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A critical comparative review of emergency and disaster management in the Arab world

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Abstract

Purpose – The Arab world is made up of 22 countries in the Middle East and North Africa. These countries are subjected to many social, economic, political and geographical vulnerabilities contributing to increased risks or ineffective emergency and disaster management. This paper examines these vulnerabilities, how they may impact the country's ability to face disasters, and how they can improve disasters' overall management.

Design/methodology/approach – The author selected Qatar, Oman to represent the Arab oil-rich countries, while Jordan, Egypt and Morocco to represent non-oil rich countries. The research was conducted in a qualitative, inductive systematic literature review based on a well-established systematic literature review methodology. Selected literature was based on its recency and the countries in question.

Findings – The review reveals population gaps that could threaten the social system in the event of a disaster in countries like Qatar and Oman. The majority of the countries lack community engagement and pre-planning for emergency preparedness due to social and cultural barriers. Other nations like Jordan, Egypt and Morocco are prone to long-lasting economic challenges due to lack of resources, mismanagement or corruption. The paper also highlights the need to raise the educational attainment among citizens to understand disaster risk reduction.

Originality/value – This study utilized the research method developed by Williams *et al.* (2017) to present a comprehensive systematic and comparative review of disaster management in the Arab world. Considering that disaster and emergency management has remained disproportionately unexplored in the Arab world, this paper reviewed several vulnerabilities and how those vulnerabilities may affect disaster and emergency management efforts in the Arab countries.

Keywords Arab nations, Disaster management, Emergency management, Socioeconomic

Paper type Research paper

Introduction

The total number of disasters worldwide has nearly doubled since the 1980s. Disasters can strike any country regardless of economic status; however, developing countries sustain the worst impact (Coppola, 2015). Developing countries have limited capacity to prepare for disasters and emergencies and limited capacity to cope with disasters when they do occur. In some cases, the nation may have difficulty meeting minimum requirements for supporting urban infrastructures and rural support services, so when an extreme event occurs, already overloaded capacities may fail. While few Arab nations have an excellent economy and are in no sense third-world countries, other nations have many challenges.

A highly urbanized Arab world spread across the Middle East and North Africa (MENA) region means that the population's future growth will primarily occur in already-populated cities (Serageldin *et al.*, 2012). Floods, earthquakes, major weather events, storms and drought are the most common natural disasters in the Arab region (Bousquet *et al.*, 2014). The likelihood of these disasters increases with the rise of climate change, which harms national

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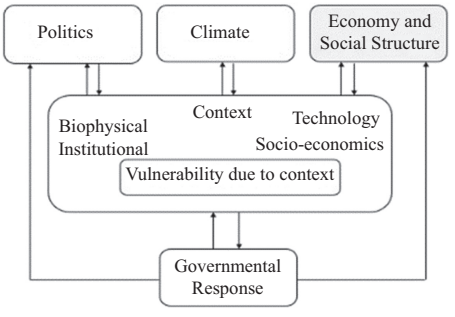
and local economies, the environment and society in general. The accelerated urbanization in the Arab countries is causing people and resources to be more vulnerable to disasters (Serageldin *et al.*, 2012). According to Kirch *et al.* (2017), Arab countries can be more susceptible to economic and political disasters because they have low preparedness levels.

In prosperous oil economies like the Gulf Cooperation Council (GCC) countries, the nations are stable; the economies are booming. Unemployment is virtually non-existent, and no one lives in poverty. Even though natural gas and oil prices have dropped in recently, the countries have begun the diversification process and to build an economic base that will not be dependent upon one or two resources. In the case of non-oil rich countries with stressed economies, many Arab countries have much lower gross domestic product (GDP) per capita, a significant unemployed population, and many people living in poverty. In recent years, many Arab countries like Egypt, Iraq, Tunisia, Yemen and Syria have experienced a great deal of active political unrest, protests and terrorist activities. However, Kirch *et al.* (2017) found that many Arab countries, regardless of their economic status, had limited ability to cope with potential disasters. To better understand disaster management, one must view it from a comparative perspective (McEntire, 1997). Therefore, it is essential to gain a more thorough understanding of the issues and vulnerabilities affecting different rich or poor Arab countries, leading to solid recommendations for better disaster management in the Arab world.

In the illustration above, the political system, the economy and the social structure, all provide the context for biophysical, institutional, technology and socioeconomic vulnerabilities. The governmental response to these issues in total not only changes or modifies the context but also contributes to political and economic stability. Disasters susceptibilities are not limited to natural, technological or technical hazards but are often compounded by other dimensions like physical, social, economic, political and environmental conditions (Oliver-Smith, 1996; Blaikie *et al.*, 2004; Martins, 2017). By understanding the drivers of exposure in the overall system, it is possible to develop recommendations to eliminate or mitigate vulnerabilities and enhance national disaster preparedness. This paper seeks to assess different economic, political, social and geographical vulnerabilities and highlight the factors influencing disaster management processes. It also aims to identify measures needed to improve disaster management in Arab countries.

Theoretical background: emergency and disaster management

Numerous emergencies and disasters occur every day around the world. While emergencies and disasters are used interchangeably, researchers and practitioners denote distinctive differences. Disasters are catastrophic, deadly and disruptive events that occur when hazards



Source(s): Adapted from Owusu and Nursey-Bray (2019)

Figure 1.
Drivers of vulnerability

interact with vulnerabilities requiring extensive resources (Etkin and Burton, 2015). Disasters have a more significant impact on individuals, families, organizations and societies. Emergencies are small disasters with limited impact and required resources (Coppola, 2015).

Disasters can be caused by natural, technological, political, economic or human-made causes. When hazards interact with vulnerable people and weak infrastructure, they result in harm, damage and disruption (McEntire, 2007). To prevent and minimize the consequences of these vulnerabilities, people, communities and governments have created many preventive and recovery strategies. Regardless of the adopted approaches, the final goal is to manage disasters effectively (Coppola, 2015).

During the 1980s, when disasters hit a global scale, the United Nations (UN) named the 1990s as the International Decade for Natural Disaster Reduction to raise global public awareness of the risks posed by natural hazards. As disasters increased, countries around the world adopted the Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities in Kobe, Japan 2005. This action was ratified by General Assembly Resolution with global intent to act holistically to reduce disaster risks. Member states later adopted the 2015–2030 Sendai Framework for Disaster Risk Reduction at the third UN world conference on Disaster Risk Reduction in Sendai, Japan. The framework included seven targets and four priority actions for countries to improve disaster management and reduce risks.

Derived from the Latin term *vulnerabilis*, which means "to wound," vulnerability is the likelihood of an object, individual, community or country to be affected by a hazard; it is an indicator of susceptibility for being harmed (Coppola, 2015). The vulnerability can be exacerbated by combinations of physical, social, economic, political and environmental influences or processes (Oliver-Smith, 1996; Blaikie *et al.*, 2004; Martins, 2017). As a result, all governments employ disaster management and risk reduction policies, strategies and plans to reduce their vulnerability to hazards.

Hazards are generally classified as natural, biological, technical or man-made (Blaikie *et al.*, 2004; Coppola, 2015). Natural hazards are natural phenomena that have the potential to cause bodily and property damage, such as earthquakes, tsunamis, floods (Blaikie *et al.*, 2004). Biological hazards may include disease epidemics and plagues. Technical or technological hazards, on the other hand, are human-made or caused by technology failure or accidents. Technical hazards may consist of industrial accidents, nuclear radiation, toxic releases, transportation accidents, chemical and oil spills.

Research method

This study's methodology is adapted from the systemic review method developed by Williams *et al.* (2017). Eight steps are guiding the process:

(1) Determine if the review is relevant; establish the need

(2) Define the time boundaries of the articles to be used

(3) Define the area or field of search

(4) Develop the search strings to be used and what will be included or excluded

(5) Choose search databases and what type of articles or information will be included

(6) Develop a list of articles to be used in the review

(7) Conduct an analysis to identify general patterns, and

(8) Identify the use of core themes in the research articles and compare them to the themes' initially conceived idea.

Attride-Stirling (2001) argued that the entire point of conducting thematic analysis is to uncover the themes used in texts at different levels. This process can be summarized as examining texts closely, identifying the themes in the texts and exploring how all the themes integrate. In the introduction, there is a need for information relating to the study of risk or vulnerability in the Arab nations (step 1), ensuring that the materials studied are relevant and includes determining the time boundaries of the articles to be used (step 2, described in the Inclusion section). To gather relevant research, the area or field of search is defined (step 3), and the search strings (step 4) and databases are established (step 5, described in the Search section). A list of potential articles is developed for use in the review (step 6). In the current research, the texts were read and summarized (step 7), and the themes or subject matter were extracted (steps 7 and 8) (both by nation and subject). The themes were then integrated.

Many researchers showed that low and high-income countries are equally exposed to disasters (Coppola, 2015; Etkin and Burton, 2015). However, disaster management approaches may vary between countries depending on hazard profile, policies, vulnerabilities and risk reduction plans. Therefore, it is crucial to understand how different exposures may influence how high and low-income nations in the Arab world deal with disaster and emergency management. Hence, the researcher selected Qatar and Oman as high-income oil-rich nations primarily from the GCC countries. Jordan, Egypt and Morocco were selected to represent non-oil low-income countries in the Middle East and North Africa region. To ensure appropriate representation from the 22 Arab countries, the researcher determined how they are all interrelated in terms of national backgrounds, hazards, political state, economy, security issues, disasters and emergency management similarities and differences.

Inclusion and search criteria

Due to the lack of literature available in the Arab world for emergency and disaster management, it took 20 years to retrieve enough literature. This study's inclusion criteria established that documents relating to the countries in question best set between 2004 and 2020, although one older supporting document was accepted. Although the study concentrated on academic materials, government studies or international reports were also utilized. In the end, all documents were used, whether for primary or secondary information, were from 2002 to 2020.

Several search terms were used in the research, including risk management, natural disasters, public policy, risks, emergency management, natural hazards, technological hazards and disaster emergency management. The terms were used alone and in combination with other terms, including Qatar, Oman, Jordan, Morocco and Egypt. A wide variety of databases was utilized, including Google Scholar, Scopus, Academia, ResearchGate, and other proprietary databases. The databases allowed the search for exact terms and also for specific dates or date ranges. Combining terms and date ranges allowed for a great deal of flexibility to either determine inclusive or excludable materials.

Literature review

World risk and vulnerability index

The United Nations created the World Risk and Vulnerability Index to reflect various nations' threat levels (Kirch and Mucke, 2019). The report ranks each of the world's countries in terms of overall risk, with sub-rankings of exposures, social vulnerability, susceptibility to hazards, lack of capacity to cope and inability to adapt. In the table below, exposure rank measures the nation's population's exposure to natural hazards, including droughts, cyclones, floods and other threats. Vulnerability is the social accumulation of susceptibility, lack of ability to cope and lack of capacity to adapt. Susceptibility is the society's dependence on the nation's

infrastructure, access to nutrition, general income and the prevailing economic overlook. Finally, the lack of capacity to adapt is the inability to adjust to things that are likely to happen in the future, including climate change and other natural events (Kirch and Mucke, 2019).

Based on the ranking scale used, Qatar is the country with the least risk in the entire world. Qatar scored the best rankings in vulnerability, lack of capacity to cope and lack of capacity to adapt. Egypt ranks the worst in the ability to manage. Oman's overall susceptibility is its low point. Finally, Morocco is ranked as the overall lowest nation of those investigated, with higher scores in all risk categories. The lack of coping capacity is its greatest weakness. Susceptibility is described as the likelihood of suffering harm, while exposure is the exposure to natural hazards. For comparison purposes, the United States has a ranking of 133, meaning that it falls between Jordan and Oman in the overall risk. The United Arab Emirates (UAE) ranks 134th, and the United Kingdom ranks 144th. In terms of overall risk, the Arab Nations are doing well (Kirch and Mucke, 2019) (see Table 1).

Annual global risk assessment

The World Economic Forum (The Global Risk Report, 2020) conducts an annual global risk assessment. For 2020 they concluded that the highest risks globally, in terms of the likelihood of happening, are all related to the natural environment: "extreme weather, climate action failure, natural disasters, biodiversity loss, and human-made environmental disasters" (The Global Risk Report, 2020, p. 2). However, the top five risks in terms of impact differ: "climate action failure, weapons of mass destruction, biodiversity loss, extreme weather, and water crises" (The Global Risk Report, 2020, p. 2). Three of the top impacts are also three of the highest events likely to occur, making climate action failure, biodiversity loss and extreme weather both with high impact and high risk. One example of these risks is that each of the countries investigated for this study is already exceeding more than 100% of the available renewable water resources (World Health Organization, 2002).

The short-term risk outlook is somewhat different; the top five risks are economical, domestic political differences, extreme heatwaves, ecosystem destruction and cyberattacks on infrastructures (Global Trade Review, 2020).

Qatar

Qatar, one of the oil-rich nations of the Arab world, achieved independence from the United Kingdom in 1871. It has a mixed legal system, with civil law prevailing in business and international relations, and Sharia law for family and personal issues (Khedr, 2013). According to the 2020 estimation, Qatar's population is about 2.5 m people with a 1.2 growth rate (CIA, 2020a, b, c, d, e). The majority of the population is clustered on the eastern side of the peninsula, in or around the capital city of Doha. Qatari citizens represent only 11.6% of the

Table 1.
Risk index vulnerabilities

	Risk index	Exposure	Vulnerability	Susceptibility	Lack of capacity to cope	Lack of capacity to adapt	Ranking
Qatar	0.31	0.9	34.35	8.75	66.29	28.01	180
Egypt	1.84	3.91	46.98	21.45	82.57	36.92	173
Oman	2.74	6.74	40.63	22.51	67.72	31.66	157
Jordan	4.08	9.23	44.23	22.97	70.51	39.22	130
Morocco	5.83	12.23	47.66	25.53	78.88	38.58	99

Source(s): Kirch and Mucke (2019)

Nation	Agency	Response agencies	Role	Level
Qatar	NCC–National Command Center	Qatar Emergency Service Center	Central contact for calls	National
	Permanent Emergency Committee (PEC.)	Ministry of Interior	Has control of the emergency process	National
	UNISDR	Interior Security Forces	Maintains safety and security	National
		Hamad Medical Corporation	Ambulance and medical services	National
		Ministry of Foreign Affairs (MOFA)	Development and Humanitarian Affairs and Disaster Response	International
		Representatives of the public and government ministries	Established a National Plan for Emergencies, adopted in 2005	National
		Civil Aviation Administration	Established an observatory that is used to observe natural disasters A general framework for reaction to disasters	International
Oman Marwah (2017)	Royal Omani Police	National Committee for Civil Defense (NCCD)	Controls the Civil Defense	National
		Ministry of Health	Provides health services	National
		Ministry of Environment and Climate Affairs	Environmental and Climate issues	National
		Public Authority for Civil Defense and Ambulance Service	Provides ambulance service	National
Egypt United Nations Office for the Coordination of Humanitarian Affairs (OCHA) (2019)	CMDR–Crisis Management and Disaster Reduction Sector	Ministry of Interior	Works with and supports CMDR	National
		Egyptian Atomic Energy Authority	Deals with issues related to atomic energy	National
		Academy of Scientific Research and Technology (ASRT)	Provides scientific advice and technology capacity	National
		Ministry of Housing, Utilities and Urban Communities	Addresses housing and infrastructure	National
		Egyptian Environmental Affairs Agency	Environmental issues	National
		Armed Forces	Defense	National

(*continued*)

Table 2.
Emergency and disaster management organizations in the Arab countries

Nation	Agency	Response agencies	Role	Level
Jordan	Civil Defense Directorate	Cross-Border Task Force	Develop policies and deliver assistance	International or cross border
		Health and Nutrition	Health and nutrition service	International or cross border
		Food Security	Food development	International or cross border
		Logistics	Moving supplies	International or cross border
		Shelter	Providing Housing	International or cross border
Morocco United Nations Office for the Coordination of Humanitarian Affairs (OCHA) (2019)	Directorate General of Civil Protection	Watch Center and Coordination	Central contract and control	National
		National Geophysical Institute	Issues relating to geology (such as earthquakes)	National
		Directorate of National Meteorology	Issues relating to weather	National
		Global Facility for Disaster Reduction and Recovery (GFDRR)	Mitigation of disaster and improvement of recovery	International
		World Bank	Funding	International
		Organization for Economic Cooperation and Development (OECD)	Funding and business advice	International
		Swiss Government		
GCC Emergency Management			Enhance risk management in the region, regional support incident response; promote integrated incident response plans, and foster regional interoperability (GCC, 2020)	Regional

Table 2.

country's total population (CIA, 2020a, b, c, d, e). As a result, non-citizens account for the majority of the population. Most of the residents are foreign workers from a variety of Asian countries (CIA, 2020a, b, c, d, e). Immigrant workers have fewer advantages in the country, and many live without their families as a result. Therefore, workers generally have lower community attachment which is linked to social and cultural barriers. This scenario has been shown to harm community disaster and emergency preparedness.

Political state of Qatar. The monarchy is hereditary, but the Emir appoints the prime minister and the deputy prime minister. The Amir also appoints the cabinet. The legislative branch consists of a unicameral advisory council composed of 45 seats, with 30 members elected by direct popular vote and 15 members appointed by the monarch. The Amir has announced that the council will become directly elected, but this has not yet occurred. In the judicial branch, the Supreme Court consists of the court president and a small panel of judges.

At the same time, the Constitutional Court is comprised of the Chief Justice and six additional members, all of which are appointed by the Supreme Judiciary Council, which is appointed directly by the Amir. There are many subordinate courts, with each having a specialty in terms of what they do. Qatar participates in a wide variety of international organizations and has diplomatic representation in the United States.

Qatar has a military draft for males aged 18–35, but the service period is as little as four months. Women also serve in the armed forces as both officers and pilots. Qatar mounts a land defense, navy and coast guard, air force, internal security and gendarmes (Al Maeena, 2014).

Economy of Qatar. Qatar's economy is based on natural gas and oil. It currently has a large budget deficit due to high spending on infrastructure. Besides, the gas and oil prices have been relatively low in recent years, cutting into the expected budget. Qatar expects to depend on gas and oil for its income for the next 138 years (Oil and Gas Year, 2020) but is taking steps to shore up construction, manufacturing and other non-oil sectors.

Qatar's purchasing power parity or GDP was USD 339.5 bn in 2017, placing it 52nd in the world rankings. The real growth rate is slow and behind most nations. However, the GDP per capita (PPP) ranks Qatar second in the world ranking. This, combined with the gross national savings rate of 55.13% of GDP, is the highest globally; most households are very well off (World Bank, 2020). None of the population in Qatar is under the poverty level. At the time of this writing, Japan, South Korea, India, China, Singapore and the UAE are Qatar's primary export partners. At the same time, China, the US, the UAE, Germany, UK, India, Japan and Italy are Qatar's primary import partners.

Natural hazards of Qatar. The natural rainfall pattern in Qatar is changing. Al Mamoon and Rahman (2017) determined that rainfall in December through February increases. In March and April, it is decreasing. Water resource planning will need to change in Qatar to ensure the nation has enough water.

Qatar has built a new town, named The Pearl-Qatar, on reclaimed land on the Gulf's shore. The islands were planned to expand the miles of coastlines and increase the number of luxury homes bought and sold. The Pearl includes high-rise apartments as well. However, the area is prone to seismic problems, tsunamis, tidal waves and erosion. Cyclones are also possible, and the availability of drinkable water is a challenge. These hazards are emphasized in reclaimed areas, which are not as stable as regular land. Thus, seismic hazards cause a much higher risk than in most Qatar, especially in high-rises areas. Cyclones, which have not been typical, are becoming more familiar with the increase in global warming. Finally, pollution is rapidly increasing with these projects, and organic waste is poisoning the coral reefs. In addition, the temperatures in Qatar are increasing and pose a risk to life, particularly in the young and the elderly (Mohieldeen *et al.*, 2014).

Technical hazards of Qatar. The high population of Qatar brings a high volume of trash. Ahmad (2016) pointed out that the nation must find a sustainable solution for solid waste; the current solution is inadequate for the population. Qatar has plans for an increasing number of cities. Charfeddine *et al.* (2018) pointed out that environmental quality is beginning to suffer in Qatar. Given that the current ecological conservation methods will limit economic growth, and Qatar does not wish to have its growth limited, it will need to seek other solutions to improve environmental quality.

Qatar's government has estimated that by the year 2032, Qatar's population will level off and begin to fall (Rahman, 2014). Until then, they have identified the following technical hazards: There is a lack of public transportation as well as a lack of open space; many Qatari are marginalized because they are subjected to inner-city life with no remittance. There is little open space, and current policies for land use endanger traditional family values. The nation has very high energy consumption, and mega-projects are improperly planned for human needs. Simultaneously, developers frequently lack technical knowledge, and the government does not have an adequate regulatory structure (Rahman, 2014).

Vulnerabilities of Qatar. In 2017, political considerations caused the UAE, Saudi Arabia, Bahrain and Egypt to levy Qatar's trade restrictions. As a result, Qatar decided to put a great deal of effort into developing new trade routes and supply lines to access imports from non-Arab countries (Kabbani, 2017).

Qatar is not involved in any international disputes. It is home to 1200 stateless persons and is a "destination nation" for trafficking in persons. Forced prostitution exists, but the larger problem is that men, women and children are all subjected to forced labor. Foreign nationals come to Qatar looking for work, but they end up in forced labor. Qatar does not comply with international standards to help eliminate trafficking (United States Department of State, 2018).

Disaster management structure, planning and preparedness in Qatar. There is little published research on the structure of emergency management, planning and preparedness in Qatar. In 1998, Qatar established a Permanent Emergency Committee (PEC) under the Ministry of Interior to manage disasters and crises. The PEC is comprised of representatives of the 25 public and governmental ministries led by the Director of Public Security in the Ministry of Interior. The PEC has established a National Plan for Emergencies, which was adopted in 2005 and will serve as a general framework for a crisis. The plan is periodically reviewed; however, the researcher was not able to locate the plan. The Civil Aviation Administration is responsible for an observatory to be used to monitor earthquakes and natural disasters. The United Nations Office for Disaster Risk Reduction (UNISDR) seeks to improve the nation's recovery framework through the International Sendai Framework for Disaster Reduction 2015–2030. Each ministry is responsible for improving outcomes for their area of expertise to enhance the overall resilience (United Nations Office for Disaster Risk Reduction [UNDRR] and Prevention Web, 2020).

The Qatar Shelter Initiative is very active in developing information related to shelter challenges linked to disasters. At present, the main issue seems to be a lack of knowledge of volunteers, even within the disaster relief sector (Heiden *et al.*, 2011). Qatar has long been the center of disaster preparedness education in the Gulf with its early intent to organize the area against disaster (Moeller *et al.*, 2004).

Oman

Oman, one of the oil-rich nations of the Arab world, achieved independence in 1650. It has a mixed legal system, with Anglo Saxon and Islamic law (Mechantaf, 2010). Oman's population is estimated at 3.7 mpeople with a 1.8 growth rate (CIA, 2020a, b, c, d, e). The majority of Oman's people are concentrated in an area in the north, while a smaller cluster is there in the south of the country. Around 46% of the total population are immigrants (CIA, 2020a, b, c, d, e). Like Qatar, Oman has seen a significant influx of expatriate labor due to its rising oil-based economy (CIA, 2020a, b, c, d, e). Immigrant workers differ in their attachment to the community and have higher rates of social and cultural isolation. This poses a potential risk for community response to disasters and emergencies.

Political state of Oman. The absolute monarchy is a modified hereditary form. The monarch is both the chief of state and the formal head of the Omani government. The cabinet is appointed by the monarch, while the legislature itself is bicameral, with half being directly elected and half being appointed by the sultan from prominent citizens and individuals who served the country in one form or another. If the sultan passes away or becomes incapacitated, the ruling family's council appoints a successor; if they cannot do so, the individual the sultan who had assigned as a successor is accepted. In the judicial branch, the Supreme Court consists of five judges, while the Supreme Court has nine members appointed by the monarch. They serve for life. There are many subordinate courts, with each having a specialty in terms of what they do (Mechantaf, 2010). Oman participates in a wide variety of international organizations and has diplomatic representation in the United States.

Oman does not have a military draft; both males and females have served since 2011 (Khaleej Times, 2011). Oman has Sultan's Armed forces, an army, a navy, air force and rural guards.

Economy of Oman. Oman's economy is based on natural gas and oil. It currently has a large budget deficit due to high spending on infrastructure. Besides, the gas and oil prices have been relatively low in recent years, cutting into the expected budget. Oman is diversifying, privatizing and industrializing to make up for low oil prices (Abouzzohour, 2020).

Oman's purchasing power parity, or gross domestic product (GDP), was USD 190.1 bn in 2017, placing it 67th globally. The real growth rate is negative and behind most nations. The PPP ranks Oman 28th globally (Knoema, 2019). There is no unemployment, nor are there any households in poverty. At the time of this writing, China, the UAE, Qatar and India are Oman's primary export partners, while United Arab Emirates, China, India, Qatar, Saudi Arabia and the European Union are Oman's primary import partners (Nordea, 2020).

Natural hazards of Oman. Perhaps the most significant natural hazard in Oman is the risk of seismic activity (El-Hussain *et al.*, 2012). There is also substantial evidence that tsunamis are a risk in Oman (Rodriguez *et al.*, 2013) due to landslides in shallow water. Oman is also prone to cyclones and tsunamis, and storm surges (Fritz *et al.*, 2010).

Technical hazards of Oman. Oman is an oil-rich nation, but it has been subject to problems coming from petroleum-related drilling (Al-hamhami *et al.*, 2011). The country has begun implementing procedures to lessen the dangers of that drilling. Water transmission in Oman is also at risk because the system is typically damaged after tsunamis or other disasters (Al-Jabri, 2016). Work-related injuries in the oil field are a hazard (Al-Rubaee and Al-Maniri, 2011). Food-borne illness is also a problem in Oman, primarily due to a lack of standards for ready-to-eat foods in restaurants (Ali, 2015).

Vulnerabilities of Oman. In 2019, Oman acknowledged a heightened military threat in the Gulf of Oman, Strait of Hormuz, the Arabian Sea and the Red Sea based on the possibility that Iran could attack US interests in the Gulf. The US and UK navy are protecting the US, UK trade interests in the Gulf. Because the US is a primary trade partner of Oman, Oman falls in the threatened category. Oman also has approximately 5,000 refugees from Yemen.

Disaster management structure, planning and preparedness in Oman. Surprisingly, disaster and emergency management and planning in Oman have not been closely examined in the existing literature. Emergency and disaster management was proposed in 1988 as the National Committee for Emergencies instituted in an extremely small area. The committee included the Royal Omani Police, Ministry of Interior, Ministry of Health and Ministry of Social Affairs. Al-Shaqsi (2009) argues that such a committee was one of the first organized committees in the region to tackle disaster management. Despite several large disasters between this time and 1999, there is no record that a process was implemented. In 1999, the National Committee for Emergencies was reactivated, merged with the National Committee for National Disasters, and named the National Committee for Civil Defense (NCCD). It was intended to respond to emergencies and did not include preventative activities. In 2002 the NCCD took on protective actions and became part of the Royal Oman Police. The following year, eight response specialty groups were formed, including a chemical response unit and a medical service (Al-Shaqsi, 2009). The current NCCD is chaired by the Inspector General of the Royal Oman Police.

Historically, Oman has been lax in recording information relating to disasters. There was a significant flood in 1977 and floods in the Salalah region in 2003. Cyclones in 1977 (2), 1981, 2002, 2003, 2007 and 2010 caused a great deal of damage. In addition, in a major bus accident in 2004, the military had to be called in to help because of the remote location. In 2008, a building collapse caused the nation's search and rescue team's activation for the first time. In 1995, 2000 and 2005, civil unrest occurred and was considered "internal disasters" (Al-Shaqsi, 2011).

Al-Shaqsi attributes Cyclone Gonu as the first actual implementation of national emergency management in Oman. Roads and bridges washed out, hospitals floods, infrastructure was damaged, freshwater was delivered by boat. The late Sultan Qaboos gave the NCCD the authority to invite additional members and ordered a significant reform in the NCCD structure.

Oman addresses hazards as being human-produced or non-human produced. The use of mobile phones while driving is a human hazard. Human hazards in Oman also arise from Iran and Yemen and extremists' threats coming across the border illegally. Oman's perception of the human-produced hazards is that societal changes facing the country, primarily due to international politics, are a large part of the problem and need to be addressed (Al-Shaqsi, 2011).

Egypt

Egypt has existed as a country for thousands of years, but it has been independent of UK supervision since 1922. Some of the law systems still exist from colonial days (Aboueleid, 2019). Egypt's population is estimated at 106.4 m people, with a 2.7 growth rate (CIA, 2020a, b, c, d, e). In total, 95% of the population lives within 20 km of the Nile river, vast areas of the country remain unpopulated. Egypt is the most populated country in the Arab world and is the third most populous country in Africa (CIA, 2020a, b, c, d, e). A 2002 poverty assessment report by the World Bank shows that 16.7% of the population cannot obtain their basic food and non-food needs.

Political state of Egypt. The government of Egypt is a presidential republic with the president elected by direct vote. The government's executive branch nominates the cabinet, but its unicameral House must approve it of representatives. The House is partly elected and partly appointed. There are a wide variety of courts. The nation's Supreme Court has ten judges and a president. There are numerous political parties. Egypt participates in a wide variety of international organizations and has diplomatic representation in the United States.

Egypt has a military draft for ages 18–30. Women can serve in administrative and medical units and are fighting for rights to enter other fields. Egypt has Sultan's Armed forces, an army, a navy, air force, a central security force and national police (Kechichian and Nazimek, 1997). The UN has also had troops in the Sinai region since 1982, enforcing the treaty between Egypt and Israel.

Economy of Egypt. Egypt's economy is based on service, industry and agriculture. The economy has been volatile in the recent past. Unlike the oil-rich countries, Egypt has had to approach international economic aid providers, including the IMF, for assistance economically. For much of 2017, the inflation rate exceeded 30% (El-Tablawy and Feteha, 2017).

Egypt's purchasing power parity, or GDP, was USD 249.56 bn in 2017, placing it 21st in the world rankings. The real growth rate is 4.2%. The PPP was only $14,023 per capita. Unemployment was 10.9%, and 1.3% of the population is below the poverty line. At the time of this writing, the UAE, Italy, US, UK, Turkey, Germany and India are primary export partners. At the same time, China, the US, the UAE, Germany, Saudi Arabia and Russia are Egypt's primary import partners (Knoema, 2020).

Natural hazards of Egypt. Flash flooding is a natural hazard in Egypt (Cools *et al.*, 2012). There is also a high rate of seismic activity. Severe warming occurs as lakes in the western part of Egypt dry up (Hereher, 2017). Insects have created disasters in Egypt, as have epidemics and droughts (Abulnour, 2014).

Technical hazards of Egypt. In Egypt, fertilizers have been used in such large amounts that they have caused harmful radioactivity levels to accumulate in the soil. These radioactivity levels are so high that they are harmful not only to farmers and workers but also to individuals that consume the foods that grow in the soil (Uosif *et al.*, 2014).

Vulnerabilities of Egypt. Egypt has at least three home-based terrorist groups whose aim is to overthrow the Egyptian government (Harakat Sawa'd Misr or HASM; the Islamic State of

Iraq and ash-Sham ISIS-Sinai Province; and Liwa al-Thawra). There are also two foreign-based terror groups, including Al-Qaeda and the Army of Islam or AOI, seeking to overturn the Egyptian government. Egypt also has approximately 300,000 refugees and internally displaced persons (Karasapan, 2016).

Egypt is a "destination nation" for trafficking in persons. It is also a source nation and a transit nation. Besides, men, women and children are all subjected to forced labor. There is a great deal of prostitution along the Libyan border. Egypt does not comply with international standards to help eliminate trafficking (Law Library of Congress, 2016).

Egypt is also on the transit route for several drugs, including cannabis, heroin and opium. Drug traffickers move drugs to Israel, Europe, Nigeria and North Africa through Egypt. According to the Gan Integrity Group, Egypt suffers a great deal of corruption, impacting its ability to do business through legitimate routes (Gan Integrity Group, 2018).

Disaster management structure, planning and preparedness in Egypt. Despite the importance of disaster and emergency planning and management for Egypt, there remains a paucity of published research on this area (Elboshy *et al.*, 2019). The available research to date has tended to focus on earthquakes and associated evaluation models. According to Egypt's National Strategy for Crisis/Disaster Management and Disaster Risk Reduction issued in 2017, three disaster management structure levels, including strategic, tactical and operational. The National Committee for Crisis/Disaster Management and Disaster Risk Reduction (DRR) sits at the strategic levels to manage the crisis at the national level. The Committee is presided by the Prime Minister and composed of the following members: Ministry of Defense and Military Production, Ministry of Interior, Ministry of Foreign Affairs, Minister of State for Local development, Minister of Information, Minister of Health, representative of Public Intelligence Body, the Minster concerned with the crisis/disasters, Minsters according to the type of crisis/disaster and invited heads of institutions and experts. A coordinating committee for crisis/disaster management is responsible for coordinating the tactical response for national disasters and emergencies. The operational response is left for local governorates and concerned bodies. The national strategy focuses on critical priorities, including understanding disaster risks, enhance disaster risk governance, investment in disaster risk reduction, disaster resilience and post-disaster reconstruction. Like other countries, one of the major drivers to develop the national crisis management strategy is to fulfill Egypt's obligations with the International Sendai Framework for Disaster Reduction 2015–2030. In some of the scarce studies, Egypt has been one of the leading countries in the disaster preparedness movement in the region, particularly in terms of the impacts of terrorism (Moeller *et al.*, 2004). Egypt is considered one of the keystones in the Global War on Terror (GWOT). The key to disaster preparedness may be the realization that tragedies or disasters do not stop at the borders (Leiba *et al.*, 2005); therefore, international cooperation regionally is vital. The emphasis needs to be on information, medical intervention, and developing an "all nations" response for the Arab countries (Moeller *et al.*, 2004). Egypt is also investigating the possibility of developing post-disaster settlements that would accommodate many urban residents when a city is involved in a disaster. These communities would encompass both educational accommodations and medical service provision (Abulnour, 2014).

Abulnour (2014) pointed out that in a developing country like Egypt, a surmountable disaster in a nation with high resources may be devastating and take a great deal of time to restore the status quo. Whether they are natural or human-made, the effect is the same: Scarce resources are stretched even further. The Egyptian government is well-versed in disaster recovery; they need to devote more effort to planning and mediation. The Egyptian Institute of National planning reports that there are no classes or training in the emergency planning field (EINP, 2020), nor are there no published instructions to help the public in an emergency (Crisis Management Sector, 2020).

Jordan

Jordan, one of the non-oil-rich nations of the Arab world, achieved independence from the United Kingdom in 1946. It has a mixed legal system combining code from the Ottoman Empire with Islamic law and British common law, essentially combining law elements from the nations that once controlled it (Isaias and Jennings, 2020). Jordan's population is estimated at 10.9 m, with 0.8% growth (CIA, 2020a, b, c, d, e). Estimates for immigration also include Syrian refugees. The population is concentrated mainly in the west and southwest and around the capital Amman. Smaller communities are located in the south along the shore of the Gulf of Aqaba. The Jordanian government has recently seen a massive influx of refugees from Syria, Iraq and Somalia.

Political state of Jordan. There are numerous political parties in Jordan. The prime minister also appoints the cabinet in conjunction with the ruling monarch. The legislative branch consists of a bicameral Advisory Council composed of 65 assigned seats in the House of Notables and 130 seats in the House of Representatives. In the House of Representatives, 115 members are openly elected, while the remainder is proportional representation. In the judicial branch, the Supreme Court consists of 15 members and many subordinate courts, each having a specialty in terms of what they do. Jordan participates in a wide variety of international organizations and has diplomatic representation in the United States.

Jordan does not have a draft. Women can serve in the Army Women's Corp and the Royal Jordanian Air Force. Jordanian Armed Forces (JAF), Royal Jordanian Land Force, Royal Jordanian Navy, Royal Jordanian Air Force, Special Operations Command (Socom); Public Security Directorate (falls typically under Ministry of Interior, but comes under JAF in wartime or crisis) (NationMaster, 2020).

Economy of Jordan. Jordan has a tough economy; it is the smallest of all mid-Eastern countries economically and severely lacks resources. It has a high rate of unemployment (World Bank, 2020). It is predominately service-industry oriented.

Jordan's purchasing power parity, or GDP, was $4095 in 2017. The real growth rate is slow at 4.6% and behind most nations. The PPP places Jordan at 110 in the world ranking for 2017, with an annual per capita income of only $9,173 (Worldometer, 2017).

Natural hazards of Jordan. Like the other Arab nations investigated here, Jordan is susceptible to seismic problems (Al-Tarazi and Korjenkov, 2007). The country is short on water (Rosenberg *et al.*, 2008). Flash floods, floods, snowstorms and cold waves plague Jordan. Further, frost, epidemics and drought have a great deal of impact (Al-Nammari and Alzaghal, 2015).

Technical hazards of Jordan. Waste management processes are the source of numerous technical hazards in Jordan (Aljaradin *et al.*, 2015). While many dumping areas have chemicals, organic wastes and dangerous discards, the issue is complicated by Jordanians' tendency to scavenge the disposal areas, accompanied by their children. Children are particularly susceptible to the dangers of dumping areas. Neither children nor adults use any protective equipment. They are exposed to injury and acquiring the disease from items in landfills and dumps (Aljaradin *et al.*, 2015). Fatta *et al.* (2005) reported that the lack of adequate wastewater treatment, coupled with the need to use wastewater to alleviate water shortage, has caused polluted water and soils, health hazards for farmers, and illness from eating crops watered with reused water.

Vulnerabilities of Jordan. Jordan is not involved in any international disputes. As of 2015, there were nearly two million Syrian refugees in Jordan (Rogin, 2015). The conflict in Syria drove large numbers of refugees into Jordan. These refugees need food and money and cannot even accomplish their basic needs. Displacement is particularly difficult for younger people because it can affect their development and delay their ability to become functional adults.

Disaster management structure, planning and preparedness in Jordan. There is little published research on disaster and emergency management, planning and preparedness

(Albattat and Mat Som, 2013). As of 2015, Jordan's approach to disaster management focused on emergency response (Al-Nammari and Alzaghal, 2015). According to UNISDR (2012), flash floods, floods, snowstorms and cold waves are responsible for numerous reported fatalities in Jordan. In Jordan, disaster and emergency management are mainly derived from the General Directorate of Civil Defense (GDCD) as the oldest disaster and emergency management agency in Jordan (GDCD, 2020). The civil defense law no.18, 1999 and its adjustment law no. 57, 2002 give GDCD the jurisdiction to manage disasters on the national level. The GDCD law authorizes the civil defense to form The Higher Council of Civil Defense (HCCD) to prepare National Response Plans and hazards assessment to deal with national disasters. The HCCD is directed by the Minister of Interior and GDCD as vice chairman with the Prime Minister. All Cabinet Ministers Jordanian Armed Forces, and Public security. The HCCD is tasked with setting public emergency management policies, budgets, resources and preparedness plans to manage national emergencies. In 2015, the Center for Security and Crisis Management was formed by royal decree to manage national disasters and crises in Jordan (NCSCM, 2020). The NCSCM's board of directors is chaired by the Prime Minister with Minister of Defense, Minister of Interior, Joint Chief of Staff of the Armed Forces, Director of Intelligence Agency, Director of Public Security, Director of Civil Defense, Director of Internal Police. Although the nation virtually struggles with Disaster Risk Reduction (DRR) programs, one of the recent positive deliverables of the NCSCM was the issuance of Jordan's National Natural Disaster Risk Reduction Strategy (NNDRRS) 2019–2022 in March 2019 in association with the United Nations Development Program (UNDP). This strategy is driven by Jordan's compliance efforts with the International Sendai Framework for Disaster Reduction 2015–2030. The NCSCM is responsible for overseeing the implementation of the country's NNDRRS and coordination among concerned agencies and ministries. Jordan is also developing a regional and a cross-border emergency communication program using social media (Simon and Aharonson-Daniel, 2015).

Morocco

Morocco, one of the non-oil-rich nations of the Arab world, achieved independence from France in 1956. It has a mixed legal system based on French law and Islamic law (Butera and Pillay, 2018). As of 2020, Morocco's population is estimated at 36.5 m, with a population growth of 0.9%. (CIA, 2020a, b, c, d, e). The Atlantic and Mediterranean coasts are home to the highest population densities, with many densely populated urban areas scattered through the Atlas Mountains.

Political state of Morocco. There are numerous political parties in Morocco. The monarchy is hereditary, and the monarch appoints the prime minister from the people elected to the legislature. The legislative branch is bicameral, and all are elected. In the judicial branch, the Supreme Court consists of five judges' panels, while the Constitutional Court comprises 12 judges, six elected by the legislature and six appointed by the monarch. There are many subordinate courts, with each having a specialty in terms of what they do. Morocco participates in a wide variety of international organizations and has diplomatic representation in the United States.

Morocco has a military draft for all citizens aged 19, both male and female, with a service period of 12 months. Morocco has a Royal Armed Forces, Royal Moroccan Army, Royal Moroccan Navy, Coast Guard, Marines, Royal Moroccan Air Force and Force Aerienne Royale Marocaine (NationMaster, 2020).

Economy of Morocco. Morocco's economy is based on labor and services. It does have a wide variety of other concerns, however. Morocco's economy had steadily improved since 1999 when King Mohammed VI took the throne. It has entered into agreements with the United States and has eliminated various subsidies weakening the budget. Morocco is also concentrating on developing renewable energy resources (Azeroual *et al.*, 2018).

Morocco's purchasing power parity, or GDP, was USD 298.6 bn in 2017, placing it 57th in the world rankings. The real growth rate is moderately slow. The PPP ranks Morocco 147th in the world ranking. However, the gross national savings rate is 30.1% of GDP, making Morocco the 31st. While the unemployment rate is high, only 15% of Morocco residents are below the poverty line. At the time of this writing, Spain, France, Italy and the US are Morocco's primary export partners. At the same time, China, the US, France, Germany, Spain, Turkey and Italy are Morocco's primary import partners.

Natural hazards of Morocco. According to the Global Facility for Disaster Reduction and Recovery (GFDRR, 2020), Morocco is one of the most hazard-prone countries in the MENA region. Earthquakes, tsunamis, extreme heat, floods and wildfire represent critical natural hazards in Morocco (Omira *et al.*, 2010). Long-term drought means the possibility of disaster (Esper *et al.*, 2007). The country also faces extreme heat, floods, wildfires and droughts.

Technical hazards of Morocco. Lack of water in Morocco is a serious problem. As a result, water is frequently reused, particularly in agriculture. Unfortunately, the use of wastewater in agriculture has led to a high incidence of parasites in children who live in the areas that use wastewater (World Health Organization, 2002). Surface water pollution is also a problem. Air pollution caused by leaded gas was also a health determinant (World Health Organization, 2002). As in Jordan, the lack of adequate wastewater treatment, coupled with the need to use wastewater to alleviate water shortage, has caused polluted water and soils, health hazards for farmers and illness from eating crops watered with reused water (Fatta *et al.*, 2005).

Vulnerabilities of Morocco. Morocco is involved in many disputes with its border nations. It disagrees with several other countries over the ownership of local islands (Fanack, 2020). Morocco is a central stopping point for illegal migrants from North Africa who want to head into Spain. Similarly, the border with Algeria is also an area heavy with unlawful migrants and harboring arms smugglers. The terrorist group National Liberation Front claims it owns part of Morocco. The country is also the world's largest producer of cannabis and hashish and is also a stop in the cocaine pipeline from South America to Western Europe. Finally, the consumption of cannabis and hashish is very high in Morocco (Fanack, 2020).

Disaster management structure, planning and preparedness in Morocco. Similar to the other Arab countries, few studies have systematically investigated disaster and emergency management. According to UNDRR (2020), a road map to develop a national platform for disaster risk reduction was planned in 2012 as part of the Hyogo Framework, which was superseded later by the International Sendai Framework for Disaster Reduction 2015–2030. In Morocco, the Environment Department at the Ministry of Energy is responsible for leading disaster and risk reduction efforts (UNDRR, 2020). Because there are so many natural disasters in Morocco, the nation is experienced in search and rescue teams (Hong *et al.*, 2004). Emergency trauma care in the event of an emergency has been organized under the World Health Organization (WHO) (Tachfouti *et al.*, 2011). Participatory planning methodology has been suggested to improve Morocco's human development needs and perhaps mitigate these disasters, particularly in the rural areas (Ben-Meir, 2015). According to ReliefWeb (2018, p. 1):

> . . .the Moroccan government has made disaster risk management (DRM) a top priority. With the support of the Global Facility for Disaster Reduction and Recovery (GFDRR), the World Bank, the Organization for Economic Cooperation and Development (OECD), the Swiss government, the Moroccan government has been implementing an integrated DRM reform program.

Literature synthesis

Governmental emergency and disaster management organizations

Except for Qatar's Ministry of Foreign Affairs, all nations except Jordan have agencies that function nationally. Jordon, which is in a critical physical position related to Syria and

receiving vast numbers of Syrian refugees, works at a more international level than other nations.

Non-governmental emergency and disaster management organizations

The government generally funds non-governmental organizations such as the Red Cross and Crescent Society of the Arab world. The research suggests that very few non-governmental organizations work with the Arab nations on anything other than an "on demand" basis. The United Nations Office for the Coordination of Humanitarian Affairs (OCHA), the expert in these matters, suggests that Egypt is the recipient of a significant amount of humanitarian funds, mostly issued through "the European Commission, the Regional Development and Protection Programme (RDPP), the EU-Africa Trust Fund, and the EU Regional Trust Fund for the Syria Crisis (the Madad Fund)" (OCHA, 2019, in Humanitarian Response Operations). These funds are not non-governmental organizations; the International Red Cross and the group USAID have contributed to Egypt.

According to OCHA (2019), Morocco has no ongoing aid programs. Oman also has no ongoing aid programs. Jordan's humanitarian interventions are all overseen by OCHA, and Qatar works with the World Food Program to help Yemen. In addition, Qatar joined the Turkey Country Pool Fund (CPF) in 2016 (OCHA, 2019).

Past emergency and disaster management in the Arab countries

Major natural disasters have occurred relatively infrequently in the Arab world in recent years. However, past emergency and disaster management efforts have been weak. Perhaps because of the richness of its national economy, Qatar has been one of the chief proponents of disaster preparedness education in the Gulf (Moeller *et al.*, 2004). Qatar has also worked with the United States to understand how to manage disasters. Oman began its disaster and emergency preparedness in 1988 but did not take any action until 1999; the country is still developing a plan.

While Qatar advocated disaster preparedness because of its wealth, Egypt was forced to be one of the leaders in disaster preparedness in the region because of its constant fear of terrorism (Moeller *et al.*, 2004). Qatar and Egypt have taken the position that disaster preparedness must be a cross-border action. Jordan's approach to disaster management focuses on response to emergencies rather than prevention and what aid it receives goes mainly to a large number of refugees it supports. Morocco, a low-level economy, concentrates on search and rescue and providing emergency trauma care in a disaster. They have little to no plans to mitigate damage or use participatory planning methodology even though the nation has been advised to do so.

Strengths and weaknesses

Some of the examined countries have advantages and capacities for emergency and disaster management, improving the overall response to disasters. For instance, Qatar is a small nation with abundant natural resources. All countries included in the research have friendly and fast access to regional and foreign resources that can be rapidly mobilized when a disaster occurs. Many of the Arab nations examined in this study had no major natural disasters. Lack of experience in disaster management can be viewed as a weakness. Table 3 outlines the significant disaster management strengths and weaknesses for the countries covered in this study.

Conclusion

Despite all UN organizations' efforts, the level of governmental engagement and action on disaster risk reduction and management differs significantly across the Arab countries

Strengths	Weaknesses
Oman and Qatar have excellent financial resources	The three non-oil rich nations have weak financial systems
Oman provides a great deal of money for disaster preparedness	Oman tends to place disasters in the context of being human-related because of societal changes
Qatar appears to be well-prepared for disasters in the future	Needs to put more effort into a regional plan and help the other Arab nations with an integrated plan
Jordan has been able to leverage unease in the area to get international assistance from international agencies. Jordan is working well with international organizations; Jordan is relatively good at disaster response	Any disaster may be devastating, and Egypt has no real plans or classes in disaster management
Morocco is concentrating on trauma care and is focused on implementing an integrated DRM reform program	Jordan has no real disaster pre-planning
	Morocco needs to accept a great deal of outside help and funding
	Egypt, Jordan and Morocco will face severe financial challenges if another disaster occurs

Table 3.
Strengths and weaknesses

(UNDRR, 2020). However, many of the Arab nations continue to face several risks associated with disaster management (UNDRR, 2020). Efforts should be directed at forming national disaster management (DM) strategies to ensure adequate coordination and stakeholder engagement. Capacity building, sufficient funding, training and transfer of technologies are critical to building local capabilities.

Qatar and Oman's financial resources provide them with an excellent opportunity to develop their disaster and emergency response capabilities. However, governments must enhance community capabilities and involvement in the DM process. Other Arab nations like Jordan, Egypt and Morocco should pursue better political and economic solutions. Perhaps Qatar's most apparent weakness is the population's workforce being comprised almost entirely of the majority of non-citizens, who are economically deprived and lack excellent ties to the culture. It is essential to include the community in the disaster planning process and adequate education and training for all social levels.

Recommendations

In nations with levels of corruption, eliminating the corruption should be the priority to ensure that funds are available for disaster preparedness and response. Humanitarian organizations will be reluctant to provide funding unless this detail is taken care of. Each of these nations must be prepared to enhance emergency planning, preparedness, response and recovery. Part of the problem is that when a country has a high level of corruption, such as Egypt, international agencies and local agencies are reluctant to provide them with no controls.

To develop disaster plans without being overly dependent upon other nations, the non-oil-rich Arab countries must build revenue streams. This will be a real challenge in parts of the world where the environment can be challenging, particularly in nations where educational attainment levels are low. One of the first steps should be to improve educational attainment in any country with a poor school graduation rate. To acquire projects from other nations and to be able to function well in the global economy, employees must be able to read. Improving the household income level in non-oil-rich countries is a first step toward developing the nation and supporting robust disaster and mitigation plans.

All nations should explore technical knowledge transfer and programs available from other countries (such as the one through the US Department of Agriculture) to help organizations develop better emergency disaster management.

Disasters must be managed and not just endured. Many of the disasters that these nations face or have faced in the past have occurred because there has not been any pre-planning. When housing is built in a flood plain, it is only a matter of time before the area floods and people are homeless. Pre-planning might have resulted in placing homes in another area. Alternatively, the homes might have been built on stilts. Homes can be built with stricter standards in earthquake areas. Part of the problem is that these issues are not being addressed *before* they occur. To some degree, Qatar is attempting to address these issues through the use of modern technology. This is an expensive but necessary intervention; if nations in the region cannot afford earthquake detection systems or any other type of disaster prediction equipment, then they need to team with other countries in the region to operate a facility jointly or to contract to another nation or private company to provide these services.

Plans must be developed to deal with large-scale disasters such as cruise ship accidents or terrorist attacks, or airline crashes. As this is being written in 2020, the globe faces financial and human disasters because of the novel coronavirus disease 2019 (COVID-19) infection. More than anything else the author could say or anyone could do, this infection shows the necessity for disaster planning and mitigation, whether the disaster turns out to be natural or human-made. All nations of the region and throughout the world must be prepared to work together to mitigate disasters to the extent possible.

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