

An interdisciplinary analytical study on the risk preparedness of Bam and its cultural landscape, a world heritage property in danger in Iran¹

Alireza Fallahi reports on a study investigating the extent to which opportunities presented by the Bam Earthquake in Iran 2003 contributed to the City's current resilience.

Abstract

Cultural heritage is very important in fostering a quality of life with value and pride in all civilizations. It comes together with an historic message and information that the cultural materials transmit from the past to the present and the future. Therefore, the protection of world cultural heritage from natural and man-made disasters has been a focus both nationally and internationally for the last fifty years. There are a number of examples indicate the extent of the irreplaceable destruction of heritage by natural disasters, such as Arg-e Bam.

Similar to most disasters, the 2003 Bam earthquake presented windows of opportunities for disaster mitigation, risk preparedness, physical planning, and socio-economic and cultural developments. The earthquake damaged a significant part of the historical areas of city and created an opportunity for developing a resilient community that could be used as a model city for other parts of the country.

The Bam disaster created new opportunities for the city's exceptional cultural heritage and further developments in tourism. Publicity focused on the earthquake provided an opportunity for further development and growth of the city's unique and internationally renowned date production, renovation of the old irrigation systems, and expansion of the city's related industries. The city could also use this disaster to reshape its physical planning and development by introducing new planning ideas and innovations.

Now, more than four years after the disaster, this article analyses the extent such opportunities were exploited and proposes strategies and recommendations for future risk preparedness planning in Bam. It outlines a study, findings of which indicate that without undertaking an integral approach in terms of physical, social and cultural aspects, there will be little chance to find suitable and sustainable growth.

Introduction

Bam has a rich cultural heritage which includes first and foremost, the Arg-e-Bam. Being a symbol of cultural identity for the population of Bam and the entire Kerman province, Arg-e-Bam is the largest architectural earthen complex in the world with international recognition. The oasis city is said to have been founded between the 4th and 6th centuries. It flourished as a commercial centre on the silk-road and was a mighty fortified town.

The 2003 Bam Catastrophe led to the destruction of a number of historical buildings and cultural landscapes, hence exemplifying the urgent need for a risk preparedness program in these areas. Despite the fact that Iranian authorities had extensive experience in post-disaster reconstruction, they faced two new major challenges in the case of Bam. In the first instance, contrary to the previous earthquakes which mainly affected rural areas, the bulk of damages in Bam occurred in the center of an urban area; and secondly, this urban area had considerable historical significance.

In this regard, the UNESCO World Heritage Committee was held in China six months after the Bam disaster and registered as a World Heritage site and also inscribed on the World Heritage In Danger List. Some of the criteria for such selection were as follows:

- Bam developed at the crossroads of important trade routes at the southern side of the Iranian high plateau, and it became an outstanding example of the interaction between the various influences.
- Bam and its Cultural Landscape represent an exceptional testimony to the development of a trading settlement in the desert environment of the Central Asian region.
- The city of Bam represents an outstanding example of a fortified settlement and citadel in the Central Asian region, based on the use of mud layer technique (Chineh) combined with mud bricks (Khesht).

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- The cultural landscape of Bam is an outstanding representation of the interaction between man and nature in a desert environment, using the qanats. This system is based on a strict social network with precise tasks and responsibilities, which have been maintained in use until the present, but has now become vulnerable to irreversible change.

Study context

The effort to cope with the complex nature of catastrophe, its successes and failures encompasses lessons valuable both to Iranian and international bodies who have to deal with disastrous situations. To document and analyze the experience, an interdisciplinary study has to be conducted which would take into account the pre- and post-earthquake periods, and would examine the existing strengths and persisting weaknesses in earthquake preparedness and mitigation in Bam. In this respect, heritage properties and historic areas seem to be considered in three ways (Hidetoshi 1999):

- as a 'patient' for whom prevention and preparedness measures should be provided,
- as a 'educational sample' from which methods of disaster prevention and reduction may be learned,
- as a 'value' which has allowed communities to be preserved and strengthened their traditions and cultures over decades. (Roberts, 1999)

There is evidence indicating that 'risk prevention' is supplied as one of the excuses for destruction. It is often claimed that 'adobe and dried brick structures' are weak against earthquakes; hence we must demolish them and compile stronger structures. This concept of disaster prevention devalues adobe and dried brick structures and is also reflected in parts of current laws (building regulations). As a result, certain strong and secure buildings which exist within appropriate climatic and structural conditions are unfortunately being eliminated by this system of restriction called 'strengthening old buildings'. (Murosaki, 1999). In addition, following the Bam earthquake, a number of old buildings were destroyed. Although the earthquake was the immediate cause, this destruction instigated a process of urban renovation. This occurred as during the process of reconstruction, many elderly buildings and structures were demolished in order to allow for the construction of stronger and sturdier structures. However, due to lack of a comprehensive urban design guideline, this destruction did not have a positive and harmonized impact upon the traditional architecture and community infrastructure.

Research questions

Considering the 'relief to development cycle' in relation to disaster prevention and preparedness in historic districts of Bam, the following questions should be addressed and answered:

- How can we protect historic districts from earthquakes?
- How can we prepare an appropriate risk preparedness strategy in historic areas?
- To what extent may strengthening policies increase risk preparedness and disaster prevention capabilities?
- Is there any possibility to successfully administer disaster preparedness programs in regards to Bam, keeping in mind its status as a World Heritage In Danger Property?
- What sorts of risk preparedness measures are required within the management plan of cultural property?
- What are the ways of strengthening the protection of World heritage property, in particular endangered properties?
- What is the role of local people?

Risk preparedness in historical areas

To investigate and derive appropriate responses to the mentioned questions, it appears that we need to examine the relation between historic areas or traditional buildings and disaster risk preparedness from the following three points of view (Hidetoshi 1999):

a. Materials and disaster preparedness

The first point of view lies in a consideration of the vulnerability of traditional adobe and dried brick structures in the event of earthquakes. It should be noted that even though some buildings may be destroyed easily, others may not. A number of earthquake incidences have indicated that different buildings experience varying degrees of damage. For instance, in the case of Bam, dome shaped buildings survived in the majority of cases. This means that the safety of a building against an earthquake is influenced not only by the materials used but also by the type of construction and methods of disaster prevention. In other words, if the materials used are not vulnerable, or if a building is architecturally constructed in a certain way, or if the necessary disaster preparedness measures have been implemented, there remains a high chance that the adobe and dried brick structure will not be destroyed. It is worth mentioning that evidence provided following the 2003 Bam earthquake indicated that few

modern buildings survived while a number of traditional buildings were able to withstand the tremendous force of the natural disaster. This exemplifies the idea that traditional and customary disaster prevention schemes were much more successful.

b. Culture and disaster preparedness

The second point of view is to consider the relation between culture and disaster preparedness. If we look at disaster preparedness from the point of view of culture, it may be recognized that the more affluent a culture is, the stronger the interest in disaster preparedness. Indeed, the motivation for disaster preparedness lies in the belief that there is something to protect, something to love, something to be proud of. If the object of love is lost, the desire to protect will also be lost. If the culture of adobe in a historic district is lost, interest in disaster preparedness will also be lost. Therefore this must not be allowed to take place if future prosperity and survival is to be achieved.

If we look at culture from the point of view of disaster preparedness, the relationship and link between them can further be exemplified. For instance, it is well known that traditional earthen framed windows, plastered walls and tile roofing, which are designs all richly remindful of the culture of traditional buildings, have been devised for the purpose of preventing disaster. This has altered many cultures to become more mindful and understanding and to strive for disaster management and hence has been referred to as “disaster subculture”. It appears that this disaster subculture is alive in the traditional landscapes in most of the Iranian historical areas. (Tehrani 2007)

c. Technology and disaster preparedness

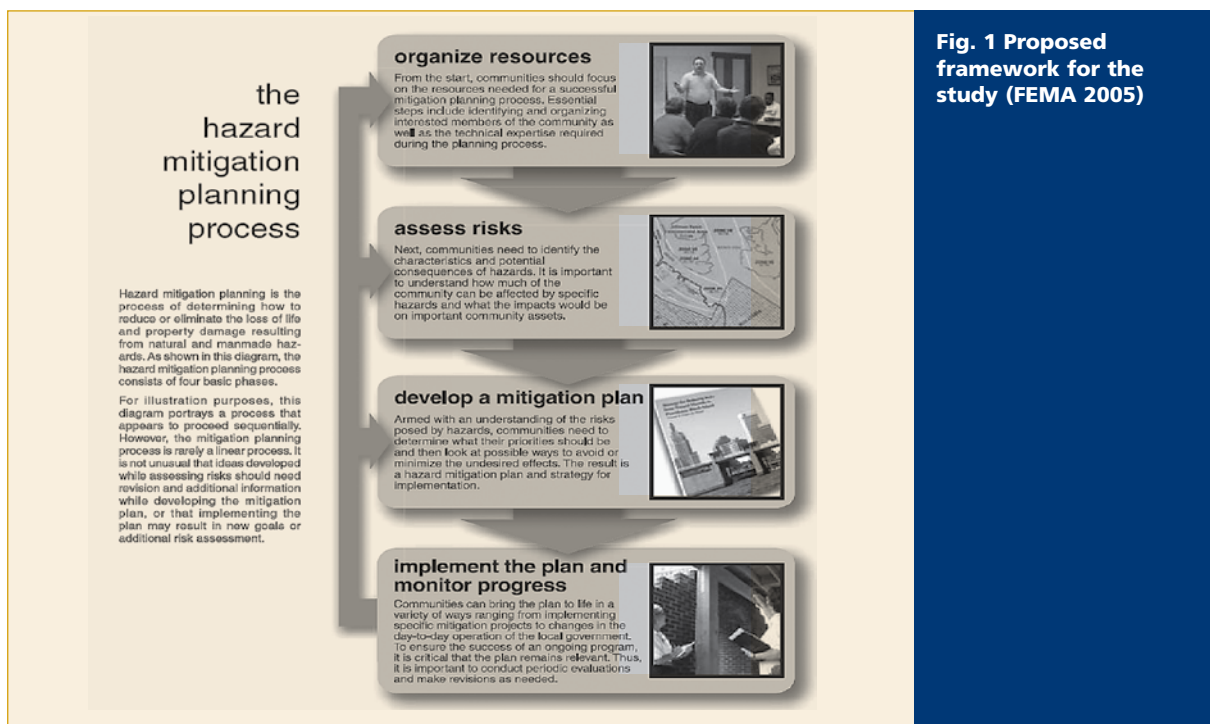
The third point of view is to consider disaster preparedness and its relationship with progression in technology. It is clear that technology is, without a doubt, a part of culture. This means that any form of disaster preparedness must be aligned with not only the culture of the society but also the technological capabilities with which they possess. (Adachi 1999)

The issue here is what and the way in which new materials, such as concrete and new techniques are introduced and incorporated. The uniqueness of a given culture must not be compromised by introducing these materials and techniques in an inappropriate or incompatible manner. In this sense, a spirit of acceptance and willingness must also exist if such hybrid constructions and developments of landscape are to be successfully carried out.

FEMA (2005) has also recently proposed a framework to study risk preparedness in historical areas. In this four steps model, the resources within communities should be organized and then the possible risks to be assessed. To develop a mitigation plan and then, to implement a plan and monitor progress are the next steps in this model (Fig. 1). The mentioned model was little modified and used in field trip and concluding remarks.

Field trip

On 29th December 2006, the field study trip for undertaking a household survey commenced in historic areas of Bam. The team representing the University of Shahid Beheshti, Reconstruction Research Department,



comprised of 3 supervisors and 13 postgraduate students. During the duration of the team's stay, a minibus, provided by the Housing Foundation, was used for travel. The Housing Foundation is a NGO responsible for the reconstruction of the city of Bam. The team was invited to use a room at the Cultural Heritage Organization (CHO), near Arg-e-Bam (Bam Citadel), as a temporary headquarter. The number and locations of historical buildings and cultural sites were outlined by comparing pre- and post-earthquake maps.

On the map of the city, seven regions were outlined and selected according to the residential and commercial facilities and historical buildings and heritage sites (Fig. 2). Previously prepared in three types (A, B and C), blank questionnaires were distributed between the 13 students who had been organized into seven groups, each group focusing their efforts on one particular region within the city.

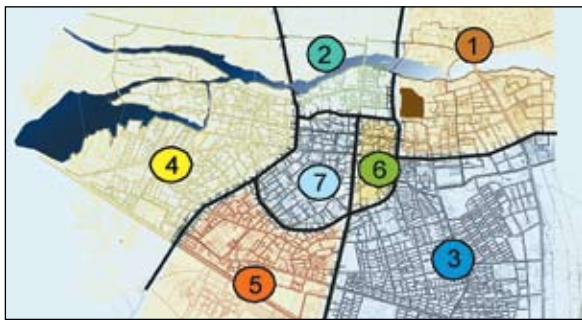


Fig. 2: The City of Bam was divided into seven regions according to the number of historical buildings and cultural sites for undertaking the field research (source: author)

Survey results

As mentioned earlier, the interviews were carried out of three community groups in Bam, as follows:

Group A: People with business affected by cultural heritage;

Group B: People with deep interest in cultural heritage;

Group C: Ordinary people.

Below reveals the findings derived from interviews, questionnaires and field work with local authorities, academics, Business persons and other social groups within Bam:

- Arg-e Bam is a symbol of culture, tradition and history within Bam. For this reason, it represents and conjures a sense of identity and pride within the community. It is this representation which warrants the urgency of its reconstruction, particularly that of its main entrance. The next priority deals with the restoration of Imam shrines and mosques, following by the reconstruction of other historic buildings.

This sequence of priority coincides with the viewpoint of Bam's residents.

- There exists significant differences between the residents of Bam whom hold long entrenched historic within the area and those who have migrated during the post-earthquake period in regards to their feelings of belonging to Arg and other historic sites.
- There does not exist significant differences between low, middle and high social classes in regards to their feelings towards Arg and Bam's overall Heritage.
- Those individuals whom remained residents of Bam after the disaster possess much stronger feelings of affection and attachment towards Bam.
- Younger residents, that is, those under the age of 20, lack awareness about Arg-e Bam and other historic monuments. Therefore, there is an urgent need to educate and train residents in this regard in order to improve cultural awareness and to build a framework of prevention and preparedness. Hence, to form a "culture of prevention" within all levels of society, particularly in schools.
- Some people have been involved in burning date and palm trees and bushes in an attempt to alter the land from agricultural to residential. This has been undertaken in order to financially gain from the difference in price between these two lands.
- Mobilization of local people within councils and their participation, interest and effort in preserving historic areas (90% participants in election).
- Support is required for palm and date tree owners in order to assist in deterring plant diseases and other epidemics.
- Relations must be strengthened between the District Governor, Mayor, The CHO and other related stakeholders.
- An integrative view in risk preparedness within the framework of a comprehensive urban management program must be collaborated in regards to all stakeholders and sectors if success is to be achieved.
- Greater responsibility must be allocated toward the private sector in order to persuade them to assist in maintaining historical buildings (eg. Through renovation). One such action may be turning Amery or Arsham Houses into motels.
- Greater authority and enforcement powers should be granted in order to assist the CHO in regulating a number of protective guidelines. This would allow historic areas to be protected to a much greater capacity and risk preparedness programs can be enforced much more easily.
- There exist 4 main elements in Risk Preparedness: planning, regulation, budget and people participation.

After extracting all data collected during conducting the survey in Bam, quantitative data were put in tables, and quantitative analysis was done. Tables enclosed with this report show the data quantitative analysis.

Qualitative data and information was also extracted and put in a special section for presenting qualitative information. The section titled “Survey findings” was designed to extract and present attitudes of people

interviewed during the survey conduction in Bam. These findings have been analyzed using SWOT technique (Table 1).

Table1. Survey results SWOT

T (Threat)	O (Opportunity)	W (Weakness)	S (Strength)
After the earthquake, increasing numbers of outsiders (migrants) resulted in both, a decrease of local interest in cultural heritage preservation, and a decrease in social relations. These outcomes negatively affected the community's sense of belonging and Bam's heritage.	Native residents of Bam feel deeply attached and aligned with their culture. This has meant that they strongly support and even participate in any program in regards to cultural heritage preservation.	We should be aware that UNESCO regulations and guidelines regarding cultural heritage areas, such as those within Bam, may place certain obstacles in the development process.	Attitudes regarding cultural heritage values, are being influenced by living conditions in Bam, hence any improvements in peoples lives affect positively upon their attitudes regarding heritage values, and preservation programs.
Shortage of income after the earthquake disaster for those involved in the tourism industry forced many to change careers. Therefore, at the present time, there is a very low level of tourism within Bam. The reconstruction programs of Arg-e-Bam should be sped up in order to restore tourism activities and business for the wellbeing of the economy.	Local residents believe that Arg-e-Bam and other heritage elements have been inherited from their fathers, and they hence feel a sense of pride and attachment to the monuments and sites. Such feelings are the reason for their willingness to participate in any preservation program.	Cultural behavior was deeply affected in a negative way after the earthquake. Neighborhoods are disappearing, and peoples' relations are deteriorating.	Most local persons link their family's history to the city, particularly with Arg-e-Bam, and its cultural heritage values.
City infrastructure and international tourism have influences upon one another. Tourists demand quality infrastructure, while good and prosperous conditions attract tourists and hence result in tourism development. Problems with infrastructure can affect heritage preservation and interest in a negative way.	Local people used to present Arg-e-Bam as a symbol of their cultural heritage and link their identity to the Arg. They were proud of the Arg and its great values. For these reasons, they are willing to participate in any heritage conservation program.	After the earthquake migrants (outsiders) are affecting the local urban community of Bam in a negative way, by not following cultural traditions and local social values.	National tourism, prior to the earthquake resulted in the establishment of favorable social relations throughout the nation. These relations led to the providing of assistance during the earthquake disaster period.
Many gardens are being changed into buildings with small flats/apartments. Continuity of this problem can destroy the historical landscape heritage of Bam.	Local citizens live, at the time being, with hope in the reconstruction of the Arg as the most valuable element of their common identity. They are willing to take part in any reconstruction or preservation program of the Arg-e-Bam and its cultural heritage.	After the earthquake, people lost their trust in sun-dried brick structures. This trust should be rebuilt through research and scientific works.	Bam is a city that presents and defends the Iranian urban culture and its values, on the border regions of Balouchestan which can be affected by Pakistan and Afghanistan.

Main issues and problems

1. Sever destruction to the Arg and other cultural heritages, and reconstruction and conservation of CH may last a long time, and people fade up.
2. Authority does not pay attention to public participation, so people lost trust in local authority and do not show good will to participate in programs.
3. City damage and lack of infrastructure may reduce tourism, so the city and its CHs may decline in development process.
4. Outsiders are creating shortage in house stock, and invading palm farms, so date and orange product reduction may reduce interest in heritages.
5. Outsiders are changing cultural interest in Bam, so long stay of them and destruction may reduce people interest.
6. Lack of trust in government and local offices, turned people to see registration of the cultural heritage of Bam, may put some obstacles on the development process of the city.
7. When the qanats were destroyed, villagers became poor, and they moved to live inside the city, so many native people have left Bam and are not willing to come back. This may reduce interest in CHs.
8. Outsiders turned the city to be a nest for drug dealers, smugglers and thieves, so cultural Heritage of Bam may be under risk of destruction and theft.
9. Some were killed by earthquake, for living in traditional houses, so traditional houses are disappearing in Bam.
10. Many cultural heritages' sites were destroyed by earthquake, so fear from earthquake may destroy traditional building style.

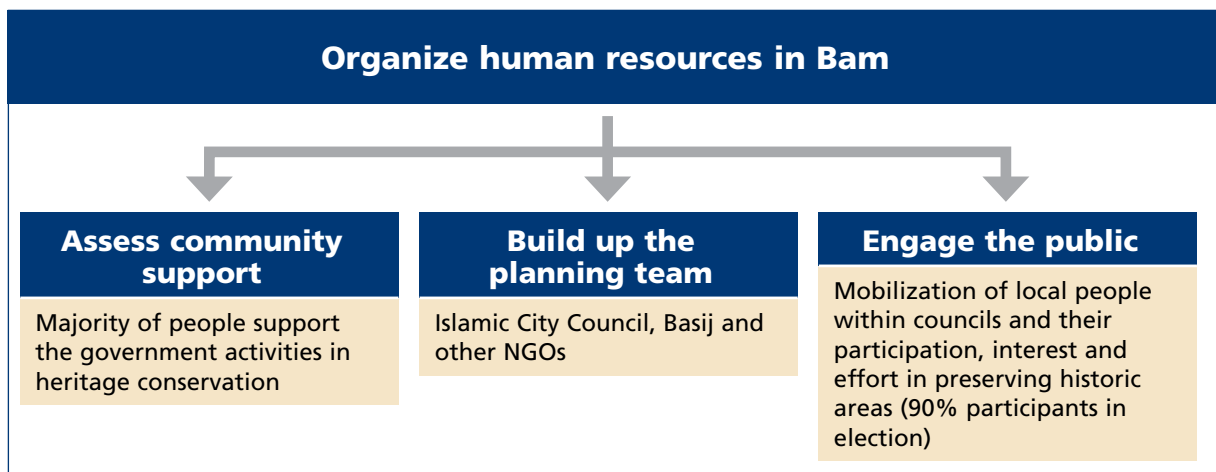
11. Outsiders are changing cultural interest in Bam, and reducing safety,so security for international tourism may be affected.
12. Migrants came to get money allocated to Bam-earthquake victims, so city cultural face may change, and people role in conservation may decline.
13. Mismanagement of reconstruction process have caused problems for people, so distance between people and local authority may increase in a dangerous way.
14. Heritage protection face problems of shortage in many aspects, so Cultural Heritage of Bam may be under risk of destruction and theft.

Action plan

Based on the international literature and the findings from field survey in Bam, the proposed action plan, including operational and organizational aspects, is folded in four sections:

1. Organize local Bam resources

As mentioned in chapter two, the first step to organize resources is to assess community support. The survey results indicate that the high percentage of local Bam people is willing to participate in various stages of heritage conservation. However, the local authority should attract their trust in this regards. The next step is to build up the planning team, in both governmental and community levels. Findings from interviews show that there are some organizations, such as the Islamic Council, Basiji and young Bamis which should be organized in several teams. The third step in organizing resources is to give people the real opportunities to be involved and engage in planning and decision making processes. The recent Parliament Election in Bam indicates that people are interested in expressing their ideas and participate in decision making process.



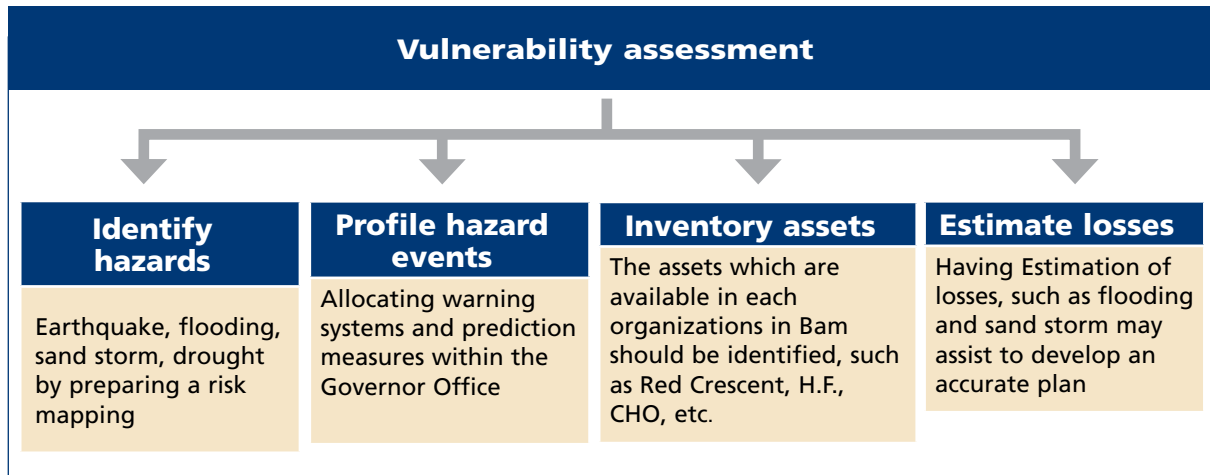
2. Vulnerability assessment

As mentioned in chapter six, there exist a number of hazards that threat Bam, such as earthquake, flooding, sand storm or strong wind and drought. The first step is to **identify hazards** that need to prepare a number of risk mappings for each individual hazards (Table 2). For instance, some people have been involved in burning date and palm trees and bushes in an attempt

to alter the land from agricultural to residential. This has been undertaken in order to financially gain from the difference in price between these two lands. The second step is to **profile hazard events**. The third step **inventory assets** which deals with identifying all assets available in individual organizations in Bam, such as personnel and equipments. The last step deals with **estimating losses**.

Table 2: Hazards in Bam and priorities in risk preparedness

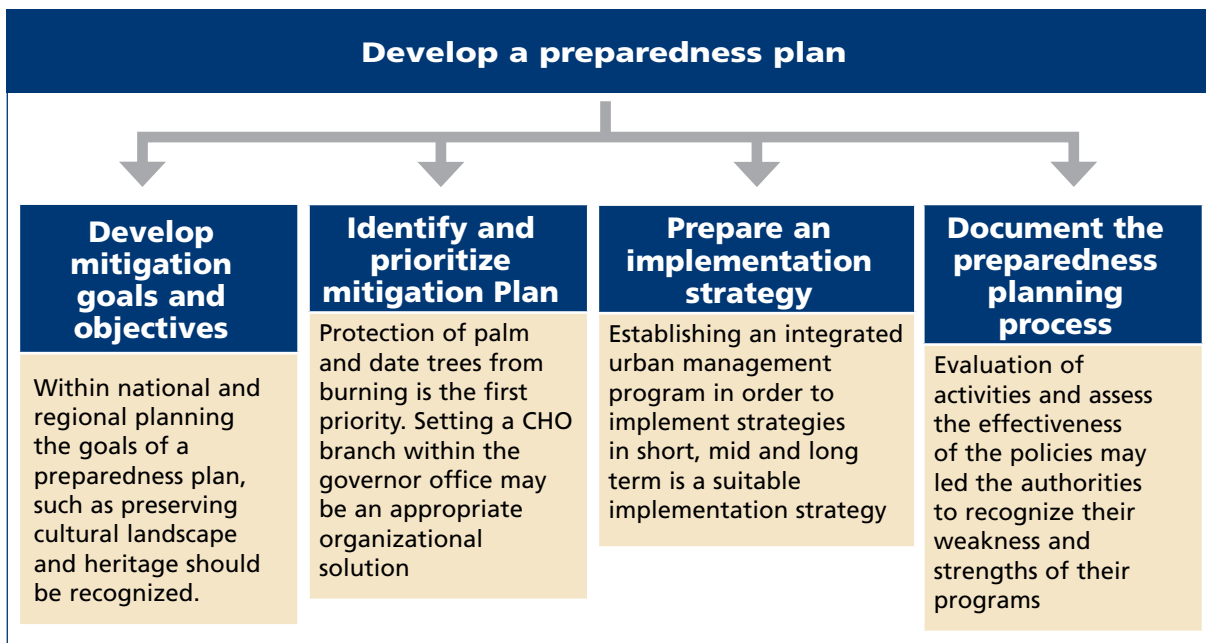
Hazards in Bam	Priorities in risk preparedness
Earthquake	Building earthquake resistance structures according to the 2800 building code, risk reduction strategy in urban planning and developing the culture of prevention
Flooding	Building soil dykes, clearance and construction of flood pathways
Sand storm or strong wind	Planting Ghaz and Kahoor trees around desert areas in order to deter the passage of wind
Drought	Efficient water management and agriculture by supervising qanat, upgrading early warning systems



3. Develop a preparedness plan:

First step, the **goals and objectives of risk preparedness in Bam** should be recognized. This should develop through the national and regional planning process within the country. As far as the heritage conservation objectives is concern, the cultural landscape and historical sites should be approached as an integrated planning in Bam. For instance, if privatization is a goal, therefore a number of historic buildings should be managed by private sectors. The next step is to **prioritize mitigation actions**.

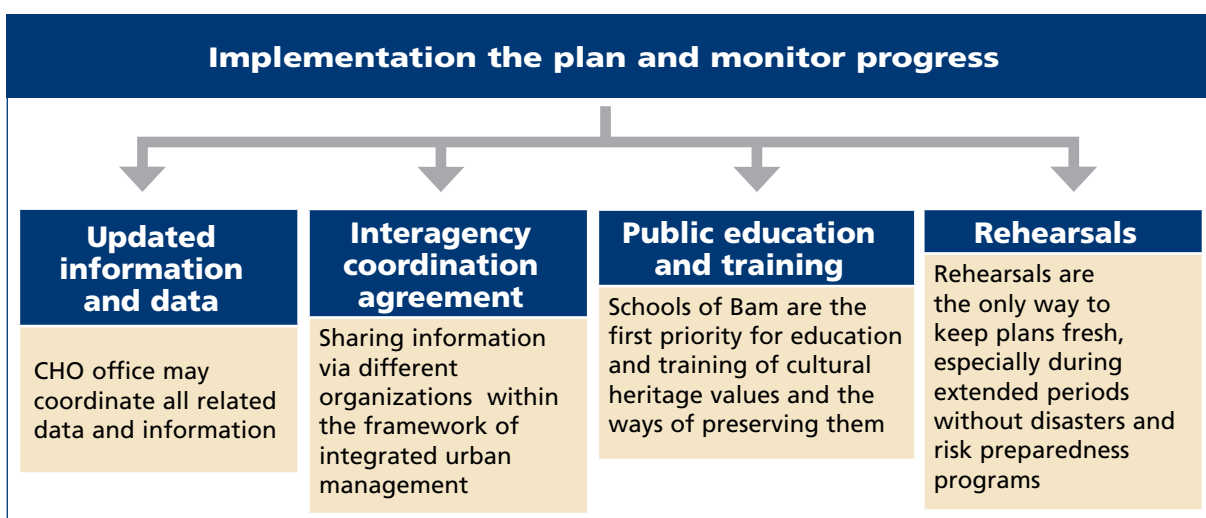
It appears that the first priority in risk preparedness in Bam is to **protect palm trees and burning date trees**. Preparation an **implementation strategy** is the next step. It is worth mentioning that the general governor office has a vital responsibility to lead such activities in the framework of urban management policy by participating all related stakeholders. It seems that a CHO branch should be established within this office to look after heritage conservation in City. Such branch should be given the authority to follow up legally the problems related heritage conservation and historical and buildings and cultural sites. The last step is **documenting all mitigation planning process** in order to learn lessons from them.



4. Implementation the plan and monitor progress

Having **updated information and data** regarding historical buildings and cultural sites is the first step. It is worth mentioning that CHO should work closely with the general governor and other local authorities to evaluate and monitor such activities. The second step is **interagency coordination agreement** in order to share information and data. Third step deals with **public education and training** which can be achieved through schools, local managers public information and media and other extension programs. The findings of the field survey show that younger residents, that is, those under the age of 20, lack awareness about Arg-e Bam and other

historic monuments. Therefore, there is an urgent need to educate and train residents in this regard an order to improve cultural awareness and to build a framework of prevention and preparedness. Hence, to form a “culture of prevention” within all levels of society, particularly in schools. The last step is **rehearsals** that are the only way to keep plans fresh, especially during extended periods without disasters. Rehearsals invariably expose gaps that otherwise might be overlooked. Rehearsals must be conducted system-wide and taken seriously. System-wide means that all the stakeholders which would be involved in a real disaster situation, from central to local authorities, should be rehearsed.



Conclusion

The study reveals that it is not appropriate to discuss the structure of traditional buildings or landscapes without understanding the relation between culture and risk preparedness. After all, the purpose of disaster preparedness is to protect culture, life, significant monuments, traditions and history. The findings indicate that without undertaking an integral approach in terms of physical, social and cultural aspects, there will be little chance to find a suitable and sustainable solution. It is clear that refined culture has been created, transmitted and developed as a result of risk preparedness. Culture which has been protected and nurtured by disaster preparedness must not be destroyed by merely "disaster physical reconstruction". In this respect, the following strategies can be outlined:

1. Bam Cultural Landscape is well known globally, so international assistance and technology available to help.
2. Identity linkage between people and cultural heritage, so people interest to work within a conservation program, should be well considered.
3. Cultural heritage attract tourists, and tourism helps economy develop of the city and the region.
4. Good connections between heritages, palms, qanats, cultural behavior, will turn conducting development program to help conservation.
5. People love heritages and feel proud about them, so local people can help as tourist guides.
6. More than 2000 year history support cultural heritage, so people of Bam are desperate to see international tourists coming.
7. Cultural heritages are useful for the people, but the reconstruction of their life is the most important.
8. Because of people awareness on heritage values and keeping photos of heritage prior to earthquake, CHO can get help from local people on documentation.
9. Arg-e-Bam was the main reason for causing high international interest to the earthquake, so speeding up the reconstruction process of the city will help attracting more tourists and, economic development.
10. Native people of Bam were wealthy and well educated, so they did not use to steal cultural heritage.
11. Even wealthy people of Bam preferred to live in traditional houses, so they are willing to rebuild their houses according to CHO instructions.
12. Local people started to rebuild the Imamzades' shrines, so traditional life is returning to Bam by real people participation.
13. Qanats, palm farms, cultural sights and traditions of people are related, so traditions can be used to well manage the reconstruction of city infrastructure.
14. Local people love humanity, and their identity and their deep roots in local culture, so people can help as tourist guides which will increase international tourism.
15. People are proud of living near Arg-e-Bam, because it is one of the most valuable global heritages, so speeding up the reconstruction process of the city will help quick restoration by people assistance.
16. Local people can keep eyes on the Arg preventing it from demolishing and theft, Local people love heritages and believe in their restoration.

Recommendations

- Speeding up reconstruction programs of urban infrastructures.
- Establishing a department for dealing with cultural heritage aspects within the Local Governor Office.
- Establishing training courses for local people by the Cultural Heritage Organization
- Employing local educated and experienced people and training them regularly.
- Supporting the local cultural and social organizations.
- Educating and training local people by the Cultural Heritage Organization.
- Supporting local NGOs that love cultural heritage.
- Encouraging building new hotels and restaurants.
- Subsidizing reconstruction of traditional and clay made houses.
- Establishing a university in Bam specified on cultural heritage affairs..
- Establishing research institute on cultural heritage affairs in Bam.

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