

<b>Access this article online</b>
Quick Response Code:

Website: <a href="http://www.jehp.net">www.jehp.net</a>
DOI: 10.4103/jehp.jehp_256_18

# Natural disasters and challenges toward achieving food security response in Iran

Soheyla Ainehvand, Pouran Raeissi<sup>1</sup>, Hamid Ravaghi<sup>2</sup>, Mohammadreza Maleki<sup>1</sup>

## Abstract:

**INTRODUCTION:** The consequences induced by the natural disasters such as damage to food systems and destruction of livelihood-related infrastructure can threaten the food security of the people. Hence, food security measures are one of the most important responses concerning the management of natural disasters. This study was conducted to identify the challenges of food security response following natural disasters in Iran.

**MATERIALS AND METHODS:** This study was conducted using a qualitative approach. The data were collected through semi-structured interviews with 29 key subjects; selected using purposive sampling. The qualitative content analysis was run to analyze the data collected.

**RESULTS:** Based on the findings of this study, food security response challenges following the occurrence of natural disasters in Iran were classified into three main themes: (1) underlying challenges, (2) challenges of process and resources management, and (3) challenges of organizing and coordinating. These themes consisted of 11 subthemes.

**CONCLUSION:** Following the occurrence of natural disasters, the management challenges, as well as the lack of coordination and organization between the stakeholders, are the serious challenges to achieving food security. Meanwhile, underlying challenges like climate change in the context of unsustainable living conditions of the vulnerable people have aggravated the food security response challenges.

## Keywords:

Disaster management, food security, natural disaster

## Introduction

Food insecurity threat, following the occurrence of natural disasters, is not only because of damage to food reserves and food systems but also due to the damage of means of living and livelihood assets of people.<sup>[1]</sup> The consequences of natural disasters, namely, earthquake, flood, and drought, can last for a long time. Damage to infrastructures affecting people's source of livelihoods such as land and agricultural inputs, livestock, and roads, undermines people's food security.<sup>[2]</sup>

Climate change and the global trend of unpredictable patterns of weather, especially rainfall, have threatened the food security with hazards such as droughts and flood. This insecurity imposes tension on people's livelihoods.<sup>[3]</sup> The definition of food security as "all people access to adequate, healthy, and nutritious food at all times for a healthy life" is generally accepted.<sup>[2]</sup> Based on this definition, food security responses after natural disasters can involve a range of response measures such as predicting adequate relief food supplies, appropriate food items, health and nutritional considerations, various food assistance options, and appropriate

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: [reprints@medknow.com](mailto:reprints@medknow.com)

**How to cite this article:** Ainehvand S, Raeissi P, Ravaghi H, Maleki M. Natural disasters and challenges toward achieving food security response in Iran. *J Edu Health Promot* 2019;8:51.

*Department of Health in Disasters and Emergencies, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, <sup>1</sup>Department of Health Services Management, School of Health Management and Information Science, Iran University of Medical Sciences, <sup>2</sup>Department of Health Services Management, Health Management and Economics Research Centre, School of Health Management and Information Sciences, Iran University of Medical Sciences, Tehran, Iran*

## Address for correspondence:

Prof. Pouran Raeissi, Department of Health Services Management, School of Health Management and Information Science, Iran University of Medical Sciences, Tehran, Iran.  
E-mail: [raeissi.p@gmail.com](mailto:raeissi.p@gmail.com)

Received: 04-08-2018

Accepted: 14-11-2018

strategies in accordance with compensation and livelihood provisions.<sup>[1,2]</sup>

In this area, some previous studies have focused on postdisaster nutritional challenges. For example, Inoue *et al.* reported gastrointestinal symptoms after the Great East Japan earthquake.<sup>[4]</sup> In the same event, Nakazawa and Beppu showed that disruption of the storage and distribution systems were the major challenges.<sup>[5]</sup> In this regard, Chodur *et al.* reported that the inefficient distribution system threatened the food security postdisaster.<sup>[6]</sup> While Clay *et al.* showed that food insecurity of high-risk groups should consider as the important challenge.<sup>[7]</sup> Some other studies highlighted the executive and management challenges. In this regard, Nekouie Moghadam *et al.* emphasized the importance of coordination of the logistics process of the agents in humanitarian actions.<sup>[8]</sup> Furthermore, Scarpin and Silva believed that in Brazil the Bureaucratic structure of disaster management was the main challenge that threatened the food security.<sup>[9]</sup>

In a few studies conducted in Iran on nutritional responses after the occurrence of natural disasters, only short-term responses, including the distribution of food items in the response phase, were investigated; however, other responses affecting food security after the occurrence of natural disasters and challenges related to natural disasters are yet to be addressed.<sup>[8,10]</sup>

Iran is a disaster-prone country and suffers from a lot of droughts, floods, forest fires, and sandstorms constantly, whereas earthquakes are always a serious concern.<sup>[11]</sup> The urbanization rate in Iran increased from 61.8% in 1997 to 74.4% in 2017.<sup>[12]</sup> The major part of this population moved to the margin of cities. Currently, about 10 million people in the country live in 700 unofficial settlements on the margin of cities while they are poor and suffer from inadequate social and health conditions.<sup>[13]</sup> In a study aimed developing food security map in country Kolahdooz and Najafi highlighted a wide range of food insecurity in many parts of the country (including 14 provinces). They emphasized the role of natural disasters such as flood and drought on food insecurity in these areas.<sup>[14]</sup>

The National Disaster Management Organization is responsible for monitoring, the establishment of integrated management in policy making, planning, coordination, and solidarity the various stages of disaster management in Iran.<sup>[15]</sup>

This paper examined the measures taken for providing food security; in the response stage of natural disaster management and aimed to identify the challenges of achieving food security response in Iran.

## Materials and Methods

This study was conducted to investigate the challenges of food security response after the occurrence of natural disasters in Iran by using the experiences and views of experts in this field. We also attempted to create a clear understanding of the existing processes of food security responses in Iran by identifying the related challenges. The study adopted an interview-based qualitative study using content analysis. Content analysis was used as a research method for subjective interpretation of interview data through a systematic classification process of coding and identifying concepts or patterns.<sup>[16,17]</sup>

### Study participants

A total of 29 people participated in this study. The participants had so much experience in food security responses to natural disasters; as the participants included managers and experts working in related organizations. Most of the participants (27 participants) were current and former experts, working at disaster management offices of stakeholder institutions; whereas two were natural disaster correspondents. Table 1 presents their composition in terms of occupational and administrative position. The selection of participants for interviews was based on purposive sampling. The inclusion criteria were as follows: having expertise and experience in food assistance and nutrition responses to natural disasters, having the willingness to participate in the study and do the interview, and being accessible. We got access to these participants through Iran Disaster Management Organization. Simultaneously, a number of participants (7 persons) had informal activities in nongovernmental charities for food aid and their responses made the data more robust.

**Table 1: Executive position of the participants in the study**

Institution	Administrative position	
	Experts	Administrators
The Ministry of Health and Medical Education	2	2
Iranian Red Crescent Society	2	4
Military (health and education departments)	4	
National Disaster Management Organization Of Iran		3
Supportive Organizations	1	1
Correspondent (Natural Disaster Reporter)	2	
The Ministry of Agricultural Jihad	3	2
Agricultural Insurance Fund		1
Agricultural Bank		1
Agricultural Meteorological Administration	1	
<b>Total</b>		<b>29</b>

## Data collection

In-depth semi-structured interviews were used for data collection. The interview guide included a list of general questions used as a tool for initiating the interviews. Each interview began with an open question, based on the participants' experiences and observations on the challenges of food security response to natural disasters, for example, "Could you explain your experiences with respect to the food security of people after the incident?" Moreover, if necessary, follow-up complementary probing questions were raised during the interview to further explore the details and clarify the basic extracted concepts regarding the types and methods of food security response, the response steps, the observed challenges, and the respondents' organizations and institutions. Interviews were conducted from June 2016 to March 2017. The duration of the interviews varied from 21 min to 87 min, with the average time for the interview recorded at 55 min. The interviews were recorded, and in some cases, because the participants were reluctant to have their voices recorded, their responses were written down. Data collection continued until data saturation was achieved; which means no new concepts were found.

## Data analysis

This qualitative study was conducted with the use of the content analysis method.<sup>[17]</sup> Qualitative content analysis may be conducted with varying degrees of interpretation and focus. In each text, obvious messages and latent meanings exist that should be described and interpreted, respectively.<sup>[18]</sup> In this regard, the content of each interview was transcribed and double checked by two people (the first author and another person outside the research team) immediately each interview ends. Afterward, the transcriptions were read several times to gain a deep understanding of the content. After identifying the meaning units, the basic tips and ideas were labeled to be codified and thus, the original codes were produced. Then, the research team compared the data and merged the codes based on the differences and similarities. The obtained codes were subsequently classified with respect to their similarities. Finally, the content and concepts of the data were extracted; with each category carefully reviewed and discussed.<sup>[16-18]</sup> After extracting the concepts and discovering the latent content of the data, the themes and sub-themes were defined. Eventually, the themes illustrated the challenges of food security response after the occurrence of natural disasters in Iran. The use of MAXQDA10 software facilitated the classification and management of the data.

## Trustworthiness

Trustworthiness in a qualitative research is related to transparency in methodological approaches, including the selection of the participants, data collection, analyses,

and interpretation.<sup>[18]</sup> To promote the credibility of the current study, we applied the following strategies; the consideration of the field notes and memos, long-term interaction with the data, maximum variation in sampling, inclusion of interviews with a wide range of participants from different food, agriculture, health, and economics departments related to the topic, as well as allocation of sufficient time to collect the data. To further promote the dependability of the study, discussions, and negotiations in the intermittent meetings of the research team members to reach an agreement on the differences and similarities, to categorize the codes, and to integrate their perspectives around the meaning units, primary codes, themes, and sub-themes were done. To add another control and to increase the validity of the study, the participants reviewed the transcriptions and field notes composed during the interviews and modified them as needed (member check). Furthermore, two co-workers from the college, who were outside the research team, checked the initial set of codes, themes, and subthemes from the first interviews (peer check). Since the nature of qualitative studies is effective on the transferability of the research conclusion, in this study, we tried to shed more light on the reason and manner of the final concepts by providing a clear explanation of the research processes, including data collection and analyses.<sup>[16-18]</sup>

## Ethical considerations

The interviews were conducted at the participants' workplaces after obtaining a written consent. Before the interview, participants were informed about the voluntary nature of the interview and the right to withdraw from the interview at any desired time; moreover, they were assured that their answers remain confidential. To ensure that the extracted content is consistent with the views of the participants, the transcripts were E-mailed to them and their corrections were observed in the transcripts. Each interview was coded and the data leading to the identification of the interviewers was removed. This study was approved by the Ethics Committee of Iran University of Medical Sciences (Code: IR.IUMS.REC.1394.9211567205).

## Results

The participants in this study presented common perspectives on the effects and consequences of natural disasters on food security. They believe that natural disasters have negative impacts on various dimensions of food security, including food availability, food access, food utilization, and sustainability of each of these components. Even though natural disasters affecting the food security are diverse; earthquakes, floods, droughts, as well as snow storms and frost wave, have been more important in recent years because of their frequency of

occurrence and spread across vast areas of the country. However, most participants believed that the mentioned natural disasters, regardless of their type, usually had similar negative consequences on the food security of the people.

As Figure 1 depicts, according to the findings of the present study, the challenges of food security response after natural disasters in Iran are divided into three main themes, including: (1) underlying challenges, (2) challenges of processes and resources management, and (3) challenges of organizing and coordinating. The stated themes consisted of 11 subthemes [Table 2].

### Underlying challenges

The findings of this study revealed that one of the main food security response challenges in Iran is underlying challenges such as “the geographical and weather condition of the country, the impact of climate changes, and the vulnerable people”. Based on the participants’ point of view, food security responses are affected by these challenges, which can complicate

**Table 2: The main themes and the subthemes related to the challenges of food security response to natural disasters in Iran**

Main themes	Subthemes
Underlying challenges	Geographic and weather conditions Impact of climate change Vulnerable people
Challenges of process and resources management	Structure of disaster management Inefficient management Passive responses Compensation mechanisms Ineligible distribution of food assistance
Challenges of organizing and coordinating	Organization-based responses Unsolicited donations Nutrition and health considerations

the response conditions and threaten any response planning to maintain food security at the time of natural disasters.

### Geographical and weather condition

Participants pointed out that geographical conditions and climate diversity lead to challenges in the provision of natural disasters responses, including food distribution and other measures related to food security response. In this regard, participant number 4 said thus: “...in the earthquake of Azerbaijan, about 300–400 villages were hurt in 3 cities. When there is too much scatteredness. and harsh roads., there is a problem in service delivery.”

### The impact of climate change

The impact of climate change on rainfall and the occurrence of flash floods, and the extent of the drought disaster in most parts of the country were prominent challenges of this area which were pointed out by the participants. Most of the participants acknowledged the impact of climate change on the abundance and diversity of natural disasters in recent years, as well as its impact on food security and the responses provided in this regard. The 24<sup>th</sup> participant has this to say: “...Seventy millimeters of water was collected after 10 precipitations; it was in the cold season and there was snow. The climate change made these numberless., so it’s possible that we lost this amount of water, or it may turn into flood and flowing water....”

However, there was no consensus among the participants regarding the impact of climate change on the occurrence of natural disasters, especially drought. Some of the agricultural sector managers had different viewpoints in this regard and believed that problems are induced mostly because of managerial approaches than climate change. “Our country always has a dry climate. The lack of rain and water is part of our climate. Unfortunately, however,

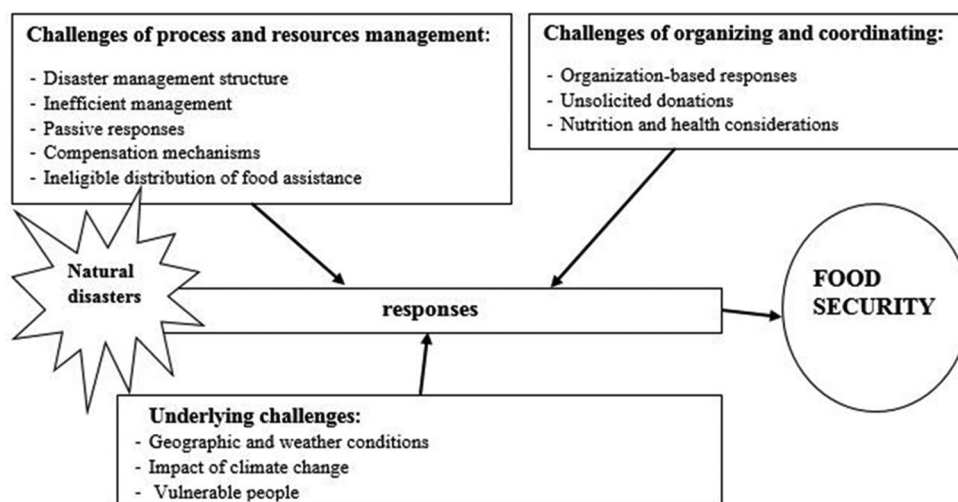


Figure 1: The challenges of food security response to natural disasters in Iran



*this issue is forgotten when we have precipitations for two consecutive years.” (Participant number 11).*

### **Vulnerable people**

According to some of the participants, poverty and vulnerability of a part of the people living mostly in villages and margin of cities is usually associated with lower income deciles and poses a serious challenge. The food security of this population, even under normal conditions, is one of the serious concerns of the government. *“In disasters, mostly poor people are affected; the one who does not have the money to resist his livelihood, the one who does not have saving, those who are covered by support organizations” (Participant number 4).*

However, some of the Disaster Management Organization managers believe that the occurrence of natural disasters will increase this group of people’s livelihoods and they often will receive more assistance in advance. According to participant number 19, *“Government provides a lot of assistance... the government continues its contribution and support for many years.”*

Some of the participants from the Disaster Management Organization and Iranian Red Crescent Organization were concerned about the dependency of affected people on governmental financial and food assistance. Whereas, the other participants believed that these contributions should continue for a long time for vulnerable groups such as the disabled, orphans, and female-breadwinner of households affected by natural disasters and their consequences.

### **Challenges of process and resources management**

The findings of this study also demonstrated that “Management of processes and resources” to provide timely and effective responses to food security, is another challenge for food security responses. According to participants, the challenges caused by mismanagement of processes and resources can be expressed under the subcategories of “Disaster management structure, inefficient management, passive responses, compensation mechanisms, and ineligible distribution of food assistance” [Table 2].

#### **Disaster management structure**

According to this study, the Disaster Management Organization manages and responds to natural disasters using the resources, equipment, and operational sources of other ministries and organizations through the formation of 14 main working groups. However, none of these working groups have a comprehensive approach to food security responses. A number of participants believed that the performance of Disaster Management Organization is not good considering food security response, and declared that the organization had weak performance because its administrative status and

structure is parallel with other responsive organizations. According to the participants, the Disaster Management Organization did not have the expected performance concerning food security responses due to lack of authority, enough power, and influence to utilize the resources and the capacities of responsible institutions and to create the necessary coordination between them. *“The Disaster Management Organization is weak. its approvals are not enforceable. Because the power is in the hand of the rich institutions. This organization has no money to give. Most organs do not obey it” (Participant number 6).*

#### **Inefficient management**

With respect to participants’ point of view, the change of governments and managers followed it leads to instability of the country’s governing body, which ultimately results in decision-making and performance based on personal or factional interests of managers. The issue criticized by most participants and which was considered as the main cause of the instability in governing body concerning disaster management was the rapid change of managers. In other words, one of the challenges for food security responses is the rapid change of managers. According to participant number 7, *“The minister changes, the vice president changes., there is the law. but laws are enforced with respect to individual interests, we do not reprimand the manager for his own interest.”*

However, one of the agricultural sector directors believed that a long duration of unchanged manager policy can lead to managerial stagnation; he pointed out that this policy led to managers’ disinterest and organizations sensitivity reduction in some institutions toward emergency responses. *“Some managers have been appointed for a long time so that everything is normal for them ... they want to have a safe environment just for themselves. Do not want to change. Do not want to do new work” (Participant number 13).*

#### **Passive responses**

Based on the participants’ opinion, passive responses without a prior plan and making spurious promises such as financial facilities and loans by political officials not only increase the expectations of the people but also reduce the trust of in the credible institutions. Some managers’ practices done based on political motives and interest can waste resources since they aim to hide management weaknesses and keep people satisfied by cross-sectional distribution of food assistance that exceeds the real need. According to many of the participants, the responses are mostly temporary, and the responsible institutions leave the region after the early stages; *“We do not plan ahead and act when the incident occurs. the issue is not a priority for the authorities concerned until the incident occurs, and it is only prioritized at the time of the incident because of its urgency” (Participant number 19).*

### Compensation mechanism

The statements of some participants indicated that damage caused by natural disasters to sources of livelihoods and food security of people, compensated by the government through agricultural insurance, financial facilities, as well as granting agricultural inputs. A number of participants believed that: the dependence of all these mechanisms on governmental budgets and credits, the long-time spending for allocating these credits, the interpretability of executive guidelines, the nonprofitability of agricultural insurance, the lack of transparency in insurance laws, lead to functional challenges: *“Our insurance system has a problem in defining the number of damages and compensation. Every year, the insurance organizations receive money from insured people and government and help insured people when needed but people are always dissatisfied”* (Participant number 17).

### Ineligible distribution of food assistance

According to the some participants' viewpoint, the extent and scatteredness of damaged regions and distance from aid centers mentioned may result in the inappropriate distribution of food assistance and insecurity in groups of people who are less able to move to other places. In addition to the need for fair and commensurate distribution in accordance with the needs of each group, consideration of the dignity of the injured people during the delivery and receipt of donated food were considered by the participants and some of them referred to the lack of respect for human dignity during the distribution of food aid: *“I saw the scenes in which the truck came and threw relief items out of the truck, hands were all high to get a food item, and it was far from the dignity of the affected people”* (Participant number 23).

### Challenges of organization and coordination

The findings of this study revealed that organizing participants and various governmental and nongovernmental actors emerged in such emergencies after natural disasters are one the major challenges; since they are formed while there is no demographic information and periodic evaluations of before and during the response. In addition, there is an inconsistency between multiple contributors. The three subthemes of *“organization-based responses, unsolicited donations, and nutritional and health considerations”* were remarkable in the statements of the participants [Table 2]. It is worth mentioning that, while the issues raised in this category (challenges of organizing and coordinating) are close to those in the above category (challenges of process and resources management), but they are assigned to a different category to highlight and emphasize the importance of coordination and organization.

### Organization-based responses

Despite the fact that macro policies are being communicated by the Disaster Management Organization, most

participants acknowledged that each stakeholder has its own task and instructions to respond to responsive practices are in line with the organizational goals of the institutions; while the criteria for the interaction of the contributors and the engagement and exit strategies of each organization are unclear. Therefore, parallel and repetitive practices or even contradictory ones will be probable. To put it simply, responses are organization-based, and coordination between different actors appears to be difficult within this framework. organization-based responses, the lack of unique commanding, and the increasing number of stakeholders such as contributors and relief organizations without clear definitions for tasks and the jurisdiction of each stakeholder face organizing response operations; particularly food security response requiring the contribution of various institutions and several ministries with challenges: *“Now the number of actors is very large, all with the parallel powers. their command and coordination systems are not appropriate. We are much more organization-driven than the task-driven”* (Participant number 10).

### Unsolicited donations

After the occurrence of disasters, a large number of people's contributions, especially food aid, are sent to affected areas without planning. The findings of this study indicated that these unsolicited donations with real needs waste the time and resources of relief forces and disturbs the timely and fair distribution of food items between the needy and the injured as they are unorganized unplanned and disproportionate; such that much of this food aid is useless and a lot of energy is spent to dispose of it or to remove it from the human consumption cycle. People's lacks of trust in formal assistance agencies to collect, distribute, and organize people assistance, face any planning for the effective use of this potential capacity with a serious challenge. Participant number 1 remarked thus: *“Everyone rushed and helped. the routes were blocked.it wasted a long time because unnecessary contributions were also sent.”*

### Nutrition and health considerations

Lack of specific program for food security, lack of nutrition and food security assessment, and lack of evidence and information on the needs of affected people, demographic characteristics, number of vulnerable people and patients, and current nutritional problems in each natural disasters region, limit the process of nutritional measures to short-term and cross-sectional responses. Choosing the type, quality, and preservation and storage methods of food items and monitoring their usability, is a serious challenge even when the goal of food security responses is short-term and just once. Food aid in the early days after the disaster is mostly packaged and ready to eat,

and as soon as the possibility of cooking is provided, dry diets and cookware are distributed. Ready-to-eat foods distributed to injured and rescued workers during the early days after the incident often include canned foods, types of bread, biscuits, and dates. According to a number of participants, these foods mostly contain sodium, sugar, and no fiber. The provision of the same food baskets for all groups in all regions of the country, regardless of the nutritional needs and considerations of age groups, patients, and the lack of adequate health monitoring in the early stages of the response; on the one hand, and the lack of assessment of the needs and measures in each stage; on the other hand, leads to wastage of resources and pose a challenge in delivering nutrition-related services. A participant commented thus: “We do not do any nutritional analysis in the events; we have a preset prescription. so we distribute it... and there is no organization responsible for food and nutrition after the acute stage” (Participant number 10).

The Ministry of Health proposed formulations for emergency food baskets, taking into account nutritional recommendations; and the Red Crescent Organization has stored food items based on its resources and budget. However, the health monitoring and compliance with accepted health and nutrition standards is the responsibility of the Ministry of Health. One of the response challenges is to choose the type, quality, and preservation and storage methods of these food items and monitor their usability. It seems that each of stakeholders, including the Iranian Red Crescent Organization, various departments of the Ministry of Agricultural Jihad, the health sector of Military Organizations, and supportive organizations, have separate guidelines in this regard. This study revealed no evidence indicating that the health and nutritional regulatory guidelines of stakeholders are integrated to meet critical situations after natural disasters.

## Discussion

This study was conducted to identify the challenges of food security responses after the occurrence of natural disasters in Iran. To the best of our knowledge, little research has been done on food insecurity postdisaster in Iran. Although the findings of the present study indicated that a wide range of challenges exist in the field of food security in Iran, which can be attributed to the fact that the responses in onset and protracted natural disasters are wide, varied, multi-disciplinary, and multi-sectoral.

According to the findings of this study, the underlying challenges such as Geographic and weather conditions, climate change, and the vulnerability of a part of the population, can make the response conditions more

complicated to maintain food security at the time of natural disasters. In a review study, in line with our findings, Farrokhi *et al.* mentioned that climate changes exacerbate the short term and long term impacts of natural disasters and one of the main of these impacts is food insecurity.<sup>[19]</sup> In another study, Richardson *et al.* investigated a revised index to understand the challenges that climate change presents in developing countries (through flood and drought events). Their findings suggest that climate drivers will intensify food security risks in the absence of sufficient mitigation and adaptation.<sup>[20]</sup>

We found that the vulnerability of a part of the population, who are usually from the low-income deciles is a serious challenge. Meanwhile, the poorest and most vulnerable social classes live in the rural or suburb areas; and their food security, even under the usual conditions, is one of the social concerns. Consequently, due to the lack of financial support such as insurance and savings, they have the least capacity to recover and return to predisaster situations; thus, their food security is heavily threatened. In a document analysis study, Abbasi Dolatabadi *et al.* referred to a wide range of people, including people with disabilities, the elderly, female breadwinner of households, orphans, the unemployed, the poor, and marginalized people, as vulnerable groups in disasters in Iran.<sup>[21]</sup> In another study, following Hurricane Katrina in Louisiana and Mississippi Clay *et al.* showed that low social support, poor physical health or mental health, and female sex were risk factors. They believed that programs that increase access to food supplies among high-risk groups are needed to reduce the negative health impacts of disasters.<sup>[7]</sup>

With respect to findings of the current study, supportive organizations can detect the real needy people and serve help to targeted groups more accurately and speedily since they have enough information about the vulnerable and covered groups, as well as have access to current resources and strategies used for responding. In a study that was conducted by Dorosh *et al.* After the 2010 flood in Pakistan, it was acknowledged that supportive programs for food security and households' livelihoods should focus on appropriate targeting based on the identification and support of destitute households as well as appropriate distribution methods.<sup>[22]</sup>

Our findings revealed that one of the challenges of food security response is the weakness of the process and resource management to provide prompt and effective responses to food security. These challenges are comprised the country's disaster management structure, inefficient management, passive responses, compensation mechanisms, and ineligible distribution of food aid. In this regard, we believe that the disaster management



organization, due to its administrative structure, which is parallel with other responsible organizations, had a weak operation. It also did not have the expected performance regarding the food security responses due to the lack of enough authority, power, and influence to utilize the resources and capacities of the responsible institutions and to establish the necessary coordination between them. Reliance on the short-term and passive responses with political motives, lack of prior plans for food security, and promises that will not be followed later, reduce the trust of the people to the responsible institutions. Some managers' measures lead to waste of resources, due to political motives and prioritization of political interests on cross-sectional distribution of food aid more than the required amount, to hide (cover) the managements' weaknesses and to keep the people satisfied. In line with our results, in a qualitative study by Scarpin and Silva, after the flood in Blumenau–Brazil, had been reported that governmental authority and bureaucracy restricted the coordination between humanitarian actors. They believed a complexity of factors with significant impact within the chain, slowing down the logistics process and coordination throughout the supply chain should consider as the main objective.<sup>[9]</sup> In another study, Nekouie Moghadam *et al.* reported that the major challenges of nutritional measures in bam earthquake were managerial, infrastructural, and executive. This study showed that inappropriate and unfair distribution of food aid causes food insecurity in groups of people with less ability to move.<sup>[8]</sup> In another study, in the same event, Moosazadeh *et al.* reported that food storage equipment, provision of food, and food distribution were unsatisfactory.<sup>[23]</sup> Furthermore in case studies of the effects of Winter Storm Jonas of 2016 and the 2013–2017 California drought in Baltimore with the utility of the fault tree model by Chodur *et al.* had been illustrated that inefficient distribution systems in the case of individuals who rely on donated food, threats their food security.<sup>[6]</sup>

The findings of the present study indicated that another challenge for food security response is the creation of coordination among multiple actors and organization of numerous governmental and nongovernmental stakeholders. Challenges related to coordination and organization emerged in three areas of organization-based responses, unsolicited donations, as well as nutritional and health considerations. Lack of a single coordinator, increasing number of stakeholders, and organization-based responses jeopardize the coordination of response operations, especially in the context of the food security response that requires the participation of various institutions and several ministries. In this regard the disorder, confusion, and the disproportion between the donations; especially food assistance can cause serious problems; for example, the disposal of donated food due to lack of planning for their collection, packaging, and

distribution. In the study in the aftermath of the 2010 flood in Blumenau–Brazil Scarpin and Silva showed that these food assistances caused a lot of problems; and determining their usability needs a lot of time, resulting in the disposal of many donated food items.<sup>[9]</sup>

According to our findings, the provision of the same food baskets for all groups in all regions, regardless of the nutritional needs and considerations of age groups, patients, and lack of adequate health monitoring in the early stages of the response are considerable problems. At this point, food assistance is usually in the form of packaged and ready-to-eat foods. These foods are mostly dried and canned, containing high amounts of salt and sugar, as well as no fiber. Therefore, after a short period of time, they can result in nutritional problems. In the consistency with our results, Farajzadeh *et al.* reported nutritional problems in the absence of a distribution program and lack of food diversification up to several weeks following the Bam earthquake.<sup>[10]</sup> Nozue *et al.* reported the insufficiency of food supplies in the Great East Japan earthquake and highlighted the need to predict and store required amounts of food items in the preparation stage.<sup>[24]</sup> In another study in the same event, Inoue *et al.* showed most delivered food was carbohydrate-based, and they reported decreased food intake, losing weight, and gastrointestinal symptoms 1 month after the event.<sup>[4]</sup>

Our findings showed that selecting the type, quality, and preservation and storage methods of the food items, as well as monitoring their usability, are key challenges of response. Wien and Sabaté identify an appropriate dietary for emergency situations with respect to nutritional facts, food spoilage, volume, and shelf life of foods. They introduced four food vegetable groups, including dried grains, dried cereals, dried fruits, and nuts as the most suitable diet for emergency situations.<sup>[25]</sup>

According to our results, the Ministry of Health is responsible for health monitoring and compliance with the accepted health and nutrition standards. However, other stakeholders, including the Red Crescent Organization, various departments of the Ministry of Agriculture, the health sectors of the military organizations, and supporting organizations, have separate guidelines in this regard. In the current study, no evidence was observed to support the fact that the health and nutritional controlling guidelines of the stakeholders were implemented or harmonized in critical situations after natural disasters.

## Conclusion

Climate change along with the country's diverse climatic and geographical conditions in the context of



unsustainable living conditions of the vulnerable people, are the underlying challenges that threaten the food security of many people, even without the occurrence of natural disasters. With the onset of disasters, these threats are aggravated and all the responses to food security are faced with serious challenges. After natural disasters, the management challenges such as the structure of disaster management, inefficient management, passive responses, improper compensation mechanisms, and inappropriate distribution methods of food aid are among the serious barriers to food security response. However, lack of coordination and organization between the actors and stakeholders, organization-based responses, unsolicited donations, as well as nutritional and health problems, threaten the food security in areas affected by natural disasters. Food security responses to natural disasters should also be multidisciplinary, polychotomy, and made with the participation of various stakeholders. Further studies are also needed on developing and organizing appropriate disaster management structures as well as increasing the resilience of food security in the country.

### Acknowledgment

This study is related to Ph. D. dissertation approved and supported by the Iran University of Medical Sciences under number IUMS/SHMIS\_1394/41. The authors would like to make special thanks to all participants for their cooperation in this study.

### Financial support and sponsorship

Nil.

### Conflicts of interest

There are no conflicts of interest.

### References

1. FAO. The Impact of Natural Hazards and Disasters on Agriculture and Food Security and Nutrition. Rome: Food and Agricultural Organization; 2015.
2. FAO, IFAD, and WFP. The State of Food Insecurity in the World 2015: Meeting the 2015 International Hunger Targets: Taking Stock of Uneven Progress. Rome: Food and Agriculture Organization; 2015.
3. Elbehri, A., J. Elliott, and T. Wheeler, Climate change, food security and trade: An overview of global assessments and policy insights, In: Climate change and food systems: global assessments and implications for food security and trade. 2015, Rome: Food and Agriculture Organization of the United Nations (FAO).
4. Inoue T, Nakao A, Kuboyama K, Hashimoto A, Masutani M, Ueda T, *et al.* Gastrointestinal symptoms and food/nutrition concerns after the great East Japan Earthquake in March 2011: Survey of evacuees in a temporary shelter. *Prehosp Disaster Med* 2014;29:303-6.
5. Nakazawa T, Beppu S. Shifting from Emergency Food to Disaster Preparation Food to Help Disaster Survivors. 2012, Ministry of Education, Culture Sports, Science and Technology, Japan, NISTEP Science and Technology Foresight Center. p. 36-54
6. Chodur GM, Zhao X, Biehl E, Mitrani-Reiser J, Neff R. Assessing food system vulnerabilities: A fault tree modeling approach. *BMC Public Health* 2018;18:817.
7. Clay LA, Papas MA, Gill KB, Abramson DM. Factors associated with continued food insecurity among households recovering from Hurricane Katrina. *Int J Environ Res Public Health* 2018;15. pii: E1647.
8. Nekouie Moghadam M, Amiresmaeli M, Hassibi M, Doostan F, Khosravi S. Toward a better nutritional aiding in disasters: Relying on lessons learned during the Bam Earthquake. *Prehosp Disaster Med* 2017;32:382-6.
9. Scarpin MR, de Oliveira Silva R. Humanitarian logistics: Empirical evidences from a natural disaster. *Procedia Eng* 2014;78:102-11.
10. Farajzadeh D, Tavakoli R, Sarrafpour R. Food preparation and programming models in crisis and disasters. *J Mil Med* 2004;5:309-18.
11. Seyedin H, Ryan J, Keshtgar M. Disaster management planning for health organizations in a developing country. *J Urban Plann Dev* 2010;137:77-81.
12. World Bank. World Urbanization Prospects; 2018. Available from: <https://www.data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS>. [Last accessed on 2018 Nov 04].
13. Ministry of Health and Medical Education of Iran. The Marginalization and Health Policies in the Marginal Areas of Iran; 2016. Available from: <http://www.health.behdasht.gov.ir/news/news/139387/>. [Last accessed on 2018 Nov 07].
14. Kolahdooz F, Najafi F. Report of National Survey: Food Security Information and Mapping System in Iran. Tehran, Iran: Nafis Negar; 2012.
15. National Disaster Management Organization of Iran. Rules and Regulations. Available from: <https://www.ndmo.ir>. [Last accessed on 2018 Sep 20].
16. Malterud K. Qualitative research: Standards, challenges, and guidelines. *Lancet* 2001;358:483-8.
17. Elo S, Kyngäs H. The qualitative content analysis process. *J Adv Nurs* 2008;62:107-15.
18. Graneheim UH, Lundman B. Qualitative content analysis in nursing research: Concepts, procedures and measures to achieve trustworthiness. *Nurse Educ Today* 2004;24:105-12.
19. Farrokhi M, Dolatabadi, Z. Pakjoui, Sh. Pouyesh, V. Approaches to post-disaster environmental recovery. *Health Emerg Disasters Q* 2016;1:65-70.
20. Richardson KJ, Lewis, K. H. Krishnamurthy, P. K. Kent, C. Wiltshire, A. J. Hanlon, H. M. Food security outcomes under a changing climate: Impacts of mitigation and adaptation on vulnerability to food insecurity. *Clim Change* 2018;147:327-41.
21. Abbasi Dolatabadi Z, Seyedin H, Aryankhesal A. Policies on protecting vulnerable people during disasters in Iran: A document analysis. *Trauma Mon* 2016;21:e31341.
22. Dorosh P, Malik SJ, Krausova M. Rehabilitating agriculture and promoting food security after the 2010 Pakistan floods: Insights from the South Asian experience. *Pak Dev Rev* 2010; World Bank/International Food Policy Research Institute: Washington, DC. :167-92.
23. Moosazadeh M, Zolala F, Sheikhzadeh K, Safiri S, Amiresmaili M. Response to the bam earthquake: A qualitative study on the experiences of the top and middle level health managers in Kerman, Iran. *Prehosp Disaster Med* 2014;29:388-91.
24. Nozue M, Ishikawa-Takata K, Sarukura N, Sako K, Tsuboyama-Kasaoka N. Stockpiles and food availability in feeding facilities after the great east Japan Earthquake. *Asia Pac J Clin Nutr* 2014;23:321-30.
25. Wien M, Sabaté J. Food selection criteria for disaster response planning in urban societies. *Nutr J* 2015;14:47.