Article

Burhanpur Cultural Landscape Conservation: Inspiring Quality for Sustainable Regeneration

Amit Wahurwagh [†],* and Alpana Dongre [†]

Department of Architecture and Planning, Visvesvaraya National Institute of Technology, Nagpur 440010, India; E-Mail: alpanadongre@arc.vnit.ac.in

[†] These authors contributed equally to this work.

* Author to whom correspondence should be addressed; E-Mail: amitwahurwagh@arc.vnit.ac.in; Tel.: +91-712-280-1057; Fax: +91-712-280-1376.

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Abstract: The heritage landscape of Burhanpur has an architectural and horticultural composition, consisting of many historic gardens, a unique water management system, a sustainable planning and design framework, the use of landscape and topography with numerous heritage components and historical monuments, temples, tombs and mosques that are locally, regionally and nationally significant. Conserving Burhanpur as an inspirational model for other sites is not only a cultural heritage objective, but it is also a crucial component of the heritage-based sustainable regeneration of the landscape, because it is directly linked to environmental integrity, economic efficiency and resources for present and future generations. Although the last decade has witnessed vigorous efforts by the municipal corporation to preserve and develop Burhanpur by designating it as one of the heritage cities of the UNESCO—Indian Heritage Cities Network (in 2006), a coherent, holistic and sustainable heritage outcome has not been achieved. This paper proposes to harness the cultural landscape as an approach for the sustainable regeneration of Burhanpur heritage and takes a holistic approach to the interpretation of the historic district and natural landscape of the city, where historic buildings are located.

Keywords: cultural landscape; sustainable regeneration; nature-culture relationship

1. Introduction

The cultural heritage of Burhanpur, a historic district of the state of Madhya Pradesh in India, is characterized by natural features and architectural and religious monuments (see Figure 1). The historic urban landscape flourished in the 14th and 17th centuries, with many heritage components and systems, such as picturesque landscapes, historic structures and environmental and health qualities. This heritage is a tested model of sustainability and can be considered the outcome of a model relationship between culture and nature that is livable, participatory and sustainable. Efforts of Mughal emperor Jehangir are highlighted in the historic literature and some research papers with reference of regulatory framework—Dastur-ul-amal in the encouragement of the combination of public and private actions; and private investment [1]. Presently, the historic urban cultural landscape of Burhanpur is confronting gradual erosion due to neglect, insensitive interventions, vandalism, development pressures and encroachment by informal settlements (slums). The natural resource management systems and complementary indigenous framework pertaining to the area's planning and architectural traditions have been lost in the absence of proper management services, the increasing demands of population growth, over-intensive use of its walled city area and reliance on artificial technologies. These factors have resulted in a complex system of interconnected problems, such as degradation of the quality of life, high levels of energy consumption and pollution and the deterioration of the water and its quality. The historic landscape of Burhanpur and its new developments need to interact and mutually reinforce their roles to make the new city a better place to live and a more attractive place for inhabitants and tourists/pilgrims alike. The landscape of Burhanpur needs to be understood, preserved and enhanced for its environmental and health qualities and its beauty and historic characteristics in a visible, practical and sustainable way within a modern city.
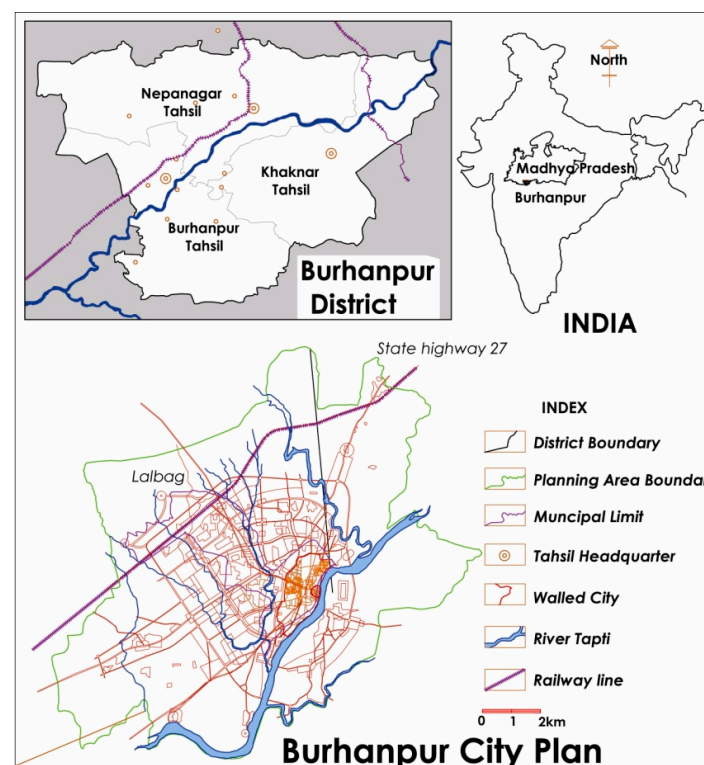
Figure 1. Location of Burhanpur.

This paper argues that understanding the history of Burhanpur's urban landscape is the best way to move forward and that its cultural heritage, with its indigenous planning, design and building practices, including historic gardens and water management systems, is vital. Burhanpur's cultural heritage explains how it has continuing relevance and importance for ensuring the sustainable regeneration of this historic urban cultural landscape, as well as for upgrading the quality of life and the attractiveness of contemporary Burhanpur.

This research is based on the landscape approach and the distinct ideology of Francesco Bandarin and Ron Van Oers, the authors of "The Historic Urban Landscape: Managing Heritage in an Urban Century" [2]. This ideology states that cultural landscapes are literally an imprint of human history, representing a closely woven net of the interrelationships between people and their natural environment and are thus fundamental to the identity of the people. In addition, they tell us the story of a people and how they have transformed the natural landscape into the cultural landscape. Thus, this research is based on the method of interpreting heritage in a holistic manner, and it argues that there is a mutual dependency between landscape and culture [3]. This research also proposes to harness the cultural landscape as an approach for the sustainable regeneration of Burhanpur's heritage and takes a holistic approach to the interpretation of the historic district and the natural landscape of the city where the historic buildings are located. This approach includes a broader scope of the heritage conservation framework in the Indian context that has been hitherto directed largely towards the built heritage to the exclusion of their settings. Cultural features, one of the important causative forces in the evolution of this heritage, have not been a part of the cultural heritage projects undertaken in Burhanpur. Presently, the conservation concerns in Burhanpur are centered on the built heritage (especially the monumental structures) within the city boundary, whereas the cultural heritage resources remain unfocused. Although Burhanpur is designated as one of the heritage cities of the UNESCO—Indian Heritage Cities Network (since 2006) with the endorsement of the Ministry of Urban Development, Government of India [4], a coherent, holistic and sustainable heritage outcome has not been achieved. There are substantial references that highlight the values and significance of Burhanpur's heritage. However, because such references are in segments and only explain the importance of heritage in isolation. In some research papers the role of the "Quanat" water management system and its importance in the sustainable regeneration of the Burhanpur landscape is highlighted [5]. In the case of conservation and development efforts, the built heritage is seldom related to the natural heritage or the intangible cultural heritage, and the architectural building traditions do not receive sufficient attention. Broad discussions on Asian cultural landscapes are presented by Ken Taylor with an argument for the need to research regional values to place Asian cultural landscapes in an international context [6,7]. The present paper can be the foundation for such a regional approach to cultural landscape recognition and development strategies. The cultural landscape approach includes the conservation of the intangible heritage and the management of natural and cultural resources with the public's participation. Thus, through this approach, multiple forms of heritage can be conserved. In contrast to the conventional approach, which is monument-centric, this paper is based on a nature-culture relationship and takes a holistic approach to conserving the district and natural landscape of the city, including its historic buildings. Human decisions and adjustments in response to the landscape's cultural and natural features have helped in the evolution of distinctive natural resource management systems, gardening traditions and the city's planning and design framework, thereby ensuring the sustainable growth of the

city. Several of the important components of the Burhanpur landscape that are deeply integrated with the ecological system to create a sustainable landscape are discussed here.

2. Indigenous Systems of the Burhanpur Cultural Landscape

2.1. Indigenous Planning and Design

The indigenous planning and design framework of historic Burhanpur is a result of centuries of decisions and adjustments in response to the landscape's cultural and natural features. The compact built environment of the walled city of Burhanpur is an important strategy to achieve sustainability using (connectivity) ready access to services and facilities, minimizing energy for transport. The indigenous planning and design framework of Burhanpur considered the landscape holistically, as well as its component parts, such as street width, building height, orientation, open spaces, landuse forms, overall configuration and other physical issues within the climatic considerations. The compact nature of the traditional Burhanpur settlements ensures that the built structures not only enclose the space, but also use it as a resource. The fortification wall of the city, with a circumference of 5.5 km, contains nine gates and 12 windows. The principal streets running centrally along the main axes culminate at the city gates. There are secondary streets and also narrow winding lanes approaching clusters of houses through community gates. Narrow streets opening out into squares exemplify this aspect (see Figure 2).

In the composite climate of Burhanpur, where the summers are hot and arid, this compact built environment is appropriate to reduce heat exposure and offer mutual protection. Moreover, in the present context, such a compact built form helps with the reduction of energy consumption, reducing greenhouse gas emissions by minimizing the number and length of trips. This spatial linkage also reveals the relationship of the urban form to the landform. The placement of important buildings at elevated positions, the irregularity of the streets and other aspects divide the space into recognizable visual statements, revealing the existing topography in its true sense. The Badshahi Qila or citadel, the Jami Mosque and the River Tapti define the basic axial and geometric organization of the city. The spatial organization of the walled city of Burhanpur consists of a series of interlinked landuse patterns and open spaces, defining a hierarchical relationship with a size and shape based on the functions performed therein. The landuse pattern and spatial organization of the walled city, including Badshahi Qila, the Jami Mosque, Gardens, *Sarai* and Hammam, constitute one of the most proficient and sophisticated exercises in city planning. These important structures form visual links, whereas other elements, such as the riverfront and fortification wall, create barriers. The terraces of Badshahi Qila frame visual linkages or viewpoints with the landscape of Zainabad across the River Tapti. The functional and visual connection between spaces is integral to the significant character of a landscape. The pedestrian movement network, social structure and community life are the primary determinants of the spatial organization of the Burhanpur settlement. The rich morphology of residential clusters or traditional neighborhoods, such as *the mohallas, wadas, ganjs and puras*, developed over time, an extended joint family system, cultural aspirations and pedestrian linkages, which all promote psychological and physical security needs. The mixed landuse of residential, commercial and (religious) open spaces, which was the grain of development of these settlements, reduces home-work journey

times and enhances the sense of security by increasing the number and activity of people on the street and in public places. The mixed landuse environment is easily walkable and is small enough to reduce reliance on the use of vehicles but large enough to offer the range of opportunities and services that comprise a rich life. The sustainable landuse pattern of the Burhanpur settlement has evolved and developed following an organic growth pattern. Although outwardly cramped and crowded, it has, in fact, an organized indigenous framework of semi-private and private spaces (communal qualities and settlements that distinguish one society from another), part of an organization that is more meaningful in both socio-economic and cultural terms.

Figure 2. Section of the Burhanpur settlement illustrating the spatial organization.

2.2. Indigenous Building Practices

The indigenous building practices, crafts and architecture of Burhanpur exhibit a typical morphological character that involves a shared knowledge of centuries of understanding the context. This understanding accepted the development of building skills, technical methods and construction practices harmonious with the natural environment. The traditional residential architecture of Burhanpur, for example, consists of courtyard houses (see Figure 3), which are an excellent example of low energy consumption and low pollution levels. The traditional architecture obstructs harsh

sunlight and allows natural ventilation. A deep understanding of the context meant that these houses depend very little on artificial technologies for comfortable environs, effectively reducing the pollution of the environment. The historic built environment of Burhanpur offers design lessons and so much more, that evaluating new developments becomes crucial, because the built environment is a result of socio-cultural, physical and technological factors manifested in design attitudes during various phases of history. The vernacular architecture of Burhanpur is an excellent example of passive solar design and microclimatic conditions (including the orientation of buildings, layout and density) that minimize the requirements for the cooling or heating of buildings.

Figure 3. Traditional residential architecture of Burhanpur.

2.3. Historic Gardens and Designed Landscapes

As one of the important medieval centers of the Mughals, garden tradition and Islamic environmental planning ethics can also be observed in Burhanpur. The medieval Mughal gardens (a tradition that originated in Central Asia and extended into South Asia in the 16th century) and designed landscapes of Burhanpur can be categorized into three typologies: royal hunting preserves (for example, Zainabad), royal pleasure gardens (for example, Mahal Gulara, Shahi Qila and Lalbagh) and sacred tomb gardens (for example, the tomb of Shah Nawaz Khan and Ahukhana) (see Figure 4). Garden and landscape design is an integral part of Burhanpur's planning and design framework, a description of which can also be found in Ain-i-Akbari. The Ain-i-Akbari is a 16th century detailed document recording the administration of the Mughal emperor Akbar. Through this document, one can understand the importance given to the gardens in the medieval town planning of Burhanpur, which is described as a large city with many gardens dotted with sandalwood trees. Zainabad, a landscape unit of Burhanpur, situated across the River Tapti, just beside the Badshahi Qila, contains numerous Faruqi

and Mughal monuments. On the northern side of Zainabad is a designed landscape of Ahukhana (the pleasure garden of Mughal princes, literally deer park), developed with a water system (from the Utaoli River), fragrant grasses, plants and trees during the times of Akbar's son Daniyal (1609) and Jahangir (1605–1627). Before the construction of the Taj Mahal, Mumtaz Mahal, beloved queen of Shah Jahan (1631) was buried here for six months and then shifted to Agra [8]. The significance regarding the flora and naturally beautiful setting of this landscape can be traced to the fact that this location was a proposed site for the Taj Mahal; (see Figure 5) a conceptual painting can still be seen on the wall of Zanana Hammam of Badshahi Qila. This defined landscape is an excellent example of the architectural composition of built and natural heritages. The built heritage components of this defined landscape include a central cenotaph surrounded by abundant trees, "baradari" (kiosk) of Bagh-e-Alamara, Nizam Bagh, *Sarai* and the tomb of Hazrat Pir Shah Chisti Qadri. These gardens, dating back to the times of Akbar (1556–1605), Jahangir (1605–1627) and Shah Jahan (1628–1658), also feature buildings, pavilions, "hauz" (tank), walls and a mosque, as well as complex water management techniques.

Figure 4. Charbagh of Shahi Qila, Burhanpur.

Figure 5. View of Burhanpur walled city from the River Tapti.

The holy spaces of various religions, such as Hinduism, Islam, Jainism and Sikhism, comprise a variety of features of the physical environment in Burhanpur. Places with distinctive natural features associated with human events were developed as pilgrim centers with the association of religious saints and religious activities. Examples include Ichhadevi hill with the temple, *Ghats* (stepped riverfront of the River Tapti), and the Kabir Panthi near Nagjhiri (Kabir Panthi is a center of learning for the followers of the religious saint Kabir). The sacred landscape unit of the Ichha Devi temple and Zainabad (a royal hunting preserve) are completely forgotten cultural landscape elements that support various species of plants and animals in the Burhanpur cultural landscape. The concept of planting in these gardens not only was based on aesthetics, but also had another benefits such as providing fruits/food for human, animal, medical and commercial consumption. The nature-culture interaction (especially Barela tribal traditions) also produced traditional knowledge of rare varieties of medicinal and herbal plants (Ayurveda and Unani medicine) and biodiversity. Within this context, local communities (such as the Bohras, Jains, Behnas, cotton-cleaners, Cutchis, and other Barela tribes) developed ethics, including meaning and belief systems, commonly referred to as indigenous knowledge systems.

This planning and design framework articulated with gardens and green open spaces in the compact built environment of Burhanpur helps with the creation of a social and physical environment that promotes social interactions and good health in an increasingly urbanized Burhanpur. The conservation of these historic gardens and traditional landscapes are important, especially because it fosters community pride and provides social, psychological and physical services, which foster stress recovery by inducing positive feelings and offer a sense of peacefulness and harmony, including quality of life. In addition to the aforementioned benefits, these historic gardens can function in microclimate stabilization by acting as an air and water purifier and offering wind and noise filtration, thus helping reduce the costs associated with decreasing pollution. These historic gardens not only are culturally significant, but also provide economic benefits, attracting inward investment while also delivering solutions fit for modern needs in many ways. Thus, these gardens generate employment and revenue through the tourist industry and help communities to regenerate.

2.4. Indigenous Water Management Systems of the Landscape

Ample references in history along with archaeological evidence demonstrate the efforts taken by the stakeholders to ensure an adequate supply of water and the holistic approach for the development of the Burhanpur landscape. Burhanpur has a potential geological feature, a large Bajada fault, parallel to the River Tapti and adjoining the valley of the Satpura hills. In Burhanpur urbanism, water and topography played a vital role. As the governor of the Subah of Khandesh during the reign of Jahangir, with Burhanpur as his capital, Abdurrahim Khan-i-Khanan constructed an underground canal in the vicinity of the city. He utilized the geological uniqueness, and as a direct response to local geo-physical conditions, he developed the unique water system known as "Quanat" (or subterranean water channels and cisterns). This system was built between the 14th and 17th centuries under the guidance of the Persian geologist Tabkutul Arz by utilizing the fault landform, which sloped towards the east to the River Tapti. The city planning of Burhanpur is not limited to the fortification wall; it also extends at the regional level. The landuse and buildings dotting the landscape were oriented and consistent

according to the slope of the terrain to allow continuous water flow by the force of gravity. The water recharging system devised for the canal is based on the principle of intercepting the run-off in the subsoil groundwater level through underground channels and collecting it in structures, partly underground and partly aboveground, called "Bhandaras" through a system of underground channels and galleries (see Figure 6). The system involved the construction of an aqueduct mostly by tunneling with vertical airshafts to tap the underground water flow from the nearby Satpura hill ranges [9]. The ground water thus collected is stored in sump-wells known as "karanj", from where it is further distributed through quaternary channels throughout the major consumer points, such as the rest houses of the Sarais, Hammams, gardens, mosques and residential areas of the city. This system of eight water works, known as the "Kundi Bhandara", "Sookha Bhandara", "Trikuti Bhandara", "Mool Bhandara", and "Chintaharan" uses unparalleled construction techniques and may be considered glorious relics of Mughal engineering, ingenuity and skill.
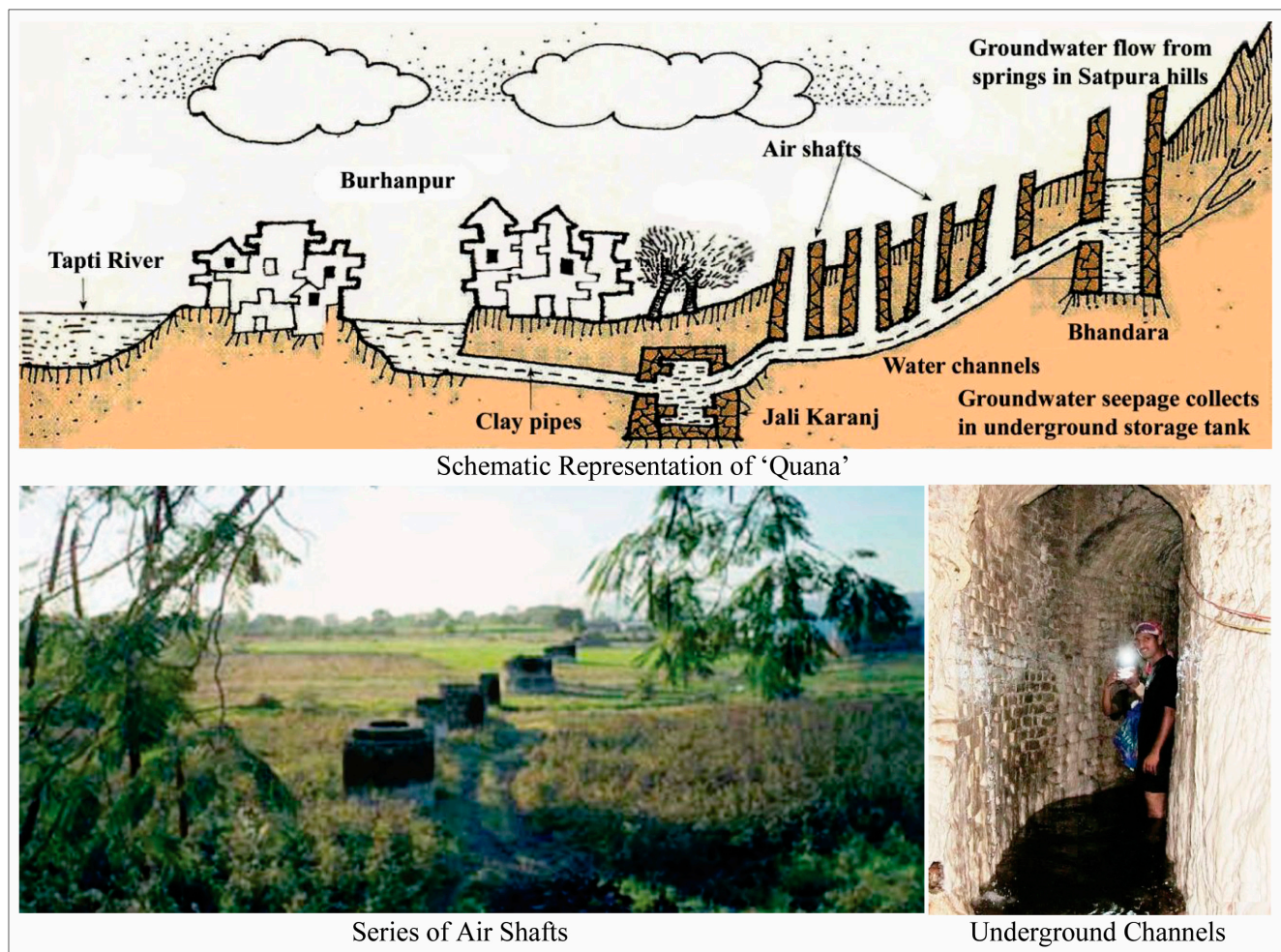
Figure 6. Details of the "Quanat" water management system in Burhanpur [9].

Other typologies of the water system of Burhanpur are located along the north-eastern side of picturesque Ahukhana, which was developed from the River Badi Utaoli with interconnected water ponds between 1605–1627 A.D. Towards the north of this Ahukhana on the bank of the River Badi Utaoli is the twin palace (Mughal pleasure retreat), Mahal Gulara, constructed by Mughal emperor Shah Jahan. A 91 m enchanting masonry dam was constructed across the River Badi Utaoli with a small,

approximately 3.5 m high waterfall. This defined landscape with a picturesque setting was compared with Kashmir in Shah Jahan-nama (the Chronicle of the Emperor), representing a medieval investment of physical, natural and intellectual resources. In addition, there are many instances where the water management system can be observed. For example, three large artificial tanks, namely the Ganga, Jamuna and Badami tanks, and three artificial lakes, namely the Mama, Bhanja and Rani lakes, are the outcome of the sustainable project of the construction of the Asirgarh forts. Asirgarh is located at the highest altitude of the region, approximately 673 m above Indian mean sea level. Stones for its construction were quarried from the same rocky outcrop on which the Asirgarh fort was supposed to have been built. This quarrying of stone for its construction was a sustainable project associated with the construction of artificial harvesting tanks, which made water available at such a high altitude.

3. Conservation Issues and Discussion

After the decline of Mughal rule in India, the sequential chain of indigenous planning and design broke down, and the pattern of planning and design as followed under British colonial rule moved to a different course from the indigenous milieu. The colonial legacy still dominates the planning, design, conservation and management framework of the natural and cultural resources. The Archaeological Survey of India (ASI) is the principal organization (established during British time), under the Ministry of Culture, India, with certain goals and objectives related to built heritage. In addition to the ASI, Bhopal circle, the State Department of Archaeology, in collaboration with the Indian National Trust for Art, Culture and Heritage (INTACH), protect and conserve the built heritage of Burhanpur. Some of its religious heritage structures, such as the Jami Mosque, Dargahs (Tombs) and temples, are owned by religious trusts. As per the Master Plan 2005, approximately 350,000 tourists visit Burhanpur per year. This number largely comprises pilgrims who visit Dargah-e-Hakimi (pilgrims of the Dawoodi Bohra, a caste or sect of the Ismaili Shia Muslims), the goddess Renuka Mata temple, Gurudwara Badi Sangat (pilgrims of the Khalsa, a Sikh sect), Kabir Panthi (pilgrims of the Kabir, a sect follower of Saint Kabir), the goddess Ichha Devi temple and Jami Mosque. The average number of foreign visitors per year is 7000 to 10,000. The lack of infrastructure for the floating population common in the pilgrim/ religious places of India is also one of the reasons for the environmental degradation of Burhanpur [10]. Currently, the fortification wall of the city is broken at several places. Encroachments, garbage dumping along the wall and hoardings have covered the historic streetscape of the walled city. The walled city, however, in the absence of proper services and the presence of over-intensive use, is no longer acknowledged and appreciated. New developments along the north-western side of the walled city spread as sprawl and lack a sense of enclosure or urban design. Instead of rationalizing the existing compact and mixed landuse nature of the city, new roads separate the city into a series of unrelated fragments or into areas zoned for specific uses only. In the Burhanpur context, landuse according to a specific function has little or no validity, as it disturbs the existing indigenous framework, where a close relationship prevailed between residential and commercial areas. Even within the same building, a mixture of uses was common. Including the Burhanpur walled city, 48 wards are presently designated as slums in the development plan [11]. The Municipal Corporation has initiated an integrated slum housing development scheme, which consequently resulted in further sprawl. Many historic sites, including the walled city and surrounding settlements in the landscape, which serve as

thriving examples of livability and sustainability, are facing threats of disintegration, demolition and uncontrolled urbanization. Revival of the cultural heritage landscape could contribute considerably to restoring characteristics that signify deeper socio-economic and cultural roots. In contrast to the acknowledgement of existing sustainable systems and irrespective of the regional setting, various modules/protocols/guidelines have been adopted, and new development projects are often implemented. Insensitive interventions, inappropriate preservation approaches, short-term development programs and a lack of appreciation and understanding are certainly leading to the destruction of the traditional management systems of the highly evolved landscape.

These traditional residential structures, including traditional neighborhoods (presently not included in the heritage list of Burhanpur), are rare examples of dying crafts, indigenous building practices and traditional knowledge. Conservation and continuation of these energy-efficient and sustainable practices are important, especially currently, because greenhouse gas concentrations in the atmosphere are increasing at an alarming rate. The conservation of monumental structures will certainly help in enhancing community pride; however, concern for traditional culture and vernacular architecture is also required, as it is directly related to sustainability.

The historic forest coverage has shrunk to only five reserved forest areas, namely Asir, Ichhadevi, Samardev, Mandwa and part of the Satpura water catchment area. The parks of the city, once known to be a garden city, are either encroached upon or not satisfactorily conserved. Insensitive developments throughout the landscape are degrading its highly evolved character. The picturesque Ahukhana, one of the significant units of this landscape and, an excellent example of a Mughal-designed landscape, presently stands completely isolated, without a proper access road or signage and with a deteriorating traditional water system (presently non-functional). Its condition worsens during the rainy season. The Collector administers Burhanpur District, the boundary of which is not the same as for the management of forest areas because the forest boundaries are different. The Ministry of Environment and Forests of India manages the forest boundaries, with goals and objectives that are related to only the forest area and not the built heritage areas within the forest. The Archaeology Department and Forest Department with their separate interests work under the legitimacy, framework and budget allocations of their parent organizations, the "Ministry of Culture" and "Ministry of Environment and Forests". Neither ministry's approach is sufficiently comprehensive to commemorate the merits of the cultural landscape, leaving them acutely vulnerable and unprotected. In the absence of a governance or planning mechanism that requires them to consult with each other, the former addresses the part of the cultural landscape area known as the "prohibited or regulated areas", but not in the spirit that these landscapes have a broader cultural heritage and a nature-culture interrelationship. In contrast, the latter excludes the forest-intertwined communities living near the fringes of the forest area and their settlement in response to varying factors, such as local geological features, available resources, the existing topography and microclimatic conditions. The defined landscape is thus beyond the purview of a compartmentalized administrative system. The outdated legislative framework lacks the ability to precisely address the overall surroundings or the context of the area, including the environment and setting of monuments. In contrast to the colonial legislative framework, traditionally, nature and culture have always been considered inseparable aspects of the environment [12,13]. Thus, conservation efforts do not receive prominence in terms of the conservation of the cultural landscape. Presently, a few historic gardens have almost vanished (for example, the pleasure-garden of Lalbagh,

of which there are now no traces, except for a cluster of trees). Currently, some parts of these gardens are damaged because of vandalism and, more recently, by encroachment and urbanization. Some of these gardens are designated as green belts in the development plan, and a few have become entirely new urban parks, recalling only the original name. Consequently, the landscape and its gardens are deteriorating rapidly, simultaneously giving rise to a growing environmental threat. However, restoring these gardens means reviving the ideology of the authority, creating a plan for sustainability and addressing the economic and social factors that support a cultural landscape.

The under-utilized traditional water management system, a sustainable solution, has the potential to continue its function. Even today, vestiges of these systems are still functional [5], supplying 1,350,000 liters of water per day, which is 15 percent of the total water supply of the city (the remaining 85 percent, *i.e.*, 7,650,000 L of water, is supplied by dug-wells and bore-wells). For example, Trikuti Bhandara and Mool Bhandara of the system supply water to areas such as the railway station and Lalbagh gardens, whereas many segments of this system are currently threatened due to the discharge of bleaching and dyeing effluents by the textile industries near Jali Karanj. These systems are not considered part of a heritage framework. If these segments are repaired, they can supply up to 1,800,000 L (*i.e.*, 20 percent) of water daily at zero cost. Instead of restoring this water management system, the authority is diverting development funds (a share of one billion Rupees) in the construction of overhead water tanks under the so-called "sustainable" plan. Considering the objective of sustainable development, the Burhanpur Municipal Corporation has also initiated various infrastructure development activities. Such projects often involve the demolition of the fortification wall of the city at several places to facilitate traffic. In contrast, sensitive infrastructure planning must be performed to maintain the good quality of the city environment and to ensure that the interventions are not detrimental to the heritage assets [9]. Today, the rich traditional water-related heritage of Burhanpur is neglected, consequently resulting in a complex system of interconnected problems, such as biodiversity loss, water scarcity, deteriorated water quality and depletion of the groundwater table. Quanat is the best example of a community-based water resources organization. Support of such community-based organizations and of the local authorities will help to improve the management and continuation of these heritage resources.

4. Conclusions

The cultural heritage, natural resource management systems, indigenous planning and design framework, which are imperative to the establishment and sustenance of historic Burhanpur, are slowly deteriorating. Although these components, in the absence of proper management services and the presence of vandalism, encroachment and over-intensive use, are no longer acknowledged and appreciated, restoring these components means reviving sustainability. The arguments of this paper are supported by four key insights and linked implications for the heritage-based sustainable regeneration of the Burhanpur cultural landscape as it is directly linked to environmental integrity, economic efficiency and resources for present and future generations.

First, we demonstrated that the indigenous planning and design framework of Burhanpur, involving a sustainable approach on different spatial levels such as the sustainable compact built form and the city-level spatial arrangement articulated with gardens, open spaces and mixed landuse pattern, help

the community physiologically and psychologically, as well as in terms of their health and productivity. Second, the building level concepts related to energy efficiency and indigenous building practices reduce reliance on artificial technologies or energy consumption for living or human comfort. Third, we proposed that the conservation of historic gardens and designed landscapes can serve as a catalyst for generating employment and revenues through the tourist industry and helping communities to regenerate. These gardens and designed landscapes also contribute positively to the compact built environment of the Burhanpur by maintaining its biodiversity, reducing pollution, promoting good health, fostering community pride, and enhancing ecological diversity and thus sustainability. Fourth, indigenous water management systems, such as "Quanat", and other typologies are tested models of sustainability and can be considered as the outcome of a model relationship between culture and nature, through which a self-sustained landscape was created. Such knowledge and technology of the past is vital and can act as a catalyst for ingenious new designs.

The revival of the indigenous framework for planning, design and building practices could contribute considerably to restoring characteristics signifying deeper socio-economic and cultural roots, providing economic benefits and attracting inward investment, while at the same time delivering solutions fit for modern needs in many ways. Thus, the proposal of cultural heritage landscape conservation serves as a catalyst for the sustainable regeneration of the Burhanpur landscape. The sustainable regeneration of the Burhanpur landscape will be accomplished by integrating natural and cultural heritage conservation, and the development efforts should be guided by the cultural landscape concept, which aims to establish culture and nature as interconnected elements of the same space.

Hence, there is a crucial need to conserve this cultural heritage to improve community life and the quality of space, water efficiency and energy efficiency and to reconsider the dying wisdom that had ensured sustainability. The conservation strategy should be framed in cooperation with stakeholders; furthermore, there is a need to address the adverse impacts of human activities, such as sanitation, pollution prevention, increasing demands of population growth and wastewater treatment. The use of local and traditional knowledge and technology, such "Quanat" and other water systems, should be encouraged to continue ecologically rooted management practices. New planning frameworks and development measures need to be formulated that are more sensitive to both culture and nature and that facilitate a greater recognition of local values and traditional knowledge. To be sustainable, a new planning framework should accept an indigenous respect for the environment and an approach that is both holistic and integrative.

The Burhanpur cultural landscape helps us understand our origins and provides significant information on the management of natural resources in the present. The natural values of the Burhanpur traditional landscape will be continued if the existing sustainable landuse is supported. The heritage conservation approach in Burhanpur is monument-centric and must be integrated into a broader perspective. Individual features in the landscape should never be viewed in isolation, but rather in relationship to the landscape as a whole. The cultural landscape is a tested model of sustainability and requires holistic understanding. Ironically, the stakeholders are attempting to implement many sustainable projects and a sustainable regeneration plan on a limited and compartmentalized knowledge base. Because the heritage value stands under-recognized and the area is not nominated as a cultural landscape, concerned administrative authorities tend to focus their energies on built heritage-centric secondary issues, rather than the issues concerning the inclusive cultural landscape. Re-nominating the

heritage to broaden the recognition of these landscape values could curb the threats to a sustainable Burhanpur. This effort will support nurturing and harvesting the natural values of this landscape. The response of a cultural group to the natural setting and its resource base would fit the Burhanpur landscape with the nomenclature of an "organically-evolved cultural landscape" in the national heritage list. Integrating the natural and cultural heritage of the Burhanpur landscape can be a model for sustainable regeneration in many other landscapes of the Indian subcontinent, whose outdated legislative framework and conservation practices preserve built and natural components in isolation.

Author Contributions

Both authors contributed equally to this work and provided equal extensive revision.

Conflicts of Interest

The authors declare no conflict of interest.

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