

Rains and floods in Saudi Arabia. *Crying of the sky or of the people?*

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The Kingdom of Saudi Arabia (KSA) has recently hit world news and has become well known for man-made disasters, such as terrorist attacks, and the high rate of motor vehicle accidents. However, natural disasters, such as floods have had much less attention, even though it leads to much more damage than the rest of other disasters or accidents combined. This article will present the 2 cases of Jeddah 2009 floods and Riyadh 2010 floods as the most recent disasters in the region. These 2 events were chosen since they are very recent, and have awakened policy makers to shift their emergency preparedness efforts to a more active approach. This article will also review the main lessons learnt and recommendations for future disaster preparedness strategies.

There is a scarcity of literature published on natural disasters in KSA, and perhaps the best record on international disasters comes from the International Disaster Database (IDD). The IDD is an established World Health Organization (WHO) project that originates from the Center for Research on the Epidemiology of Disasters, School of Public Health of the Université Catholique de Louvain in Belgium. It compiles and standardizes the data collection of all international natural and man-made disasters. **Table 1** summarizes the main 10 natural disasters that occurred in KSA in the last century.¹ It is obvious that floods have been the most frequently encountered natural disaster in the country. The exceptions to floods, being a main natural disaster, were only 3 incidents of bacterial/viral meningitis occurring during Hajj time (that is, annual pilgrimage to Makkah). Of all natural disasters enlisted, the 2009 Jeddah floods have topped the list in terms of severity, fatality, and cost. Some disasters have been omitted from **Table 1** due to the strict inclusion criteria and definitions used for IDD (refer to **Table 2**).¹

At approximately 6:30 in the morning of Wednesday (25th November 2009), rain started falling heavily in Jeddah, and continued for almost 12 hours. The amount of water in this relatively brief downpour (approximately 90 mm³) doubled the average annual rain fall in Jeddah.² With sound infrastructure and proper drainage system lacking, this rain turned into a worst disaster that Jeddah has experienced in 27 years or so.³ The downpour resulted in the formation of water tides coming from the hills on the east of the city,

heading west towards the Red Sea, and cutting their way through the city. Jeddah only rarely has rainfall, and hence preparedness to any risk arising from such a natural phenomenon is, at best, minimal. The passage of the floods through a city with an almost non-existent drainage system was devastating. Several residential houses collapsed, forcing many inhabitants to the upper floors and roofs. Laboratories and databases at the King Abdulaziz University and King Abdulaziz Hospital were destroyed, wasting valuable resources, specimen, and medical records.^{2,3} Major roads of the city were blocked by meters-high water waves, or by cars that have been washed out. As a result, thousands of pilgrims were rendered waiting in buses for hours before arriving in Makkah for the first day of Hajj. Furthermore, the King Abdullah Bridge on the South of Jeddah has partially collapsed, adding to the chaos and fright to the situation.^{2,3} Power and telecommunication services were not spared either. As early as 11 A.M, floods have already resulted in a temporary power outage on the whole Western region of Saudi Arabia (such as, Makkah, Madinah, and Jeddah). Many people were not even able to call for help as communication with emergency services (for example, Civil Defense Forces, police,

Table 1 - Top 10 natural disasters in Saudi Arabia from 1900-2010 sorted by the number of people killed.¹

Disaster	Date	Number of fatalities
Flood	24 November 2009	163
Epidemic	11 September 2000	76
Epidemic	March 2000	57
Epidemic	9 February 2001	35
Flood	28 April 2005	34
Flood	24 December 1985	32
Flood	22 January 2005	29
Flood	4 April 1964	20
Flood	8 April 2002	19
Flood	11 November 2003	12

Table 2 - Criteria and definitions.

For a disaster to be entered into the database, at least one of the following criteria must be fulfilled:

- Ten (10) or more people reported killed.
- A hundred (100) or more people reported affected.
- Declaration of a state of emergency.
- Call for international assistance.

killed - persons confirmed as dead and persons missing and presumed dead (official figures when available), affected - people requiring immediate assistance during a period of emergency; it can also include displaced or evacuated people

and ambulance) has failed due to the overwhelmed network and power outage.^{2,3} Overall, 161 people lost their lives as a result of these floods, either drowning, or from car crashes. This disaster had an estimated cost of approximately US\$900 million to reconstruct Jeddah and help its victims.²

On 3rd May 2010, Riyadh experienced a brief 45-minute water shower, accompanied by light hail and winds gusting up to 24 km/hour.⁴ As brief as the downpour was, however, it resulted in floods and car crashes across the city. Local newspapers reported that at least 2 people were killed, and that the floods caused almost 275 car crashes. Even though King Khalid International Airport was not affected, many people missed their scheduled flights due to poor road conditions.⁴ A survey committee appointed by the Prince of Riyadh has started assessing the extent of, and the reasons behind the damages that have been the result of this rain.⁵

Floods can be a notorious disaster since they have the potential of occurring suddenly (for example, breakdown of a dam, or quick melting of snowfall). However, taking proper precautionary actions well in advance can substantially reduce adversities from such disasters. Such measures can include establishing functional drainage systems, and proper use of dams and levees. Natural disasters do not respect geographical boundaries, and international emergency planning may be therefore required.

The lessons from Jeddah and Riyadh floods are broad, and can be summarized into the following points:

Lesson one. It is often said 'history repeats itself: first as tragedy, second as farce'. Unfortunately, this has been true for the history of disasters in KSA. Floods have hit the county many times in 2000, 2001, 2002, 2003, 2005, 2009, and finally in 2010. However, lessons from these events pass by unnoticed. Preparations to such disasters are still lacking, and people return to their normal lives as if nothing happened. This might be because of the widely accepted attitude that "what Allah decrees to happen, will happen, and we cannot do anything about it."

Recommendation one. Disaster history has to be taken seriously, and lessons and recommendations from each event should be analyzed in order to make better decisions, and take better preparatory actions for the next event. It is also important to realize that Islam has taught us to "trust in Allah, but tie your camel," indicating that people have to take a proactive role. It is sad that such precious experiences are not documented nor shared, which is a considerable waste of knowledge that could save lives down the line.

Lesson 2. Recent floods have revealed serious fragmentation in the coordination between different sectors in the management of such emergencies. Currently, emergency management in KSA is a reactive system, rather than an anticipatory system. This may sometimes not be sufficient to face such a widespread disaster as a flood, for example, during the Jeddah 2009 floods people were not aware whom they should contact for help. Emergency services in Jeddah were unavailable to public as early as 11 A.M on the day of the floods, due to panic and spontaneity in trying to save the victims. Added to this chaos was the power outage that occurred early in the day.

Recommendation 2. An emergency requires a well-rehearsed strategy, planned well before any disaster hits. It is not feasible to expect different parties to work harmoniously under a crisis situation if they have no coordination beforehand. A local organizing body should be formed, and aimed at bringing together different local agencies, such as hospitals, local Civil Defense Forces, local police, local businessmen, and stake holders. Also, a unified 'emergency number' should be created and publicized for people to call, instead of occupying the lines of individual police and Civil Defense Force centers.

Lesson 3. During Jeddah floods, King Abdulaziz Hospital was also affected by the water waves. The hospital's underground was repeatedly reported to have been submerged with water. Basic understanding of the pattern of natural disasters was lacking.

Recommendation 3. Better understanding of the local geography of the city will lead to better understanding of potential natural disasters. Thus, preparing robust infrastructures would enable to mitigate such hazards. For example, Jeddah is a coastal city and 'excess' treated water can be safely let run into the Red Sea, provided there is proper drainage system.

Lesson 4. The floods were a shock to the people of Jeddah and Riyadh, and this stimulated volunteer work. The attitude of helping others when able is an Arab characteristic, and an Islamic quality that drives people to volunteer. However, this has resulted in a sharp rise of the number of volunteer bodies, many of which were disorganized, duplicated work that had already been carried out, and sometimes hindered professional aid, such as first aid by professional paramedics.

Recommendation 4. All volunteers should follow one big organized agency, so as to serve people in need efficiently and professionally. Thankfully, such organization called Jeddah Friends was recently organized, and approved by the Jeddah Governorate.

Saudi Arabia has a history of frequent floods. Jeddah and Riyadh floods are the most recent ones, and they have awakened policy makers to take a more proactive action. Lessons from these events should be considered seriously to efficiently minimize the impact of future disasters. These policies, if implemented, will enhance the readiness and preparedness of the population in the country to respond effectively to such events. Active and holistic planning has to be a priority among agencies in the country. It is, perhaps, time to look back to history and learn some lessons in disaster preparedness.

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