

Phase 2B - Organisational Maturity for Disaster Preparedness

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Introduction

Disasters, by their very nature, are unpredictable in timing and effect. Caused by natural or human hazards, their impacts on communities may range from relatively minor disruptions to communities to catastrophic demise of social and civil infrastructure, the environment and economic systems. Recent large scale disasters, such as the Christchurch Earthquake of 22 February 2011, the Tohoku Earthquake and Tsunami that impacted the Japanese City of Sendai on 11 March 2011, and the South East Queensland Floods of January 2011, provide contemporary lessons for and serve as solemn reminders to communities and governments of the importance of disaster preparedness and developing effective disaster management systems. Moreover, with Australian disaster response and recovery costs expected to rise to an average of \$23 billion per year by 2050, without any consideration of the potential impact of climate change (Deloitte Access Economics, 2013), it is essential that governments develop resilient and robust disaster preparedness, response and recovery arrangements.

Within Australia, the jurisdictional responsibility for disaster management rests with the States. While the States agreed to cede some of their powers and responsibilities (such as weights, measures, foreign affairs and defence) to the newly formed Commonwealth of Australia on 1 January 1901, this did not include emergency management. As a consequence, each Australian State has and maintains its own legislative and regulatory frameworks governing how communities should prepare for disasters and how disasters will be managed. For example, while in New South Wales, the State Emergency and Rescue Management Act (1989) outlines the arrangements that will be used in that State; Queensland's Disaster Management Act (2003) provides the basis for the disaster management arrangements of that State. This gives rise to systemic differences between these State-based arrangements, as evidenced in the different roles that local government plays in each State.

Regardless of the systemic differences between the State-based disaster management arrangements, there are some universal commonalities that underpin the various forms that these arrangements take. As explained by the International Federation of Red Cross and Red Crescent (2015), disaster management is essentially about the organisation and management of resources and responsibilities for dealing with emergencies. As such, while the particulars of contributing disaster management agencies and the systems to manage them might vary between States, each jurisdiction will have a need for systems that facilitate inter-agency communication and coordination, command and control of incidents, logistics and supply chain management; and the effectiveness of these will be at least in part dependent on clarity of roles and responsibilities, the effectiveness of inter-agency structures and standard operation procedures, effectiveness of succession planning and capacity building for staff, the potential for sharing of assets and staff, communications protocols and the timely sharing of information.

The effectiveness and maturity of these core processes, and the organisations in which they are embedded, can be both measured and mapped. Following the work of Mingay (2002) and the Gartner Maturity Model, levels of organisational process maturity can be described in terms of five levels (see Fig. 1):

- Level 1, in which processes are ad hoc, and process management systems are initiated
- Level 2, in which consistent management processes are applied and processes become repeatable in output
- Level 3, in which processes become well defined, documented, standardised and defined
- Level 4, in which processes become well managed, with the development and application of quantitative performance measures
- Level 5, in which the emphasis is on optimisation of processes through adoption of quality improvement meta-processes and systems, testing and organisational commitment to continual improvement

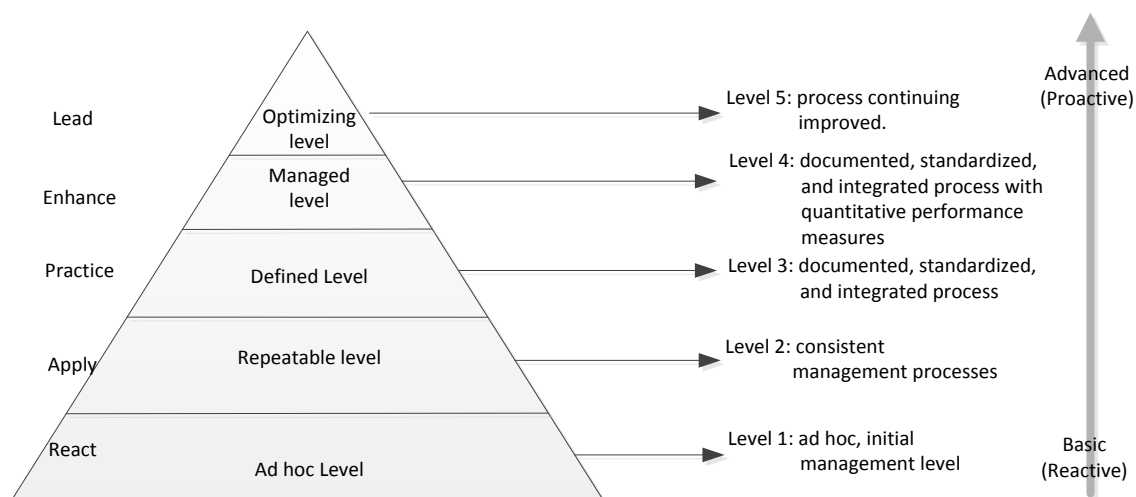


Fig. 1: Organizational Maturity Model for Disaster Preparedness

Given the importance of disaster management to the social, economic and environmental well-being of communities and states, it is desirable that disaster management agencies strive to reach the highest level of organisational maturity for those core disaster management processes of command, coordination, communication, logistics and supply chain management.

As disasters by their very nature are events that impact and cause serious disruptions at a community level, a community's response to them will by necessity involve multiple agencies; and there will be a range of interdependencies between them. For example, to check that no-one was trapped or injured inside buildings damaged by severe Tropical Cyclone Larry in Innisfail in March 2006, the following agencies needed to cooperate and coordinate actions: Queensland Fire and Emergency Services to provide urban search and rescue skills, Queensland Police Service to provide access to closed and secure sites, Queensland Ambulance Service to provide primary healthcare to

the injured, the local shire council to provide information and intelligence to responding agencies, and so on. Given this network of dependencies, all disaster management agencies should target an organisational maturity level of 3 or better, if they are to work effectively to deliver an all-agency response. This is because at level 3 processes are well-defined and documented, and their inputs/outputs, which other agencies will contribute or depend on, are clearly known. As a system of systems, optimal effectiveness of multi-agency disaster management arrangements will be dependent both on optimisation intra-agency and inter-agency processes.

This part of the study investigates and maps multi-agency disaster management coordination and communication processes, and explores the organisational maturity of these processes and opportunities for their improvement. Specifically, following on from work undertaken in the Townsville Regional Council area (Townsville Regional Council, 2009), this study examines the disaster management arrangements as they are practised within the City of Gold Coast, Queensland, and examines how the arrangements can be optimised and be made more resilient through enhancements to timeliness, plan effectiveness and resource application.

By focussing on the Gold Coast as in a case of study, this study seeks to portray the richness and complexity of how disaster management arrangements are actually constructed and practised. At one level, therefore, the lessons of this study will speak specifically to the Gold Coast. However, as the Gold Coast practises multi-agency disaster management, the context of this study is typical to varying degrees of any other disaster management systems, and as such lessons from this study can speak to and will be instructive for any disaster management jurisdiction, system and/or agency.

The Disaster Management Organisational Context

Within Queensland's disaster management arrangements, local governments are primarily responsible for disaster management within their boundaries (Queensland Government, 2003;Section 4A). This means that local governments are responsible for ensuring that their communities are prepared for disaster events and can be supported with effective all-agency disaster response and recovery systems. In assigning this role to local government, the State notes that "local government is best situated to provide first-hand knowledge and understanding of social, economic, infrastructure and environmental issues within their respective communities and are ideally placed to support their community from a disaster management perspective" (Queensland Government, 2015).

Under the Disaster Management Act 2003, local government has a number of statutory obligations. These include developing and approving a disaster plan for the local government area, raising and maintaining a local disaster management group (LDMG), and maintaining a disaster response capacity. A local government's LDMG is formed from persons typically drawn from a range of agencies that are required to contribute to local disaster response, and is charged with supporting the local government with disaster planning, coordinating multi-agency disaster response and facilitating inter-agency communication, and ensuring that local communities are aware of disaster events and ways to mitigate them.

It should be noted that, while all of Queensland's 77 local governments have the same statutory disaster management obligations for their communities, their capacities to deliver these services differ dramatically. For example, while Brisbane City Council has an annual operating budget of \$2.6 Billion in 2015-2016 (Brisbane City Council, 2015), Barcoo Shire Council in central western Queensland has an annual operating budget of \$23.9 Million (Barcoo Shire Council, 2015); and while Brisbane City Council has an established fulltime disaster management team to manage its disaster management functions, for Barcoo Shire disaster management is an adjunct function to an already existing position with other responsibilities.

As observed by Childs et al (2010) and King (2008), the capacities of some local governments (especially smaller ones) to effect comprehensive disaster management may be limited by their resource and skill constraints. In the case of the State's larger regional local governments, such as Gold Coast and Townsville, there typically is funding allocated from those annual operating budgets for disaster management programs which are managed by small, dedicated, fulltime teams of disaster management officers (typically 1 – 4 officers).

Although Queensland local governments are *primarily* responsible for disaster management within their boundaries, albeit with significant resource constraints in some cases, it is important to recognise that local government does not hold the *sole* responsibility for disaster management. Queensland's disaster management arrangements are structured around a three-tier system involving local, district and State levels.

In general, local governments are grouped into disaster districts, each of which is managed by a District Disaster Management Group (DDMG). DDMGs comprise representatives from regionally-based Queensland government agencies, and perform a 'middle management function within the disaster management arrangements by coordinating the provision of functional State agency resources when requested by LDMGs on behalf of their local governments (Queensland Government, 2015). DDMGs provide resource assistance to local governments responding to disaster-stricken communities, which assists resource-constrained local governments deliver required disaster management services through augmentation of local resources. As such, DDMGs are important stakeholder partners with local governments in the management of disasters within Queensland. At the third tier, the State level, whole-of-State disaster management arrangements exist in part to coordinate strategically the deployment of State-based resources to support disaster response and to coordinate requests for extra-ordinary Commonwealth resources to augment the State's response (Queensland Government, 2015), see Fig. 2. For the three-tier State system to work effectively, it is essential that there are well developed systems and processes for sharing of information and managing supply chains within and across levels.



Fig. 2: Queensland Disaster Management Arrangements

Disaster Management in the City of Gold Coast

The Gold Coast is a coastal city located in South East Queensland on the New South Wales border. With a base population of approximately 550,000 and tourism bringing up to an additional 350,000 visitors to the City, the Gold Coast spans an area approximately 70km x 20 km along the coast. The city extends west to the hinterland mountain ranges, and encompasses Hinze Dam and the World Heritage listed rainforests of the Lamington National Park. The topography of the Gold Coast consists of a coastal plain that includes beaches and dunes, five major river systems and associated deltas, bays, estuaries and wetlands, rolling foot hills and low mountain ranges. Much of the eastern portion of the city is coastal plain (less than 10 metres above sea level). The Council of the City of Gold Coast have identified and assessed the following hazards as disaster risks to the Gold Coast community:

Table 1: Disaster Risks

High Risk	Medium Risk	Low Risk
<ul style="list-style-type: none"> Severe weather (e.g. east coast low, severe thunderstorm, storm surge) Bushfire (High Risk Areas as identified within Gold Coast Planning Scheme) 	<ul style="list-style-type: none"> Aircraft accident – off airport – Building collapse – significant building or facility Epidemic / pandemic Essential Infrastructure failure / collapse Floods on Coomera River, Currumbin Creek, Logan River, Albert River, Nerang River, Tallebudgera Creek Heatwave High rise / major building fire Insect / vermin plague (including dengue fever) Major traffic accident Oil spill - marine based Utility failure (gas / power – greater than 48 hours) – Rail accident Terrorism – government, places of mass gathering, transport Tsunami – major land inundation 	<ul style="list-style-type: none"> Earthquake Landslide Oil spill - land based Tsunami – marine inundation

Local Disaster Management Plan of the City of Gold Coast (Local Disaster Management Group, , 2013) acknowledges the importance of coordination when multiple agencies are involved in responding to a disaster event; and, as each local government is responsible for developing a disaster plan for its own area, the City of Gold Coast plan should outline the roles and responsibilities as well as the key functions of each of each agency that contributes to the effective functioning of the LDMG and disaster response in the Gold Coast. That is, the Gold Coast plan should be uniquely geared

towards the local needs of the Gold Coast and the local response capacity. Table 2 lists the key functions of the key primary response agencies that contribute to disaster response within the Gold Coast, and their primary roles.

Table 2: Disaster Response Phase - Lead Agencies/Groups and Primary Roles

Response Agency / Working Group	Primary Role
Local Government (Council of the City of Gold Coast) and LDMG	Responsible for planning and coordinating multi-agency disaster management response
Queensland Police Services (QPS)	Functional lead agency for public safety and security, including counter terrorism
Queensland Fire and Emergency Services – State Emergency Service	Functional lead agency for emergency supply, deployment of SES in search and rescue in emergency situations
Queensland Fire and Emergency Services – fire and rescue response services	Lead agency in the event of urban fires, bushfires, building collapse, oil spill on land, and hazardous material incidents
Queensland Ambulance Services (QAS)	Support agency providing ambulance services & temporary health infrastructure where required
State Government – district disaster management group and Queensland Disaster Management Committee	Responsible for planning and coordinating disaster management response at district and State levels respectively, and providing support to local government and its LDMG
Transport Working Group (TWG), comprising representatives of agencies with custodianship of transport assets (eg, Council and Dept of Transport and Main Roads)	Functional lead for transport systems and planning during disaster events

While Table 2 outlines agencies and their roles, it is important to note that these agencies do not operate independently of each other, and a clear understanding of the key functions and levels of inter-dependency is critical for the effective functioning of the LDMG during a disaster response. In order to effectively discharge their functions the respective agencies/groups relied on inputs from other agencies; and their activity outputs fed into and supported the functions of other agencies. For example, Table 3 which breaks down further the functions of the *Transport Working Group* (TWG), illustrates for each function the key inputs and outputs, and some of the inter-dependencies with other agencies.

The agencies and the key functions outlined in this section relate to the immediate response during a disaster event. However there is another key aspect to dealing with disaster events. In the aftermath of a disaster and immediate response, recovery efforts continue long after the LDMG is stood down and response agencies return to normalcy. However, this phase is outside the scope of the reported modelling. So, the communication model and analysis reported herein is limited to studying the interdependencies of lead agencies during the disaster response phase only.

Table 3: Analysis of key functions, inputs and outputs as related to the Transport Working Group

Function / Activity	Input	Output
Develop, review and update Transport Sub-Plan	Advice on available transport options by road and rail transport agencies	Transport sub-plan for LDMG
Development of Traffic Management Plans (TMP) during disasters	LDMG advice regarding expected and actual disaster impacts (eg, flood levels, cyclone impacts)	TWG provides LDMG with TMPs, which include evacuation routes
	LDMG advice regarding evacuation needs	
Provision of situation reports (SITREPS) to LDMG on transportation matters	Transport network intelligence gathered from sensing and surveillance devices (eg, cameras, drones and flow devices) and reports from on-ground response personnel (eg, police and emergency services) on the status of the network	SITREPS to LDMG and reviewed/updated TMPs to reflect current and emergent conditions

Communication and Coordination Modelling

Model description

To explore the interdependencies of lead agencies during the disaster response phase, a total of 17 key functions (identified in Appendix A), performed by 8 different agencies, were modelled using the Functional Resonance Analysis Method (FRAM). FRAM provides a way to describe outcomes using the idea of resonance arising from the variability of everyday performance (Frost and Mo, 2014). Interviews with members of response agencies were conducted to ascertain the level of interdependency among the response agencies. The inputs and outputs to perform any selected function were modelled on a scale of '0-1-2' being 'not important-somewhat important-very

important'. A typical data model for a single key function performed by TWG is shown diagrammatically in Fig. 3

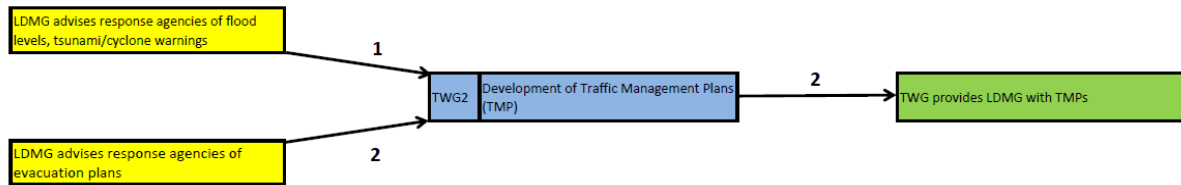


Fig. 3: Input-Function-Output for one of the key functions performed by TWG

In developing the FRAM model, the following four (4) steps were followed:

- 1) Identify and describe the essential functions, and characterise each function using six basic characteristics (i.e. input, output, preconditions, resources, time, and control);
- 2) Check the completeness / consistency of the model;
- 3) Characterise the potential variability of the functions in the FRAM model, as well as the possible actual variability of the functions in one or more instances of the model;
- 4) Analyse the overall performance based on scenario analysis.

For each function, a total of six (6) basic characteristics were detailed as follows:

- 1) Input (I) - which the function processes or transforms or that which starts the function;
- 2) Output (O) - which is the result of the function, either a specific output or product, or a state change;
- 3) Preconditions (P) - conditions that must be exist before a function can be executed;
- 4) Resources (R) - that which the function needs or consumes to produce the output;
- 5) Time (T) - temporal constraints affecting the function (with regard to starting time, finishing time, or duration);
- 6) Control (C) - how the function is monitored or controlled.

Model Input

In order to establish the FRAM model, a questionnaire was designed to examine the relationship among different key functions performed by the various agencies. Based on the received input, the following diagram was established (at the macro level) to reflect the inter-relationship among the various agencies. As can be seen in Fig. 4, there are eight agencies, including the City Council (CC), Department of Transport and Main Roads (TMR), Queensland Police Services (QPS), Transport Working Group (TWG), Local Disaster Management Group (LDMG), District Disaster Management Group (DDMG), Queensland Ambulance Services (QAS), and Queensland Fire and Emergency Services (QFES).

According to the diagram, LDMG has the most links to, and from, other agencies which are essential for the coordination and communication among agencies. CC and TMR work together with TWG to assist LDMG for disaster management.

For those interested in the model's mathematical features, the performance of an agency (say TWG) during the response phase, is represented by its O (output) which is a function of I (input), R (resources), C (Control), P (Precondition), and T (Time), mathematically it is represented by the following formula,

$$O_i = \frac{P_i(\varpi_I I_i + \varpi_R R_i + \varpi_C C_i + \varpi_T T_i)}{2(\varpi_I + \varpi_R + \varpi_C + \varpi_T)}$$

where, ϖ_j is the weight of element j ; O_i , P_i , I_i , R_i , C_i , and T_i are output, precondition, input, resources, control and time for Agency i , respectively. The input is determined by the output of other agencies, mathematically,

$$I_i = \frac{\sum_{j=1}^J v_{ij} O_j}{\sum_{j=1}^J v_{ij}}$$

where v_{ij} is the level of dependency of Agency i on Agency j ; O_j is the output of Agency j .

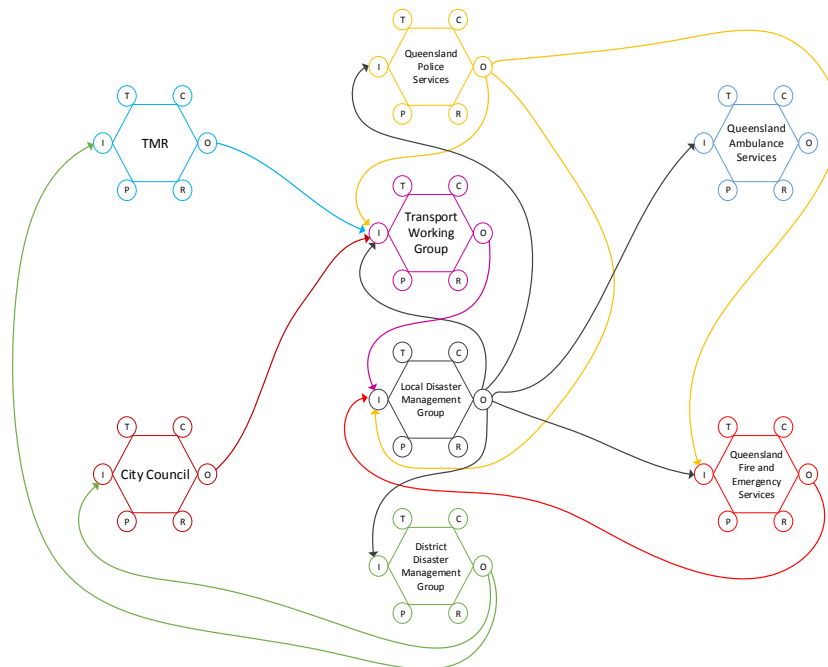


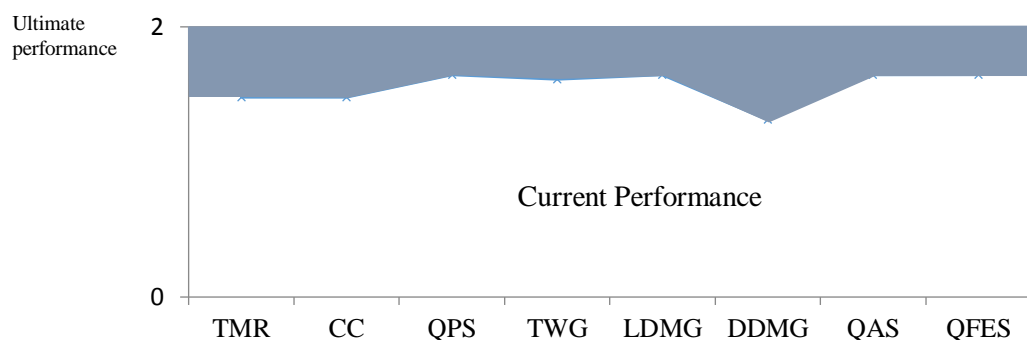
Fig. 4: Input-Output Model Overview

Discussion

Overall Performance

Based on the FRAM analysis, the computed function performance appears to range between 1.31 and 1.65, where 1.00 and 2.00 represents average and excellent performance, respectively. Based on this range of obtained values shown in Fig. 5, it could be argued that there is room for improvement (shaded blue area) for key functions carried out by a number of key agencies. Areas for performance improvement can be traced back to:

1. Plan Effectiveness: Effectiveness of plans regulates a function so that it results in the desired Output. Plan effectiveness, therefore, reflects the "Control" in a FRAM model
2. Timeliness: represents the various ways in which time can affect how a function is carried out.
3. Resources: needed or consumed while a function is carried out, e.g information, competence, software, tools, manpower, etc.)



TMR: Department of Transport and Main Roads
CC: City Council
QPS: Queensland Police Services
TWG: Transport Working Group
LDMG: Local Disaster Management Group
DDMG: District Disaster Management Group
QAS: Queensland Ambulance Service
QFES: Queensland Fire and Emergency Service

Fig. 5: Room for Performance Improvement

Sensitivity Analysis

Local Disaster Management Groups (LDMG) are both central and critical within Queensland's Disaster Management Arrangements (Queensland Government, 2015). Following from the functions of LDMG, as outlined in Section 30 of the Disaster Management Act 2003, an LDMG is the hub from which multiagency disaster response efforts are coordinated and synchronised. By maintaining a view over an impacted community and the component agencies that comprise disaster response, LDMGs serve as the hub through which inter-agency information should be shared, and from which a common operating picture for a disaster event and its response is generated.

By developing and maintaining effective communication systems between agencies and this central hub, LDMGs add value to agency-level business by filtering, sorting and redirecting the incoming mass of information from individual agencies and the community, and ensure that responding agencies have access to required information. The LDMG is also responsible for ensuring that the “system of systems” that is the local disaster management arrangements, are working effectively. That is, that the outputs of one agency’s processes is sufficient and timely, as required by downstream agencies. Like the conductor of an orchestra, the LDMG is in the best position to advise when some processes should “ramp up”, and when others should “scale back”, to achieve community response and recovery objectives. Moreover, LDMGs are in the best position to assess when the local disaster management “system of systems” itself becomes at risk, and additional support is required from District and State level groups.

While the centrality of LDMGs is not in question, their ability to carry out their functions and serve as the coordination hub is limited due to a number of issues, including the prevalence of immature inter-agency systems, reliance on individuals to deliver the group’s functions, and insufficient process-level training offered to the group’s members.

In light of the above, it was prudent to carry out sensitivity analysis to gauge the influence of the LDMG performance on other agencies’ performance. Against current communication and co-ordination performance, Fig 6 and Fig 7 demonstrate undesirable and desirable situations, respectively. By simultaneously reducing the level of plan effectiveness and available resources for LDMG, whilst delaying the process of timely information exchange, LDMG performance drops significantly (62% drop in performance). Consequently, the performance of all other agencies functions drop somewhere between 16% and up to 38%, see Fig. 6. Improving plan effectiveness for LDMG has positive impact on its own performance (12%) as well as that of other agencies (ranging from 3-8%), see Fig. 7.

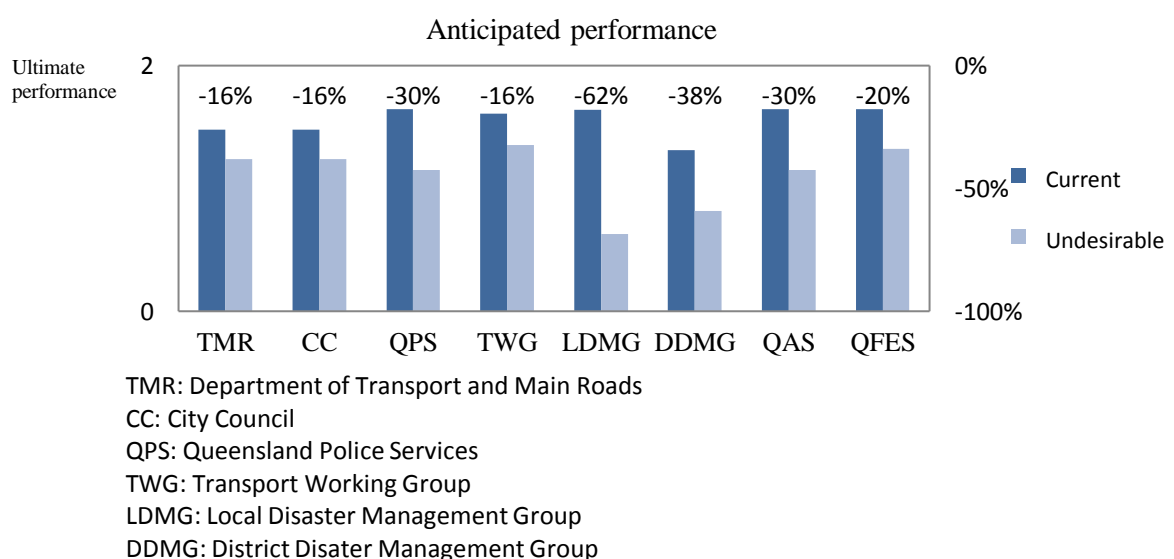


Fig. 6: Sensitivity Analysis – Undesirable Situation

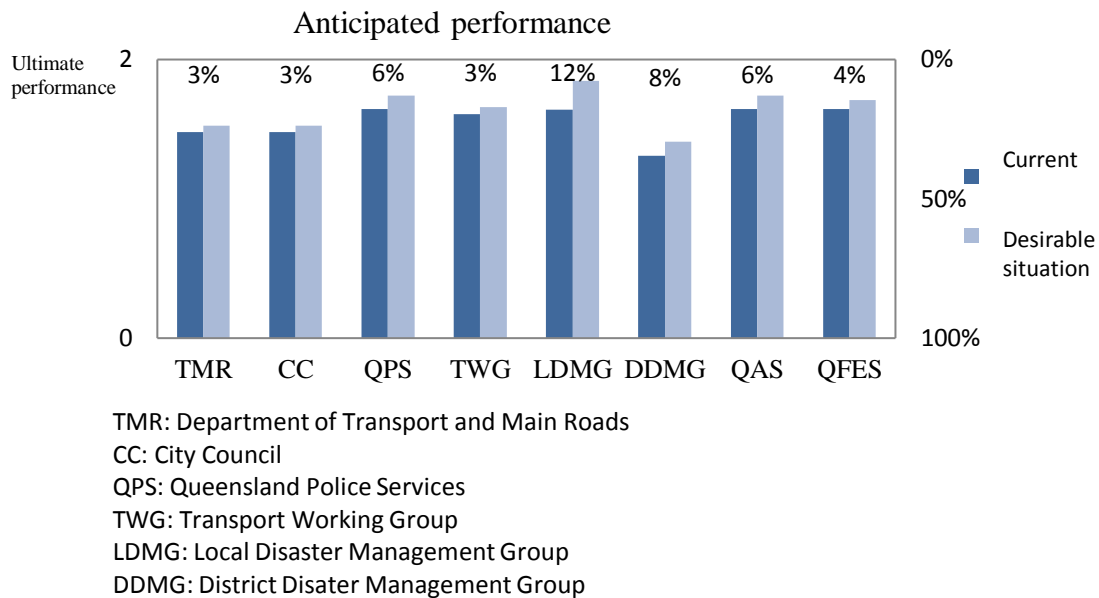


Fig. 7: Sensitivity Analysis – Desirable Situation

Within Queensland local governments, regardless of their size, the quality and effectiveness of sharing information and ensuring coordination of process outputs/inputs typically is highly dependent on the skills and commitment of individual liaison officers. This is because, while LDMGs typically have high level disaster management plans in place (as required under legislation), which describe roles and responsibilities; they typically do not have mature processes in place to govern how agencies will work together.

While many LDMGs have developed standard operating procedures (SOPs) for LDMG outputs (e.g., situation reports), many of these SOPs typically fall short of describing inter-agency linkages and how these linkages should operate. In such cases, when inter-agency interactions are highly reliant on individual liaison officers, there is the risk of high variability and unreliability in agency outputs, which consequentially impacts on downstream agencies. This is the case when liaison officers change at shift handovers and the incoming liaison officer manages processes differently. Secondly, as noted by IBM in their Smarter Cities Challenge study of the Gold Coast (IBM 2014), a disaster management system that is predominantly reliant on individuals, carry high levels of risk due to its human-based processes becoming stressed and fatigued as a result of the disaster event(s) being managed. Case studies from Hurricane Katrina (IBM, 2014), South East Queensland Floods (Holmes, 2012), and other major events, serve to remind that local responders are themselves often impacted by the disaster that they are responding to, and often suffer significant fatigue as response and recovery becomes protracted.

To address these issues, LDMGs need to move beyond current levels of planning which fundamentally seek to just document the roles and responsibilities of agencies. LDMGs need develop greater capabilities to develop and implement effective interagency processes. These processes need

to be: better documented and shared between agencies; critically analysed in terms of their ability to foster inter-agency coordination; and, where possible, through the adoption of more automated and smarter systems, the degree of dependence of these systems on individuals should be reduced. For example, through more considered input/output analyses of processes, it may be possible to automate inter-agency communications and workflows, and thereby enhance overall effectiveness of LDMGs.

For such a change to occur, there needs to be a change in the training regime that supports the Queensland Disaster Management Arrangements. While the Queensland Disaster Management Training Framework (Queensland Fire and Emergency Services, 2015) currently delivers training in legislation, how to prepare a disaster plan, how to plan evacuations, and other disaster-related content, there is also an unmet and perhaps unrecognised need for underpinning 'soft' skills. For example, training in interoperability and process management, inter-agency communication skills and leadership, would enhance the ability of LDMGs and their component agencies to synchronise and coordinate disaster response efforts.

Organisational Maturity

Effective preparedness is a critical precondition for successful response. Preparedness is the process of identifying the personnel, training, and equipment needed for a wide range of potential incidents, and developing jurisdictions – specific plans for delivering capabilities when needed for an incident.

Individuals in the organisations greatly affect the *response-to-crisis* environment, this includes leaders and managers in their reactions, decisions, and preparedness of their organisations. A well thought strategy is expected to include practices covering risk assessment, coupled with effective response systems that are self-sustaining, has flexibility with systems that are mature and can be activated rapidly. A system that has a high level of preparedness helps reduce the extended impact of any disaster event. Labaka et al (2012) suggest that organisations can increase their level of preparedness by implementing a variety of elements.

This part of the research builds on the work reported by Labaka et al (2012) and adopts the well-established maturity model, shown in Fig. 1, to evaluate the level of preparedness of a number of agencies for managing a disaster event. As mentioned earlier, five levels of preparedness were identified as follows: initial 'react' level (e.g. ad hoc), 'Apply' level, 'Practice' level, 'Enhance' level, and 'Lead' level. Based on this assumption, a questionnaire was developed and distributed to a number of agencies (namely, City Councils and TMR) to evaluate the depth and robust nature of their preparedness in the context of managing disaster events. Respondents, with varying managerial responsibilities, were asked to rate their responses using a scale expressing the level of their satisfaction with a number of statements (see Table 4) describing organisational dimensions such as Planning capacity, role of management in managing disaster events organisational culture, and

learning and development capacity. For each dimension, a number of practices were listed (see Table 5), each with its unique description where respondents were able to comment on its evaluation from a low (or basic) to high (or advanced).

Table 4: Maturity Scale

Organisation maturity Model (Dimension)	React	Apply	Practice	Enhance	Lead
	Basic (Reactive)-----Scale-----Advanced (Proactive)				
Organisational Planning/Managing					
Evaluate of the maturity level of disaster management plans					
Role of management in managing Disaster Events					
To what level does the disaster manager participate in the governance of disaster management planning?					
Evaluate the effectiveness of communication process during disasters					
Organisational Culture/Processes					
Your satisfaction level with the current level of understanding of the disaster management importance among your staff					
Evaluate the overall effectiveness of the organisational culture in disaster management					
Learning and Development					

Evaluate the effectiveness of training activities					
Rate the satisfaction level with training frequency					
Evaluate the effectiveness of post disaster reviews					
Please rate the current measures to evaluate training effectiveness					

Table 5: Organisational maturity for Disaster Preparedness – Dimensions and Practices

Dimension	Practices
Organisational Planning/Managing	<ul style="list-style-type: none"> • Developing of disaster management plans • Providing the availability of disaster management plans • Evaluating of the maturity level of disaster management plans • Introducing of disaster management responsibilities
Role of management in managing Disaster Events	<ul style="list-style-type: none"> • Introducing of the dedicated disaster manager/director role • Involving of disaster manager/director in the disaster management planning • Performing the media training for relevant staff • Developing of a formal disaster communication plan • Evaluating of disaster communication effectiveness
Organisational Culture/Processes	<ul style="list-style-type: none"> • Embedding the disaster management into organisational processes • Promoting the importance of disaster management • Including the key performance measures of disaster management into the staff performance evaluation process • Evaluating of overall effectiveness of the organisational culture in disaster management
Learning and Development	<ul style="list-style-type: none"> • Developing of formal disaster management training plans • Evaluating of the effectiveness of disaster training activities • Evaluating of the satisfaction level of the disaster training frequency • Performing the post disaster reviews • Evaluating of the effectiveness of post disaster reviews

	• Rating of training evaluation measures
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Discussion and Recommendations

All rated the maturity level of their organisational planning and managing as somewhere between levels 3 and 4. Generally, respondents commented that there are sufficient capabilities to identify, measure, report and respond to disaster events

It became clear that since the implementation of the Disaster Management Act (Queensland Government, 2003), there has been a steady shift in the way disaster management is viewed within Queensland’s local governments and Police Service, as the groups responsible for managing the disaster management arrangements at local and district levels, respectively. In 2005, the Local Government Association of Queensland (LGAQ) released guidelines and support materials for local governments on issues of disaster management should and could be mainstreamed; and numerous large disaster events in Queensland spoke to the need for local governments to resource the function (Queensland Government, 2005). As a result, most medium-large regional Councils within Queensland, now have allocated within their establishments staff with dedicated disaster management roles, budgets and work programs to address community preparedness and planning. Likewise, the Queensland Police Service has allocated officers and budget to support that organisation’s role in disaster management. With the allocation of staff, budget and other resources, disaster management has become increasingly embedded as a normal, mainstream organisational activity.

Although organisations have embraced disaster management over recent years, there are still some significant enhancements that need to be made. First, the changes above are limited to larger organisations which have the capacity to allocate dedicated staff and financial resources. Smaller regional shires, while having the need, do not have the capacity to provide dedicated disaster management resources, and hence do not have the capacity to be able to mainstream disaster management in the same way. As outlined by the Council of the City of Gold Coast in evidence to the Queensland Floods Commission of Inquiry (2012), this is a strategic issue that needs to be examined by the State.

Second, because disaster management is typically multi-disciplinary and whole-of-organisation in its mission, and interfaces with external organisations, there is a need for disaster management coordinators to be relatively senior within their organisations. As observed by IBM in their Smarter Cities Challenge report into the disaster management arrangements of the City of Gold Coast (IBM, 2014), the level of seniority of disaster management coordinators is an effective indicator of disaster management maturity, and the role levels of disaster management coordinators should be elevated to enhance disaster management outcomes. To be able to effect change within Councils, disaster management should be headed by senior leaders, who understand disaster management needs and who have the ability to champion the program. At present, disaster management coordinators within Councils range in levels from relatively senior executive positions (as in the case of Brisbane City Council, where the disaster management team and program is managed by a Manager reporting to

the Chief Executive Officer) to more junior positions whereby (as in the case of the City of Gold Coast) disaster management programs are managed by a Coordinator, who reports up through several levels of management.

A third issue relates to how boards and councils manage disaster management issues. While Queensland Councils are required to establish and appoint members to Local Disaster Management Groups (Queensland Government, 2003), there is a tendency within many local governments to consider disaster management “dealt with” through these appointments and, in the case of larger councils, the allocation of dedicated resources. That is, there is a dominant view within local governments that concerns and risks associated with disaster management can be “outsourced”. Council meetings and senior decision making forums such as executive leadership teams, typically do not regularly review or set strategic directions for disaster management, and rarely include disaster management as a standing agenda item.

Evaluating disaster management and training exercises is fundamental for the improvement and testing of organisational preparedness. Within Queensland, most training in disaster management is delivered by Queensland Fire and Emergency Services (Queensland Fire and Emergency Services , 2015) in accordance with the State’s Disaster Management Training Framework. QFES, whose Commissioner has responsibilities under the Disaster Management Act 2003 to ensure that all personnel who have a role in disaster management are suitably trained, delivers a generic program of disaster management training. This training is designed to raise awareness and knowledge of how disasters impact communities and the principles by which communities should prepare for them. Training modules, targeting all agencies with identified roles, include, for example, topics that address statutory obligations and requirements of the Disaster Management Act (Queensland Government, 2003, the requirements of State-approved guidelines for the preparation of disaster management plans, and principles by which disaster evacuation centres should be managed.

While the development of disaster management knowledge is important, and the commitment to the delivery of this training should be acknowledged, it is important to note that little skill development training in disaster management is delivered within Queensland’s local governments. While some local governments (eg, Brisbane City Council) engage fulltime education and training staff to deliver such training to its staff and other stakeholders, in most other local governments there is an unmet demand for such training, fuelled partly by an incorrect view that the QFES program of delivery makes local delivery unnecessary or an inadequate understanding of the importance of skills-based training. Effective disaster management is highly dependent on the ability of personnel to efficiently implement processes, such as assessing intelligence, providing situation reports, tasking of agencies, etc. As these local government has the primary responsibility for managing disasters within their boundaries (Queensland Government, 2003; Section 4A), local government should embrace the responsibility for ensuring that all personnel are adequately trained in local processes.

The Disaster Management Act 2003, and current State-approved guidelines, require local governments and their LDMGs to review their disaster plans at least annually. In most cases, this review is accepted to mean that an exercise should be conducted to test the arrangements as outlined within their plan. The problem with this, however, is that by disaster plans being all-hazard in their

approach and inclusive of all agencies, a single annual exercise cannot fully and effectively test disaster plans. Exercises, which are typically constructed around a scenario event, will test the arrangements for only some hazards and hence for only some response agencies. To overcome this as an issue, there is a need for a strategic approach to be adopted with respect to exercise management. That is, exercises should be strategically planned so that their scenarios reflect levels of disaster risk, and constructed in a manner that facilitates generalisation of exercise outcomes and lessons learned. As in case study methodology, exercise scenarios should sample and be typical of events that occur within the hazard-scape and agencies responses should be typical and within expected resource constraints. By contrast, this is not the case in most disaster management organisations. Very few have a strategic approach to the conduct of, and will plan exercises to meet compliance needs.

Moreover most exercises that are planned and delivered rarely explore or push their organisation's disaster management arrangements to the limits. As disasters can be extreme in their impacts on communities, it is important that exercises include extreme scenarios and place disaster management arrangements under stress. Although not typically practised within local government, exercise programs should include extreme scenarios designed to "break: the normal disaster management arrangements. For example, Exercise Trident, delivered by the City of Gold Coast, tested the Gold Coast response under a flash flood scenario occurring on a Sunday night of a major sporting event. Under the scenario, the Council identified a range of lessons, including limitations in the availability of human resources amongst all agencies and physical resources due to the timing of the scenario, and difficulty with using existing processes by less experienced but available personnel. Through stress-testing of arrangements, disaster managers and their agencies can develop deep appreciations of the limits of their response and recovery capabilities, and make explicit residual risks that are usually not identified. Understanding the constraint of resources is an important factor in the functional relationship between local and district disaster management groups.

To be able to implement a strategic exercise program which includes scenarios to "stress test" arrangements requires organisations to have a very high degree of maturity in process and confidence in their culture. That is, organisations need to understand in detail the operation of their disaster management processes, and not be afraid to expose their limits. Unfortunately this is typically not the case within most public sector organisations. Most exercises delivered within local government are designed to be delivered within capacity, and hence are typically pre-destined to show successful outcomes.

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