophy. What matters, he argued, is not constantly new goals for action within the process of civilization, but rather the “relatedness of these goals to the humane sense of life of our civilization” (138), which includes moral action and capacities such as initiative, criticism, and self-criticism (Lübke, 1983, p. 138, 145).

“We need garden thinking,” demanded biologist Hubert Markl (1938–2015). As a consequence of our mental mastery of nature, Markl (1986) argued that our species would, for the first time in the history of life, acquire the ability “to change and *disturb* the whole of living nature on this earth in such a lasting way that its destruction-and thus also that of man-becomes a real possibility” (Markl, 1986, p. 9). Thus, for humans, as “beings *out of* nature, as beings *in* nature, and as beings *against* nature” (Markl, 1986, p. 10), nature would become “inescapably more and more a mission for the fulfilment of which he bears responsibility, and since all of man’s activity is an expression of his capacity for culture - which constitutes his being - nature becomes for him a threefold cultural task” (Markl, 1986, p. 7): the exploration of nature, the care of nature, and the preservation of nature, or “more precisely: for the preservation of its capacity to bear and endure human culture” (Markl, 1986, p. 9).

On the question of the development and future of culture and civilization, Immanuel Kant (1724–1804) combined ethical perspectives. The determination of man as a culture-creating being takes place in relation to nature because “man can only be a final purpose of creation as a moral being” (Kant, 1790; after Markl, 1986, p. 341). In the sense of the categorical imperative, the “idea of morality still belongs to culture” (Kant, 1784, p. 26; Elias, 1989, p. 8 f.). Without this guiding principle, man is only able to develop in a purely technical way.

In his main work, *The Principle of Responsibility - An Attempt at Ethics for Technological Civilization*, the philosopher Hans Jonas (1903–1993), following Kant, among others, extends the scope of human responsibility to the whole of animate nature and to the dimension of the future. His imperative is “Act in such a way that the effects of your action are compatible with the permanence of genuine human life on earth” (Jonas, 1979, p. 36). Thus, his ethic of preservation and conservation of nature encompasses not only the survival of the biosphere but also the integrity of its essence and respect for its dignity. It exhorts us to reverence human dignity in accordance with nature’s “moral proper” (Jonas, 1979, p. 29; Wetz, 2005, p. 115–116, 120).



### ***21.5.1 Changes in the Perception of Nature***

*Gardens in cultural history* bear witness to the formation of tradition and orientation as social expression (Renn & Rohde 2020, pp. 23–37). The cultural world of man includes the design and use of gardens, which acquired aesthetic, religious, scientific, ideological, political and even functional significance through symbolic meaning. Designed nature and artistic gardens existed in the advanced civilizations of Mesopotamia or Egypt, later in Roman and Greek antiquity, and from there were finally adopted in northern Europe. The princely, public and private gardens were always characterized by political structures, sciences and arts.

But man's relationship with nature has changed again and again in the course of history. If the garden was considered a metaphor for earthly and heavenly paradise until the Renaissance, the mastery of nature as a means of enhancing one's sense of life followed with a new sense of power and order. The elaborately architecturally designed gardens stood in contrast to "wild nature." They served as a representative expression of an absolutist and hierarchized state and world order. Currents of the Enlightenment, and later Romanticism, again shaped a changed sense of nature from the eighteenth century onward. Philosophers and painters as garden artists derived the creation of picturesque landscape gardens from nature via a socially new idea of freedom, now also via a view of the ethical and aesthetic. Since the twentieth century, this has given rise to an ethic of preservation and conservation of nature, which should enable survival on the planet into the future while also respecting its dignity.

In his *History of German Garden Art*, Dieter Hennebo (1965) took a holistic view of the development of garden ideals: "They move in a common direction of development determined by social changes, because the respective culture-shaping society also determines the ostensible garden image of its time through its relationship to nature and the garden, through its conception of art, and through the demands it makes on the garden" (Hennebo, 1965, p. 9).

### ***21.5.2 Gardens and Parks for a New Understanding of Nature***

How do we understand gardens, parks, and historic cultural landscapes as cultural monuments and World Heritage sites, and how do they help us in the Anthropocene of the twenty-first century? (cf. Crutzen, 2002; Renn, 2020). This question was recently explored at the DBU-sponsored international SPSPG congress "Historical Gardens and Society" (Rohde & Schmidt, 2020, pp. 13–16).

The rich potential of historic gardens, parks and cultural landscapes as cultural monuments can counter the trends of the unprecedented dynamics of our civilization as well as environmental and natural destruction. They have the capacity to initiate and perpetuate a responsible, humane sense and style of life. Their formal artistic design and their centuries-long preservation encompass cultural and

ecological as well as economic and social contexts of impact. Gardens are transcultural places of understanding that connect people, and, in this capacity, also promote the development of a sense of global citizenship.

Historical gardens can create significant social identities of culture and education and have enormous potential biodiversity (Agenda 2030, SDG 15 Life on Land). These gardens can also achieve, in addition to the added value of tourism and job security, hardly quantifiable economic values and welfare effects, which are gaining importance in times of evident transformations: enhancing air quality, strengthening health resources, reducing noise pollution, promoting relaxation and stress reduction, and improving physical and psychological quality of life through movement, art events, creativity and perceptions of nature.

Ultimately, the focus is on people, as “stewards” of gardens and cultural landscapes and their development, to intervene much more strongly than before and to achieve a (re-)renewed, sustainable relationship between people and nature (Schmidt, 2020). Educational processes must always be updated for this purpose, explicitly in connection with the cultivation of international gardens (reference Agenda 2030, SDG 4 High-quality education worldwide): This requires “insights into central problem contexts that determine future viability - such as nutrition, climate change, biodiversity conservation, and cultural diversity” (Stoltenberg, 2010, p. 294; Bernecker & Grätz, 2017). The essential goals of preserving, expanding and disseminating knowledge should be achieved, among other things, “by preserving and protecting the world’s heritage of books, works of art, and monuments of history and science,” according to Article 1, 2c of the Constitution of the United Nations Educational, Scientific, Cultural, and Communication Organization (UNESCO), founded in 1945 (Constitution UNESCO, 1945). A variety of examples, including international cases, of the appreciation and benefits of gardens as cultural monuments for society, as well as sustainable future strategies for education, can lend themselves to achieving these goals.

## 21.6 Epilogue

Gardens, parks and cultural landscapes have been under World Heritage status as cultural monuments for decades. As early as November 1972, the UNESCO World Heritage Convention stated that “cultural and natural heritage are increasingly threatened with destruction, not only by the traditional causes of deterioration, but also by the changes in social and economic conditions which aggravate the situation by even more pernicious forms of damage or destruction.”

In times of complex and dramatic changes in societies and environments, man’s relationship with nature is changing. We, humans, are part of nature on this earth and thus, in a sense, stewards of “gardens.” In this context, we act on all levels of society: politics, economy and administration, science, technology and culture. Historical gardens are not just cultural constants: by newly recognizing and

implementing sustainable action goals and ways of life, cultural landscapes can and must contribute to an expanded, ethical understanding of nature.

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