A model for a multi-agency response management system (MARMS) for South Africa

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Abstract

Purpose – The promulgation of disaster management legislation and policy in South Africa necessitates the development of a uniform multi-agency incident and disaster response system. This paper aims to argue that a uniform response by numerous government agencies in South Africa can only be achieved through the application of an accepted model, which is based on the requirements of the Disaster Management Act 57 of 2002 as well as the National Disaster Risk Management Framework of South Africa.

Design/methodology/approach – The model was developed using grounded theory methodology through the use of the internet and focus group interviews with South African as well as international experts. During the process of analysing the data by open and axial coding, key elements emerged which were then clustered into categories from which the core concepts of the model emerged. The emergent core concepts were then dimensionalised, which formed the major constructs of the model thereby ensuring that the model was grounded in the theory. Constant comparisons were drawn with the experiences in the field throughout the process in order to ensure theoretical sensitivity. During the process of axial coding certain intervening conditions emerged which could negatively or positively affect its application. The developed model was therefore subjected to scrutiny by means of a quantitative attitudinal test amongst senior professionals involved in the field of emergency and disaster management, resulting in triangulation.

Findings – The findings demonstrate that in order for the proposed model to be implemented effectively it is necessary to refine each level of response in terms of authority, communication and reporting lines.

Originality/value – This model can be used as the foundation for the development of a comprehensive response management system for South Africa and other similar countries, and that the model can further contribute to the development of a basic training module for inclusion in the curricula of response agency personnel.

Keywords Disasters, South Africa, Modelling

Paper type Research paper

Introduction

The loss of life, damage to property and to infrastructure caused by the impact of severe weather events and other events of natural and technological origin as well as environmental degradation, results in major economic losses for any country (UNISDR, 2004). However, in South Africa when events of this nature strike, those who suffer the most are the poorest of the poor who live in extremely vulnerable conditions and who are repeatedly exposed to severe hardship as a result (South Africa, 1999).
Until 1994, such events were regarded as unavoidable and were therefore managed reactively (South Africa, 1998). However, the floods – which took place in the Cape Flats (Western Cape Province) in 1994 – were the turning point in the way significant events and disasters were managed in South Africa. The newly elected democratic government resolved to move away from the traditional thinking that nothing could be done to prevent such occurrences and resolved to adopt a new developmental approach in line with global trends by integrating risk reduction methodologies into developmental initiatives to build resilience in households, communities and areas known to be at risk.

Government’s policy proposals included the introduction and implementation of a new Disaster Management Act to give effect to the new approach (South Africa, 1998). It recognised too that risk reduction was an ongoing activity that extended into the response to a given event. In this regard, there was acknowledgement that the saving of lives and prevention of loss and damage to property, infrastructure and the environment also depended on rapid and effective response operations which in turn require mechanisms for integration, coordination, cooperative management and authority for decision making (South Africa, 1998, 1999, 2003, 2005). The requirement for the application of joint standards of practice and a uniform approach were key characteristics of the policy proposals.

Unlike other developed countries in the world such as the USA, Canada, Australia and the UK, that have adopted a national incident management system, no national standard system currently exists in South Africa for the integrated and coordinated management of multi-agency response operations. However, the National Disaster Risk Management Policy Framework which was promulgated in 2005 (South Africa, 2005), in giving effect to the policy proposals, calls for the development and implementation of regulations for a national standard for the management of multi-agency responses.

The model discussed in this paper has been derived from research conducted towards the fulfilment of the requirements for a Master’s degree. The model provides a generic framework on which a comprehensive multi-agency response management system for South Africa can be developed.

The model for a Multi-Agency Response Management System (MARMS) provides a seamless environment for integrating and coordinating operational responses; for tactical and strategic decision-making; and for invoking extraordinary powers for the effective resolution of the situation and is applicable for any type of occurrence, regardless of its origin, be it:

- a single agency response to a routine occurrence;
- a multi-agency response to a single occurrence;
- a multi-agency response to a series of occurrences within a single jurisdiction; and
- multi-jurisdictional responses within a particular sphere of government (local, provincial or national).

Towards a standardised approach
The problem that was investigated in this research, was the absence of a statutory national standard for the management of multi-agency responses in South Africa. This
research topic was selected because of practical problems experienced in the field, which included:

- uncoordinated responses by multi-agencies;
- lack of standardised communication amongst role-players;
- absence of multi-level management and decision-making; and
- lack of clearly defined thresholds for event escalation.

Although the requirement for the implementation of a standard system is clearly provided for in the disaster management legislation and policy (South Africa, 2003, 2005), such standardisation is in actual fact far from being realised. Another major obstacle that could threaten the successful introduction of such a system in South Africa is that of attitude, behaviour, inter-agency rivalry and the issue of “turf battles” which exist, even in response to day to day emergencies.

Key to the success of the above-mentioned system and standardisation is the uniform use of various concepts that underpin MARMS. For the purpose of clarity, the terms incident, emergency and disaster will briefly be defined in order to illustrate their application within the South African environment.

**Standardised terms**

**Incident**

Generally, an incident is defined as a relatively minor occurrence or episode which is of brief duration. According to Firescope in 1999, an incident is an occurrence requiring urgent response by emergency services in order to prevent or reduce loss of life, injury, damage to property, infrastructure and the environment. The White Paper on Disaster Management (South Africa, 1999) concurs with this precept but suggests that an incident does have the potential to escalate to more serious proportions.

La Valla and Stoffel (1991) categorise an incident as an occurrence which falls into the routine scope and capabilities of emergency services operations but adds that it is normally an unpleasant event requiring urgent response which may either be expected or may occur suddenly or accidentally. Drabek and Hoetmer (1991) on the other hand only use the term “emergency” but describe three levels of emergency. A “level one” emergency is described as an “unexpected occurrence” that can be dealt with by a single agency and does not exceed the operational and resource capability of that agency but may require response by other agencies.

Clearly, in the context of this paper, the term “incident” is a general term applied to the first level of response and refers to an occurrence of limited magnitude which does not exceed the response capability of a single response agency or the capabilities of agencies from other disciplines acting in support of the primary agency for the purposes of preventing or reducing loss of life, injury, disease, damage to property, infrastructure or the environment which may occur as a result of the incident.

**Emergency**

The South African White Paper on Disaster Management (South Africa (Republic), 1999) refers to an emergency as “a sudden and usually unforeseen event that calls for immediate measures to minimise its adverse consequences”. In South Africa the term “significant event” is used to describe an event, which is of such magnitude that
extraordinary measures are required to deal with it effectively but does not necessarily constitute a disaster (South Africa (Republic), 2003).

La Valla and Stoffel (1991) define an emergency as “an unexpected event involving shortages of time and/or resources which places life and/or property in danger; and which requires immediate response; requires response beyond normal incident response resources; normally a single incident site”. An unexpected occurrence which exceeds the capability and resource capacity of more than two sectors in a particular sphere of government and which involves response from external agencies, constitutes a level two emergency according to Drabek and Hoetmer (1991). The definition also refers to the requirement for the application of mechanisms to engage “cooperative efforts” of support agencies in terms of personnel and resources to deal with the situation.

Despite the fact that the terms “incident” and “emergency” may be used interchangeably, the important concept that has emerged is that in the context of this paper the two terms are used essentially to differentiate between the levels of response required in relation to the magnitude of the occurrence; that magnitude is measured in terms of available capability and resources required to deal effectively with the occurrence; and that as a consequence the level of response escalates accordingly.

The research also revealed commonality in the characteristics that distinguish between what constitutes the first and second levels of response. Clearly, the key characteristic which triggers a second level of response is the demand for extraordinary measures in terms of operational capability and resources; that this in turn involves the engagement of external role players from a multiplicity of sectors; calling for a higher level of management in order to effectively apply multi agency operations to deal with the situation.

A significant factor which is worthy of noting which emerged from this aspect of the research is that although the second level of response requires the application of extraordinary measures, it clearly does not put the scale of the occurrence beyond the capabilities or jurisdiction of the responding agencies nor is it of such magnitude and impact that it disrupts the normal functioning of society. What has emerged, is the need for mechanisms to ensure the procurement and coordination of additional resources, particularly with reference to scarce resources. This purports to a third level of response.

Disaster

La Valla and Stoffel (1991) define the term “disaster” concisely as follows: “when the resources available are exceeded”, but also state that a disaster situation is comprised of multiple incident sites. Carter (1992) identifies four characteristics which separate a disaster from other events, the first of which, focuses on disruption in the context of the speed of onset, predictability and extent. The second relates to effects or impact on people which includes death, injury, disease and resulting hardship. The third characteristic is damage to or destruction of infrastructure such as lifeline facilities and essential services and communications and then finally he identifies humanitarian needs such as medical care, shelter, food, clothing and other social needs.

The United Nations International Strategy for Disaster Reduction (UNISDR, 2004) defines a disaster as “a serious disruption of the functioning of a community or society
causing widespread human, material, economic or environmental losses which exceed the ability of the affected community or society to cope using its own resources”. In South Africa, the definition of a disaster in the Disaster Management Act of 2002 supports the characteristics included in Carter’s definition and compares favourably with that of the UNISDR, but spells out the fact that the term “disaster” does not only apply to events affecting an extensive geographical area or areas but also embraces events affecting a limited geographical area or areas. It too provides a comprehensive description of the likely effects or impact of the occurrence on the elements at risk although it does not categorise them in the same manner. The South African definition includes an additional important characteristic by including provision for occurrences that are “threatening” to occur.

As indicated above, Drabek and Hoetmer (1991), do not use separate definitions to differentiate a single manageable day-to-day incident from incidents of greater magnitude and disasters, but rather only use the term “emergency” which is defined at three levels according to magnitude. On the other hand, Perry (1991), makes a differentiation between what he refers to as “routine emergencies” and “non-routine events”. He argues the fact that routine emergencies are incidents that occur regularly and can largely be anticipated, and whilst their impact may result in devastating consequences and extreme hardship for those directly affected, the impact does not necessarily have the same or any effect on the community as a whole. Perry (1991) views them as emergencies which can be dealt with within existing organisational arrangements by the normal emergency response agencies whereas by comparison, disaster events have significant impacts on the social fabric of the community. He defines disasters as “non-routine events in which societies or their larger subsystems (e.g. regions or communities) are socially disrupted and physically harmed”. He further elaborates that the key defining characteristics of such events are:

- the length of forewarning;
- the magnitude of impact;
- the scope of impact; and
- the duration of impact.

From the research conducted it is fair to conclude that a disaster is characterised by:

- the speed of onset;
- the predictability and origin of the event;
- the magnitude of the event;
- the extent of its impact on people, the economy, infrastructure and the environment and the consequent disruption of the normal functioning of society to such an extent that;
- it exceeds the capacity of the surviving elements to deal with the consequences using all available resources; and
- extraordinary measures are required to limit and deal with its effects.

Levels of response
Level of response is the generic term to which a numerical tag is applied to indicate the predefined parameters or limits in terms of capability, resources and scope of authority
within which a response operation can effectively be managed before a higher level or levels of management are triggered. The numerical tag is applied on an escalating scale, as illustrated in Table I, with a level one being the first level of response up to a level six response which signifies an occurrence which can be classified as a national disaster. These levels are consistent with the disaster management legislation and policy in South Africa.

The defining characteristics derived from the discussion above which distinguishes incidents and emergencies from a disaster are first, the fact that the scale of the occurrence is such that it exceeds available local capacity to deal with the effects and second, the normal functioning of society has been seriously disrupted. It is logical to conclude that in such circumstances where the existing legislation, powers and contingencies of emergency and essential response agencies are inadequate to deal with the effects, the need arises to take extraordinary measures and to engage additional resources from outside of legislative and jurisdictional boundaries (Drabek and Hoetmer, 1991).

The above inevitably calls for a higher or fourth level of response as it demands the engagement of the next sphere of legislative and jurisdictional authority; executive decision making and direction; and may even require an official declaration to allow the necessary additional powers to be invoked to effectively manage the occurrence (Drabek and Hoetmer, 1991; South Africa (Republic), 2003). Subsequently, a fifth and six level of response can also be identified (South Africa (Republic), 2003) should the escalation of the event necessitate an even higher jurisdictional response (i.e. from a provincial or the national government).

The different levels of response as illustrated in Table I will be used as the foundation in explaining the MARMS model and its application within the South Africa context.

<table>
<thead>
<tr>
<th>Level of response</th>
<th>Nature of response</th>
<th>Trigger which activates next level</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Single agency response</td>
<td>Support required from other disciplines in the jurisdiction to effectively manage the situation</td>
</tr>
<tr>
<td>II</td>
<td>Multi-agency response operations</td>
<td>Normal internal agency capability and resource capacity depleted; procurement and deployment of additional resources required to effectively deal with the situation</td>
</tr>
<tr>
<td>III</td>
<td>Multiple inter-agency response operations</td>
<td>Magnitude exceeds available capability and resources; spans across jurisdictional and/or legislative boundaries</td>
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<tr>
<td>IV</td>
<td>Multiple jurisdictional response operations constituting a local disaster</td>
<td>Engagement of resources from outside jurisdictional boundaries; additional powers invoked to deal effectively with the situation</td>
</tr>
<tr>
<td>V</td>
<td>Multiple jurisdictional response operations constituting a provincial disaster</td>
<td>Engagement of resources from outside jurisdictional boundaries; additional powers invoked to deal effectively with the situation</td>
</tr>
<tr>
<td>VI</td>
<td>Multiple jurisdictional response operations constituting a national disaster</td>
<td>Engagement of resources from outside jurisdictional boundaries; additional powers invoked to deal effectively with the situation</td>
</tr>
</tbody>
</table>

Table I. Levels of response
A model for a multi-agency response management system (MARMS)

The model, aims to provide a generic framework on which a comprehensive multi-agency response management system can be developed for South Africa. The model does not strive to provide a system which addresses the intra-disciplinary operating procedures of the individual response agencies which is commonly referred to as an Incident Command System and which clearly should be the subject of a separate study, but focuses on the management of multi-agency responses.

In the research conducted it emerged that the lack of concisely defined standard reporting procedures in South Africa prevents the necessary escalation to higher levels of response management. Consequently, the level of coordination, integration of operations, direction and decision-making demanded by events of significance is impeded. It applies particularly when multiple events of significance occur simultaneously which may not individually constitute a disaster, but the sum of which requires the application of extraordinary measures.

The advantage of this model therefore, is that it provides for the natural escalation of the management function from a single agency response to a routine occurrence; to a multi-agency response to a single occurrence or multi-agency responses to a series of occurrences within a single jurisdiction; as well as to multi-jurisdictional responses within a particular sphere of local government and right up through the second sphere to national government – a problem that was identified in a report of the Department of Water Affairs and Forestry (South Africa (Republic), 1999).

The model provides a seamless environment for integrating and coordinating operational responses; for tactical and strategic decision-making; and for invoking extraordinary powers for the effective resolution of the situation and is applicable for any type of occurrence, regardless of its origin. The most significant concept that emerged from the research was the logic to move away from linking the term “incident” to the title of a system that is designed to provide for graduated levels of managing response across the spectrum of occurrences in respect of magnitude as opposed to response to an incident. In support of this approach, was the fact that the use of the terms “incident” and “disaster” conveyed a “stop, start” context which inhibited the natural escalating management concept. Consequently, the use of a generic term which describes the exact purpose which a system of this nature is designed to serve, was adopted and hence this model is referred to as the “Multi-agency Response Management System” (MARMS).

Figure 1 is a flowchart diagrammatical representation of the MARMS model. The different aspects of the flowchart will briefly be discussed below in order to clarify its exact application.

**Level one response**

A level one response constitutes the response to an incident involving a single agency that has statutory responsibility to deal with the primary effects of the incident. The scope of management applied in a level one response is that of vertical command and decision-making, exercised by the Agency Commander over own agency resources from an Agency Command Post (ACP). Reporting is executed in terms of internal agency operating protocols. Triggers for the escalating of a level one response to that of a level two response are dependant on: whether the authority or jurisdiction of the
responding agency has been exceeded; the capability of the responding agency has been exceeded; or the resources of the responding agency has been depleted. Once the incident escalates to such an extent that the primary agency needs support from allied agencies with which the primary agency has concluded mutual assistance agreements, or support services from other disciplines operating within the jurisdiction manage the situation effectively, then the Agency Commander activates a level two response.
**Level two response**

A level two response applies to an incident demanding the response of the primary agency, which has statutory responsibilities to deal with the primary effects of the incident; and support agencies from other disciplines within the same jurisdiction, which have statutory responsibility to deal with the secondary effects of the incident. A level two response may also involve support agencies from the same discipline as the primary agency with which the primary agency has concluded mutual assistance agreements.

**Span of management and scope of authority**

The span of management applied in a level two response is that of horizontal coordination and decision-making exercised by the Incident Coordinator (IC) who establishes an Incident Coordination Post (ICP). From this post the overall management of the situation takes place, spanning across all the agency commands involved in the response operation without impinging on the authority exercised by the individual agency commanders in the management of their own agency operations. Reporting is executed in terms of internal agency operating protocols for agency on site operations and to the ICP by means of situation reports in accordance with pre-determined standard operating protocols and for notification to the ICP that saturation of available own agency resource thresholds is approaching. Once the incident demands required to effectively manage the situation exceed the available own resource thresholds of any agency in terms of personnel, equipment and organisational capabilities, then the Incident Coordinator activates a level three response.

**Level three response**

A level three response constitutes a response involving multiple agencies to an incident, the magnitude of which, demands resources in excess of the available own resource thresholds of any single agency which has statutory responsibility to deal with the primary or secondary effects of the incident. Such a response would therefore demand human, equipment or organisational capabilities and/or decision-making which exceed local capacity to the extent that it requires the engagement of either executive decision making, resources from outside of jurisdictional boundaries, or powers to invoke extraordinary measures. Such an escalation can also be classified as a local disaster and where necessary declared as a municipal state of disaster (South Africa (Republic), 2003).

The span of management applied in a level three response is that of horizontal coordination and decision-making, exercised from the Joint Operations Centre (JOC), which is established by the JOC Coordinator. The JOC Coordinator is the individual vested with the responsibility to manage a level three response. The responsibility is assigned to the JOC Coordinator by the municipality, which, in terms of disaster management policy and legislation, has been assigned primary responsibility for the coordination and management of disasters which are occurring or threatening to occur in the jurisdiction of that municipality.

Once the incident demands required to effectively manage the situation are such that local resource thresholds are reaching saturation or exceed jurisdictional or legislative authority then the JOC Coordinator reports the situation to the Municipal
Disaster Management Centre (MDMC) and the Head of the Centre activates a level four response.

**Level four response**
A level four response applies to a single occurrence of such magnitude that it demands human, equipment or organisational capabilities and/or decision making which exceeds local capacity. It can also be a series of Level three response operations taking place simultaneously in the jurisdiction of a single local municipality, in multiple local municipalities within the jurisdiction of a district municipality, or a metropolitan municipality. Such a response can accordingly be classified as a local disaster and where necessary declared as a local state of disaster (South Africa (Republic), 2003).

The span of management applied in a level four response is that of direction spanning horizontally across jurisdictional boundaries; executive decision making; invoking extraordinary statutory powers necessary to deal effectively with the situation and is exercised by the Head of the Municipal Disaster Management Centre supported by the Disaster Direction Team from the Disaster Operations Centre (DOC) within the MDMC.

Once the demands required to effectively coordinate and manage the disaster are such that resource thresholds of a district or metropolitan municipality are reaching saturation or exceed jurisdictional or legislative authority then the Head of the MDMC reports the situation to the Provincial Disaster Management Centre (PDMC) thus activating a level five response.

**Level five response**
A level five response applies to an occurrence of such magnitude that it exceeds the statutory and jurisdictional capabilities of a single district or metropolitan municipality to deal with it effectively or a series of Level four response operations taking place simultaneously in the jurisdiction of a province. Such an event can accordingly be classified as a provincial disaster and where necessary declared as provincial state of disaster (South Africa (Republic), 2003).

The span of management applied in a level five response is that of direction spanning horizontally across jurisdictional boundaries; executive decision making; invoking extraordinary statutory powers necessary to deal effectively with the situation and is exercised by the Head of the Provincial Disaster Management Centre supported by the Disaster Direction Team from the Disaster Operations Centre (DOC)

Once the demands required to effectively coordinate and manage the disaster are such that resource thresholds of a province are reaching saturation or exceed jurisdictional or legislative authority then the Head of the PDMC reports the situation to the National Disaster Management Centre (NDMC) thus activating a level six response.

**Level six response**
A level six response applies to an occurrence of such magnitude that it exceeds the statutory and jurisdictional capabilities of a single province to deal with it effectively or a series of level five response operations taking place simultaneously in the country. Such an event can accordingly be classified as a national disaster and where necessary declared as a national state of disaster (South Africa (Republic), 2003).
The span of management applied in a level six response is that of direction spanning horizontally across jurisdictional boundaries; executive decision making; invoking extraordinary statutory powers necessary to deal effectively with the situation and is exercised by the Head of the National Disaster Management Centre by the Disaster Direction Team from the Disaster Operations Centre (DOC).

Although a level six response constitutes a final response in terms of the MARMS, it should be noted that an additional level of response not covered by MARMS can further be invoked. This will include an international call for assistance through the agreed mechanism, agreement and protocols of the government. Such a response is first, of a political nature, and is therefore not included as a seventh level in the MARMS.

**Recommendations**

In order for MARMS to be used as a model for further development, the paper makes the following recommendations:

- Further refining is necessary for each level of response in terms of the scope of authority; communication; and reporting lines. This can be done through the development of standard operating protocols.
- Although the MARMS can be used as a foundation for the development of a comprehensive response system for South Africa, the development of a national standard for level one response is fundamental to the further development of this model.
- The model could contribute to the development of a basic training model for inclusion in the curricula of response agency personnel.

**Conclusion**

The findings of this research have shown that the management of multi-agency responses takes place on six escalating levels. Each level has inherent key characteristics for the clear definition of responsibility in terms of the span of management and the scope of statutory authority; defined lines for communication, information sharing and reporting; and that the clear definition and recognition of indicators that signal the need to trigger higher levels of management, authority and decision making, are crucial to achieving rapid and effective response.

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**About the authors**

Pat Reid has 30 years hands-on experience in the field of disaster management, having worked for an international NGO, for government at local and provincial spheres as well as tertiary institutions and is also a Registered Professional Nurse. Pat Reid has a MA (Development and Management) *cum laude* from the North-West University, Potchefstroom Campus, South Africa. She is a Fellow of the Disaster Management Institute of Southern Africa (DMISA), and is a Past President of the same Institute where she currently holds the portfolio of Protocol. She serves on the National Inter-Departmental Disaster Management Committee and on the Training and Capacity Building Workgroup. Pat was directly involved in the drafting of the White Paper on Disaster Management, the Disaster Management Act 57 of 2002, and the National Disaster Risk Management Framework. She is currently the national convenor for the drafting of disaster risk management regulations as per the National Disaster Risk Management Framework.

Dewald van Niekerk is the founder and director of the African Centre for Disaster Studies at North-West University, Potchefstroom Campus. He is co-author of five academic books, numerous articles and research reports. He has been project leader for local, national as well as international disaster risk reduction projects. In 2003, Dewald was one of 64 researchers worldwide to receive the Provention Consortium and the World Bank research grant for young researchers in disaster risk reduction, for his studies on uniform hazard datasets. He obtained his Doctorate in disaster risk reduction at North-West University, Potchefstroom Campus in 2005. Dewald was involved in the drafting process of the Disaster Management Act 57 of 2002 as well as the National Disaster Risk Management Framework of South Africa. He is currently a graduate member and council member of the Disaster Management Institute of Southern Africa (DMISA). He also serves on the management committee of the Tshwane region of the same Institute.

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