

Response Functions in Disasters: Iran Flash Flood 2016

Reza Abbaszadeh Dizaji, PhD Candidate; Ali Ardalan, MD, MPH, PhD; Farin Fatemi, PhD

ABSTRACT

Objective: Heavy rain and flash flooding left behind a trail of disaster in the western and south-western provinces of Iran in April 2016. The purpose of this study is to highlight the response functions that should be undertaken when such disasters strike.

Methods: Secondary data, such as documents, organizational reports, and forms completed during response to the flood visits, were the methods of data collection in this study. Then, collected data were analyzed according to the response functions to disasters.

Results: The study found that a strong disaster response function was the early warning system, by the Iran Meteorological Organization, announced 1 week before the flood. Weaker functions were the lack of coordination among response organizations and the lack of a safety officer in the Incident Command System structure during the flash flood.

Conclusions: The list of the disaster response functions identified by this study should aid the decision makers and first responders in facing natural or man-made disasters and enable them to better prepare for response functions in the future disasters.

Key Words: flash flood, response, disasters

BRIEF INCIDENT REPORT

Between April 13 and 14, 2016, the western and south-western provinces of Iran were swept by heavy rains accompanied by lightning and thunder. The weather was unprecedented in this season of the year and resulted in flash floods throughout 23 provinces of Iran. Among these, 3 provinces, including Ilam, Khuzestan, and Lorestan, were damaged seriously from flooding. In Ilam province alone, this flood killed 4, injured 9, and affected 66,532 people. Power and water supplies were knocked out, and thunderstorms damaged telecommunication towers in some towns and villages. Also, the flood destroyed agriculture land and products, buildings, and roads in its way. In total, according to the initial assessments, this flash flood had cost counties and villages an estimated USD 86 million throughout Iran.

This study attempts to review the response functions during a disaster and compare them with the measures taken during this flood in the most damaged province, Ilam, as shown below.

Warning and Event Confirmation

The Iran Meteorological Organization (IMO) did not succeed in timely predicting the past few natural disasters, such as the Tehran dust storm in 2014 or the Golestan flash floods in 2001 and 2002.^{1,2} But, fortunately, the government's weather forecasts operated

quickly during the April 2016 flash floods. The IMO cautioned about the occurrence of a flood in the western and south-western provinces 7 days before. So, the authorities in the western and south-western provinces had 1 week to prepare and respond to this event. The provincial Emergency Operation Centre (EOC) confirmed the occurrence of the flood in each affected region and announced the news to the county.

Keeping the IMO warnings in mind, the shift work program was adjusted. The entire staff was on call for the emergency situation.

Joint Rapid Assessment

Rapid assessment in the first few days following a disaster is most important to establish the priorities and assess the immediate needs of the affected community.³ This was done in the case of the recent disaster in Iran.⁴ A rapid health assessment team was sent to flooded areas to evaluate the loss, assess the health needs of the affected people, and plan for delivering health care. This team involved experts in different fields, such as environmental health, communicable diseases, EOC, and technical health deputies of damaged counties.

Establishing Incident Command Posts

EOCs were activated at the national, regional, and local levels according to IMO warnings about heavy

rains, storms, and flooding in Ministry of Health (MOH), provinces, and counties exposed to the flood hazard. The EOCs of affected counties established Incident Command Posts (ICPs) in the affected locations to provide a timely and effective response. On-scene incident command functions were performed.⁵ Individual commanders were selected for ICPs to perform the on-scene incident command functions. They maintained constant contact with the incident commander in each ICS.

Codifying the Incident Action Plan

An Incident Action Plan (IAP) is a dynamic program that expresses the objectives and necessary tactics for the management of disasters and emergencies.³ Also, the IAP answers 3 questions: what actions should be taken, who should take action, and when the measures should be implemented in response to disasters and emergencies.⁶ It can be revised according to the needs and operational field sources. The type of action in an IAP will be based on the recognized functions in an Emergency Operations Plan (EOP).

The IAP was codified before the flood for different governmental sectors and revised during the event according to the reports of rapid assessments.

Command and Control

Incident Command System (ICS) is an organizational structure that comprises of a series of management positions in order of authority to aid in the management of resources and capacities during incidents.⁷

This structure includes the incident commander, command staff, and general staff. The incident commander is responsible for the overall leadership of the event. The command staff has a safety officer, a liaison officer, and a public information officer.⁸ The ICS was activated during the first hours of the flood occurrence, and the incident commander was the health deputy, the highest authority of health in the Ilam province. Also, experienced experts joined ICS from MOH in the next 2 days. One of the observed weaknesses in the established ICS was the lack of a safety officer during the recent floods.

Safety and Security of Personnel

As mentioned above, the safety officer was not among the command staff of ICS. Safety and security of the first or secondary responders and even their families are very important in disasters.⁷ The safety officer is responsible for monitoring and assessing safety hazards or unsafe conditions and developing precautionary measures for ensuring the safety of personnel during such incidents.⁵ This issue was usually ignored in the response phase during the past disasters and so was it in this case. It is necessary to remember that the health and safety

of personnel/operational teams is priority while delivering services to the affected population.

Logistics

Logistics and maintaining it at an acceptable level is vital to continue the services to the affected people. In this case, different ministries and organizations, such as MOH, Water and Sewage Organization, Iranian Red Crescent (IRC), Ministry of Power (MOP), and Department of Agriculture (DOA), supported the needs of people in the flooded regions. For instance, the MOH sent the first loading of vaccines, supplementary medicines, and antiseptics to the affected regions within 24 h after the occurrence of the event. Also, the IRC supplied the other nonfood necessities, such as tents, blankets, and clothes during the first 12 h after the floods.

Public Communication and Information Management

Information management plays an important role in the response phase. It is also one of the greatest challenges that emergency managers and authorities encounter.^{9,10} The tools available include satellite phones, radios, conventional telephone systems, computers, and other devices, all linked by redundant systems. Many offices have network-based systems for organizing requests and information.⁷ Therefore, the national government should invest heavily in better ways so that operational teams can communicate with each other and senior levels during activation. The virtual networks were active during this flood, and many messages were transferred in this way between the operational teams. But, the formal communication system was by means of telephone or paper reporting from the field.

Mass media played a key part in public communication in the affected regions. Important warnings and precautionary measures for protecting people against the flood were repeated many times by the media. People were asked to evacuate from areas that were at a higher risk of flooding.

Also, the other mechanisms for the information management process and mobilization of the required resources are as follows: (1) preparing the situation reports in flooded regions according to a joint rapid assessment; (2) timely distribution and effective transfer of information to decision-making organizations, service providers, and communities at different levels; (3) collecting, organizing, and storing reports and other technical and scientifically relevant information related to disasters and emergencies; and (4) applying the results of reports that analyze, assess, estimate flood losses, and lessons learned into a publication.

CONCLUSION

Establishing an Early Warning System (EWS) for floods in a systematic way can be very effective in mitigating the losses caused by floods.¹¹ Timely and correct public communication

should be one of the strategies of mass media in the time of natural disasters. Coordinating among responsible organizations is vital during the response phase to have a good performance in Iran. Studies predict that global warming and climate change will increase both the number and intensity of floods in coming years. Therefore, managing and mitigating the flood hazard with community-based activities should be on the agenda of all relevant organizations.

About the Authors

Department of Disaster and Emergency Health, School of Public Health, Tehran University of Medical Sciences, Tehran, Iran (Mr Dizaji and Dr Ardalan); Harvard Humanitarian Initiative, Harvard University, Cambridge, Massachusetts (Dr Ardalan); Research Center for Health Sciences and Technologies, Semnan University of Medical Sciences, Semnan, Iran (Dr Fatemi).

Correspondence and reprint requests to Farin Fatemi, Research Center for Health Sciences and Technologies, Semnan University of Medical Sciences, Semnan, Iran (e-mail: f-fatemi@alumnus.tums.ac.ir).

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REFERENCES

1. Fatemi F, Ardalan A, Moslehi S. Preparedness functions in disaster: lesson learned from Tehran dust storm 2014. *Nat Hazards*. 2015;77:177-179.
2. Ardalan A, Holakouie Naieni K, Kabir MJ, et al. Evaluation of Golestan Province's early warning system for flash floods, Iran, 2006-7. *Int J Biometeorol*. 2009;53:247-254.
3. ICRC. Guidelines for assessment in emergencies. Geneva, Switzerland: ICRC; 2008.
4. Babaei J, Moslehi S, Ardalan A. Rapid health needs assessment experience in 11 August 2012 East Azerbaijan earthquakes: a qualitative study. *PLoS Curr*. 2014;6.
5. Federal Emergency Management Agency. ICS Glossary. FEMA. Glossary.training.fema.gov/emiweb/is/icsresource/assets/icsglossary.pdf. Accessed May 28, 2016.
6. Ardalan A, Moradian MJ, Saberinia A, et al. *I.R.Iran National Health Disaster and Emergency Response Operations Plan*. Tehran: Ministry of Health; 2015.
7. Ciotton GR. *Ciotton's Disaster Medicine*. Amsterdam: Elsevier; 2015.
8. Smith JS, Kuldau GA. Methods of instruction of the incident command system and related topics at US veterinary schools. *Disaster Med Public Health Prep*. 2014;8:505-510.
9. PAHO. Information Management and Communication in Emergencies and Disasters. In: Barrantes SA, Rodriguez M, eds. Washington, DC: PAHO; 2009.
10. Deen S. Pakistan 2010 floods. Policy gaps in disaster preparedness and response. *Int J Disaster Risk Reduct*. 2015;12:341-349.
11. Cools J, Innocenti D, O'Brien S. Lessons from flood early warning systems. *Environ Sci Policy*. 2016;58:117-122.