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TITLE: DISASTER RISK REDUCTION (DRR) MEASURES FOR HERITAGE SITE AT RISK, A CASE OF BAHU DERE IN SWABI-KHYBER PAKHTUNKHWA, PAKISTAN

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ABSTRACT:

Background: The assets of previous civilizations, known as cultural heritage, are at risk from both natural and man-made disasters. It is extremely risky to lose these assets, whether they are tangible or intangible, due to existing hazards and vulnerabilities. **Purpose:** This study will concentrate on strategies for reducing disaster risk for cultural heritage sites that are at risk from natural or man-made disasters. Cultural heritage is vulnerable to a wide range of risks, including earthquakes, torrential downpours, urbanization, development, tourism, floods, vandalism, thefts, winds, sliding, and other dangers depending on where the site is located. **Methods:** This article will use cultural heritage sites as an example, using a practical survey to elaborate on risk assessments for these sites. It will also use several modules to research and suggest disaster risk reduction strategies for these sites using real-world examples and case studies. **Results and Conclusions:** This study will offer recommendations for heritage sites including how to reduce disaster risk, the function of stakeholders, and the ability of the community to protect the legacy that is vulnerable to disasters. Each heritage site that faces a

different hazards can use a module. **Implication:** This study has a significant impact on preserving cultural heritage sites that are in danger and require evaluations through standardized modules for heritage sites in a community and region. To protect the lifelines of civilizations in danger, a set of straightforward principles is offered with a case study of a cultural site.

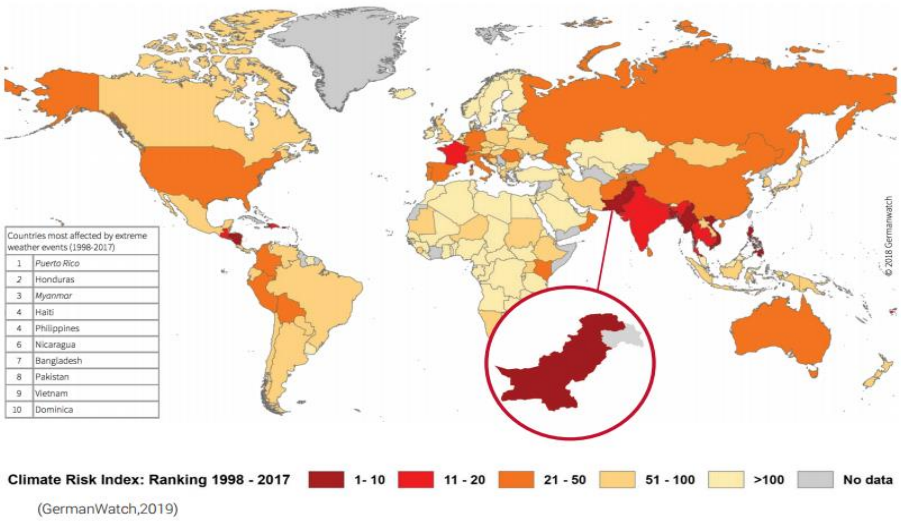
INTRODUCTION

World Heritage organizations are working on heritage sites that need to protect from the different disasters around the world. The 1972 Convention has to protect 1000 world heritage sites in different countries around the world. Disasters i.e. Natural or man-made always threaten the cultural heritage (Tandon, 2013).

Examples of cultural heritage at risk include the Iraq Museum, Syria, Lebanon, the Bamiyan Buddha in Afghanistan, and the Cairo Museum, in addition to natural calamities like the Kobe Earthquake in Japan, the Tsunami, the Florence Flood, the Khyber Pakhtunkhwa Flood, the Earthquake in Pakistan in 2005, and the War Against Terrorism in KP.

Pakistan is one of the disaster-prone nations in South Asia and is threatened by several ongoing hazards, including seismic activity, flooding, annual monsoon rains, and varying climate conditions (Khan, 2017). Due to the war in Afghanistan between the US and Taliban and the man-made calamities like degradation Pakistan has been fighting against extremism. The cultural legacy is under threat from all of these disasters, and further continuous development and urbanization growth pose further risks (UNDRR, 2019).

The main cause of the flood damage to heritage in Pakistan is excessive rainfall, or monsoon rain, which poses a serious threat to all of the country's heritage sites due to their exposure to flooded areas, mountainous regions, and proximity to rivers, land sliding, and degraded forests. Figure # 1 is the climate risk index i.e. ranking 1998 – 2017 (Eckstein et al., 2019). According to the climate risk index, Pakistan is one of the top 10 nations that pose a threat to world heritage sites.



(GermanWatch,2019)

The main threats to our cultural and architectural heritage are natural disasters. All disasters, whether they are man-made or natural, not only pose a threat to cultural heritage but also human life, the economy, physical infrastructures, social activities, etc. In the past, examples of disasters that posed a threat to heritage included the earthquake in 2005, the flood in 2010, the looting of the national museum in Iraq, the looting of the Alpha Moya Mausoleum in 2012, the looting of Bamiyan in Afghanistan, and the war in Pakistan from 2007 to 2012.

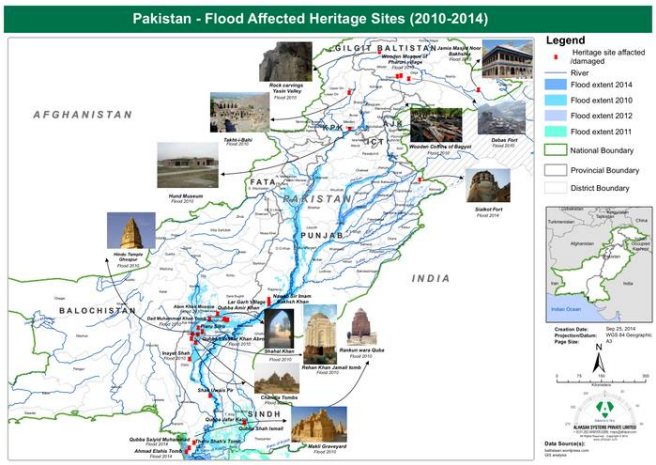
To suggest potential frameworks for the future disaster to protect cultural heritage, many frameworks for cultural heritage protection have been developed internationally with the help of the world heritage center at UNESCO, ICCROM, Blue Shield, Prince Claus, ICOMOS, ICOM, and ICORP.

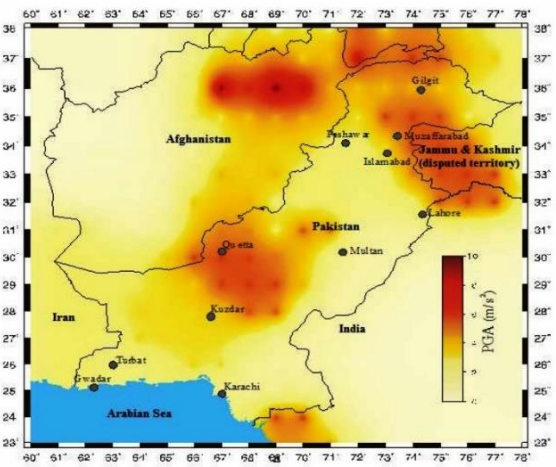
The parties involved in developing the framework for the Cultural Heritage at Risk are the Hyogo Framework of Action (HFA) Kobe Hyogo - Japan 2005 - 2015, World Conference on Cultural Heritage at 2005 by United Nations, and Hague 1954 Netherlands by UNESCO.(Ünal, 2012).

Understanding the disaster risk, strengthening disaster risk governance, investing in disaster risk reduction, and improving disaster readiness are the top priorities of the Sendai framework, one of the greatest techniques for disaster risk reduction.

Pakistan has a few institutions, including the PDMA (Provincial Disaster Management Authority) and NDMA (National Disaster Management Authority), as well as district-level divisions of these bodies that deal with local disasters. However, there is no such framework or authority to work during or after the disaster on protecting Pakistan's cultural heritage. As a result, as time passes, we will lose heritage places (UNDRR, 2019). Figures # 2 and 3 are the maps of flood-affected heritage sites and the seismic map of Pakistan.

Each location has unique geographic characteristics that could endanger historic structures. Regional issues are the primary areas that Pakistan's NDMA must address in accordance, although there is no step or priority set aside for heritage sites in Pakistan.





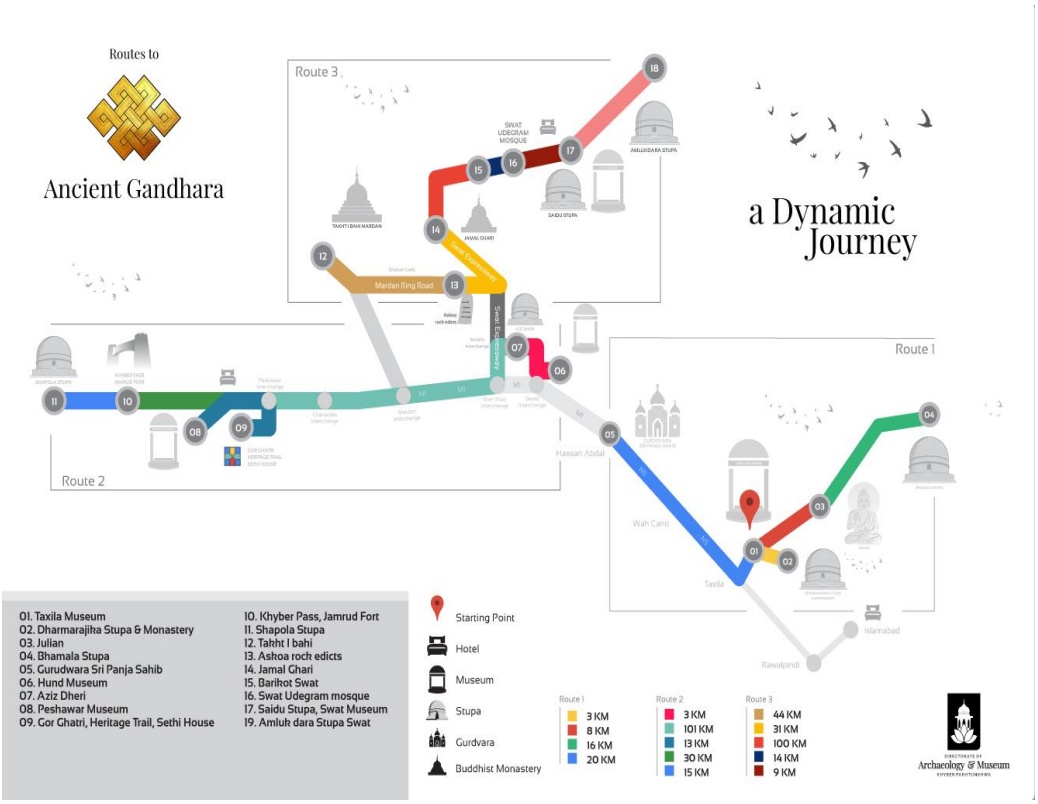
GANDHARA HERITAGE SITES AT KP

The lifeline of the Gandhara Heritage sites began in the Swabi region and ends in the Swat division in Khyber Pakhtunkhwa Pakistan, which is known as the "country of Gandhara wisdom." The Gandhara Civilization's beautiful and opulent architecture draws professionals, students, communities, and tourists from Pakistan and around the world.

However, ongoing natural and man-made disasters are destroying these monuments, endangering the Gandhara heritage and sites in KP, and posing a serious threat to one of this region's ancient civilizations. As a result, these sites needed a disaster risk management framework to save civilization's knowledge, which is already in danger in Khyber Pakhtunkhwa, Pakistan.

The preservation of heritage monuments is crucial to preserve for future generations as a source of information, skills, and social appeal as well as a force to propel the region's economy through tourism.

The preservation of cultural heritage is crucial and must be made sure for future generations, not only because it is a source of a community's cultural identity but also because it is a major economic driver. Figure # 4 (DA&M KP - 2021), published by the Directorate of Archaeology and Museums at Khyber Pakhtunkhwa Pakistan, is a map showing the Gandhara heritage. It includes some portions of the heritage sites from the Punjab province also.



Disaster Risk Reduction Approach

The Gandhara Civilization's heritage sites are protected by World Heritage organizations, but many of these sites are still at risk from natural and man-

made disasters. While national organizations are working on projects like heritage conservation and restoration, the most crucial thing we need to focus on is the "disaster risk reduction framework" for securing the heritage sites that are in danger in the area.

Heritage sites have similar value and necessitated plans for protection against future calamities. World Heritage organizations and UNESCO worked on individual sites that are on the list of World Heritage Sites. Working on the "Disaster Risk Reduction Framework for safeguarding heritage sites at Risk" is the overarching idea that needs to be pursued.

We don't have any such plans to keep it from further degradation, not even the ICCROM-developed First Aid to Cultural Heritage concept. A challenging issue for professionals and groups to safeguard the cultural sites is the discovery by the Directorate of Archaeology and Museums KP of several Gandhara heritage sites in the region. And the first stage in creating DRR plans is to identify the historical sites that are at risk. Then, using technology and the expertise of disaster risk management professionals, work on a framework for these historical heritage sites.

A CASE STUDY OF BAHU DERE SWABI

The site was discovered by the directorate of archaeology and museums, Khyber Pakhtunkhwa Pakistan, in February 2022 because of a dispute between two parties in the area over the theft of artifacts from the site. It is situated in the village of Bahu Dheere in the Razar Tehsil of the District Swabi. Numerous Buddhist ancient sites can be found in this area, including Rani Ghat, Aziz Dere, Zaro Dere, and seven other Dere, according to local lore. The Dere is a local word used to denote the mound or a mountain with less height. This network connects to the Swat region through the steep valleys that run from Swabi to Buner to Swat.

Due to its historical significance and 1800-year-old civilization, Bahu Dere stands out among other places. It is in the Swabi region, 83 kilometers from Peshawar and the capital Islamabad. During the excavation at Bahu Dere, the specialists found a 10-foot-long life-size figure of the Buddha from his feet. The investigators discovered an additional 400 hundred antiques there (BBC, 2022). The attraction of this place in the Swabi region is the largest stupa in this area, which is 73 feet in height. During the author's survey of the site, it was discovered that the site contains a variety of unusual figurines, including a small Buddha, statues of various sizes placed in various locations, as well as social activities and architectural styles from that era associated with various social statuses. One crucial area of study that helps us comprehend the skills, social life, activities, and technological use of a particular culture is architecture. The language of Gandharan architecture from 1800 years ago is evident in the use of local stones, the use of lime and mud as a binding agents, and the decorative niches and corners of the stupa. These sites give views that make it simple and useful to see the entire surrounding environment. Site views and information are shown in figures # 5 to 13 captured by the author.

Bahu Dere Heritage Site Swabi

DISASTER RISK REDUCTION APPROACHES "A Case Study of Bahu Dere - Swabi"

First, it's crucial to comprehend the terminology used to describe disasters because the terminology is critically linked to vocabulary. Locals are better knowledgeable about their area, villages, cities, towns, etc., and this information can be used to the site's advantage in disaster risk reduction strategies. Understanding the fundamental terms is crucial for teaching students, professionals, and the public about terms like a disaster, both natural and man-made, hazards, risk, vulnerability, capacity, exposure, and some other fundamental terms.

The historic site of Bahu Dere Swabi is in jeopardy. Consequently, the first concept to comprehend risk We typically use the term "site analysis" to refer to an analysis of any site. Situation analysis is crucial when working on the DRR Plan. The geolocation of the site and any hazards, whether natural or man-made, that increase the danger of a disaster must be known to research the condition of the site. It is crucial to gather information on maps, plans, pictures, and anything else that may be available.

Find out the significance of the site you are working on, the local community's involvement in and connection to the site, who owns and maintains the heritage site, what kind of relationship the site has with the community, and whether the site generates any income, and whether the relevant authorities are connected to the site. What are the capacities—local, governmental, and organizational—that can be used during a disaster, or even before or after it, to protect cultural heritage? To create a disaster risk reduction plan for the heritage site, the following fundamental questions must be addressed.

Various Modules:

It is also crucial to understand the many modules that will be used in the safeguarding of cultural heritage. The crucial modules created by ICCROM are listed below; you must be familiar with them to use them during the processes for disaster risk reduction. (DALLAL, 2021).

Module 1: Terminologies
Module 2: Situation Analysis
Module 3: Stakeholder consultations
Module 4: Risk Assessment
Module 5: Working with communities
Module 6: Risk Mitigation/Reduction

Beginning with the concept of a disaster risk reduction study of the endangered Bahu Dere heritage site, the necessary first step was to locate the route to the site, the nearby community, and the organizations that were authorized to permit you to collect data because the plans and any information about the heritage site would need to be gathered.

It is crucial to communicate with the organization because the site is governed by the directorate of archaeology and the museum's KP. Stakeholder mapping is a crucial phase to consider. Who are the site's stakeholders? Stakeholders of the site include, for instance, the neighborhood police station, the local government, the local community, security personnel, neighborhood NGOs, and the directorate. Therefore, identifying stakeholders is a crucial first step in developing a disaster risk reduction strategy for this historic property. These characteristics are all available. Figure # 14 explains the risks near the site as well as the weaknesses and ability to assist you with the site's disaster risk reduction plan.

For the risk reduction strategy, a personal visit to the site is crucial. Discussions with stakeholders are necessary to gather information about the history of the heritage site. Since locals have lived in the area for a longer period and have experienced more natural and man-made disasters, they are better qualified to identify the routes and points that will aid in your plan and are more helpful in disaster risk reduction.

With the assistance of the local community that resides there, the hazards and weaknesses in the above image were marked using Google Earth. The site is exposed to heavy rain floods because a large portion of it is in contact with a deep water channel that is coming down from the hills, and because the water flows very faster during heavy rain seasons, especially the monsoon rains, which are particularly dangerous to this site. This gives water the best chance to sweep away the appropriate portion of the site in the event of a heavy flush flood. Figure # 15 shows that to provide access to homes and schools, people blocked the path of rainwater, which might easily destroy the site during severe downpours. There are a few other examples of risks for this historic site in the site's Google Earth image, which is seen above. A tree that was cut down at the site of a 10-foot-tall Buddha and still appeared threatening was an example of how dangerous it is to plant trees inside a heritage site since they can damage the site's structural elements figure 16 left side below.

Figures # 17 and # 18 on the right show nearby construction that poses a risk to the historic property. It is above/upside, and exposed drainage pipes from nearby homes and public structures provide a risk of damage to the site.

A similar problem exists on all four sides of the chosen heritage site; in certain places, dense

vegetation, drainage systems, streets, and nearby construction all pose risks to the historical assets.

Rockfall from the hill above the heritage site is perilous for the local community first and subsequently for the heritage because both the site and the community living there are already at very high risk. Without proper planning, homes, community facilities, and public facilities like primary schools are built, and the streets that connect them become obstructions to the water channel during heavy rain.

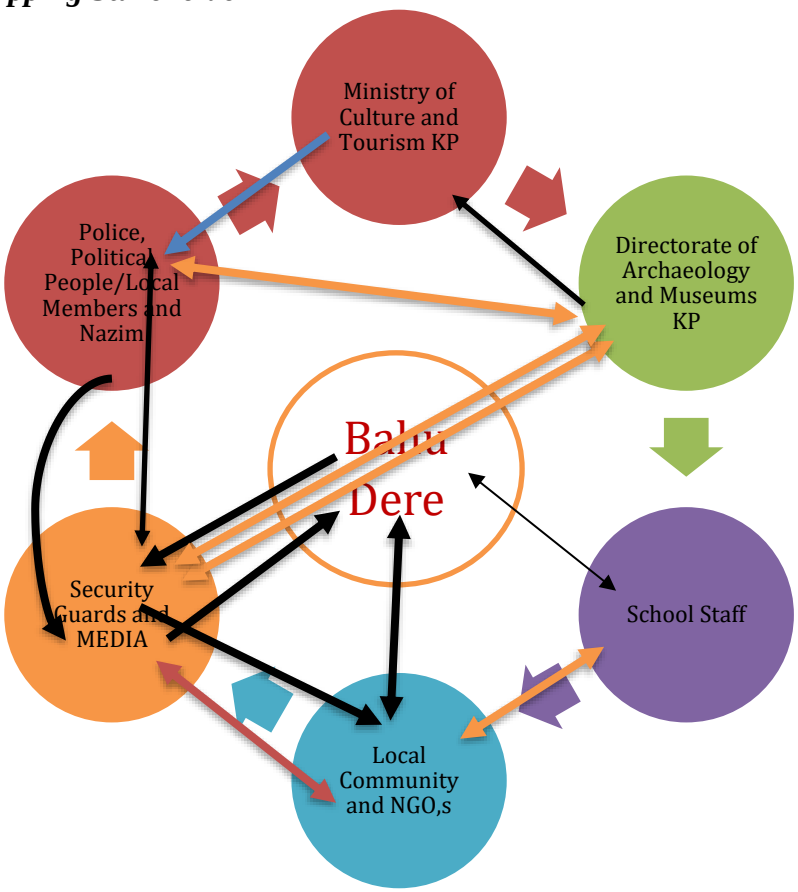
The local population is not aware of the significance of this heritage site, which is located in the center of the hamlet, which presents another concern. The primary stakeholders in this site are the schoolchildren, the local community, and everyone who lives nearby. However, because there is a lack of understanding about the heritage, it is in danger because locals, tourists, and children frequently come to this place and damage or remove small statues. They also take stones from the heritage site to use in the construction of buildings for their homes nearby.

The disaster risk reduction strategy is necessary to safeguard this historic place from future harm and devastation. The DRR Plan for the chosen heritage site must consider risk, hazards, vulnerability, capacity, exposure, and stakeholders among other factors.

Disaster Risk Reduction Plan for Bahu Dheere

With the use of illustrations and a greater description of concerns, the study went into detail about the risks facing cultural property. Stakeholder mapping is crucial in the Disaster Risk Reduction Plan since the local population is more familiar with the risks, vulnerabilities, and solutions. Identify the individuals that can assist you in heritage protection (Tandon et al., 2021).

Mapping Stakeholder



This is a crucial stage in gathering the data for your plan. The local community can assist you by explaining the vulnerabilities as well as prior dangers. You can learn about past and anticipated looting, vandalism, damages, and other

incidents from the police and security personnel. They will inform you of the risks and may even have better solutions, but due to a lack of physical, financial, and intellectual resources, it is not possible to secure the site. The political figures will be useful in gathering the neighborhood residents and journalists. The media will spread information and raise awareness to inform funding organizations, disaster professionals from the field, and institutions as well as other groups interested in heritage. comprehensive disaster risk reduction strategy Applying stakeholder mapping can be more effective. Once you have gathered all this information, you can go on to the next phase.

Terminologies

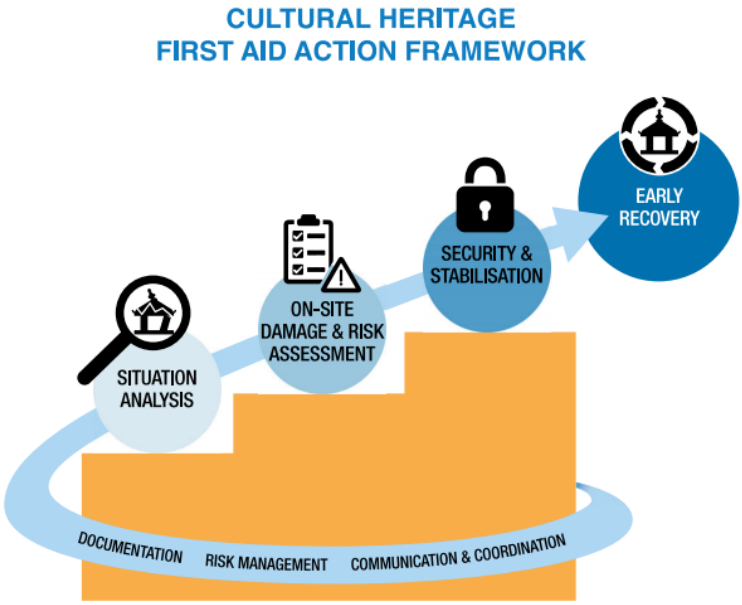
To understand and use the vocabularies in the local context as well as the local language, it is crucial to grasp the work terminologies for the disaster risk reduction plan as well as the basic terminologies of disasters and cultural heritage. Determine the basic terms that are typically used in disasters, such as "disaster," "risk," "management," "culture," "heritage," "hazards," "vulnerability," "exposure," "capacity," and "heritage site," etc. This will help everyone involved with heritage sites to understand these terms in their languages before, during, or after the disaster (Meltem VATAN & YARAŞAN Bahçeşehir University, 2020).

Local Community

The local community is a strength when creating a disaster risk reduction plan for a heritage site. By identifying the neighborhood around the site and finding those who are more interested in the heritage sector, we may enlist their assistance. The masjid imam can assist you in being conscious, as can the faculty, community members, and religious individuals. With the aid of brief visits, training exercises, public awareness campaigns, postcards, cultural events, etc., you must develop your capacity for the chosen heritage site. This will aid in the framework for disaster risk reduction (Tandon et al., 2021).

First Aider Team

A team of trained individuals known as the "cultural heritage first aiders" is necessary to assist you in protecting cultural heritage. They will compile all the preliminary data and create a work plan for the required steps for the heritage that is in danger. A crucial component of the disaster risk reduction strategy used to protect heritage sites Figure # 19 is the image of the cultural heritage first aid framework (Tandon, 2018).



This is the disaster response strategy, either natural or man-made, developed by ICCROM experts to safeguard cultural heritage.

Risk Mitigation

Some experts recommend taking these steps to lessen public exposure to a particular heritage site. You can investigate disaster risk reduction measures and safeguard the heritage site once you have determined the risk profile of the chosen heritage site.

Experts Team

Disaster For a heritage resource, risk reduction requires a team of professionals who comprehend risk and know how to mitigate it in the future. Disasters often take diverse forms, thus learning about previous disasters from the local population is crucial. We can create a framework or plan for the heritage site that can protect it from upcoming disasters based on collective knowledge and research about the place.

Role of Organizations

Organizations play a crucial role in the DRR Framework because they have the resources and expertise needed to support heritage sites. The NDMA, PDMA, DDMA, and other stakeholders in Pakistan must participate in these initiatives. Such teams must receive training and education on heritage to comprehend it before engaging in hands-on work with heritage experts.

Resources and Funding

It is crucial to determine what resources are needed for the chosen cultural site because resources and funding are the major entry point for the DRR strategy

for heritage sites. The situation analysis will outline the funding and resources needed for your DRR plan for the historical site. The first stage in putting your proposal into practice will be to look for funding opportunities.

Objectives

To accomplish the crucial goals and objectives for the heritage site, the study of architectural heritage sites and the advantages of the DRR framework would be beneficial. The following goals can be accomplished using the DRR Framework:

- To develop advanced disaster disk reduction Plans (DRR)
- To protect the architectural vocabulary of Bahu Dheere
- To provide first aid to heritage sites at risk
- To understand sustainable architecture and planning of past civilizations
- To increase opportunities for tourism and community development in the region
- To create awareness about the importance of Heritage
- To strengthen the lifeline of Gandhara Architecture

This broad concept paper is an effort to show how we may safeguard the cultural heritage in our area, what are the key simple actions that we are lacking, and how to deal with disasters and loss of cultural treasure. The simple procedures needed to concentrate on a chosen history with your regional terminology and comprehension. The first stage is to strengthen local knowledge and awareness throughout the area with the aid of First Aiders of Heritage, organizations, various campaigns, specialists, and community involvement.

Recommendations

The measures for disaster risk reduction that should be taken into consideration for actual implementations to protect the Bahu Dere Heritage Site are listed below. These suggestions are based on the real-world knowledge, exposure, and experiences needed in our region for such priceless heritage sites in Khyber Pakhtunkhwa (JIgyasu Rohit, 2013).

S.NO	Descriptions	Images
1	Ancient Gandhara Civilization, 1800 Years old Bahu Dheere Site is Unique in the Region, and the Concern Authority Need to Work on Risk and Situation Assessments to figure out the causes of Hazards, Vulnerabilities, Exposure, Capacity, and Route and to Explore Solutions for the Safeguarding of Heritage Site which is at Risk Since February 2022.	

2	First aid to Heritage is crucial in the early stages of the project since the Site is vulnerable to both natural and man-made hazards. Although temporary protection had been set up by the Directorate, it had already disappeared owing to weather and wind pressure. As a result, to provide first aid, it is necessary to identify the arrangements for both the individual elements and the overall site.	
3	The existing houses there needed a good drainage line to protect the heritage site from further deterioration by the drain water from the buildings, and the authority needed to restrict future construction near the sites because it is a factor in the site's degradation. The figure's exposed, unprotected drainage pipe that runs from the heritage site upside down is hazardous. With the aid of funding provided by the local KP government, the line should be extended from the location to the opposite side of the street or connected to the main water channel using concrete or plastic pipes.	
4	The plants now growing on the site need to be removed immediately because the elements have already harmed some sections of the property. It is necessary to remove these abstractions carefully and to sanitize the site and its components. After the trees are removed, the appropriate repair is needed.	
5	The site is unsafe because it has a lot of exposed elements. Some were harmed by unidentified individuals, and there is no First Aid response to safeguard these crucial components, which are unique. There are numerous statues inside this cultural site with distinctive shapes, but the male and female statues have been damaged by the locals and require immediate repair.	
6	A retaining wall is necessary to support the site since it is blocked by a water channel that collects rainwater from the hilltop and flows through it. Stone and dirt are poured into the water channel to create a connection between the road, the school, and the homes. The stupa is 73 meters high and dangerous for the site, the town, and the school, thus a modest bridge is needed to open the passage to the water and protect the site from the pressure of the water.	

7	To protect the site from intrusions from the outside and avoid obstructing outside views, boundary walls made of steel mesh are necessary. The installation of the electric poles must be done away from the historic site because they are so close to it. To attract tourists and safeguard the site with the same architectural style, it was necessary to renovate the weak construction, such as the block wall up site, with stonework.	
8	For the convenience of the local population and visitors alike, the road to the heritage site needs to be built with concrete or stone pavers. An information office is also needed to inform visitors about the site's significance, though a digital room would be preferable for establishing and securing the collections inside the room.	
9	To easily grasp the site design and architecture, site drawings with 3D views and animations are necessary, as well as a physical model of the entire site. It is also needed to print a little book on Bahu Dheere for awareness and education. As a result, the region will have the chance to benefit economically from tourism.	
10	The local population must be made aware of the value of cultural heritage and its advantages for the area through various training, seminar, and visitation events, which must be organized by the directorate and ministry. Participation of the local community, schoolchildren, teachers, seniors, and council members from the area is crucial for any activities taking place on the site while taking all necessary safety precautions. It is simple to create disaster risk reduction (DRR) frameworks and methodologies for cultural assets in the region if we concentrate on such efforts for a heritage site.	
11	Educational Institutions are the force that disaster risk reduction (DRR) plans for heritage sites at risk should incorporate since they are a source of expertise, skills, case studies, information, and data about how to work, manage the risk, and protect heritage.	

CONCLUSIONS:

Disasters always take on new forms; while we can't predict what will happen in the future, we can learn from what has happened in the past in the area. Natural or man-made disasters can influence cultural heritage, but we can mitigate such effects by using a disaster risk management system, as is shown in this study paper's discussion of the case of Bahu Dheere in Swabi, a region of the Gandhara Civilization. Different kinds of risks are present at numerous historical sites. If we discover the risks and examine our resources, we may use them to create a heritage DRR plan for a heritage site.

The capacity is not just restricted to the relevant organizations that specialize in disaster relief, archaeology, and cultural heritage. The only way to protect a heritage asset is by mapping the stakeholders. The capacities that can be used for the disaster risk reduction framework for a heritage site include the ministries of culture and tourism, disaster management authority, directorate of archaeology and museums, local community, police forces, rescue 1122, schools, colleges, and local members of union council, among others. However, due to organizations' lack of awareness, this results in a lack of interest, a lack of funding opportunities, and a lack of tourism promotion of such heritage.

Professionals and concerned organizations were required to take the initial step in educating stakeholders about history, disasters, tourism, and economic development. If we lose our heritage, it cannot be replaced and we "Culture Can't-Wait" (ICCROM). Digital restoration, conservation, rehabilitation, and documentation can be used to replace it, but without a disaster risk reduction (DRR) framework, it may be lost if there are no such plans, strategies, or frameworks for heritage assets that are in danger. The DRR is a way to use cultural heritage to revive previous civilizations.

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