



IMPACTS OF NON-CLIMATIC FACTORS ON HERITAGE SITES- A CASE STUDY ON KHALIFATAABAD, BANGLADESH

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Abstract

Heritage sites are gradually becoming more vulnerable, due to natural decay and deterioration, effects of climate change, and non-climatic factors. An increased number of non-climatic human-induced impacts are causing significant problems in managing and conserving cultural heritages around the globe. For location and liberal cultural conceptualization, Bangladesh has a rich historical background with many remarkable cultural and natural heritage. Among many, the historic mosque city of Khalifatabaad, Bagerhat was enlisted as one of the world heritage sites by UNESCO in 1985 which is the only proven evidence of the 'Khan-e-Jahan style'. UNESCO has already mentioned a few non-climatic factors which also made the heritage sites vulnerable along with the various climatic factors. Conservation of the historic landscape, buffer zone, and heritage property area is also addressed there. To identify the responsible human-induced non-climatic factors and their degree of impact on heritage sites are the primary aims of this research. Through site survey, detailed observation, documentation, oral statements records, and proper qualitative analysis the non-climatic issues like weak land-use policy, tourism policy & monitoring, implementation of land law and lack of social awareness are identified. For systematic data summary and findings, the Driver-pressure-state-impact-response (DPSIR) framework has been used.

Keywords: Non-climatic factors, vulnerability, heritage sites, Khalifatabad

Introduction

Heritage sites are prestigious evidence of various renounced human settlements, their glorious tangible-intangible past, and their contribution to the present society. That's why preserving and conserving these heritage sites are a part of our social and cultural existence (Jokilehto, 2017). According to the UNESCO world heritage convention studies, various nature-made and man-made factors are responsible for making the heritage sites vulnerable (Rodwell, 2012). Climate change, climate extreme events, and changing weather patterns all are burning issues for heritage existence and conservation (Fatorić & Seekamp, 2017) in present times. Research and documentation are already started to address the climate change impacts on heritage sites to overcome the vulnerabilities (García, 2019). But on the other modern human development activities, rapid

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urban growth and technological strategies are responsible for creating many vulnerable issues regarding the existence of heritage sites. The present vulnerable condition of the great Taj mahal is an eye-opening example of the impacts of unplanned urbanization and industrialization in Asia where conservation funding and technologies are also a matter of consideration for large-scale heritage conservation (Agrawal, 2002). In a developing country like Bangladesh where the heritage sites are already under great threat of various climate extreme conditions (Biswas, 2013) and now the non-climatic issues are also becoming a matter of consideration for heritage existence (Hasan et al., 2022). For heritage site vulnerability, weak land-use policy, weak tourism policy & monitoring, weak urban and regional planning, lack of heritage land law and lack of social awareness are identified as human induced non-climatic issues.(Abdollahbeigi, 2020)

The historic mosque city of Khalifatabaad now known as Bagerhaat is at the southwest part of Khulna district near to Sundarbans, was one of the oldest cities of Muslim rule in Bengal (1204-1757 A.D.) (Ahmed, 1984) and one of the renowned heritage sites of Bangladesh. Near about 360 mosques, mausoleums, bridges, roads and public buildings were built under the great Muslim ruler of Asia named Khan-Jahan Ali (Rahaman & Mahfuz-ud-Darain). The traditional building materials were bricks and terracotta - bonded by lime or mud mortars with the Hindu construction technique of corbelled brick and the bamboo (Naqi, 2003). From these conditions and constraints of setting the style came up with a solution which produced the remarkable phase of Bengal Architecture which is called the Khan-E-Jahan style. The contextual and utilitarian character was the key concept of the Khan-e-Jahan style. Buildings here were perceived not as an art form but as pieces of architecture where forms are generated by contextual needs and organizational simplicity (Mowla & Naqi, 1993; Naqi, 2003). The UNESCO declared this city as a world heritage site in 1985. In their introductory note about Khalifatabaad UNESCO also emphasized about the Conservation of historic fabrication, landscape, buffer zone and property boundary of this historical city (UNESCO, 1995).

The Aim of this research is to identify and analyze the responsible non-climatic manmade factors that are directly or indirectly affect the heritage sites of Khalifatabaad. Also, to increase awareness and bust-up the conservation procedure.

Materials and Methods

Data collection

For a detailed survey and data collection here, seven historical structures were chosen. Among them, few are in very stable and polished condition. For example- Shat Gambuj mosque & Khan-e-Jahan mausoleum are visibly in a better condition. Few are in an average stable condition from the point of view of useability. People are still using them for their daily prayers. These mosques are treated as their daily neighbourhood mosques. For example-Nine dome Mosque, Bibi Begeni Mosque, Chunakhola Mosque. On the other hand, few historical structures are almost abounded and close to destruction. These structures are mostly victimized by various climatic and non-climatic extreme events. For example- Rezakhuda Mosque, Jindapir mausoleum. According to site and structure, the survey mapping was done.

Repeated site surveying

Repeated site surveying was carried out for detailed information about the present scenarios of Khalifatabaad's historic spots. Three main surveys can be noted -

- Primary Survey: Map development, exact historic spots selection, historic evidence collection, background and timeline analysis.
- Secondary Survey: Targeted focus group selection, Detail site investigation, Historic buildings layout, and investigated visible impacts of non-climatic factors on them.
- Final Survey: FGD with semi-structured questionnaire, detailed evidence collection for cross matching, KII for conservation proposal.

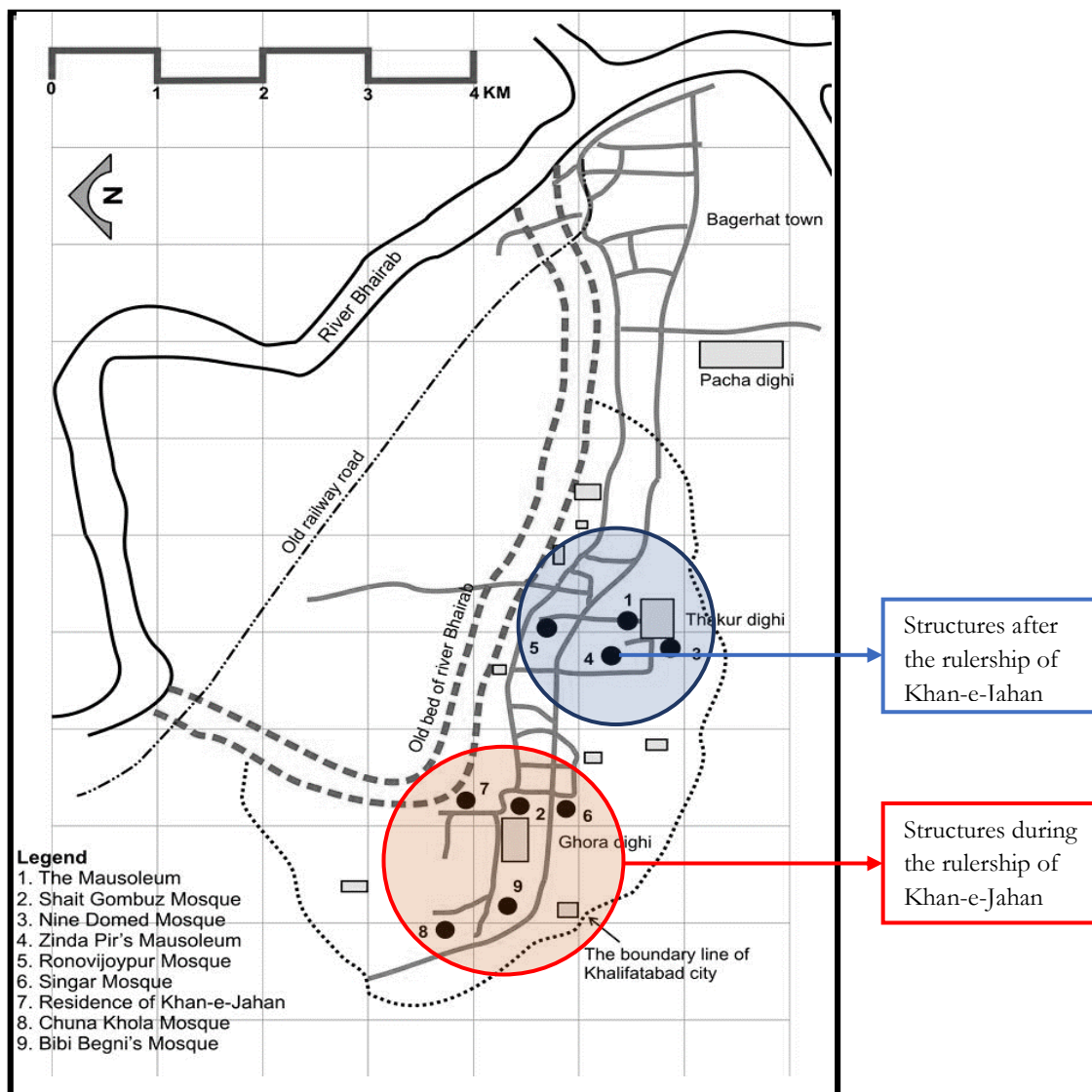


Figure 1. Studied heritage sites of historic mosque city Khalifatabad.
 Source: Department of Archeology, Bangladesh.

Focus group selection and group discussion

For collecting historical details and past social scenarios of Khalifatabad FGD was one of the key ways. The last 50 years' information collection was the main target. So, for this, there were few focuses group selection criterium

- Local residence.
- Age-wise grouping (regular user and site neighbors)
- Involvement in historical sites maintenance and conservation
- Socially and politically active people for authentic information

Observation and documentation

During the field survey, observation was made about the visible scenarios and impacts of non-climatic factors and the vulnerability of historical sites. Authorized Information about the historical sites was collected from the concerned museum. Photographs were taken of the area and connectivity maps were generated to illustrate later. Important observed information was noted and noticeable changes had been marked also.

Key informants interview

Informal interviews with key informants were carried out about the visible and nonvisible impacts and vulnerability of historical sites, responsible non-climatic factors & indicators, extreme climatic events, etc. Discussion about existing conservation techniques, material durability, future role, and policies of Authorities was also on the checklist.

Research framework

A generic DPSIR framework is used for the impact assessment of historical sites of Khalifatabaad to non-climatic factors which is shown in Figure 2.

Data Summery and Findings

From survey, FGD and KII lots of data and evidences are collected which is categorized and organized through DPSIR framework.

Drivers

Bangladesh is a densely populated country and the population is still growing. But the resource is limited that's why various problems are generated here. So, population growth is an important driver for many vulnerable issues here. Planned extension of City and urban area is still not a must have criteria for the growing towns like Bagerhat. So rapid and unplanned urbanization is always a driver for various impacts of heritage sites in urban or sub urban area. Economic development is much more demand based. Here other sectors like heritage sites and social aspects are less important. As a result, it is also driving many vulnerable conditions for heritage sites and their conservation.

Pressure

According to DPSIR principles, pressures are directly generated and linked with the drivers. Here after finding the drivers above the generated interlinked pressures are mostly clear. Huge population with limited land resource caused extreme density which is a direct threat to land use pattern and policy. Land scarcity can be threat for heritage conservation because on that point the basic accommodation demand gets much more priority than heritage site and landscape conservation. For this a demand chain is creating including various infrastructures like highways, commercial zones around the heritage sites which can create problems for heritage conservation, if necessary, steps are not taken by authority.

State

Following the survey evidence of Khalifatabaad few states of the heritage sites are very clear that influenced from the generated pressure described above. As example- few heritage properties like Jinda pir er Vita is

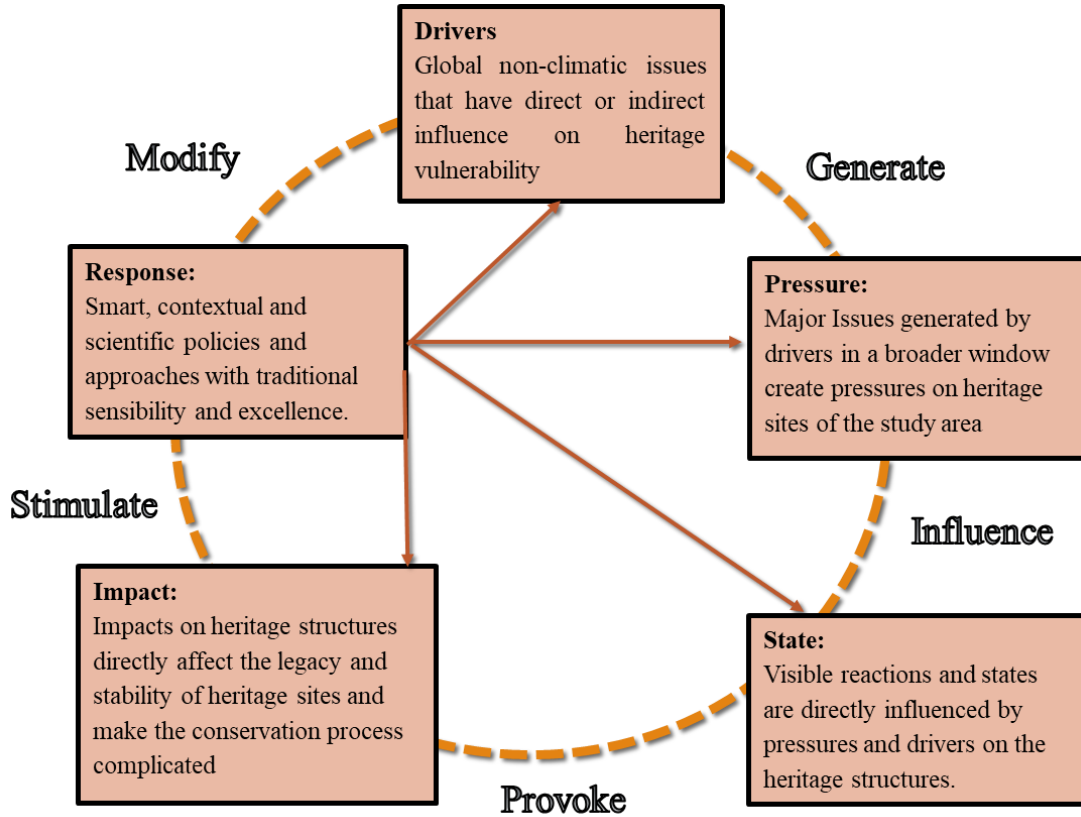


Figure 2(a). The applied DPSIR structure of this research.

already grabbed by the local people and they claimed that as their own property (Figure 6(a)). Proper look after from the concerned authorities are also very weak. Harmful economic activities and land use are also a common scenario of Khalifatabaad. Chunakhola mosque is already in trouble for fish hatchery around it which contains extreme saline water (Figure 3). Minimum buffering or any kind of buffer zone is missing in all most all heritage sites except the sixty domed mosque and Khan-e-Jahan mausoleum (Figure 4). Local people usually use the heritage property for their daily activities because of less awareness (Figure 6(b) and 6(c)).

Impact

Due to unplanned land use around the heritage property various vulnerable conditions are raised which caused serious threat to heritage site. Hatchery around chunakhole mosque caused extreme saline effect and water logging on its material durability. The director of Department of Archeology Khulna division directly mentions about the critical condition of this heritage site. Frequent maintenance is must for the dust blow effect caused by growing infrastructure around the heritage sites are also not easy due to funding limitations. Few famous heritage sites of Khalifatabaad like Singair mosque, nine domed mosque is just beside the vehicular roads need extra attention for dusts. Still the local people are unaware about the importance of these heritage property.

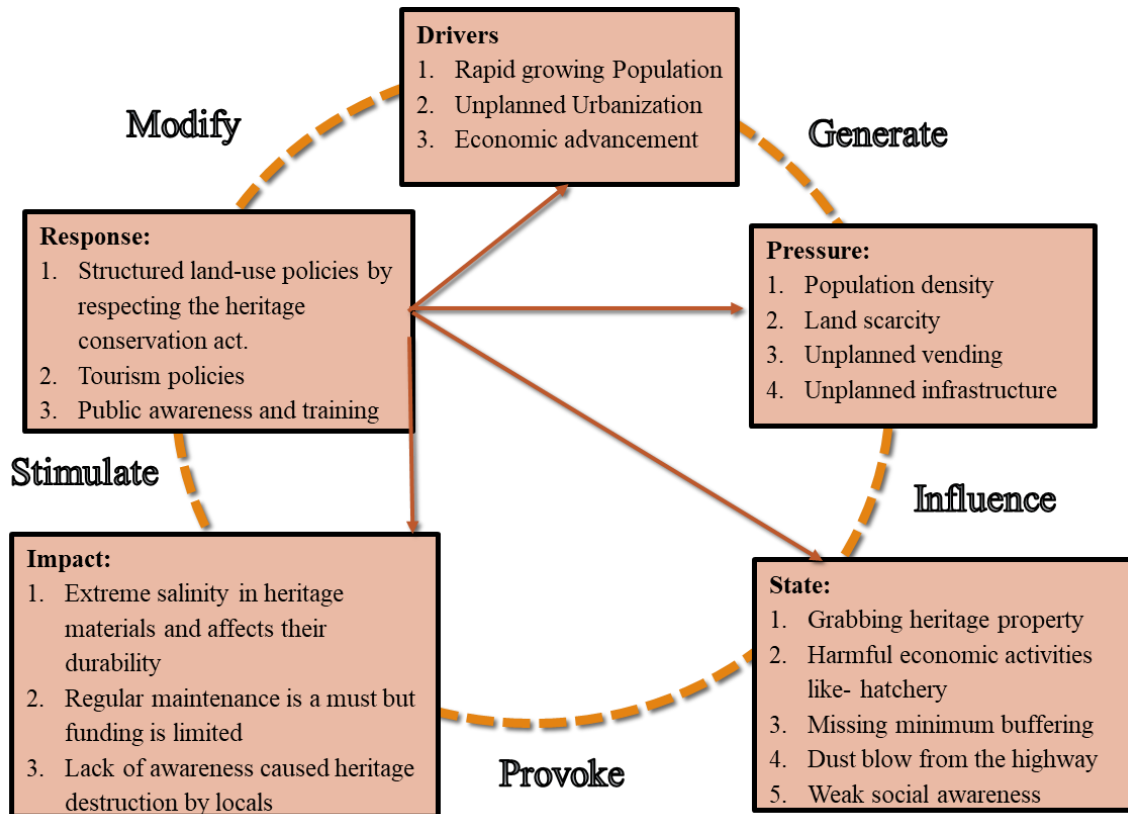


Figure 2(b). DPSIR work frame and data summary.

Sometimes they provoked many unwanted damages like breaking the heritage boundary or try to reuse the property (Figure 5).

Response

The observed impacts are stimulating few required responses as immediate as possible. A structured land use policy and conservation act is must for this heritage city. Local Authorities and Archeology department can be collaborated to implement the heritage policies and land laws. For tourists specified guideline is must which will describe what should or what should not be done here. Yearly social and cultural meetings can be arranged by the authorities to improve the level of awareness among the local people.

Findings and Discussion

This southwest coastal area of Bangladesh is economically dependent on shrimp culture which is saline water-based. As a result, few heritage sites face extreme vulnerabilities due to saline waterlogging and extreme soil salinity.

For example- Chunakhula mosque (Figure 3) is already facing an extremely vulnerable situation because of shrimp hatchery just around the structure. During the monsoon, saline water from the hatchery entered in the structure every year. Not even a boundary wall is there to protect the heritage site from these local hazards. In this case, the extreme saline effect on the Chunakhola mosque is mostly non-climatic and a man-made issue.



Figure 3. shrimp hatchery just beside Chunakhola mosque.

Ensuring site boundary, the property line, surrounding land-use restrictions, etc. are also important issues for historical structure conservation and maintenance. In Khalifatabad maximum historical property boundaries are not well maintained. Shat Gombuj mosque and Mausoleum of Khan-e-Jahan only maintain site boundary and surrounding land use restriction strategies.



Figure 4. Maintaining the buffer zone and boundary of the two most conserved structures of Khalifatabad.

On the other hand, most of the structures don't maintain the historical property boundary, buffering, and land-use restrictions. As a result, various occurrences happen and the historical structures become more vulnerable.



Figure 5. No specific site boundary, no control in historical property, no land-use restriction around historical structures.

Social awareness is also an important factor for the historical sites of Khalifatabad. In a few cases, descendants use the heritage property and land for their building extension. Which is an alarming condition for

heritage conservation. Also, the people around the heritage areas are randomly used the heritage property as their personal property.

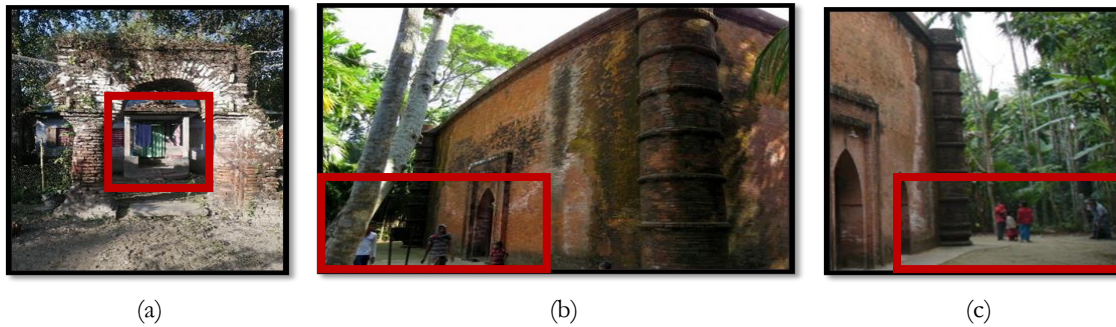


Figure 6. Lack of Social awareness in Khalifatabad.

Result and Recommendation

So according to above survey evidences few factors are came as findings that have direct impacts on the heritage sites and their surroundings. In the table below, the non-climatic factors and the degree of their impacts on various sections of heritage site in Khalifatabaad are presented-

Table 1. The vulnerability level of the heritage properties of Khalifatabad to non-climatic factors

Non-Climatic factors	Impacts on various properties od Heritage sites				
	Property preservation	Material durability	Cultural essence	Traditional landscaping	International images
1. Unplanned urbanization	Very high	Moderate	High	High	High
2. Weak land-use policy	Very high	High	Moderate	Very high	High
3. Unplanned commercial development	High	Moderate	High	Very high	High
4. Lack of social awareness	High	High	Very High	High	High
5. Lack of Tourism policy	High	Moderate	Very high	Moderate	Very High

Rapid economic development

In a developing country like Bangladesh, where unorganised commercial development and vending is very common scenario, heritage sites here are always in great threat in urban territory. Khalifatabaad means present Bagerhat is a district town with lots of economic activities. Small are large entrepreneurs have their own business strategies and think that the heritage sites are great advantages for their business. That's why unplanned commercial settlement around the historical sites of Khalifatabad is a great threat. Un planned shops and local commercial spots with large crowds also hamper the spiritual and cultural essence of the sites.

Weak land-use policy and land law

Urban and Rural land use and land use controlling laws are very important to maintain the archaeological values of the heritage sites. Rapid urban growth always has a hunger for land on centric points of the town. So, lacking of strong land use policy and law a heritage site and its Archaeological excellence are always in great threat.

Lacking in Policy level

For accommodating a fast-growing population more lands are needed. So indirectly it creates a great threat to the historical sites area, buildings and landscape. But a strict guideline, policy and implementation of the law can minimize this kind of threat. Weak policy structure and implementation is always a remarkable reason for vulnerability of the heritage sites of Bangladesh

Weak tourism policy

After enlisting as world heritage site Khalifatabaad is now well known all over the world for its cultural and archaeological excellence. It also a matter of local and international tourist interest. So, the tourism policy, laws and facilities have to be rational and world class. The whole mosque city is a historical site but only few structures are focused by the Department of Archaeology as tourist spot. So the rest of the structures are in a negligible condition and have become vulnerable day by day. As example- Shat gombuj mosque, Mausoleum of Khan e Jahan are highly facilized for tourist interest but few rests like- Chuna khula mosque, Rejakhuda mosque are in a great threat of extinction.

Lack of awareness

Educating the local people, developing their social awareness, understanding the responsibility, fascination for the culture and heritage are always a great way to save the heritage sites. As because the local people are the closest user and care taker of any heritage site their awareness is very much important. But proper social education for saving and using the historic sites of Khalifatabaad are still isn't in light. As a result, local people are also nor careful about the use of the historic structures. this is also a great matter of threat to the historical sites of Khalifatabaad.

Through this research, a few things are highly recommended to protect the Historic Mosque City Khalifatabad from manmade non climatic factors.

- The Shat Gombuj Mosque, Mausoleum of Khan-e-Jahan have got most of the light in terms of conservation and tourist facilities. but the whole city should be treated as a single historical site with many magnificent historic structures. The tourist facilities and laws should be applied thereby.
- A well-developed land use policy is must for the tangible heritage properties which is still missing here
- Land laws have to be applied properly to avoid these vulnerable issues of the heritage sites of Khalifatabaad
- Like sixty domed mosque other heritage sites of Khalifatabaad should maintain tourist entrance and access carefully to maintain the site environment.

Conclusion

Without awareness our prestigious heritage sites cannot be preserved for our future generations' sake. It is an untold truth that with a weak economic condition like ours massive and active conservation planning is not possible. So, if we want to protect our heritage sites, passive conservation strategies are the most effective

ways. Non climatic factors of our heritage sites are mostly man-made and can be controlled by our own effort. Local administration, department of Archeology and UNESCO can collaborate in that issue. The steps should be taken as soon as possible. All ready various climate extreme conditions have done massive distraction to the durability of the heritage sites in this region. Non-climatic factors are also going to be huge threat in upcoming times. Each individual factors mentioned above study are matter of research in a broader perspective to invent passive conservation strategies and protect our glorious past and brightening present international images.

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