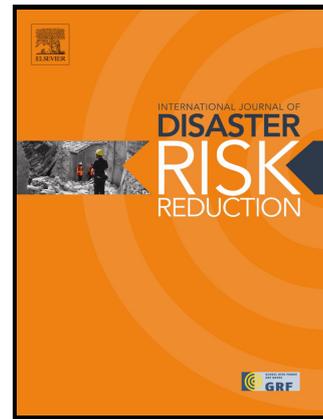


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Handling of Dead People after Two Large Earthquake Disasters in Iran: Tabas 1978 and Bam 2003;

Survivors' Perspectives, Beliefs, Funerary Rituals, Resilience and Risk

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Abstract

This paper targets the handling of dead people after two earthquake disasters in Iran: Tabas and Bam. Both places are located in arid and semi-arid areas of Iran. The high death tolls had a powerful impact on the narratives of Tabas and Bam survivors and witnesses. A thematic analysis of these narratives was performed, and various factors that impacted both the handling of dead people and the survivors' resilience were identified. The paradigmatic landscape of beliefs, rites and funerary rituals were accompanied by other factors, such people under debris, fears of epidemics, difficulty in accessing the water sources, looting, non-identification of dead people and no earthquake disaster awareness and preparedness. Beliefs and cultural traditions are seen as vital resources for the resilience, but they may shape differently the resilience of survivors and the disaster management for handling of dead bodies, and some beliefs may impact the resilience in two different ways. Furthermore, practical suggestions on the both handling of dead people and survivors' resilience are offered. The findings of this study adds to the lessons of handling dead people after

earthquake disasters in Iran, to the agenda of earthquake disaster risk reduction and to the implementation of a sound disaster management and sustainable earthquake preparedness plans in Iran.

Keywords: Tabas earthquake; Bam earthquake; funerary rituals; beliefs; resilience; risk; disaster management

1. Introduction

Earthquakes are geological phenomena that occur “at unpredicted times and in unpredicted places” [1]. Their sudden onset and catastrophic consequences immensely terrify people. After disasters, the relationships between culture, society and environment are heavily affected, and the recovery of local communities is a long, complex and intricate process [2, 3]. Earthquake disaster risk cannot be completely eliminated [4, 5], but it can be reduced to an acceptable or tolerable level [6]. Beliefs, rituals, traditions and myths are cultural elements with important roles in disaster risk reduction [7-13], and each member of the community has a moral obligation to work towards the mitigation of disasters [14]. Disasters influence “deritualisation” process as the ritual practices, including funerary rituals, are disrupted by disasters [15, 16:163, 17, 18]. After a disaster, the large number of dead creates unfounded rumours and spreads fears in the affected communities about high epidemic risk if the dead bodies are not immediately buried [19, 20, 21]. One of the major priorities after an earthquake disaster is the handling of dead people, the recovery of their bodies and their hasty burial [21-23].

This paper targets the seismic space of Iran, and specifically Tabas and Bam, two places located in arid and semi-arid areas of Iran. The earthquakes that occurred in these places, in Tabas in 1978 and in Bam in 2003, through their high death tolls, tested the limits of what people and the communities could tolerate in terms of disasters.

The aim of this paper is to analyse the handling of dead people after the Tabas and Bam earthquake disasters through the resilience and risk perspectives. The first objective is to investigate what factors affected the handling of dead people after these two earthquake disasters. Secondly, the influence of the dead body handling in Tabas and Bam and its factors on the resilience of communities is investigated.

In Section 2, insights about theoretical and methodological background are presented, followed by Tabas and Bam studies and discussions.

2.2. Funerary Rituals and Disasters

Rituals occur at specific places and times and are socially structured behaviours, full of meanings and symbols [25]. Rituals are salient forms of social and cultural interactions [26]. After disasters, rituals provide the necessary framework for required action and help the community to make sense of and discover the meanings of the new situation [16]. Death time and funerary rituals arouse among survivors contradictory feelings of strong affection and despair but also fear, and even rejection, of death [21, 26]. Funerary rituals are intended to help both the deceased and the survivors and are a part of the social practices of communities [17]. Hershiser and Quarantelli [22] distinguished within the handling of dead bodies after disasters, between unorganized individuals' actions and organised actions by local organisations, institutions and communities. In case of a large number of dead people, the complexity of the funeral ceremonies and the allocated time for burial are simplified and drastically reduced [17]. However, the handling of dead bodies still needs to respect the cultural rules of the specific place where the disaster occurred [11, 17, 23]. Dead human bodies must be treated with respect. Rituals need to be carried out as much as possible as they would be performed in the occasion of a normal death. Funerary rituals need to be completed and the dead body transformed "into an individual person" to become "socially dead" [23:18-19].

2.3. Handling the Dead People after Disasters, Beliefs and Risk for Health

After disasters, people are in a hurry to bury the deceased. The fear of epidemics caused by dead bodies is a widely spread and unfounded belief among the affected population by organisations involved in search and rescue, by media and by other public organisations and institutions [21, 27]. Both Morgan and De Ville de Goyet [27:33] and Bourque et al [28] hold their position against such "disaster myths" and beliefs that dead bodies cause the spread of epidemic diseases among the survivors. It is possible for the people who handle the dead bodies to be exposed to various health hazards, such as blood borne viruses, respiratory and gastrointestinal infections [29], if those diseases were already present in dead bodies before their death [29,30]. However, even in these conditions, the risk for health posed by dead bodies is seen to be very low [29, 31] and can be managed by simple precautionary measures, which involve basic hygiene and immediate access to water [20, 27, 32, 33]. Further details concerning appropriate Health and Safety practices and usage of Personal Protective Equipment (PPE) for the handling of dead bodies are offered by PAHO [20] and Morgan [29,

34]. After a disaster, attention needs to be paid to the hygiene and health of survivors, otherwise the survivors themselves can become a source for spreading epidemics [29]. In addition, the putrefaction of bodies starts immediately after death. The terrible smell of decomposition provokes instinctive repulsive reactions of aversion from both survivors and other people involved in handling the dead bodies [27, 29]. In such conditions, dead bodies are hurriedly buried in mass graves and may even remain unidentified [21, 27, 29]. However, the dead bodies need to be treated with respect and efforts need to be made for identification of the dead, careful clearance of debris so as to not further mutilate the bodies, transportation, cleaning, proper temporary storage, non-burial in common graves and respect for beliefs and cultural traditions [20, 22, 29].

2.4. Risk, Resilience, Funerary Rituals and Ambiguous Loss

Risk is ubiquitous within nowadays societies [19, 35]. In terms of acceptable and tolerable risk, societies proved to be very less tolerant to an event where huge number of lives is lost all of a sudden, comparative with the same number of lives lost over the time in a number of separate events [36:66-67]. Disasters and their high number of victims create individual and community trauma and affect both the resilience of individuals and communities.

Resilience relates with concepts such as preparedness and planning for, recovery, adaptation and coping capacity [37, 38]. According to Lorenz [39], the resilience of social systems is very much linked with managing the uncertainty and among resilience's dimensions, the adaptive, coping and participative capacity of the survivors can be named. Within the adaptation and coping strategies of local communities to new realities post-disaster, important roles are played by culture, traditions, moral values, beliefs, rites and rituals [2, 3, 40].

Disasters and the resulting large number of victims create individual and community trauma and affect both the resilience of individuals and communities. Both individual and collective rituals play an important role in the recovery of that "sense of community," which includes social interactions, communication and solidarity among and resilience of its members [40], [41:1377]. Respect and funerary rites and rituals help people to adapt to the new conditions and to cope with the sudden, violent and unexpected death of their families and community members [42, 43]. Recovering the bodies of dead people and establishing their legal identity is an important task in the processes of handling dead people after a disaster as well as contributes to the resilience and long-term recovery of individuals and communities [23]. After disasters, the "transition from a dead body to a person" is essential for families and

employed in Bam. Almost 40 narratives were collected from Bam and from them, 8 narratives were employed exhaustively for the present work. These 8 selected narratives provide very rich details about survivors' perspective in terms of handling of dead people after Tabas and Bam earthquakes. With reference to narrative analysis, the thematic method [51] was employed. The key themes that emerged from the analysed narratives of Tabas and Bam are explored in Sections 3 and 4. These themes are then connected to the sociological theories presented in sections 2.1, 2.2, 2.3 and 2.4. In addition, a combination of etic-emic approach [52] has been employed for the analysed data. Representative fragments of narratives are being reproduced. Furthermore, secondary sources, such as earthquake field reports and various scientific articles and other academic materials, were consulted in connection with the findings generated by the thematic analysis of the narratives.

3. Tabas

The Tabas earthquake occurred on Saturday 16 September 1978 at 19:38 local time when the majority of people were at home. The Tabas oasis is situated between two deserts in Iran, the Dasht-e Kavir (literally, "Great Desert") and the Kavir-e Lut (literally, "Lut Desert"). At the time of the earthquake, and in the days after, the temperature in Tabas was above 30 degrees Celsius during the daytime and above 20 degrees Celsius during the night. The Tabas earthquake was a large magnitude earthquake with M_w (moment magnitude) of 7.4, MMI (Modified Mercalli Intensity) scale of IX+, and PGA (H/V) (Peak Ground Acceleration) of 0.91 – meaning that the maximum ground acceleration was very near to the Earth's gravity [53, 54] – and at a shallow depth of approximately 9 km. In this part of Iran, the Tabas earthquake had the highest magnitude from among 231 seismic events that occurred within a period of more than a century, as shown in Figure 1.

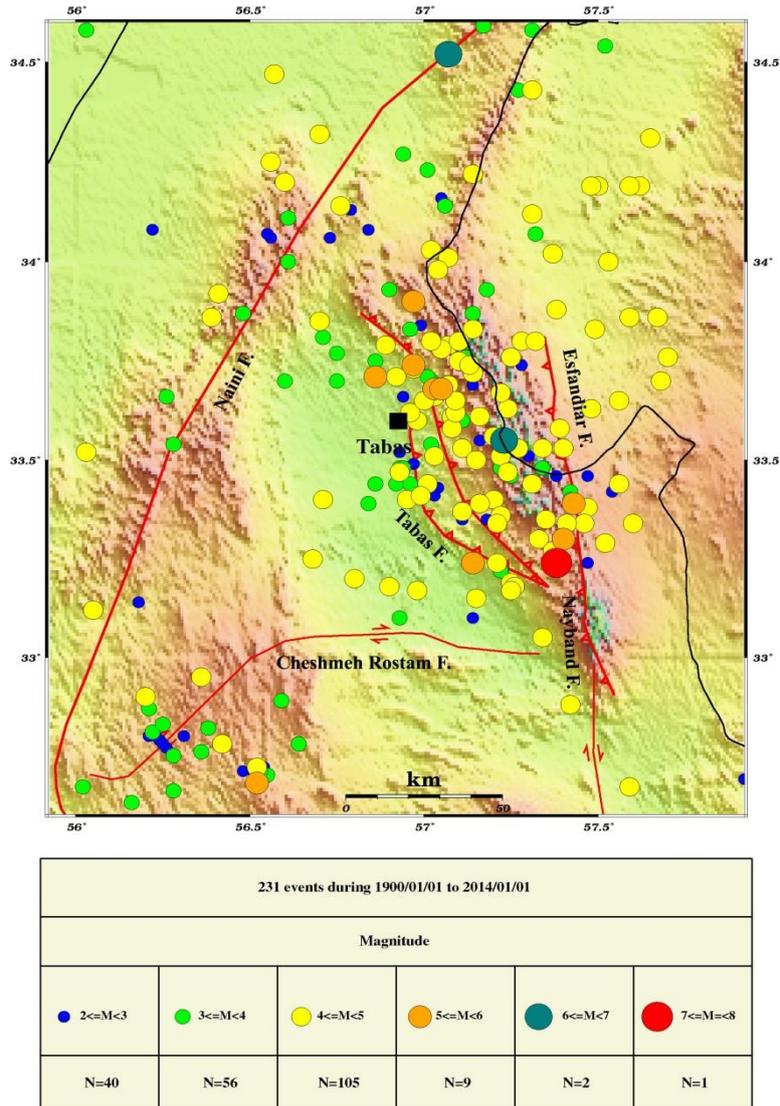


Figure 1: Earthquakes in Tabas and nearby areas in the last 114 years (Source: IIEES).

The population of Tabas was terrible affected. About 85 % of its inhabitants were killed, numbering 11,000 from a total population of 13,000. However, the total number of people killed by the earthquake reached 20,000 as 90 villages around Tabas were destroyed or severely damaged, while 50 additional villages suffered slight damages [54, 55]. The direct economic loss was approximated at that time, at the value of 11 million U.S. dollars [53]. The unfortunate occurrence of a total lunar eclipse just two hours after the main shock of earthquake, together with the breakdown of the Tabas Power Station, severely affected the rescue operations performed by the survivors [55, 56]. In addition, hundreds of people were injured and 15,000 houses were destroyed [53]. The high death toll had a significant impact on the narratives of the survivors of and witnesses to the Tabas earthquake. Table 1 presents the details of the narratives from the Tabas earthquake deconstructed in this paper.

Table 1: Narratives of Tabas earthquake.

Narrative	Survivor	Witness	Remarks	Year/Place/Source
I	Yes	Yes	Man, 70+ years old, survived to a total of 4 earthquake disasters in Iran, lost friends and neighbours	Interviewed in Bam & Baravat, 2012
II	No	Yes	Man, 60+ years old, he witnessed many earthquake disasters in Iran	Interviewed in Tehran, 2011 [47]
III	Yes	Yes	Man, lost all his family members	Interviewed in 1978, Archives Ettelaat Newspaper [57]
IV	Yes	Yes	A young woman, she lost all her family members	Interviewed in 1978, Archives Ettelaat Newspaper [57]
V	Yes	Yes	Man, lost all his family members	Interviewed in 1978, Archives Ettelaat Newspaper [57]
VI	Yes	Yes	Governor of Tabas, at the time of earthquake, he lost all his family members	Interviewed in 1978, Archives Ettelaat Newspaper [57]
VII	Yes	Yes	An old man who lost 25 family members, he was the only survivor of the entire family	Interviewed in 1978, Archives Ettelaat Newspaper [58]

These narratives belong to the survivors of and witnesses to the Tabas earthquake, and two of them are particularly striking. The first narrative belongs to a survivor of four earthquake disasters in Iran, including the Tabas and Bam earthquakes. This survivor is very much related to the Iranian religious system. The second narrative belongs to a person who witnessed many earthquake disasters in Iran, including the Tabas and Bam earthquakes. For many years, he was a part of the management for rescue operations conducted by the Red Crescent Society of Iran. The Tabas earthquake was his first experience with earthquake disasters in Iran. Narratives III, IV, V, VI and VII belong to survivors of the Tabas earthquake and were conveyed through the archives of Ettelaat Newspaper [57, 58]. By using the thematic analysis method of narratives [51], six themes about the funerary landscape after the Tabas earthquake were identified from the narratives of survivors and witnesses. Each of these themes is presented within the following sub-sections.

3.1. Rescue and ambiguous loss

For the survivors, the first priority after the earthquake was to retrieve their family members and other relatives from under the rubble. But the low number of survivors, and the hundreds of injured among them, worsened further the rescue situation. In Tabas, 85% of inhabitants were killed, the number of survivors was low and among them, hundreds had suffered injuries. It was very difficult for the survivors to remove their families from under the rubble by themselves. However, there was a case when one survivor took approximately 110 people out from the debris [50].

In addition, it took quite a long time for the rescue and relief forces to find and reach to the earthquake epicentre – the most affected area by the earthquake – in Tabas. Therefore, vital hours for the people under rubble and survivors were lost (Narrative II), [47]. Volunteers from villages and towns around Tabas joined to the rescue and relief forces of the Sun and Lion Organization (a precursor of the present Red Crescent Society in Iran) and national army. This was the case of people from village of Ferdows. They transferred injured people from Tabas to Ferdows and buried dead people (Narrative I).

The ambiguity of loss, observed after other disasters [31, 40] was not also tolerated by Tabas survivors. People were anxious to rapidly retrieve their family members from under the debris, either dead or alive. As per Narrative III: “I requested the relief groups to take out bodies of my loved ones from under debris. Even, I identified where they were and I showed them, but they just gave me some clothes instead. In these conditions, what should I do with clothes?”.

3.2. People buried under earthquake debris, “Miracles” under rubble and “*Deldary*” (literally “peace in the heart” in Iranian culture) for the survivors

With the passing of time, the chances of remaining alive under the debris diminish considerably (Narrative II), [47]. But many people did not accept such a violent and sudden loss and were hoping that their families were still alive or that a “miracle” would happen even days after earthquake. Narrative V recounted, “Nobody so far came to help us. The bodies of our loved ones are still hidden under debris...It is possible under these debris tens or hundreds [of people] to be still alive” [57].

Stories about people found alive, days after earthquake, encouraged the hopes of survivors that their families might be still alive under the debris. For instance, some days after the

The situation was made worse by the high temperature at the time, in Tabas. Less than one week after the earthquake, a strong smell emanated from the dead bodies and quickly became intolerable for the rescue and relief forces, as well as the witnesses. “I saw this in Tabas and even many animals were dead, their bodies did not have such smell [like people]” (Narrative I). Even the survivors were encouraged to stay far from the debris of their houses [58]. In such foul conditions, in the days and weeks after earthquake, many dead bodies were buried near the places where they were found and not in the cemeteries according to tradition [50].

Funerary rituals “...provide structure and order at times of chaos and disorder” [42:698], and help people to express and relieve their emotions and to grieve in private and public ceremonies. Furthermore, rituals are important for the long-term healing and the adaptation process of survivors and witnesses of disasters. In Tabas, due to low number of survivors, the funerary rituals could not be accomplished. Funerary rituals of Ghosl, Tayamum, Kafan, Namaz-Mayet (see section 2.1) were not followed.

The identification of the dead was conducted mainly by the surviving family members or relatives if they were present at the time of burial (Narratives III, IV, V, VI, and VII). The identification was also performed in some hospitals. And as such was the case for 8 survivors with severe injuries who were transferred from Tabas to the Air Force Hospital in Tehran. Unfortunately, all of them died, and, as their identities were not known, they were transferred to the legal medicine section in order to clear their identities [57].

3.4. Survivors and looting

Survivors were repeatedly urged to move away from the debris of their houses, due to hygiene matters and the intolerable smell of the dead bodies. The majority of people, however, refused to move. This situation in Tabas was relatively common with many other earthquake disasters as people wanted to remain near the rubble of their houses as “...they want to guard the bodies still under debris and the remains of their wealth” [58] – see Figure 2.

magnitude seismic event with M_w of 6.6, MMI of VIII+ and at a depth of approximately 10 km. However, a very strong shake occurred as the vertical PGA reached to nearly 1.0g (980 cm/s^2) and the horizontal PGA was about 0.8g (779 cm/s^2) [53, 54, 63]. The vertical peak acceleration was almost equal to the ground acceleration – or earth gravity – which made the evacuation of houses very difficult. The Bam earthquake was a moderate magnitude seismic event from among the 644 seismic events that occurred over a period of more than a century, in this part of Iran, as shown in Figure 3.

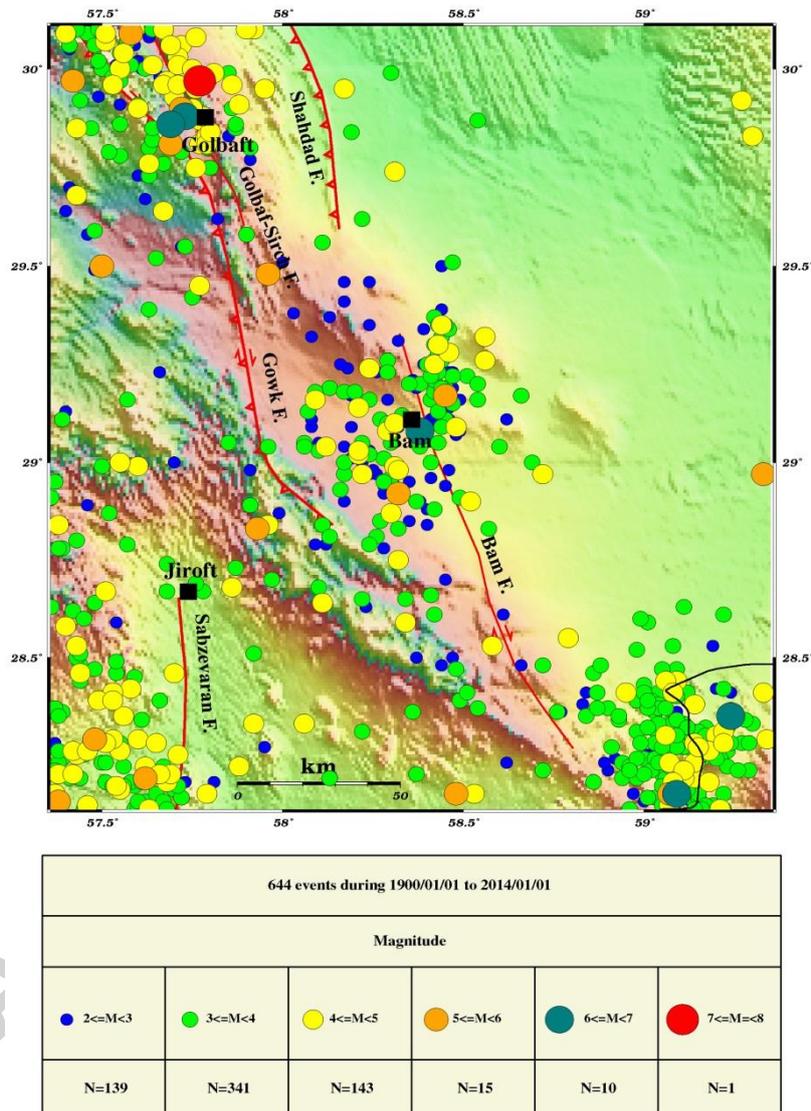


Figure 3: Earthquakes in Bam, Baravat and nearby areas in the last 114 years (Source: IIEES).

The death toll is subject to controversies and even is believed that never will be known accurately [63]. Various estimates offered a number between 26,500 and 43,000 people for the cities of Bam, Baravat and surrounding villages [17, 53, 54, 62]. An official number of

31,500 to 31,828 was later established [54]. In addition, a number between 17,500 and 50,000 of people suffered injuries [17, 54, 62]. More details about the death toll in various organizations, educational and health institutions in Bam are offered by Berberian [54] and Parsizadeh and Izadkhah [64]. The direct economic loss was approximated at that time, at the value of 1,500 million U.S. dollars [53].

The narratives from the survivors of and witnesses to the Bam earthquake were heavily influenced by the high death toll from the Bam earthquake. Table 2 presents the details of the narratives analysed from the Bam earthquake.

Table 2: Narratives of Bam earthquake.

Narrative	Survivor	Witness	Remarks	Year/Place/Source
I	Yes	Yes	Man, 70+ years old, survived to a total of 4 earthquake disasters in Iran, lost friends and neighbours	Interview in Bam & Baravat, 2012
II	No	Yes	Man, 60+ years old, he witnessed many earthquake disasters in Iran	Interview in Tehran, 2011 [47]
III	Yes	Yes	Woman, 50+ years old, lost 44 family members and relatives	Interview in Bam 2012
IV	Yes	Yes	Man, +30 years, lost 3 family members	Interview in Bam 2012
V	Yes	Yes	Woman, +30 years old, lost mother, 2 brothers, 1 sister and many other 2 nd grade relatives	Interview in Bam 2012
VI	Yes	Yes	Man, +40 years old, lost his wife, child and parents	Interview in Bam 2010 [47]
VII	Yes	Yes	Man, +30 years old, lost many 2 nd grade relatives	Interview in Bam 2012

The listed narratives belong to the survivors of and witnesses to the Bam earthquake. Of these seven narratives, the first two were also used for the Tabas case study. Their experiences as survivors and witnesses of the Bam earthquake are explored further in this section. The first narrative belongs to a survivor who had an active role in the performance of funerary rituals in Baravat, a city near Bam. The second narrative belongs to a person who was a part of the management for rescue operations conducted by the Red Crescent Society of Iran in the Bam

area. Narratives III, IV, V, VI and VII belong to survivors of the Bam earthquake and were conveyed through interviews conducted in Bam. Narratives II and VI were published extensively in Parsizadeh 2011 [47].

By using the thematic analysis method of narratives [51], among various other elements encoded within the narratives, seven themes concerning the funerary landscape after the Bam earthquake were identified. Each of these themes is presented in the following sub-sections.

4.1. Burial of dead people, beliefs and the funerary rituals

People were in a great hurry to bury the dead because of the large number of bodies. In addition, according to the beliefs and traditions, a dead person needs to be buried as soon as possible, and before the setting of the sun. This behaviour was observed as normal for such a difficult time and was also observed following other disasters, like the Tabas earthquake (Narratives I and II). In Bam, the funerary rituals suffered dramatic changes due to the conditions following the earthquake [17]. The adaptive capacities of survivors to the new realities in post-earthquake were hindered by the non-compliance with the rituals and cultural traditions. Drama of burying their own family members, or other people, without proper respect of the funerary rituals had a negative impact on their adaptive capacity. The dead were buried in the clothing they died in, still in possession of their personal belongings such as gold jewellery and money and unwashed (Narratives I, III, IV, and V). Afterwards, the survivors of Bam regretted not being able to perform the proper, required funerary rites and rituals for their families or other community members. As per Narrative V: “We lost our loved ones under the soil, without Ghosl, Kafan and Lahad .” Narrative IV recalled: “The first days was no kafan [used]. People were covering the dead bodies by blankets “.., and added that none of dead bodies were washed. In the absence of water, the Tayamum was performed as part of the funerary rituals by some of the survivors (Narratives I and III).

However, some survivors managed to conduct the minimum funerary rituals in Bam. The rituals positively affected these survivors’ coping and adaptive capacity after the earthquake. In this regard, Narrative III, from the Bam survivor, is an illustrative example. Narrative III recalled the way that she, together with another close relative, performed the funeral ceremonies for their first degree relatives - 30 people - who were extricated from the rubble in the first two days after the earthquake. The bodies were kept in their own clothes, arranged one near another, and not washed, as there was no water available. ”I remembered that I have a duty. For all of them [30 people] together with another relative, I made Tayamum. Even I

closed and arranged their hands and legs. At that time, many people were not thinking for praying. I made Namaz-Mayet for all of them.” In response to a remark by the interviewer that: “You had a big heart and power to do this ceremony by yourself and for so many family members,” the survivor answered: “Before the earthquake, I did not know I have this power. I think God gave to me [this power] to tolerate this. I should thank to God that gave to me such power [to perform funerary rituals and to bury all close family members] and patience” (Narrative III).

However, many people were buried without Tayamum, as the people burying them either did not know how to perform it or were in a hurry to bury the dead bodies and to find available places in the cemeteries, due to the overwhelming number of victims and traumatised survivors (Narratives I, IV,V). Dead bodies were buried individually, but there were many cases of family graves - see Figure 4 - and even some mass graves – see Figure 5.



Figure 4: A survivor near the grave of the family members - mother, brother and sister- who died in Bam earthquake, 2003. The gravestone was installed many years after the earthquake. (Bam cemetery, photo by F. Parsizadeh, 2012).

“One bulldozer was digging the ground and we were putting the bodies near each other” (Narrative IV)“...we were gathering dead people and putting them in very small places with pressure and bury them” (Narrative I) – see Figure 5.



Figure 5: Burial of dead in Bam earthquake, 2003. (Source: National Geoscience Database of Iran).

The ways to the cemeteries and the cemeteries themselves were overcrowded by the people trying to bury their relatives (Narratives I, III, V). Narrative V recounted that they left with the dead bodies for the cemetery on Saturday, at 6 in the morning and that they returned just after 5 in the afternoon. Narrative III recalled that she needed two lorry cars to transport all 30 dead relatives to cemetery. There was heavy traffic on the way to the cemetery, and it took almost 2-3 hours to reach there. In the cemetery, there was only one bulldozer available for arranging the graves, although there was a long queue of people waiting to bury their relatives. However, “God helped me. It was me and my two surviving sisters that we should bury so many bodies. The whole family were 30 people dead: father, mother, husband and my children, sister, her husband and their children. I do not count the number of uncles and aunts and their families [in this case the number reached to 44 relatives]. The 30 graves were prepared one near each other, in the same place in cemetery” (Narrative III). It was not acceptable for other people outside the family to be buried between family members. “Two people came between us and want to bury their relatives among our family [of 30 people]. I refused and I said that these are all families and they should be together” (Narrative III). Narrative I recalled: “I came to the cemetery and only after washing one dead body, the water finished. I was alone only with one helper – a strong lady – and we did Tayamum for about 700 people.” However, this performance of such funerary rituals, as recalled by Narrative III

and Narrative I respectively, is quite singular and was not done by other interviewed survivors. But the lack of proper space for burial in cemeteries caused many frustrations among survivors and their relatives. People wanted to bury their relatives together in one place, not in separate places through the cemetery [47]. In addition, Narrative V recounts that before the earthquake, high society families owned special mortuary rooms in the cemeteries called Aramgah (literary “the place for resting”). In these Aramgah, almost every Thursday before the earthquake, family members would gather to pray and to offer alms for their dead relatives. The majority of the Aramgah were destroyed by the earthquake, and, afterwards, people were not allowed to rebuild them. The justification of this measure was blamed on the lack of space in the cemeteries. However, survivors were nostalgic about the Aramgah and their role in commemoration and performance of rituals for perished family members and relatives (Narrative V).

4.2. Burial and the identification of dead people

Many people in Bam were buried unidentified, and photos or other measures of post-mortem identification were not taken. Furthermore, unidentified people were not buried in specially designated areas in the cemeteries, nor were special signs placed near their burial places [47]. Only when the survivors and their relatives buried family members, they marked the burial places with special signs (Narrative I, III, IV). Many people after the earthquake were traumatised because they did not know what happened with their relatives and, if their relatives were dead, where had been buried [47]. People in Bam were in a rush to bury the dead bodies, identified or unidentified. The dead bodies were often identified and gravesites were marked if only family members, friends or relatives were present. This is one of the reasons why many survivors in Bam like in Tabas guarded the debris until all their relatives and family members were taken out. Narrative IV recounted: “Most of families recognise their dead family members. However, even those who did not recognised or did not know a person, they were burying him. The most touching and painful sense I saw, was from the student dormitories of nurse school. Those dead people were lying outside of building and covered by blankets. Because it was no one to recognise them and in that time was no place to keep them and in order to stop spreading some diseases, they were buried very fast, unidentified.” This was seen as a normal behaviour that was also witnessed during the Buyin Zahra, Tabas, Rudbar and other earthquake disasters in Iran. To explain such behaviour, survivors have brought different reasons. As per Narrative I, “...usually in this kind of situations people are in rush...”, “...they want to do something in rush and these are the

In addition and similar to the Tabas earthquake, the search for epicentre took quite a while for the rescue and relief forces and thus the vital hours for the people under rubble and survivors were lost (Narrative II) [47]. Many people died on the spot, but many others were believed to be alive for hours or even days under the debris. Miracles also happened in Bam: “After 20 days, they found somebody alive in the cellar” (Narrative V). Another miracle was a “miracle woman” about 90 years old who was extracted from under the rubble nine days after the earthquake. According to the witnesses, the first thing she requested after the survival was a cup of tea [66]. Similar “miracles under rubble” were also reported after tragedy of Haiti earthquake in 2010 [67]. One of the famous speeches about such miracles belongs to Ban Ki-moon, Secretary General of United Nations (UN) which expressed his positive emotions and hopes after an UN staff member was miraculously saved from under debris: “It was a small, small miracle during a night which brought few other miracles.” [67].

According to Narrative I, it is vital, during disasters, to give “deldary” to people. Almost everybody in Bam saw their family members killed under the debris. Narrative I recounted: “It was very unusual and strange condition. People were not even able to cry...People were desperate. It was a very disturbing sense...” and “...Even the dead people were sad.” Deldary” is perceived as having good effects on the physical and mental health of the survivors, and on their recovery process. Narrative III recalled that after such a violent and sudden loss of so many family members (44 people), she could not eat anything for almost a week. Hopes that relatives under debris were still alive and the effect of ambiguous loss is recounted through Narrative V: “We could not eat or sleep till we took out the bodies of our families. If somebody is under debris, you do not know, if it is dead or alive. It is very different than somebody is in hospital and dying in the hospital.” In addition, Narrative V remembered that her relatives were in complete shock because they could not believe that so many people died. Narrative VI recounted that many injured survivors were sent to the hospitals of different cities. Some of them recovered, while others died, and their families did not know for months if they were alive or dead. The communication problems within disaster management of Bam caused great trauma among survivors and affected communities [47].

4.4. Necessity of water

Majority of dead people were buried without being washed according to cultural traditions (Narratives I, III, IV, V). As per Narrative I, only a few dead people were washed as there was no water available for washing the dead bodies. In the absence of water, the Tayammum was

performed (Narratives I and III). Moreover Narrative VI emphasised the importance of water for survivors, because they were full of dust and blood: “...then, you come out of debris and in the city there is no drop of water that you can wash your mouth”. Narrative I also recounted: “Even it was no water to wash my hands. For two nights, I was eating with the hands full of blood”. Narrative IV remembered that he attempted to give respiratory first aid to a person just taken out of the debris. Afterwards, no water was available with which to wash out his mouth, and he had the taste of blood in his mouth for one day. In addition, according to cultural traditions and beliefs, one must purify himself from “Nages” and perform special ablutions after touching a dead body. The dead body before Ghosl or Tayamum is considered “Nages”, unclean or untouchable. Other “Nages” include, but not limited to, blood, urines, and faeces.

4.5. Survivors, dead people and “looting time in Bam”

All the narratives of survivors analysed in this paper recalled that there was a massive robbery in Bam, from the dead, from people still alive under debris, from rescue and relief forces, and even in the presence of the injured and traumatised survivors. Survivors and witnesses confirmed that all their families, other relatives, neighbours were affected by the waves of looting in Bam. According to Lopez-Caressi [30:153] a clear demarcation needs to be done between looting and “appropriation”. “Appropriation” covers the cases when vital items such as food, water, clothes and shelter are taken from other members of community while looting targets usually “non-essential goods” and “luxury items”. In Bam, looting targeted valuable stuffs such as gold, electronic and electric objects and carpets (Persian carpets, especially handmade). According to Narrative V, one TV and two air-conditioners were stolen in front of her, from the house of her mother: “I was so sad that time, I could not tell anything to them”. Narrative III mentioned that all her gold, carpets and other valuable belongings from her and other relatives’ houses were stolen in the first hours/days when people were busy to rescue and bury the dead. She reported that one of the looters who was involved in the looting of her house was arrested later and his father came to her to ask for forgiveness. She refused to forgive such a terrible act within the context of such tragedy. Narrative VI emphasised that in the first days after the earthquake, people were in shock and traumatised, busy with the burial of their families, and many were in the cemeteries. Under such conditions, large parts of the city were empty, and looting was ravaging the city. Even the rescue and relief teams were not spared by the blatant theft. Narrative VII recalled when a German Shepard dog, who was trained to find people alive under rubble and who belonged to the German search and

rescue delegation, was stolen and later found in the Jiroft area. According to survivors, “looting time” affected both alive and dead people. As per Narrative V, the family dead bodies were guarded throughout the night by her husband and other relatives, before being buried the next morning. This was conducted according to traditions, but also because people were trying to not leave the bodies of their families alone. People tried to protect the dead bodies of their relatives from being buried without their knowledge, profaned by animals or even exposed to looting. In this regard, Narrative IV recounted disturbing moments: “They were stealing the stuff of people and putting in the car and adding one or two more dead bodies on top of the car or on the taken stuff. When passing from the security checks out of the city, they were saying these are our families and we are taking them to be buried out of the city. However, after passing the security check points, they were just throwing away the dead bodies.”

There were also many terrifying rumours about looters who behaved unhuman with people under debris or even severed the hand of dead women for getting their gold jewellery. For instance, Narrative III recounted a tragic case of a woman who was under rubble and calling desperately for help, but the looters just stole her gold jewellery from her hand and left her trapped under the debris. Narrative V recalled “It was that in Kerman, someone was arrested who cut the hand of a dead person to steal the gold”. Narrative I also confirmed the terrifying rumours which circulated in Bam about cutting the hands of dead women for stealing their gold bracelets and rings.

About the looting, one view is that such terrifying rumours should not be accepted uncritically. They can be easily perceived by critical views as stories not having the ring of truth or such rumours are common and are observed after other worldwide earthquake disasters [30]. But, in the same time, absolute claims that looting never occurs after disasters need to be carefully investigated [68].

In Bam, “looting time” was far from being a “disaster myth [30]” or just simply another “common misconception [30]” about disaster. Unfortunately in Bam after the earthquake in 26 December 2003, for at least the first 72 hours “the looting time” was an unbearable reality. Narratives I and II belong to survivors who witnessed more than four earthquake disasters in Iran and held important roles in Bam post-earthquake management. Narrative I belongs to a survivor who performed funerary rituals for hundreds of people in Baravat and Bam area. Narrative II belongs to a person who witnessed Bam earthquake disaster and he was a part of

the management team for the rescue and relief operations conducted by the Red Crescent Society of Iran in Bam area. Both Narratives I and II emphasized that comparative with other earthquake disasters in Iran, the security and safety of survivors was seriously affected in Bam – especially in the first days. Many looting acts happened in Bam after earthquake (Narrative I). Moreover Narrative II recalled the disturbing fact that even the tents sent by the Red Crescent Society from Tehran were stolen and later the stolen tents were for sale in Bam. The “looting time” in Bam was very well recalled by other several officials. Both the mayor of Righan – a village near Bam – and the Head of City Council of Bam, at the time of earthquake, emphasized the immediate lack of security for survivors and the dramatic situation of looting in the first hours and days after the earthquake: “... in the first days of the earthquake, all the thieves from around came to Golbaf [a village near Bam] and came between people [in Bam].” All the narratives highlighted that none of the robberies were done by the local people of Bam or of Baravat. Survivors indicated that some groups and bands from nearby desert areas and those escaped from the Bam jail were the possible looters. In Tabas, the looting was very limited and sporadic, although in Bam it was preponderant and consistent. Uncertainty after the earthquake was increased by the “looting time” and the coping and adaptive capacity of the survivors in Bam was seriously hindered by the looting [47].

4.6. Beliefs about the health risk posed by dead bodies

People were very much in hurry to bury the dead bodies. It was mentioned by Akbari et al. [69] that more than 90 % of dead bodies in Bam were buried within the 48 hours after the earthquake. For both Tabas and Bam earthquakes, the high death toll favoured the spread of fears and revival of beliefs about the health risk posed by dead bodies. Comparative with Tabas, these beliefs were at a much moderate level in Bam. The climate conditions, at the time of the earthquake and in the days and weeks after the event, largely contributed to this risk perception. In Tabas, the hot weather with temperature climbing near 30 degrees Celsius influenced the rapid putrefaction of the bodies and the emanation of pestilential smells, distinctly remembered by the survivors and witnesses. The climate in Bam, on the contrary, was very cold with temperature well under zero degree Celsius. According to Narrative I, despite the freezing temperature, people were still in hurry to bury the dead. Based on the Narrative I experience of previous earthquakes, the reason of such a rush was also the quick bad smell which can be emanated by the dead bodies. Only two of the analysed narratives recalled the beliefs and perceptions about the health risk posed by dead bodies and the

diseases and epidemics which might be spread among survivors. For instance, Narrative IV emphasized that this was one of the main reasons why people were in rush to bury the dead bodies. “Maybe 30,000 or 40,000 people died. If they were not buried, the city was becoming full of diseases”. Moreover, as per Narrative V another reason that people were trying to immediately bury the dead was that they were afraid of spreading diseases, such as cholera. In addition, the risk for health posed by dead bodies was also reminded to the survivors by the search and rescue staffs of the Red Crescent Society (Narrative V). The rest of narratives made no associations among the dead bodies and the risk for health. Comparative with Tabas, it seems that no indiscriminate use of disinfectants or vaccination was used in Bam. The graves were covered with lime and the burial in the cemeteries outside the city was enforced [69]. Survivors of both Bam and Tabas were first who handled the dead bodies after earthquake with minimum usage of PPE (Personal Protective Equipment). At best, they used a piece of material or clothes found and extracted from the rubble. They were covering their nose and mouth mainly because of the terrible dust created by the destruction of mud buildings in both Tabas and Bam.

4.7. Dead bodies and beliefs regarding “Qiamat” (literally “the Judgement Day”)

“A belief presupposes uncertainty [70:3]” and the emotions of fear, distress, anxiety and/or others highly influenced – or even produced – beliefs. The large number of dead people in Bam with their sudden and violent death brought to life the powerful beliefs about “Qiamat” and the ingrained human fear of death and dying.

People observed the destruction and the danger of death around them, and they thought that the end of the world, or “Qiamat,” had come. Narrative I recalled: “This time, it was a long earthquake. And I started to read Zelzeleh Surah [literally “Earthquake Surah”] from Qur’an and I remembered the moment that during Ferdows earthquake, instead of this Zelzeleh Surah, I started to read, by mistake, Qadr’ Surah.” Furthermore, Narrative V recounted that “...Suddenly at that second, it was like Qiamat, when nobody knows anybody. I was not thinking at all of earthquake at that time. I was thinking that Qiamat came, and everything will become powder and everything is falling down... Everybody will die...” Narrative III remembered that all 30 people in her family were under rubble and that she was alone on top of the debris, terrified of dying and of death. The narratives of Bam’s survivors emphasized another common findings in earthquake disasters around the world, as it is quite usual that

awareness and preparedness regarding the handling of the dead after disasters were in place within Sun and Lion Organization, Red Crescent Society of Iran and the national army forces. Experiences from previous earthquakes such as Buyin Zahra in 1962, Dasht-e Bayaz and Ferdows in 1968, Manjil-Rudbar earthquake in 1990 and 8 years' Iran-Iraq war offered additional lessons to these organizations in terms of handling the dead people after disasters. But, for local communities of Tabas and later for Bam, there were no training, local preparedness and disaster plans in place. To make situation worse in both Tabas and Bam, no earthquake hazard awareness programs were implemented. In case of Bam, the strong beliefs and cultural landscape of local communities [74] influenced negatively the earthquake hazard perception and evacuation despite alarming foreshocks [53].

The role of uncertainty needs to be considered within the efforts towards the disaster risk reduction [75] and in this context, both epistemic and aleatory uncertainties [36] should be evaluated. Epistemic uncertainty took its toll for both Tabas and Bam earthquakes. For Tabas, the earthquake occurred on an “unknown”, “unmapped” and “unrecognized” blind fault. In addition, prior to the large magnitude earthquake of Tabas in 1978, no records of similar events in that area were registered for a period of more than 1000 years [54]. For Bam, the earthquake occurred on an “unknown” blind fault, located only 4 km far from a known fault geologically mapped for Bam-Baravat area [54]. Epistemic uncertainty is merely due to the lack of human knowledge and therefore it can be reduced. However aleatory uncertainty is irreducible. A good example of such uncertainty associated with disaster risk reduction is the 2011 Tohoku earthquake, tsunami and the chain of disasters occurred afterwards. Tohoku disaster offered lessons which are beyond those acquired by the experiences and knowledge from previous disasters [76, 77].

Tabas and Bam are situated in arid and semi-arid areas where the main source of water is underground water resources. Arid and semi-arid areas represent more than 60 % of Iran's surface [78] and receive the lowest annual rainfall, with no rainfall during the summer months [79]. At the time of both earthquakes, water resources were tapped mainly by underground channels named Qanats. The livelihood of the people in both Tabas and Bam was dependent on water and the Qanats. Due to the damages to the Qanats, the survivors in Tabas and Bam could not access the water resources for their own needs immediately after the earthquake. In Tabas, the lack of water was even more tragic than in Bam. Moreover, the funerary rituals required for the dead people, particularly the need for water for the washing of dead bodies, suffered dramatic adaptations. In particular, people had to purify from “Nages” after being in

touch with dead bodies, blood, urines, and faeces and needed an immediate access to water for performing special ablutions. Collapse of the Qanats for both Tabas and Bam undermined the coping and adaption capacity of the survivors and communities. This highlighted the correlations between the sources of water, Qanats and the resilience of communities [74].

The access to water and the functioning of hygiene and sanitation services are seen as among the first priorities after disasters, in order to control or avoid the outbreak of various diseases among the survivors and affected communities [21]. In Bam, one of the diseases that reached an epidemic stage in the first years after the earthquake was anthroponotic cutaneous leishmaniasis (ACL) or simply leishmaniasis [80]. In 2012 Haiti earthquake, a similar outbreak of disease which reached to an epidemic stage because of precarious sanitation conditions was the spread of cholera after almost ten months of the disaster [30].

It is also important to highlight that the factors deconstructed in this paper had different impacts on the handling of dead people in Tabas and Bam. In Table 3, the impact of these factors on the handling of dead bodies in Tabas and Bam is recapped and presented.

Table 3: Impact of various factors on the handling of dead people.

No.	Factors	Handling of Dead People	
		Tabas	Bam
1	High numbers of dead people	Red	Red
2	Beliefs about immediate burial of dead people	Red	Red
3	Beliefs about the health risk posed by dead bodies	Red	Yellow
4	Participation of survivors to burial of dead people	Green	Green
5	No access to water for funerary rituals	Red	Red
6	No earthquake disaster preparedness with regards to the disaster management of dead people	Red	Red
7	Controversies regarding the usage of bulldozers, loaders and other heavy lifting machineries	Yellow	Yellow
8	Survivors' experience of other earthquake disasters	Green	Green

Red: Significant Negative Impact. Yellow: No Significant Impact. Green: Significant Positive Impact.

Moreover, the influence of the factors discussed in this paper on the survivor's resilience is important for the disaster risk reduction. According to Lorenz [39] among resilience's dimensions of a community the adaptive, coping and participative capacity can be named. Table 4 recapitulates the impact of the factors on these dimensions of the community's resilience.

the earthquake disaster of Tabas, the lessons from Tabas earthquake, in terms of the handling of dead people and the survivors' resilience, were yet to be learned.

Furthermore, the resilience capacity of the survivors and affected communities has a direct impact on the earthquake disaster risk reduction [81]. As it is presented in Table 4, the lack of earthquake hazard awareness and disaster preparedness for both Tabas and Bam had significant negative impacts on the survivors' resilience and consequently on the disaster risk reduction. If the earthquake hazard awareness and disaster preparedness were in place, they could have contributed to shift the earthquake disaster risk towards an area of tolerable risk and could have significant positive impact on the handling of dead and resilience aspects of the survivors. The necessity to implement and enhance the earthquake awareness and disaster preparedness at local level and the coping and adaptive capacities of local communities was emphasized with the occasion of other earthquake disasters in Iran [82].

6. Concluding Remarks

This study investigated the handling of dead people through the resilience and risk perspectives, after two earthquake disasters in Iran: Tabas and Bam. The funerary rituals and beliefs were unveiled through the narratives of survivors and witnesses. On the handling of dead people and resilience of communities, the narratives of survivors and witnesses were found as valuable social resources. They have potential to improve the disaster management, to offer lessons to other communities at risk and to contribute to the earthquake disaster risk reduction. The factors which affected the handling of dead people after these two earthquake disasters along with the factors which influenced the resilience of survivors were investigated. Beliefs and cultural traditions are considered as vital resources for the resilience of survivors. However they may shape differently the resilience of survivors and the disaster management for handling of dead bodies. Even more, some of the beliefs may have two different impacts on survivors' resilience. Handling of dead people after large earthquake disasters in Iran is strongly culturally bounded and a negotiation with cultural traditions, beliefs, funerary rites and rituals need to be considered within earthquake disaster risk reduction.

Based on the insights unveiled in this paper, following practical matters on the handling of dead people after large earthquake disasters and enhancing the resilience of the communities are recommended:

I. Today, there are various manuals, guidelines and academic and rigorous scientific studies available nationally and internationally which cover the handling of dead people after disaster. However, the local communities are often unaware and are not prepared for handling of dead in case of disaster. It is therefore essential that adequate trainings and education programs to be deployed at local level. For instance, such programs can be included in the annual earthquake drills which are conducted annually in some countries – in Iran the annual drill is held in November.

II. Survivors' experiences in terms of handling the dead bodies after disaster, their risk and resilience perspectives need to be valued and incorporated as lessons within the disaster management planning and practices. A constructive dialogue and collaborations between local communities and scientists, specialists, officials and decision and policy makers can lead toward earthquake disaster risk preparedness.

III. The cemeteries are usually administered by municipalities and at least in Iran, the burial of dead after disaster is a part of the municipalities' responsibilities. It is therefore important that the municipalities have trained staffs prepared for disaster situations and the national and local procedures in place.

IV. A proper record of mortality data has to be in place immediately after the earthquake disaster.

V. The significant impact of beliefs and cultural traditions on the handling of dead bodies shall be considered in the national disaster management planning. International comparisons and rigorous implementations of different scientific procedures and guidelines without proper adaptation to the local context are not effective and sustainable.

VI. In arid and semi-arid areas the role of water resources should be seriously considered for the handling of dead bodies, health and hygiene and for strong cultural traditions and beliefs of survivors.

VII. The memorial places, sites, plaques, monuments or museums reminding the earthquake disaster along with the memorial ceremonies are recommended. Their catharsis effects on survivors and affected communities cannot be dismissed.

VIII. It is recommended that the organizations involved in post-disaster management to arrange and organize for survivors, regular low-cost visits to the pilgrim's places – the

examples for Iran include: Imam Reza Shrine in Mashhad city, Hazrat-e-Masoumeh Shrine in Qom city and Shah-e-Cheragh Shrine in Shiraz city. This can alleviate their suffering and help them to recover.

A deep reflection and sustainable action towards dimensions and dramatic realities of earthquake disasters in Iran are highly encouraged, if moral concerns for present and future generations are in place and learning to live with earthquake hazard in Iran is aimed for.

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