

# Challenges during Disaster Response Planning Resulting From War Operations and Terrorism in Iraq

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**Abstract:** Disasters, including man-made ones, are an ever-present threat and are occurring at an increasing rate worldwide. Continuing terrorist attacks worldwide are likely to sustain attention to disaster planning, particularly in Middle Eastern countries. Since 2003, Iraq has been experiencing an unprecedented series of damaging events. Increased attention has been given to the country's arrangements for disaster management by policymakers. Disaster response is one of the critical phases in the Disaster Management System life cycle. Disaster response is defined as actions taken in anticipation of, during, and immediately after an emergency to ensure that its effects are minimised, and that people affected are given immediate relief and support. The research intends to evaluate the disaster response management phase based on the four management functions: planning, organising, directing and controlling. This paper focuses on the planning stage of disaster response management with the events caused by war operations and terrorism activities in Iraq. The disaster planning process, which is a sequence of steps by which an emergency plan is prepared or reviewed, is the most effective phase of disaster response management as it helps to develop the coordination that response teams will need during an actual emergency. This article aims to present the partial findings of an evaluation conducted on disaster response planning process resulting from war operations and terrorism in Iraq. As such the challenges faced at the planning stage of disaster response management are presented in this paper. The findings are based on intensive interviews and questionnaire surveys with executives responsible for disaster response in Iraqi General Directorate of Civil Defence and based on a documentary review that took into consideration all major documents related to disaster response planning in this directorate in addition to the comprehensive literature review. The major challenges associated with disaster response planning are the failure in strictly applying the law, the lack of public and staff education about disaster risks, poor urban planning, unstable security situation, citizen intervention, endowment of equipment, tools and infrastructure and lack of financial resources.

**Keywords:** Disaster response planning, Iraq, Man-made disaster, Terrorism, War.

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## 1. Introduction

Disaster response phase is one of the critical phases in the disaster management life cycle [1]. According to EMA [2, p. 32] response is an “action taken in anticipation of, during, and immediately after an emergency to ensure that its effects are minimised, and that people affected are given immediate relief and support”. Planning, organising, directing and controlling are the key management functions that help to manage the disaster response phase effectively to minimise any potential impacts. Based on Chen et al. [3] the planning process is very critical within the context of disaster response management. Planning is “the formalization of what is intended to happen at some time in the future; concerns actions taken prior to an event, typically formulating goals and objectives and then arranging for resources to be provided in order to achieve a desired outcome” [4, p. 17]. Koontz et al. [5, p. 111] and Weihrich et al. [6, p. 98] assert on the importance of planning as it bridges the gap from where we are to where we

want to go. Further, effective emergency planning would minimise the cost and effects of emergencies after all reasonable risk reduction measures. Therefore, planning process is considered the key to effective disaster management from which all related strategies, arrangements, and programs should flow [2]. The key to successful disaster response, especially in the area of construction/repair of facilities, is having a good plan [7]. Building resilient communities is the cornerstone of planning for disaster risk reduction [8].

Within the context of Iraq disaster response planning is not effectively carried out [9]. Given the security gains in 2008 and part of 2009 and the reduction of the external disaster response capacity provided by the withdrawal of the Multi-National Forces-Iraq from urban centres, there is need to set up a disaster management system within the government of Iraq (GoI) for preparedness planning and timely response to natural disasters and man-made disasters [9]. He further insists that the need for stronger technical and infrastructural

capabilities within the GoI and other disaster risk reduction stakeholders is an imperative to plan for, mitigate and respond to future crises in Iraq. However, limited individual organizational capacity, access to professional equipment and training and the absence of a central authority entrusted to create a strategic plan among all stakeholders, also greatly contribute to weaken disaster management systems [9]. The existing laws do not take account of disaster contingency planning [8].

Accordingly, the aim of this paper is to determine the challenges faced at the planning stage of disaster response management resulting from war operations and terrorism in Iraq. By doing so, the gaps in the planning process will be identified and recommendations to fill these gaps will be suggested to enhance this process. Further, the level of resilience of the society will increase by improving their knowledge and awareness on disaster risks and training them how to act in a disaster situation.

This study is limited to the Iraqi General Directorate of Civil Defence. Disaster response management has four main stages, namely planning, organising, directing and controlling. This study focuses on the planning stage of disaster response management.

The paper is one of the few works that examines response to acts of terrorism and large-scale destruction in Iraq. Accordingly, this paper helps to provide insights into the dynamic of Iraqi civil defence response to such incidences. Moreover, this paper offers one of the first attempts to provide a set of recommendations for the planning process, which are valid to the developing countries that have a similar context to Iraq.

This paper is structured as follows. Firstly, the research methodology adopted to this study is discussed. Secondly, the main findings about the challenges during the disaster response planning in Iraq are presented. This is followed with the finding section which is based on both primary and secondary data. Finally, the conclusions are provided.

## **2. Research Methodology**

Case study research strategy was used for this research. Iraqi General Directorate of Civil Defence has been considered as the critical case for this study as they are the main administrative body that is responsible for responding to disasters stemming from war operations and terrorism in Iraq [8]. Disaster response management was the unit of analysis within this case study. Hence, this research adopted a single holistic case study

approach. A mixed method approach was used to improve the validity and reliability of the research. 28 intensive expert interviews with executives responsible for disaster response in Iraqi General Directorate of Civil Defence have been conducted to evaluate the current practices of the directorate in terms of responding to disasters. The interviews were used to capture the challenges, strengths, and weaknesses of disaster response management covering the four basic management functions within this directorate. All the interviewees were from Lieutenant-Colonel and above in ranking so that they have been in a position to respond effectively to the interview questions due to their wide-range of knowledge and experience in responding to disasters stemming from war operations and terrorism activities in Iraq. Each interview was qualitative and in-depth and lasted for about one hour. 53 questionnaires were collected from the officials of Iraqi General Directorate of Civil Defence who held Captain and above in rank. The response rate for the questionnaire was 70.66%. The extent of importance and the level of implementation of the elements of good disaster response management across planning, organising, directing and controlling stages were quantified. This paper reveals the findings confining to challenges during the planning stage. In addition, a documentary review that took into consideration all major documents related to disaster response management in this directorate was undertaken. All the primary data collection tools were translated into the local language to make the responses more effective and translated back to English before analysis. The qualitative data analysis software Nvivo-10 was used to support the data analysis from the interviews. Quantitative data obtained through questionnaire were analysed based on the mean values with the support of Microsoft Excel. A gap analysis comparing the mean value of importance and implementation of the elements of good disaster response management were conducted and presented below in support of the challenges identified from interviews.

## **3. Challenges during the Planning Stage**

In this section, research findings in the planning stage are presented by combining the results from both primary and secondary data analysis. This section discusses each challenge identified from the expert interviews and are supported with the questionnaire findings, the documentary and literature analysis.

### 3.1 Citizens' Irresponsible Intervention

The culture of the community in Iraq is such that they tend to help people during difficulties. However, the lack of knowledge and understanding of the people who try to help the disaster responders makes it a very difficult situation. This affects the proper implementation of the plans that have been prepared for use during the disaster response. About 50% of the interviewees referred 'a lack of society's awareness' as a major reason for citizens' irresponsible intervention. This is supported by the gap in implementing "community capabilities audit" and "community preparedness and training", despite their high level of importance, as illustrated in Figure 1, which presents the gap analysis based on the questionnaire, survey. Moreover, two documents within documents analysis also uphold this challenge. Firstly, in its points of weakness, Committee 101 [10] mentions that there is a lack of community awareness of disaster response and risk reduction; secondly, the UNISDR [11] asserts that the weakness of community awareness is one of its challenges. Further, Baris [12] pointed out that awareness of weakness and lack of action by the population and institutions is a result of the lack of knowledge of modern disaster risk factors.

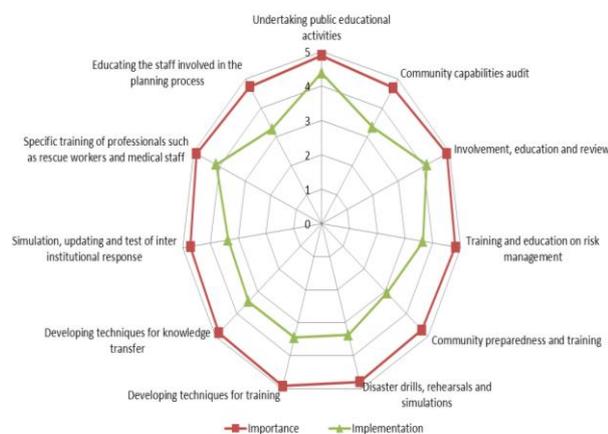


Figure 1: Comparison of the Importance of Education about Disaster Risk Factors against their Implementation at the Planning Stage

On the other hand, some of the interviewees attributed this intervention to the security breach and to failure in imposing a proper security cordon. Similarly, cordon access was a problem on the actual day and the day after the blast in the Manchester city centre's bombing in 1996 [13] though the practices in UK has now been improved.

### 3.2 Education about Disaster Risk

Education about disaster risk is another major challenges, which also acts as the major cause for citizen's irresponsible intervention as discussed above. According to the interviewees' points of view, because civil defence material is not now covered in the curriculum as it was in the past, public education is considered one of the common challenges during the planning stage. Consequently, this challenge might cause different problems for the planners and responders. The questionnaire's respondents confirm the aforementioned view, although their answers about factors such as "undertaking public educational activities" and "involvement, education and review", have a smaller gaps compared with the other factors (see Figure 1). These views are confirmed by the fact that the public educational activities are limited to employees of different organisations and students in secondary school and higher education. The document analysis of Committee 101 [10] supported this challenge, stating that there is a "weakness in capabilities at all levels, particularly in local communities". This point was also supported by UNISDR [11] who sees this from the operative point of view: "Non-inclusion of all society segments in capacity building". In Turkey, one of the many problems in organizing a proper disaster management and response system is the absence of an organized educational programme for the general public [12]. In the case of staff education, several interviewees had suffered from the lack of internal and external courses and practices, particularly because those specialised courses in the field of planning, as well as opportunities to practise the national plan to respond to the disasters are very rare. The gap analysis in Figure 1 further confirms these challenges. Further, according to Committee 101 [10], lack of training on contingency plans in a large number of important facilities, is one of the problems raised in the document analysis. Moreover, the majority of Iraqi provinces urgently required more training and development, more technical knowledge and planning skills, and exercises for better preparedness and response [10, pp. 7-8]. Similarly, UNISDR [11] has the same point of view and supports these challenges by stating "the need for human and material capacity building". In terms of disaster drills, interviewees and the questionnaire's respondents have a similar point of view that appears in the large gap for the factor "disaster drills, rehearsals and simulations" in Figure 1. This point acquired good support from Desforges et al. [14] who stated that, unfortunately, community drills may occur rarely, may not check

the plan and the participants effectively, and may create a misplaced sense of security. However other interviewees raise an important challenge concerning “weakness of schematic awareness and experience of associate members and leaders”. Perry et al. [15] agree with this view, stating that there is a general lack of awareness on planning for natural and technological disasters on the part of law-enforcement officials, elected officials, and policy makers who direct much of the terrorism plan. Further, Desforges et al. [14] put stress on experience, because it is a key element in the success of a response.

### 3.3 Endowment of Equipment, Tools and Infrastructure

According to Perry et al. [15], in order to meet the emergency demands, resources (personnel, facilities, equipment and materials) are needed by emergency response organisations. Therefore, the planning process needs to identify the demands that a disaster would impose upon those organisations. In the context of Iraq, a gap appeared regarding the “endowment of equipment, tools and infrastructure” factor in Figure 2. This point was also supported by most of the interviewees; those who suffered from the shortage of heavy rescue equipment. They attributed this to the late arrival of the supporting rescue machines from relevant organisations.

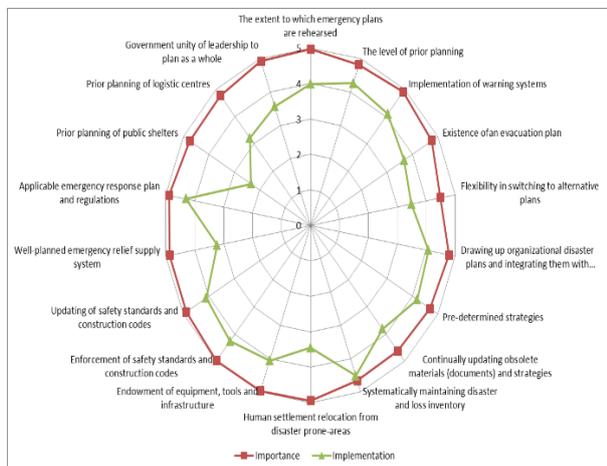


Figure 2: Comparison of the Importance of Planning Process Factors against their Implementation at the Planning Stage

According to Goodyear [9], to plan for the mitigation and adequate response to future crises in Iraq, the need for stronger technical and infrastructural capabilities by the government of Iraq and other disaster risk reduction stakeholders is imperative. However, in the USA, one of the least understood problems in public management is

the effective mobilization of a response to extreme events on a large scale [16]. Further, Larson et al [17] upheld this point, stating that local first-responder resources are often overwhelmed by large-scale emergency incidents, such as acts of terrorism, human-caused accidents, and acts of nature.

Interviewees also shed light on the problem of scarcity of civil defence infrastructure. Document analysis also supported this point and indicated that 63 civil defence centre buildings will be required in the future if we adopt a building for every 100,000 people whereas Iraq currently has only 27 centres of which 11 need to be rebuilt. This leads to a deficit totalled to 37 buildings.

With respect to the fire nozzles network, some of the interviewees pinpointed this as an important challenge, which is also supported by the document analysis where the total number of fire nozzles in the province of Baghdad is about 1550 but only 947 are in working conditions and the rest are faulty nozzles.

### 3.4 Financial Resources

The experts have considered having adequate financial resources for responding properly to disasters as an important factor. Unfortunately, the Iraqi General Directorate of Civil Defence is suffering from limited financial resources. This has happened because of the failure in budget allocation and mobilization. Questionnaire’s respondents upheld this point, as seen in the large gaps that appeared in Figure 3; particularly the gaps related to the “reserve funds for institutional strengthening” and “budget mobilization” factors. This view was also supported by document analysis.

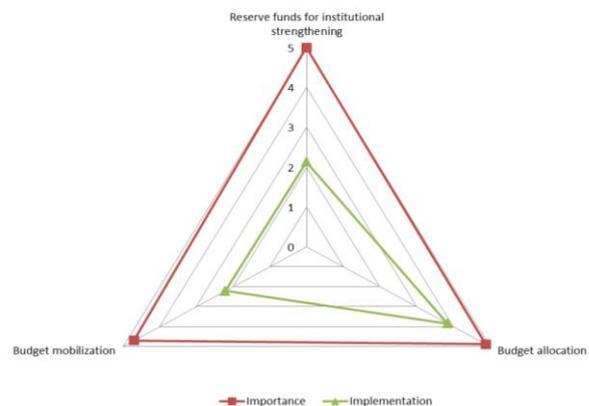


Figure 3: Comparison of the Importance of Financial Resources Factors against their Implementation at the Planning Stage

According to UNISDR [11], there is a need for material capacity building as well as a need to

allocate the budgets for disaster management. This requirement is due to the need for increasing in the financial resources necessary for the implementation of a risk reduction programme.

Similarly in the literature review, the local government in Taiwan did not have enough in the budget to perform all four phases of disaster management [3]. Meanwhile, in Turkey, strong financial resources are needed by agencies responsible for disaster risk reduction (DRR) activities. Such resources become inadequate when distributed between several units [12]. Whilst in the USA, a major obstacle that has hampered emergency responders was their funding. Such funding was stalled and side-tracked due to three reasons: the slow distribution of funds by federal agencies, a politicized appropriations process, and bureaucratic red tape at all levels of government.

In terms of an emergency budget, some of the interviewees believe that the financial process is hampered by the ability to authorize payments and limited by the amount of money that can be exchanged. The aforementioned view is upheld by document analysis. According to UNISDR [11], the presence of red tape and the large number of committees are considered a major challenge to the exchange process. Further, due to the lack of emergency allocations, relatively few resources are available for preliminary intervention.

### 3.5 Planning Process

In the case of plan implementation, according to some interviewees' opinions the plans are not strictly implemented. This was confirmed by questionnaire analysis in Figure 2 as it can be clearly seen that the majority of the planning process factors have a large gaps. The document analysis reveals that there is a lack of contingency plans in a large number of important facilities, which is designed according to standardized criteria and training. Further, there is a weakness in contingency planning for disaster risk reduction in development plan projects and regional development projects [10]. Moreover, according to Uhr et al. [18], both the literature and empirical findings indicate that sometimes response operations diverge from existing plans when adapting to an event and its consequences. However, the unique character of each disaster and the poor understanding of the response plan, are considered two of the recurring problems that plague response to disasters [14].

Planning for public shelters was highlighted as a problem by several interviewees. The biggest gap

in Figure 2 for "prior planning of public shelters" clearly indicates this.

Despite the completion of the first stage of early warning systems in all Iraqi city centres, interviewees and questionnaire's respondents still considered this as a weakness due to its limited application. The document analysis from Committee 101 [10] also concurs with this point. Similarly, Humayun et al. [8] argue that the provisions for adequate early warning systems are lacking in Iraq's existing DRR framework.

Experts highlight, a disaster that necessitates some new duties that have not been scheduled as part of their usual work duties will create a situation of overlapping duties. These might become emergency duties, which need different capabilities and competencies and an extension of knowledge of the tasks and actions when responding to a disaster. This view is supported by Saeed [19, pp. 3-4], who explained that due to the dynamic situation in a disaster, new activities may be required apart from those already planned. So new plans have to be made and incorporated with old plans and those of other organisations.

However, several interviewees consider that responses to disasters from other organisations were time-consuming and weak. UNISDR [11] confirmed this point and attributed it to limited attention by organisations and institutions in terms of preparing disaster response plans. Regarding planning against terrorist attacks, due to the involvement of different kinds of organisations that may not normally deal with one another, an inter-organisational testing process is complicated [14]. Further, working partnerships are crucial to the immediate response and subsequent recovery [13].

### 3.6 Unplanned and Random Development

One of the major problems that have hindered the planning process is its unplanned and random development. Since 2003 Iraq has been suffering from different types of random development. The majority of the interviewees stressed that there was poor urban planning such as random housing, factories, and shops. Document analysis also confirmed this point where Hassan et al. [20] concluded that "many roads and road's forbidden hard shoulder are overrun by popular markets, which leads to the complete closure of the main streets and this affects the smooth flow of traffic and doesn't allow access for civil defence teams getting to the scene of the accident in good time". Hassan et al. [20] add that, "the proliferation of street vendors, most of whose stalls are flammable, causes expansion of any fire which then spreads to other places". Consequently, based on

interviewees' opinions, a new challenge, a "lack of passable roads to reach the scene", has been generated as a result from the aforementioned problem. However, "random storage of materials" was also another challenge facing the planning process. Moreover, the problem of programmed cutting off of the National Electricity has also been repeatedly mentioned in interviews and document analysis. According to expert opinion, although there is programmed cutting off of National Electricity, sometimes electricity is only on for 2 hours a day. Coping with this deficit leads to further problems such as illegal excesses on the national electricity grid and random wiring for Simi-Generic Generators. Simi-Generic Generators is defined as machines owned by citizens that locally produce electricity. They supply neighbourhoods with electricity depending on the possible amount of produced voltage. They are operated and supervised by the workers in coordination with the local government, which is responsible for determining times of operation and the amount of money paid by citizens in exchange for providing them with electric power when the national electricity has been cut off. Hassan et al. [20] confirm these challenges, stating that connecting electric wires randomly leads to increased loads on the national electricity grid in addition to the formation of spider grids of electric wires. This causes reliance on private generators that are not subject to safety and security conditions. The scattering of quantities of fuel and oils has been observed near these generators. These are not properly stored and therefore can cause fires. This situation leads to the recurrence of fire accidents in popular markets and residential areas. From this argument, it is apparent that this situation acts as a major hindrance to effective response to disaster.

### 3.7 Supporting Ordinances

Both the interviewees and the document analysis of Committee 101 [10] show that there is a "lack of clarity in the mechanisms of the declaration of emergency in the disaster areas and legal implications of this announcement", a "lack of a unified national legal framework for disaster risk reduction and response." In addition, "after 2003, the state's structural changes have not been reflected in the laws and regulations of disaster management". These points of view are also supported by the gap analysis based on the questionnaire presented in Figure 4.

Similarly, Humayun et al. [8] confirm that the existing laws do not take account of disaster contingency planning. It also fails to assign the

federal, governorate and district levels with the necessary responsibilities to respond effectively to disasters. The laws enacted prior to 2003 fail to address all of the vagaries of DRR because the issue of disaster was not addressed in a holistic manner when these laws were designed. However, the absence of special civil defence courts in the provinces is another challenge facing the planning process. The gap analysis in Figure 4 further confirms this point.

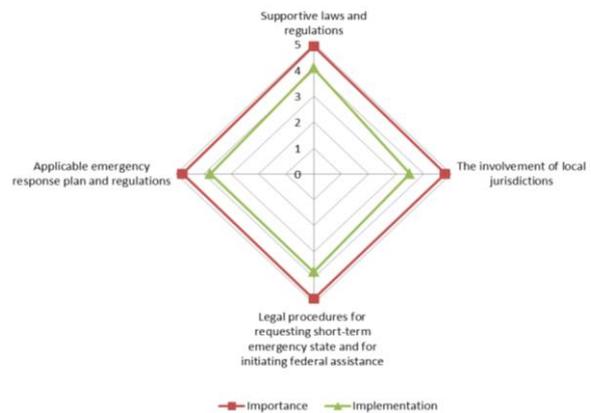


Figure 4: Comparison of the Importance of Supporting Ordinances Factors against their Implementation at the Planning Stage

### 3.8 The Security Situation

According to experts' opinions, dual or sequential bombings increased significantly because of security breaches, which is due to the lack of effective checking devices. Such an increase led to a dramatic rise in casualties in the responders' team as illustrated in Figure 5, and in the rest of the people, as shown in Figure 6, within the document analysis.

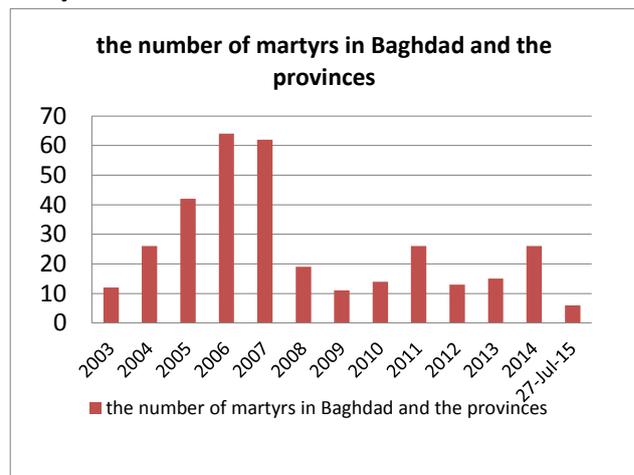


Figure 5: Number of Martyrs in General Directorate of Civil Defence in Baghdad and the Provinces while Responding to Disaster 2003–2015

Moreover, based on interviewees' opinions, due to the absence of a sense of security and the lack of seriousness of the local police in excluding the citizens from risk sites, there is a lack of knowledge about the perpetrators as well as about the time and place of the explosion. This absence of a sense of security and knowledge can cause a lot of losses.

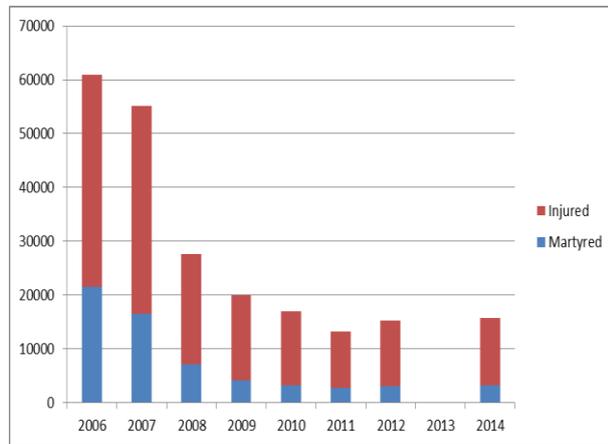


Figure 6 Number of Martyred and Injured in Terrorist Operations, 2006-2014 [21]

UNISDR [11] agree with the aforementioned view, stating that the weakness of security and political instability are major challenges facing the Iraqi General Directorate of Civil Defence. Similarly, [10] supported this view, arguing that terrorism and security risks is one of its challenges and might lead to another challenge, which is that the presence of large numbers of displaced people and refugees may continue for some time to come. Such large numbers of displaced people and refugees overwhelm the helping capacity of the government in general and the civil defence directorate in particular. Low level of implementation “human settlement relocation from disaster prone-areas” and “prior planning of logistic centres” in Figure 2 shows the agreement to this important challenge.

#### 4. Conclusions

This paper identified the major challenges faced during the planning process of disaster response management, based on the expert interviews, questionnaire survey, documentary analysis and literature. Citizen's irresponsible intervention, lack of disaster risk related education, endowment of equipment, tools and infrastructure, financial resources, planning process, unplanned random development, supporting ordinances and security situations are the main challenges revealed. Authors argue that the challenges during the

planning process of disaster response are closely linked with the socio-cultural, economical and institutional factors of Iraq. For example, willingness of citizens to volunteer and help during a disaster despite the danger that their irresponsible interventions could bring in is rooted within the culture of the Iraqi people similar to most of the countries within the Eastern region. The challenges such as lack of financial support and budgetary allocations are linked with the current economic situation of the country. Further, some of the challenges for instance, unplanned and random development within the country and lack of supporting ordinance and legal framework at the national level are deeply rooted within the institutional factors of Iraq. The paper analysed in depth the causes behind these challenges and most of such causes were supported by the gap analysis conducted from the questionnaire survey, the documentary analysis and the literature. The largest gap was identified for “community preparedness and training”, “educating the staff involved in the planning process”, “government unity of leadership to plan as a whole”, and “prior planning of public shelters” indicating the degree of implementation is low in compared to the level of importance. Addressing these gaps will lead to proper preparation and planning which in turn will help to reduce the challenges.

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#### References

- [1]. Baharin, S. S. K., Shibghatullah, A. S., & Othman, Z. (2009). *Disaster management in malaysia: An application framework of integrated routing application for emergency response management system*. Paper presented at the 2009 International Conference of Soft Computing and Pattern Recognition. SOCPAR'09.
- [2]. EMA. (2004). *Emergency Planning- Australian Emergency Manual Series: Manual 43* (pp. 32): Emergency Management Australia.

- [3]. Chen , L. C., Wu, J. Y., & Lai, M. J. (2006). The evolution of the natural disaster management system in Taiwan. *Journal of the Chinese institute of engineers*, 29(4), 633-638.
- [4]. Cole, G. A., & Kelly, P. (2011). *Management: Theory and Practice*: Cengage Learning Emea - M.U.A.
- [5]. Koontz, H., & O'donnell, C. (1955). *PRINCIPLES OF MANAGEMENT: AN ANALYSIS OF MANAGERIAL FUNCTIONS*. New York, USA: McGraw-Hill.
- [6]. Weihrich, H., & Koontz, H. (2005). *Management: A global perspective* (Eleventh Edition). Singapore: McGraw-Hill
- [7]. Kovel, J. P. (2000). Modeling disaster response planning. *Journal of Urban Planning and Development*, 126(1), 26-38.
- [8]. Humayun, S., & Al-Abyadh, I. R. (2014). Iraq: country case study report - How law and regulation supports disaster risk reduction (pp. 40): International Federation of Red Cross and Red Crescent Societies (IFRC); United Nations Development Programme - Headquarters (UNDP).
- [9]. Goodyear, E. J. (2009). The state of disaster risk reduction in iraq (pp. 94): UNDP/OCHA.
- [10]. Committee 101. (2010). Draft of national strategy for disaster management in Iraq [Unpublished Report]. Iraq: The Republic of Iraq / Ministry of Science and Technology / Secretarial Committee.
- [11]. UNISDR. (2015). Hyogo Framework for Action 2013 – 2015 (HFA):Follow-up to Iraqi General Directorate of Civil Defence [Unpublished Report]. Iraq.
- [12]. Baris, M. (2009). Effectiveness of Turkish Disaster Management System and Recommendations. *Biotechnology & Biotechnological Equipment*, 23(3), 1391-1398.
- [13]. Batho, S., Williams, G., & Russell, L. (1999). Crisis management to controlled recovery: The emergency planning response to the bombing of Manchester City Centre. *Disasters*, 23(3), 217-233.
- [14]. Desforges, J. F., & Waeckerle, J. F. (1991). Disaster planning and response. *New England Journal of Medicine*, 324(12), 815-821.
- [15]. Perry, R. W., & Lindell, M. K. (2003). Preparedness for emergency response: guidelines for the emergency planning process. *Disasters*, 27(4), 336-350.
- [16]. Comfort, L. K. (2002). Managing intergovernmental responses to terrorism and other extreme events. *Publius: The Journal of Federalism*, 32(4), 29-50.
- [17]. Larson, R. C., Metzger, M. D., & Cahn, M. F. (2006). Responding to emergencies: lessons learned and the need for analysis. *Interfaces*, 36(6), 486-501.
- [18]. Uhr, C., Johansson, H., & Fredholm, L. (2008). Analysing emergency response systems. *Journal of Contingencies and Crisis Management*, 16(2), 80-90.
- [19]. Saeed, M. R. (2012). *A System for Disaster Response Process Management*. (MSc), KTH Information and Communication Technology.
- [20]. Hassan, H. I., Baqer, M. M. S., Shawi, F. J., Abd Aoun, N. H., & Hamza, A. A. (2014). *The study of civil defence centres within the limits of the Municipality of Baghdad [Unpublished Study]*. Ministry of Interior and Designs Department. Iraq.
- [21]. Planning and Resource Development Department. (2007-2014). Annual Statistical Report. Iraq- Baghdad: Iraqi Ministry of Health.