

CHAPTER SIX

ECONOMIC CONSIDERATIONS AS IMPEDIMENTS TO THE DEVELOPMENT OF AN INTELLIGENT DISASTER MANAGEMENT SYSTEM

Chapter One examines the nature of disaster;

Chapter Two reviews Australia's existing counter-disaster organisational structure and associated management arrangements;

Chapter Three searches for intelligent effective and efficient organisational structures, system designs, and associated management arrangements with a view to designing, developing, and implementing an IDMS;

Chapter Four assesses inter-organisational relationships among selected emergency service related personnel in New South Wales and Queensland with a view to designing, developing, and implementing an IDMS;

Chapter Five investigates political and bureaucratic impediments with a view to designing, developing, and implementing an IDMS;

Chapter Six investigates economic impediments with a view to designing, developing, and implementing an IDMS; and

Chapter Seven is the outline of an IDMS and conclusion to the research project.

INTRODUCTION

The thesis so far has addressed the problems in the existing Australian disaster management system by searching for 'intelligent' organisational disaster management structures and associated management arrangements. In the previous Chapter, it became clear that Australian political and public policy dynamics have in the past, and indeed continue, to constrain this task. The purpose of this Chapter is to demonstrate that economic considerations similarly act as a constraint. This raises a number of issues which are detailed in Table 6.1.

Table 6.1
Economic Considerations

How much ideally should government spend on disaster management?
How much does government actually spend on disaster management?
How should expenditures be allocated between tiers of government?
How do disaster management organisations allocate their allotted funds?
To what extent is the allocation of funds by government optimal or sub-optimal?
Are there different optimal allocations of funds across tasks, functions and organisations?
How are resources optimally allocated between prevention, preparedness, response and recovery?
Can the market mechanism assist in the creation and allocation of funds to disaster management?
Is there a place for user-pays in disaster management?

The diagram below outlines the sequence of discussion in Chapter Six:

ORGANISATION OF CHAPTER SIX

Constraints Affecting Government Allocation of Funds to Disaster Management
Sharing of Resources
Resource Allocation Problem
Problem of Coordination
Tangible and Intangible Benefits and Costs
Moral Hazard Problem and Insurance
How Much Should Government Spend on Disaster Management?
How Much Does Government Actually Spend on Disaster Management?
How Do Emergency Service Organisations Allocate Their Funds?

So, why exactly consider the economic dimension of disaster management? Economic issues, like political and bureaucratic considerations, influence the form of disaster management (Butler & Doessel, 1979). They are a, if not 'the', major stumbling block in the development of an Intelligent Disaster Management System (IDMS). Examples of key economic issues pertaining to disaster management, that might influence the form of an IDMS, relate to the principles and components of effective disaster management practice (see Chapter Five, Table 5.2).

Clearly, there is a cost associated with effecting the principles of effective disaster management practice. The cost of:

- Achieving an all-hazards approach;
- Achieving a comprehensive approach;
- Achieving an integrated approach;
- Achieving a consistent and equitable approach; and
- Achieving a responsible and prepared community approach.

Clearly, there is a cost associated with effecting the components of effective disaster management practice. The cost of:

- Achieving an effective planning process;
- Achieving effective plans;
- Achieving effective organisation;
- Achieving skilled personnel;
- Achieving effective actions;
- Achieving effective inter-agency roles and responsibilities;
- Achieving effective information management and communications;
- Achieving an adequate supply of resources and maintenance of readiness;
- Achieving effective operational flexibility;
- Achieving a capacity to manage extreme events;
- Achieving effective funding allocation;
- Achieving effective Parliamentary accountability/Ministerial authority;
- Achieving an effective policy development process; and
- Achieving an effective evaluation or performance appraisal of results.

Disaster management is dependent for the most part on government funding (Schneider, 1995). Private contractual arrangements for disaster management are few, mainly relating to air and sea rescue, and this circumstance reinforces the dependence on governments to fund it (Meek & Tattersall, 1989). However, the existence of a few private disaster management services means that disaster management is only 'almost' a pure public good. Attempts to establish more substantive private arrangements for disaster management i.e. National Safety Council of Australia have met with failure (Thomas, 1991). In this example, John Friedrich (now deceased) head of the National Safety Council of Australia

(now defunct), determined to establish a reputable national rescue service, but unable to convince government to fund it. acquired public funds (some \$293 million) through fraud (Thomas, 1991).

Nevertheless, insurance companies appear to play a critical role in disaster mitigation and ensuring community preparedness. In the Sydney 1994 bushfires, insurance premium income in the period outweighed damage payouts (pers. comm., Chris Cunningham, October, 1996). Furthermore, the Public Appeal for this event raised \$8 million more than was needed to financially compensate uninsured victims (it went instead to the bushfire brigades) (pers. comm., Chris Cunningham, October, 1996). This type of community response can be found in most Australian disasters.

Intending private suppliers, however, face several problems in service delivery unless public subsidies are made. For example, it is difficult to see how such suppliers can both identify and charge the potential users of such services - especially of the preparedness kind. In technical terms, the services are largely indivisible. Even then, it is possible that if charges can be levied they would be insufficient to maintain the services at the necessary level (Brennan, 1991). Moreover, it is likely that any private supplier would be a monopolist - with all the consequent defects in terms of monopoly pricing and service inefficiency. It is perhaps infeasible, then, that the market place could or would want to fund disaster management (particularly, after the National Safety Council of Australia experience). Even if this was technically possible, the market would be unable to deliver disaster management at a price people are prepared to pay for it. Are there disaster management services where the private sector could survive on a fee for service basis? This is debateable. Certainly, one could charge for air and sea searches and rescues. But, inevitably the cost of some searches and rescues could perhaps be beyond the scope of the private sector, ie. if a submarine was disabled off the eastern seaboard of Australia with navy personnel on board.

Why does the government provide certain goods and services such as the legal system, a system of national defence, schools, highways, and public health services? Why don't we leave provision of such goods and services to private firms and the market place? Answers to these questions lie in the distinction between private and public goods. A private good or service each unit of which is consumed by only one individual (Parkin, 1990:499). There are two important features of a private good. One, is rivalry where one person's consumption can take place only at the expense of another person's (Parkin,

1990:499). Two, is excludability where once you have bought a good, it is yours to do with as you choose (thereby excluding others from it) (Parkin, 1990:499). Contrastingly, a pure public good is a good or service each unit of which is consumed by everyone and from which no one can be excluded (Parkin, 1990:499). There are two important features of a pure public good. One, is non rivalry where one person's consumption of a good does not reduce the amount available for someone else (Parkin, 1990:499). Two, is nonexcludability where no one can be excluded from enjoying the benefits and/or security of the good (Parkin, 1990:499). Unfortunately, the consumption of public goods gives rise to free-rider problems, where people consume a good without paying for it (Parkin, 1990:500). Free-rider problems emerge because there is no incentive for a person to pay for the good if the payment makes no difference to the quantity of the good that the person is likely to consume.

The reality, however, is that disaster management is funded principally by government. The dilemma, however, is that because there is no market, government has really no idea how much it should be spending on disaster management (Sorkin, 1982; Alexander, 1993). Markets generally indicate how much people are prepared to pay for particular services, although this is made easier where consumers have considerable information and experience about the product or service and where there are competing suppliers (Jackson & McConnell, 1988). However, disaster management goods and services are largely 'hypothetical' for the consumer who has neither experienced their use nor has any idea of what price they would be prepared to pay. One would hope that spending on disaster management involves a bit more than just 'guess-work', and that as with other policy areas, funding decisions are made after careful analysis of government portfolio and program management and budgeting. Government may have good reasons for spending what it does on disaster management. But, the reality is that the amount may bear little resemblance to what government would spend if in full possession of the facts. This qualification is important, because government might hit on the right amount of funding completely by accident, and somewhat ironically, for the wrong reasons.

Moreover, allocation of expenditure between emergency service organisations, or disaster management tasks, may be much less than optimal simply because there is no solid data on which to make rational judgements (Hirshleifer, 1987). The reality is one of uncertainty (Borch, 1968), and one learns to allocate funds accordingly, ploughing through an environment which is increasingly complex. The result, not surprisingly, as

detailed in Annual Reports, is a range of different structures of expenditure across States and Territories and emergency service organisations.

The general task confronting government is deciding how much to spend overall and to allocate it across items of expenditure (Butler & Doessel, 1979). The problem lies in the almost total absence of markets and market signals; in the uncertainty about the timing, scale, form and location of disasters; in the competition between monopolistic and self serving organisations; in the competition between all functions of government for scarce public monies; and in deciding to emphasise either preparation or response (Kent, 1987). Many of these questions bring an economic dimension to the analysis. This picture demonstrates just how difficult it is to design and develop an IDMS. What then, are some of the constraints?

CONSTRAINTS AFFECTING GOVERNMENT ALLOCATION OF FUNDS TO DISASTER MANAGEMENT

Constraints affecting the overall government allocation of funds to disaster management are many and complex. Largely the constraints fall into two inter-dependent spheres - the physical-social environment and the economic-political environment. A third sphere could perhaps be termed the organisational environment. Overall, fund allocation is decided by a multi-stage process, which includes:

- Governments (at all tiers) may allocate earmarked disaster management and emergency management funds directly to their own disaster relevant organisations (Butler & Doessel, 1979). There is a problem, however, here in deciding what expenditure is relevant, and which is for the general run of emergency services, if indeed the two categories can be separated in a meaningful way. At one extreme we might take into account expenditures specifically targeted on disasters. However, many other expenditures on emergency services are useful in disaster management also.
- Government may allocate disaster management and emergency management funds to line departments/organisations (delivering fire, police and ambulance services, for example) and those organisations then decide to allocate some resources to disaster management and/or emergency services (Kent, 1987). This is an indirect path to funds allocation.
- Government may pass on monies to other 'inferior' levels of government on either a tied (items of expenditure prescribed) or untied (government has wide discretion in expenditure) basis (Kent, 1987).
- The inferior tier of government may allocate discretionary funds in such an indirect way as the receiving organisation can itself decide whether funds are spent on emergency management, disaster management, or some other outlet (Kent, 1987).

- Government may also consider voluntary disaster management (Brudney, 1990) and emergency management services, which also have an economic value.

In short, there is quite a complex trail of expenditures on public disaster management and emergency management services. Besides this multi-stage process outlined above, determining the allocation of funds on different services/activities, one also has factors below controlling allocation:

- Societal hazardousness and vulnerability;
- Hazard perception and awareness;
- Resource allocation;
- Jurisdictional divisions and fragmentation;
- Public policy administration and implementation;
- Political decision making processes;
- Dominant social structural patterns and processes;
- Organisation specific factors; and
- Current official hazard and emergency management practices, attitudes and conventions.

State and Territory Governments and organisations, including emergency service organisations, have to compete for scarce resources. In doing this, there is a high risk that a significant percentage of possible funds will be lost unnecessarily through negotiation of competition (Hirshleifer, 1987). This is the nearest thing to a market in disaster management, where there are arrangements (albeit sometimes hidden) that facilitate the buying and selling (trading) of good, service, factor of production, or future commitment (Parkin, 1990:G-8). Trading between emergency service organisations will involve a form(s) of transaction costs, and these costs can be viewed in terms of market demand and supply, market price, market activity, and market constraint (Kent, 1987). The quantity of useable funds is also relevant, and this will depend on:

- The transaction costs incurred in collaboration between different organisations (holding joint exercises, strategic planning, negotiating contracts [see Ricketts, 1987]);
- The costs of purchasing standard equipment, but which may not be congruent with the rest of the organisation's equipment;
- The extra costs incurred in buying equipment in small lots, rather than large orders for a single organisation;
- The costs arising from incompatibility of equipment between organisations - delays, frustration, maybe property damage arising from delayed response;

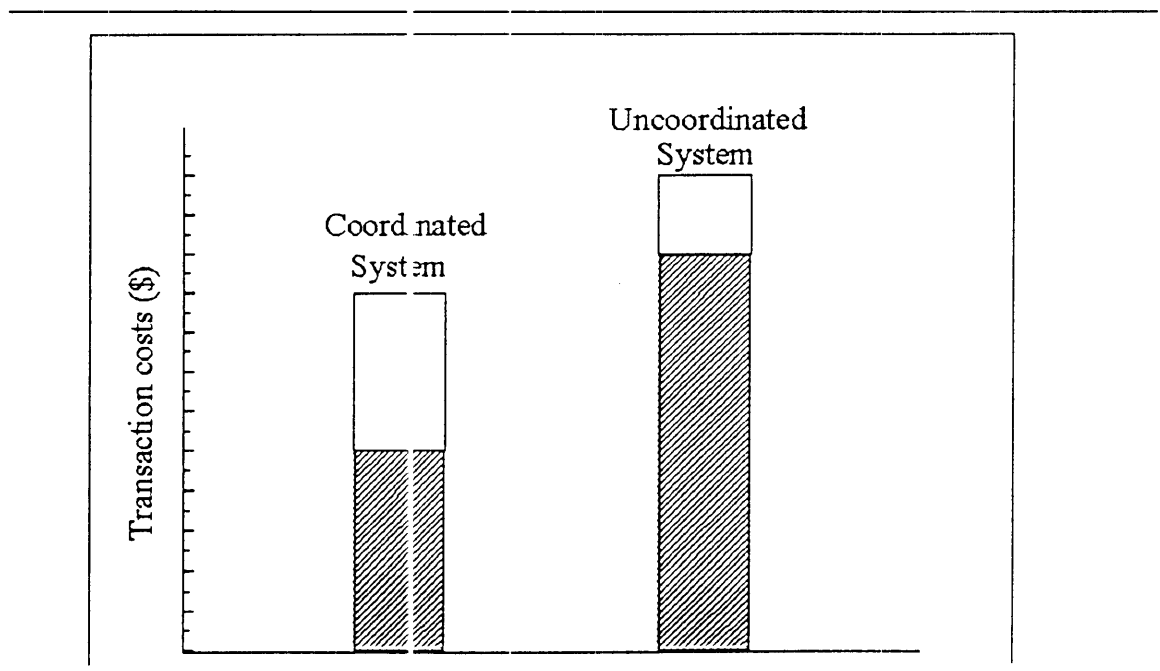
- The difficulties in sharing equipment; and
- The avoidance of duplication.

All these factors require negotiation on the part of emergency service organisations and some form of memorandum of understanding adopted, particularly with regard to mutual-aid arrangements. Such action is necessary in order to avoid market failure, that is the inability of an unregulated market (ie. among emergency service organisations) to achieve, in all circumstances allocative efficiency (Parkin, 1990:G-9). Allocative efficiency, more often than not requires the establishment of a market mechanism - a method of determining what, how, and for whom goods and services are produced, based on individual choices coordinated through markets (Parkin, 1990:G-9). Such an undertaking may overcome transaction costs related to sharing of information, equipment, and resources more generally.

The nature of disaster is such that no single organisation is capable of combating its effects (Hodgkinson & Stewart, 1991). And so, organisations have to enter inter-organisational relationships based on mutual cooperation. Figure 6.1 hypothetically shows transaction costs in a coordinated and uncoordinated system.

Figure 6.1

Transaction Costs in a Coordinated and Uncoordinated System



Transaction costs in the uncoordinated system are higher than for the coordinated system. This is due in part to the fact that the uncoordinated system costs more to maintain. The amount allocated for core functions is less in the uncoordinated system. In the coordinated system, however, there are time efficiencies with regards to overall costs and finance allocated to core functions.

Determining transaction costs is made further difficult by a dependence in Australia upon a volunteer movement which in fits into disaster preparedness, response and recovery (Britton, 1990b; 1991c). The unique physical environment of Australia, particularly distance and isolation (discussed in Chapter Two), have necessitated this. Inevitably, tensions have shown to exist between volunteers and the permanent career emergency service officer (Britton, 1991c). Effective inter-organisational coordination becomes critical in the sharing of resources (financial, material, or personnel).

Sharing of Resources

Sharing of resources incurs allocation and distribution problems, as well as associated organisational cooperation and coordination problems (Kent, 1987). Acknowledging the existence and need for contractual agreements, and recognising possible transaction costs, is critical.

Sharing resources and making the best use of them requires:

...forming agreements with others. The best strategy is to not cut oneself off from all communications with one's fellows, but rather coordinate one's activity with that of other people (Ricketts, 1987:4).

In this respect, economics is a "study of the social mechanisms which facilitate mutual agreements" (Ricketts, 1987:4). Organisations compete for scarce funds. It can be expected that no individual or group will accept a deal which would see a reduction in their own well-being or two or three individuals or groups benefit by coming to alternative arrangements. And so:

A set of agreements which it is in no single individual's or group of individuals interests to renounce in favour of an alternative is said to be in the CORE of a market exchange (Ricketts, 1987:5).

The process by which mutual agreements are formulated requires knowledge of each participating member. Particularly, in terms of what resources, experience, expertise, and overall capability they have. Disaster management is no exception, and emergency service organisations need to cooperate with one-another and establish mutual-aid agreements/arrangements and/or some form of memorandum of understanding between one-another. Sharing of resources creates resource allocation problems.

Resource Allocation Problem

Under our Federal system, State Governments are responsible for the protection and preservation of the lives and property of their citizens (Emergency Management Australia, 1995). State Governments exercise control over most of the functions which are essential for effective disaster prevention, preparedness, response and recovery (Emergency Management Australia, 1995).

The role of the Commonwealth is to provide guidance and support to the States and Territories in developing their capacity for dealing with disaster, and to provide physical assistance to a requesting State or Territory in the event that a disaster occurs beyond its capability (Emergency Management Australia, 1995). This is disaster relief assistance. Such assistance requires Commonwealth Government recognition of the potential dimensions of disaster. In particular, the nature of damage; insurance claims; distribution of financial assistance by government; and distribution of private appeal funds. Efficiency and equity in the distribution of natural disaster relief by government to individuals requires a consideration of efficiency in taxation; equity in taxation; and efficiency and equity in natural disaster relief. Quite simply, there needs to be a climate in which capacity for doing work well and fairness is openly established and advocated.

The economic justification for any government intervention in the economy is based in the operation of the market mechanism - allocation, stabilisation and distribution (Musgrave, 1959). Even in a perfectly competitive economy, social welfare may not be maximised because of the problem of market failure (Butler & Doessel, 1979). Disaster management is no exception. Disaster management as largely a public good, requires government intervention to ensure an optimal allocation of resources for disaster mitigation, disaster preparedness, disaster response and disaster recovery.

Two problems which commonly arise in a Federal system of government are termed horizontal and vertical imbalance. Horizontal imbalance refers to a situation where economic inequalities between lower-level governments are such that:

...if they were all to have equal standards of public expenditure over an equal range of public services and had to finance that expenditure from their own revenue sources, some of them would have to set their taxes and charges at a higher level of severity than others (Lane, 1968 [cited in Butler & Doessel, 1979:7]).

Vertical imbalance refers generally to a situation where there is:

a non-correspondence between revenue resources and expenditure commitments for each level of government" (Hunter, 1974 [cited in Butler & Doessel, 1979:8).

Disaster management services are best delivered at the local level (even if administered overall from the capital city). However, because of vertical fiscal imbalance, the local tier is substantially under-funded to perform its task (James, 1991). Efficient disaster management therefore depends on more effective funding arrangements between the tiers of government (Schneider, 1995). It is questionable, however, whether this is feasible. If infeasible, we have yet again another impediment to efficient and effective disaster management. Indeed, Overseas experience and in particular the United States of America, clearly demonstrates that rather than being well-coordinated and integrated, the existing governmental system is more accurately described as disconnected, uncoordinated, underfunded, and discredited (Schneider, 1995:37). Schneider (1995:37-38) highlights a number of reasons for this negative characterisation:

- First, different perspectives often develop across different governmental levels with local, state and national officials tending to view the process strictly from their own vantage points in the system;
- Second, emergency management officials are often unable to coordinate the actions of other participants in the process;
- Third, disaster-relief operations are severely underfunded throughout the entire intergovernmental system; and
- Fourth, emergency management operations have little respect or credibility within the overall governmental system.

The result is that while on paper there is a well-organised, efficient system to guide governmental activity during disasters, in reality, this system is neither clearly articulated,

completely supported, nor fully developed (Schneider, 1995:38-39). This picture holds similarity with the existing Australian counter-disaster management system (Britton, 1985b).

Adopting an all agencies (or integrated) approach to disaster management despite increasing transaction costs requires an active partnership between Commonwealth, State and Local Government, statutory authorities and voluntary organisations (Emergency Management Australia, 1995). There is, however, an identifiable resource allocation problem across this inter-government partnership. This translates into identifiable resource allocation problems across and within organisations, particularly those fulfilling a disaster management responsibility (Kent, 1987). What makes this situation even more complicated is that there are a range of organisational types based on power, status and prestige in the disaster relevant organisational network (Britton, 1986b). Such differences have reinforced and strengthened the respective organisational cultures on the part of the emergency service organisations. The attitude fostered is that each emergency service organisation in the network has an absolute advantage over the other in the sense that each organisation believes it can produce more of a good or service than another organisation (Parkin, 1990:G-1).

In a climate of unequal resource allocation, organisations because of particular advantages they have, tend to specialise in certain goods and services (Ricketts, 1987) and engage in exchange. However, across emergency service organisations there has been a long-standing reluctance (linked to organisational culture) to recognise that as part of a disaster-relevant organisational system some organisations are better suited to perform particular tasks than others, and that as a consequence, it makes sense to specialise in one's comparative advantage(s). Comparative advantage is the realisation that an organisation can produce a good or service at a lower opportunity cost than anyone else (Parkin, 1990:G-3). Instead, emergency service organisations in the disaster relevant organisational system have tended to duplicate tasks and responsibilities requiring a subsequent duplication of resources. This is not an efficient or effective use of scarce resources, either in terms of allocate efficiency or productive efficiency. It is not surprising, then, to find that problems of resource allocation and sharing creates coordination problems.

Problem of Coordination

Resource allocation and sharing creates coordination problems. Specialisation, implies the existence of a coordinating mechanism(s) by which an organisation's activities are made compatible with the actions of others (Ricketts, 1987:11). This mechanism is termed the bargaining process. In disaster management terms, we can view bargaining in the form of mutual-aid arrangements or memorandums of understanding, where emergency service organisations mutually agree to perform particular roles and responsibilities and make available certain types and levels of resources (Hirshleifer, 1987).

Bargaining, with a view to achieving inter-organisational cooperation and coordination can be costly. Secrecy and reluctance to share information means unnecessary duplication of resources as all organisations endeavour to collect the same information. But, does this have to be the case? In this regard, Ricketts (1987) argues:

Under tightly specified conditions in a world consisting of many individuals all with different tastes, skills and other endowments of resources, there will exist a set of relative prices of goods and services compatible with universal market sharing. Equivalently there will exist a set of agreements between the individuals which no one will wish to change. The activities of all contractors will be perfectly reconciled. For any given set of preferences, resources, and technological possibilities a 'solution' to the resource allocation problem exists in terms of specific outcomes (p16).

What this means is that perfect coordination of all activity requires that mutual agreements are conducted and concluded in a climate where transaction costs equal zero. Knowledge of all technical possibilities both new and in the future must be assumed to be complete (Ricketts, 1987). Where time and uncertainty are excluded from the analysis, transactions are costlessly and immediately reconciled. This suggests that an effective disaster management system will seek to minimise transaction costs in order to free funds for core activities. There will also be a point where the reduction in transaction costs leads to a greater reduction in disaster management efficiency. Obviously transaction costs should not be reduced below that level. Ricketts (1987) is talking about individuals, though his analysis can be extended to organisations with the recognition of an added layer of complexity. In one sense, organisations behave like individuals: they have aims, preferences, outlooks, beliefs and the like. However, those positions are usually somewhat 'fuzzy' or muted in that they are compromises that are likely to shift rapidly

with changing organisational leadership. Such compromises can also be added to the sum of transaction costs.

Ideally then:

The efforts of all individuals are coordinated by a gigantic and complex web of contractual commitments simultaneously entered into. The economy is made up of a myriad of individual contractors, each one in an intricate and complex pattern of interrelationships with every other (Ricketts, 1987:18).

Organisations exist and owe their existence to outcomes of rational individuals to solve the resource allocation problems which confront them (Ricketts, 1987). Organisations are characterised by a system of bilateral contracts. The nature of this set of contracts is very important. The contracts will not normally lay down extremely detailed provisions concerning when, where, and how particular tasks are to be performed, but the contracts will bind individuals to an agreement to be 'organised' (Ricketts, 1987).

Contracts are imperfectly specified because the precise details of the actions required of the employees of an organisation may be unknown at the time a contract is made (Lipsey & Harbury, 1988). In disaster management, one needs employee flexibility to undertake unforeseen roles and responsibilities in respect of disaster response and recovery as necessary. The decision making process in this respect is only revealed with the passage of time, and time will identify the decisions which may be made in the future concerning the best plan of action for an organisation(s). Ricketts (1987) makes the point that if contracts had to be re-negotiated with every small change in policy, the organisation as a useful device for allocating resources would soon disappear. Ideally, within the organisation, information is collected concerning opportunities for productive collaboration, on the skills and attributes of employees, on new technical innovations, on the demands of consumers and so forth (Ricketts, 1987).

Adopting this approach, inter-organisational coordination would require organisations to look beyond themselves, and consider that they are part of a wider network of relations. For our purposes, a disaster-relevant organisational network. By forming agreements with specialists, individuals will also gain the classic advantages from exchange (Jackson & McConnell, 1988). This does, however, raise the issue of how one creates a disaster-relevant organisational network where shared interests are the norm. The benefits of

shared exchange are not assisted by tangible and intangible benefits and associated costs (Jackson & McConnell, 1988), and these are the subject of the next section.

Tangible and Intangible Benefits and Costs

Determining the optimal quantity of disaster management services can also prove difficult due to tangible and intangible benefits and associated costs. Tangible benefits are measurable (eg. reduced hazard costs to the community as a result of saved time; community preparedness in reducing impact; and speed of recovery) (Jackson & McConnell, 1988). Intangible benefits are difficult to measure because of their psychological and/or cultural basis (eg. reduced community fears of disaster events; and increased feeling of security) (Jackson & McConnell, 1988). Moreover, not just valuing the benefits is important, but also finding a way of incorporating them into our thinking about what is an appropriate public expenditure on disaster management is worthwhile. In this regard, benefit-cost analysis can be of assistance, because it takes account of such issues as opportunity costs, which is the best alternative foregone (Parkin, 1990:G-11). The more we value the intangible benefits the more we can justify increasing the level of funding in disaster management. However, this attitude does present a dilemma in the sense that there are opportunity costs (Parkin, 1990:G-8). That is, increased funding in disaster management could see benefits foregone in other government policy areas ie. health and education.

A consideration of consumer indifference curves is also important in developing any understanding of tangible and intangible benefits and costs (Jackson & McConnell, 1988). The reasons for this are:

- That communities (in aggregate) perceive different levels of disaster hazard depending on location and hazard history;
- That as a consequence, communities may value disaster management expenditure differently according to where they live;
- That what applies to communities also applies to individuals; and
- That individuals and society are becoming increasingly more risk adverse and therefore probably prepared to spend more on disaster management services.

These attributes suggest that the amount of money that society is prepared to allocate to disaster management services is not a static thing. It fluctuates with assessment of disaster hazard, the strength of influence of particular communities on decision-making, the

changing degree of community risk adverseness (Sorkin, 1982). There is, however, another side to this complicated argument. It is that individuals and the community are not well placed to judge how much money government should spend on disaster management (Sorkin, 1982). They do not have adequate information to make rational decisions because of the infrequency of disasters and, anyway, the response to disasters has to be a whole community/nation effort in many instances because it is often not easy to identify in advance who might be affected - the potential incidence of drought, fire, flood, cyclones, earthquakes and the like is widespread. There is also an externality problem (see Brennan, 1990). Thus, government is and should be responsible for deciding expenditures for the wider public good.

Moral Hazard Problem and Insurance

Tangible and intangible benefits and costs create potential for a moral hazard. This is arguably another cost to be added to the total costs of disaster management services - like opportunity costs to which it appears to be related. The link lies in the fact that moral hazard arising from public disaster management expenditure causes an additional public loss - through more careless behaviour or shifting personal responsibility for the management of one's own affairs on to the state (Sorkin, 1982).

While effective disaster management practice is to be encouraged and aimed for, there is nonetheless an associated risk of fostering community complacency through a reluctance to insure against hazard risks (Meek & Tattersall, 1989; Tonkin, 1989). This risk exists because effective disaster management practice is seen to remove the potential community risk/threat. The implication of this, is that the more government spends on disaster management, the less the community will perhaps be prepared to spend on individual disaster preparedness (Brennan, 1990). Clearly, we must rethink and redefine carefully the magnitude and form of the state's contribution to disaster management. Commonwealth government disaster assistance to States and Territories can take the form:

...either of loans, which may be interest free to the State Government concerned but for which the recipients of the loans (primary producers, small business enterprises, churches, sporting bodies or other non-profit organisations) are charged a positive but concessional rate of interest by the relevant State Government, or of non-repayable grants. Grant assistance may be of a recurrent nature or of a capital nature. The only payments of a recurrent nature are those for personal distress and hardship (Butler & Doessel, 1979:14).

Presumably, State and Territory Governments should consider adopting a similar attitude with respect to Local Government regional area disaster assistance. However, this may require a rethink in terms of the redistribution of wealth and differences in regional policy. Particularly, in terms of there being an unequal or disparate treatment across regions in terms of funding (Butler and Doessel, 1979).

Just how big is the moral hazard problem? It varies geographically and with hazard type. The moral hazard is greater for some hazards than others - for example, many people in flood-and-fire-prone areas endanger themselves because they know that others will come to their rescue (Sorkin, 1982). Insurance companies reinforce this attitude to some degree, by stipulating that compensation is only payable where the home owner rebuilds their house on their property (pers. comm., Anon., Insurance Council of Australia, 1995). The reality, however, is that poorly-designed houses get re-built in high risk locations continually and unnecessarily.

The moral hazard question is discussed further by Brennan (1991). Brennan is critical that governments apparently deem it necessary to fund disaster management on the basis that it is a pure public good. Brennan (1991) challenges this situation using two propositions:

Proposition 1: There is an optimal number of civil disasters, and that optimal number is unlikely to be zero.

...Disasters are by definition I suppose, disastrous. Yet even so, it does not necessarily pay to prevent them all even where prevention is technically feasible. Some risks we simply have to live with (and possibly with) because there is nothing we can do about them. Other risks we choose to live with, even though there is something we can do about them, because the costs of reducing the risks or the benefits we get from taking the risks are too great...while it may be tempting to think that the critical question in civil disaster management is whether all that might be done to minimise the risk of disasters occurring is being done, that is not so. The critical question, as it bears on the likelihood of disasters, is rather whether the number of disasters is "optimal" - that is, whether reducing the likelihood of disasters costs more than the benefits from expected disaster reduction (p30).

Proposition 2: It is not always desirable to compensate victims.

...Suppose we agree with proposition 1. We accept that some avoidable disasters will occur, and should occur: that is, we accept that prevention is not always better than cure. But is cure sometimes undesirable? Should we, in cases where it does not pay to minimise the likelihood of disasters, nevertheless do all we can to minimise the costs imposed by those disasters that do occur? Again no. And, again because it depends on how much it costs to minimise the damage to be done. Then should we, at least, compensate victims for the damage done to them by disasters that we could have avoided? The answer is - not necessarily. For it may be the case that the cheapest means of avoiding damage can be undertaken by the agents actually at risk - even though those agents were not those whose actions caused the disaster to occur (p30).

Searching for an optimal solution(s) to the propositions stated above, Brennan (1991) asks the question: "Why can we not let the decentralised process of ordinary markets determine the optimal level of aid response to disaster?" Brennan (1991) rationalises two properties of disaster in response to this question:

1. The scale of disasters is such that the agents whose actions contribute to causing the disaster typically do not sustain the full consequences of their actions. When such externalities are present, preventative actions taken by those agents are likely to be inadequate: increased disaster risk is instrumental in providing some benefits to some actors and costs to others...
2. Disasters are low probability events, at least at any one time and in any one place. If ordinary decision-makers have difficulty making rational decisions in the face of considerable uncertainty, then we must take some account of this fact in assessing individual response to disaster risks specifically (p31).

Analysis of these two properties does not lead Brennan to conclude that disaster management cannot be market orientated. Brennan (1991) accepts that: That those best placed to minimise expected damage are persons other than those who are damaged; and yet, it is logically possible that those best placed to minimise expected damage are the damaged themselves [but invariably, the latter is not the case] (p31). While some preventative action by those at "source" would be desirable, the incentive to take adequate precautionary action is muted by the fact that those at the source do not bear the full costs of their actions (p31). The result suggests Brennan is that one is left with no alternative but to search for an institution(s) that will see responsibility directed to those best placed to minimise expected damage.

The Law of Torts is such an institution (Brennan, 1991). This law requires that full compensation for any damage caused must be paid (this allows for the possibility that the real damage may, in fact, be caused primarily by the negligence of the damaged party - the failure to take low cost avoidance action). However, Brennan (1991:31-32) identifies four possible problems with the Law of Torts and its application to disaster management. One, in most cases the individuals acting are themselves the agents of various collectives - although the collective may be required to pay full compensation, the individual actor's liability is quite small (p32). Two, the market place tends to place in positions of corporate decision-making a group of people who are systematically biased towards risk-taking (p32). Three, where there are many people damaged, it is rational for each to let others undertake costly litigation and aim to settle out of the court room (p32). Four, where there is not one source but multiple sources of the risk, as when the risk is created by the independent actions of large numbers of agents the Law of Torts is unlikely to be adequate (p32).

Brennan (1991) addresses the dilemma of using the decentralised process of ordinary markets to determine the optimal level of and response to disaster by suggesting:

...the case for government action seems strongest in those areas where the tort law works least well - namely, where there are multiple contributors to causing the disaster, as well as multiple victims. In other cases, however, where the case for government action depends on saving people from their own stupidity (at least, as the economist/scientist observer perceives it) the arguments appear analytically much less strong (p33).

Meek & Tattersall (1989) take the debate further in respect of ordinary markets determining the optimal level of and response to disaster, by considering the issue of insurance. There are misconceptions as to what can, and cannot be expected of insurance:

...insurance is associated with taking risks by eliminating the risk facing an individual. By applying the law of large numbers, the insurance process transfers a risk which is significant to an individual, to one that can be shared by a group to whom the risk is relatively insignificant. The key to successful insurance underwriting is to establish whether a risk can be reduced to an acceptable level of insignificance, that is, to make it insurable (Meek & Tattersall, 1989:163).

Insurers, suggests Meek & Tattersall (1989:168) have an obligation to their policyholders to apply the criteria of insurability diligently. These being:

- That there must be a demand for coverage so that premiums for a large number of risks can contribute to individual schemes;
- That there must be a spread of risks, both in nature and location, so that no single event can bring about catastrophic loss of a magnitude which could eliminate the premium pool;
- That the events covered must be fortuitous in nature and the resultant loss or damage must be incapable of being unduly influenced by deliberate actions of the insured;
- That losses must occur neither too often nor too seldom;
- That the frequency and magnitude of losses must be assessable;
- That the circumstances of the occurrence must be capable of definition; and
- That statistical data covering sufficiently long periods must be available.

Once insurability has been established, the insurer must measure its exposure to hazard threats. Meek & Tattersall (1989) suggest that assessment is made in two ways, measuring total exposure to loss and an assessment of the likely extent of loss. Measuring total exposure to loss is not simple. Indeed, Meek & Tattersall (1989:171) identify a number of complicating factors:

- That not every insurance policy can be written in such a way that the location of risk is clear;
- That some policyholders require what are called floating policies on stock around the country;
- That it is common practice to give what is called 'suppliers' premises' cover; and
- That a major problem is the definition of an area subject to a particular natural hazard.

Even if one could accurately gauge the total exposure to loss, further assessment of likely extent of loss is equally fraught with problems (Meek & Tattersall, 1989). These problems relate to the fact that determination of likely extent of loss is a function of variable demographic, economic, seismological and meteorological conditions (in the case of natural hazards).

Despite these problems, insurers have attempted to overcome these problems by developing an Insurance Emergency Scheme (an initiative of the Insurance Council of

Australia) which as required, aims to have teams of insurance adjusters and claims processors placed on site if a disaster occurs (Meek & Tattersall, 1989). The idea of the scheme is to support and complement other social welfare activity. The Insurance Emergency Scheme is assisted in its planning and management by 'catastrophe' zoning of Australia. This zoning is an outcome of the accumulation of postcodes and their grouping into defined zones of risk. The Appendix provides identification of these accumulation zones and a listing of major disasters since June 1967 (revised to 31 December 1995) on which the Insurance Council of Australia has paid out insurance losses.

The issue of reinsurance is becoming just as important as insurance. Learning from disasters sees insurers reassess their liability with the amendment of insurance policy:

...risk excess of loss covers carried event limits. Catastrophe covers required the insurer to co-insure part of the risk, to share in losses throughout and to maintain an interest in the economic settlement of losses after the priority of the catastrophe programme had been exceeded. This forced insurers to become aware of their total natural hazard peril exposures (Tonkin, 1989:176).

Reinsurers, however, have to handle two separate levels of uncertainty when looking at insurance/reinsurance exposure to natural disasters. The first and foremost level of uncertainty is about forming an accurate assessment of the current risks associated with natural disasters (Westwood, 1996:263). This is needed in order to justify insurance industry rating levels to policyholders and to justify insurance industry exposure levels and profitability targets to shareholders. The second level of uncertainty comes about from the impact of change on the current situation (Westwood, 1996:263). Change can be climatic, technological, demographic, or building code change.

Insurance/reinsurers, then, can receive expert advice (taking the example of the 1989 Newcastle earthquake) on a number of parameters: magnitude; intensity; tectonic process; rupture history; aftershocks; location of hypocentre and rupture plane; geology and subsoil; groundwater level; slides; liquefaction; tsunamis; vulnerability of elements at risk; dam failure; investment level; Gross Local Product; fires following earthquake; explosions following the earthquake; contaminations; meteorological conditions; population density; time of occurrence; day of the week; season; medical aid; and civil defence (Westwood, 1996:263). However, according to Westwood with the best will in the world, the experts will only be able to give us a range of possible values for each factor described, because it is not possible to specify any of these matters absolutely.

Undertaking a broad market survey of some twenty five insurance groups in the wake of flood events at Bourke and Nyngan, New South Wales, Carless (1996) posed the question: How will the Australian insurance industry financially respond? Results from Carless (1996:286) revealed the following:

- People in Australia are either not adverse to flood risks or they are intrinsically slow learners;
- There is an obligation on government to ensure flood costs in isolated rural townships are equitably distributed;
- While society expects government protection from all manner of things, people often refuse to believe, or are unable to recognise that a risk exists;
- Planning for disaster demonstrated a casualness on the part of local government for rare unexpected events, with response relying on crisis management than common sense planning and preparation;
- It is important that generosity re: public donations is underpinned by fiduciary processes that are fair and transparent. The Australian characteristic of independence is often exploited by governments desire to participate when it is evident that costs are likely to exceed the benefits of non-involvement;
- Attribution of blame for disaster events will become more common. Any suspicion about the appropriateness of local planning, and disaster management processes will only encourage litigation;
- The location of many flood prone towns in NSW is the result of history. Great reliance is placed upon one investment in a ring levee. More emphasis might be given to integrated multi-dimensional mitigation measures, a balance of structural and social engineering and non-structural fall-back positions; and
- While avoidance is infinitely better than response, risk awareness is a very personal characteristic and people prefer to accept that which they want to believe, often in spite of evidence to the contrary. Conversely, there is a marked reluctance to impose stronger planning controls on flood prone lands? Why is there a popular reliance upon high-tech solutions to low-level natural problems such as flooding?

Carless (1996) concludes suggesting that there is much to support the contention that Australians are slow learners, and maybe indifferent government does not mind that. So, what is the scope for private involvement in disaster management through 'forcing' individuals to manage their affairs more effectively and through use of courts (Torts) or insurance to minimise the effects of disasters? In Australia, the scope is pretty marginal given the low frequency and localised magnitude of disaster when compared with Overseas countries, like the United States of America. Consequently, disaster management will largely rest with government. However, the mechanisms of individual

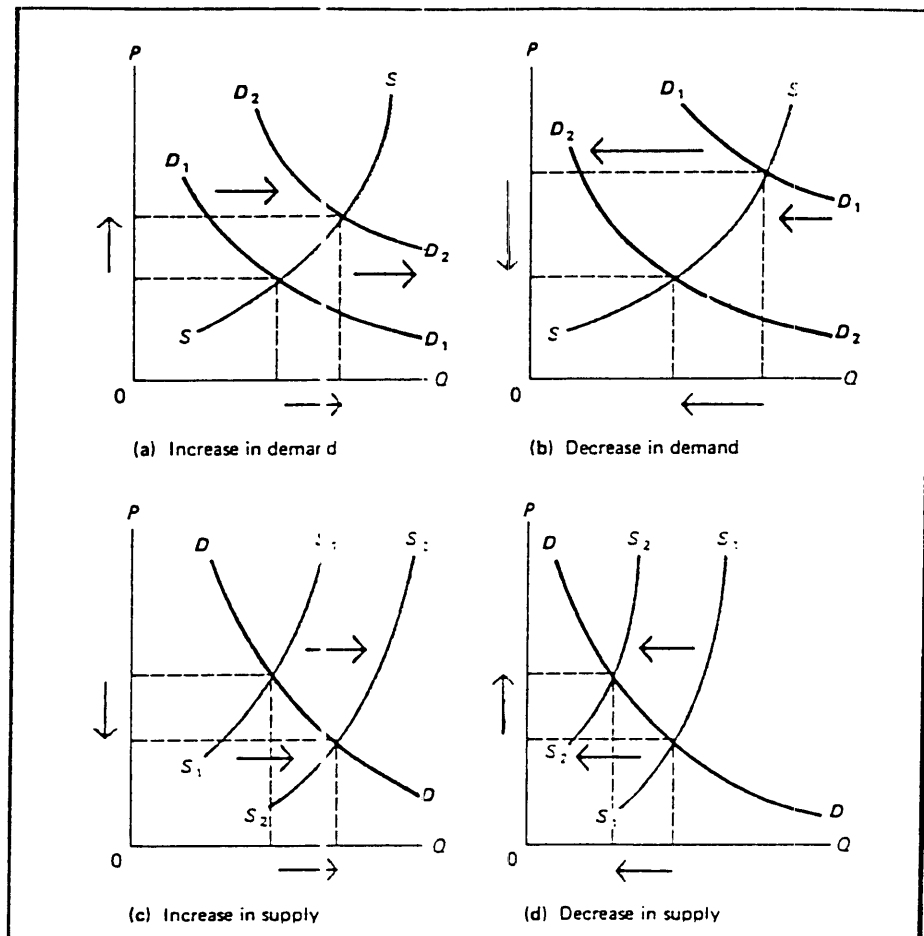
and community 'enforcement' with respect to disaster preparedness, may reduce individual's expectations of the public sector and also provide an avenue for disaster management service providers to bill those they assist for some, or all of the cost. This argument then lends credence to the view that disaster management systems are mainly public sector goods. There is much to be said for seriously considering a stance, in which providers of disaster management services attempt to recover, at least part, of the cost of disaster assistance. Not least, because it is society's interests to make people as much as possible responsible for their actions and to establish, or give greater effect to, market mechanisms which are often more adept than public accounts committees at exerting pressure for the efficient operation of public services.

HOW MUCH SHOULD GOVERNMENT SPEND ON DISASTER MANAGEMENT?

How much should government spend on disaster management? This is a hypothetical question and possible answers can only be derived from some form of hypothetical analysis. Figure 6.2 shows changes in demand and supply and the effects on price and quantity.

Figure 6.2

Changes in Demand and Supply and the Effects on Price and Quantity

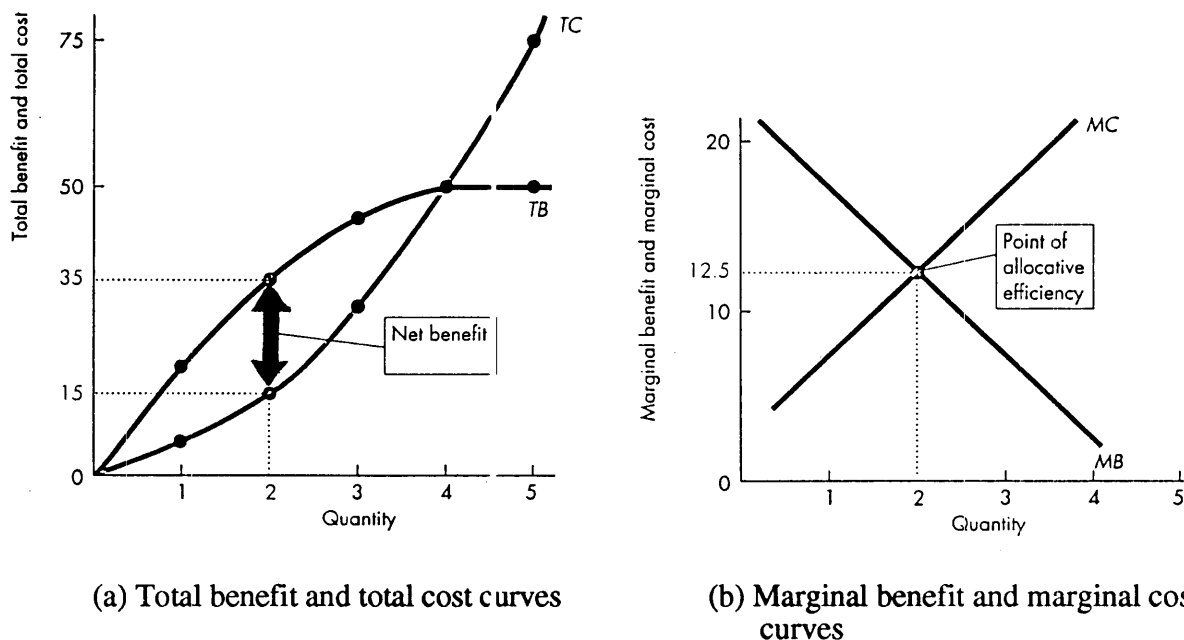


Source: Parkin (1990:52)

The increase in demand of (a) and the decrease in demand of (b) indicate a direct relationship between a change in demand and the resulting changes in equilibrium price and quantity. The increase in supply of (c) and the decrease in supply of (d) show an inverse relationship between a change in supply and the resulting change in the equilibrium price, but a direct relationship between a change in supply and the accompanying change in equilibrium quantity.

The efficient scale of provision of a hypothetical public good is presented in Figure 6.3.

Figure 6.3
The Efficient Scale of Provision of a Hypothetical Public Good



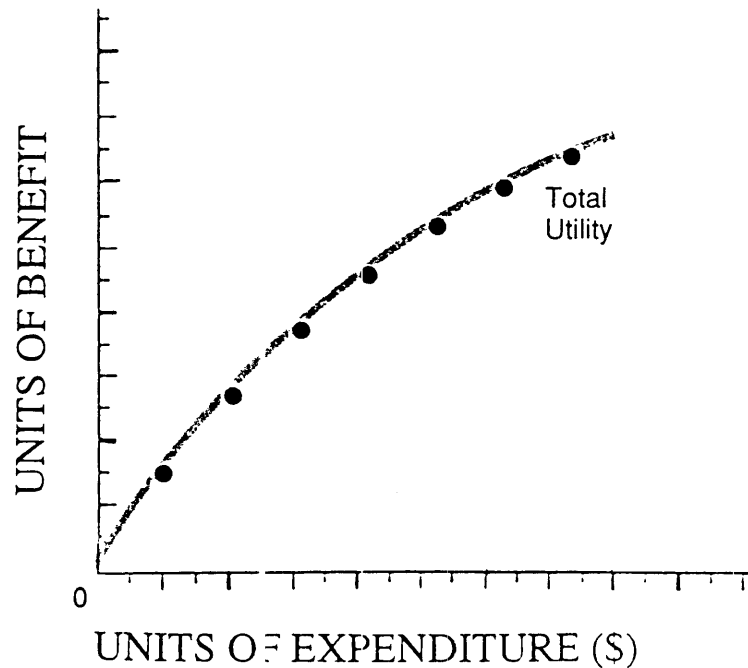
Source: Adapted from Parkin (1990:502)

The efficient scale of provision of a hypothetical public good demonstrates graphically in Figure 6.3 the following: Total benefit (TB) and total cost (TC) are graphed in part (a) as the TB curve and the TC curve. Net benefit is visible as the vertical distance between these two curves and is maximised when quantity is increased by one-unit to two. Part (b) shows the marginal benefit curve (MB), and marginal cost curve (MC). When MC equals MB, net benefit is maximised and allocative efficiency is achieved.

Additionally, the shape of the benefit (revenue) and cost curves is contingent upon a broad range of factors that this Chapter has already highlighted. In this regard, there must be in any area of policy organisational activity which at some stage will be subject to declining marginal utility. Figure 6.4 shows hypothetically the declining marginal utility of expenditure. Quite simply, as you add on a bit more expenditure, its benefits decline and decline, until a point of diminishing returns is reached - where spending more money yields worse returns!

Figure 6.4

Declining Marginal Utility of Expenditure



Where marginal benefit equals marginal cost one has an optimal quantity of disaster management services that one should fund (Butler & Doessel, 1979). But, beyond this optimal level, marginal benefit becomes less than marginal cost, and the likelihood is that diminishing returns may result (Butler & Doessel, 1979). So, how much should government spend on disaster management? This is a difficult question to answer.

Organisations compete for scarce funds. The stronger established organisations (ie. Cardinal Organisations, see Chapter Two) win. Other weaker organisations (ie. Constrained Organisations, see Chapter Two) lose. Additionally, funds allocated to disaster management bears very little relation to what we would spend in an ideal world (Britton, 1985b). And, allocation of expenditures between disaster management organisations or disaster management tasks is much less than optimal because of the lack of solid data.

Furthermore, there is no tangible evidence that suggests that expenditure of a set-given amount of money on disaster management translates automatically into a more effective and efficient system overall (Quarantelli, 1995a). Indeed, it would depend on where,

how, and why such expenditure was spent (Quarantelli, 1995a). This ultimately means that it is infeasible to price the design and development of an IDMS. The probable result, then, is most likely to be sub-optimal (disaster management system) except by some accident.

How Much Does Government Actually Spend on Disaster Management?

Problems and difficulties with the disaster management system are a function of inadequate federal and state funding. Forsyth (1984 [cited in Britton & Wettenhall, 1991]) stated:

By the end of the first decade federal government allocation to NDO was an annual budget allocation of \$5.1 million (1982-83) for the national combined counter-disaster and civil defence capability, or about 36 cents per citizen (p17).

State-level financial commitment was determined to be at a similar level (Britton, 1986a; 1989b; 1990a). Britton & Wettenhall (1991:17) using these figures as an extreme approximation, assuming each State and Territory allocated a similar amount (which they do not), determined that "funding provided solely for the purpose of maintaining a disaster management system throughout the nation would be no more than \$30-35 million per year". This figure does not appear to impute the cost of voluntary services. While Britton & Wettenhall (1991) accepted that these figures perhaps over-estimated the situation, Britton (1988) believed the figures could be contrasted with the estimated average Australian annual hazard losses of \$118 million for insured losses alone, "...a figure which obviously under estimates the actual total disaster losses possibly by as much as half" (p16). While the figures appear 'rubbery' they nevertheless underscore the disparate nature of financial support for disaster prevention, preparedness, response and recovery activities (Britton & Wettenhall, 1991). However, it is debatable whether a significant increase in expenditure would reduce the expectant losses.

Expenditure will vary across each State and Territory in accordance with such issues as:

- The political pressure and preferences of stakeholders;
- The priorities and current needs of other public policy areas; and
- The perceived risk/threat from hazards and disasters.

These issues are clearly inter-related, and one cannot ignore the fact that in some States and Territories, these issues will constrain the amount of, and actual allocation of,

expenditure available for disaster management. Let us now take two state case examples, Queensland and New South Wales to illustrate this. The author has selected these States because of their specific relevance in this thesis.

Queensland Emergency Services (QES) was established in October 1993. The Department is comprised of the components of the previous Bureau of Emergency Services, as well as the Office of Consumer Affairs (OCA) and the Office of Rural Communities. The estimated 1994-95 expenditure for the QES is \$404,690,000 (QLD State Budget Papers 1994-95). Table 6.2 details this expenditure by policy area.

Table 6.2
Queensland Emergency Services Expenditure by Policy Area

Policy Area	Program	1993-94 Est.Actual \$'000	1994-95 Estimate \$'000
General Public Services	Office of Rural Communities	2,106	2,964
Law, Order and Public Safety	Fair Trading	29,526	29,439
	Ambulance Service	154,527	188,831
	Counter Disaster Services	11,242	11,339
	Fire Services	155,136	166,437
	Statewide Services	6,754	5,680
	Corporate Services*
TOTAL		359,291	404,690

* Corporate Service costs have been allocated to service delivery programs
Source: QLD State Budget Papers 1994-95:61

The estimated 1994-95 expenditure for New South Wales emergency service organisations is \$632,175,000 (NSW State Budget Papers 1994-95). Table 6.3 details this expenditure by policy area.

Table 6.3
New South Wales Emergency Services Expenditure by Policy Area

Policy Area	1993-94 Est. Actual \$'000	1994-95 Estimate \$'000
NSW Fire Brigades	225,100	227,116
Department of Bushfire Services	53,526	50,133
State Emergency Service	12,311	11,754
Ambulance Services	353,849	343,172
TOTAL	640,786	632,175

Source: NSW State Budget Papers 1994-95:472-561

New South Wales Fire Brigades receives \$188,000,000 from the Consolidated Fund to finance its operations (NSW Budget Papers 1994-95). Funding for the Department of Bush Fire Services, however, is based on the funding arrangements whereby the Consolidated Fund contributes 25% of the total, Councils whose area is totally or partly outside fire districts contribute 25% under the Fire Brigades Act 1989, and insurance companies contribute 50% (NSW Budget Papers 1994-95). Cabinet approved an alteration to the percentage contributions to the Bush Fire Fighting Fund whereby new funding arrangements see contributions by the Consolidated Fund of 14% of the total, local government 12.3%, and insurance companies 73.7% (NSW Budget Papers 1994-95).

Using supposition, the differences in the level of funding across ministerial portfolio is most likely a function of the political pressure and preferences of stakeholders; the priorities and current needs of other public policy areas; and perceived risk/threat from hazards and disasters. Moreover, the funding tends to vary over time and space in accordance with changing circumstances, real or perceived. Allocation of funds by government to particular disaster management organisations would appear to be a function of the factors presented above. Lobbying by these organisations and/or key stakeholders sees funds allocated accordingly. Because the disaster management system is made up of Cardinal, Conditional, Controlled and Constrained Organisations (Britton, 1985a) available funds will be allocated in accordance with an organisation's 'perceived' position in the hierarchy of the disaster management system. Cardinal Organisations as the more established organisations (ie. police, ambulance and fire services) receive the greatest share of available funds. State and Territory Emergency Service Organisations as

Constrained Organisations in the disaster management system receive a disproportionate share of available funds.

HOW DO EMERGENCY SERVICE ORGANISATIONS ALLOCATE THEIR FUNDS?

Allocation of internal funds by emergency service organisations will vary across States and Territories. Queensland is of particular interest as it has a single department of emergency services, and this provides the clearest example of how funds are allocated internally within emergency service organisations. The Queensland Fire Service and Counter Disaster Services provide two examples of how financial outlays are distributed within program areas (see Table 6.4 through Table 6.7).

Table 6.4

Queensland Fire Service Current and Capital Outlays 1993-94

<u>Current Outlays</u>	\$'000	%
Salaries & Wages	79,589	76
Employer Superannuation	7,808	7
Administrative	13,280	13
Grants & Subsidies	752	1
Interest Paid	2,848	3
Total Current Outlays	104,277	100
<u>Capital Outlays</u>		
Land & Buildings	564	7
Plant & Equipment	6,755	80
Capital Grants & Subsidies	1,087	13
Total Capital Outlays	8,406	100
<u>Miscellaneous Outlays</u>		
QTC Loan Repayments	1,031	11
Corporate Services Costs	8,592	89
Total Miscellaneous Outlays	9,623	100
TOTAL OUTLAYS	122,306	

Source QES Annual Report, 1993-94:16

Principally, 76% of current outlays is consumed as salaries and wages. Eighty percent of capital outlays is consumed as plant and equipment.

Table 6.5

Queensland Fire Service Outlays 1993-94 by Sub-Program

Sub-Program	\$'000	%
Operations	110,999	92
Fire Protection	1,296	1
Training	2,769	2
Technical Support	2,919	2
Rural	3,693	3
TOTAL	122,306	100

Source: QES Annual Report, 1993-94:16

Viewing the Queensland Fire Service by sub-program, reveals that 92% of available funds is consumed by operations. The small allocation of funds for training (2%) is of concern, particularly from the point of view of disaster management and the need to establish an IDMS.

Table 6.6

Queensland Counter Disaster Services Current and Capital Outlays 1993-94

Current Outlays	\$'000	%
Salaries & Wages	2,266	24
Employer Superannuation	2,787	30
Grants & Subsidies	4,359	40
Total Current Outlays	9,685	100
Capital Outlays		
Plant & Equipment	198	100
Total Capital Outlays	198	100
Miscellaneous Outlays		
Corporate Services Costs	1126	100
Total Miscellaneous Outlays	1126	100
TOTAL OUTLAYS	11,009	

Source: QES Annual Report, 1993-94:21

Interestingly, 30% of funds for Queensland Counter Disaster Services are consumed as employer superannuation contributions under current outlays. All capital outlays are consumed by plant and equipment.

Table 6.7

Queensland Counter Disaster Services Outlays 1993-94 by Sub-Program

Sub-Program	\$'000	%
State Emergency Service	3,783	34
Disaster Management Services	618	6
Directorate	2,644	24
Volunteer Rescue Service	3,964	36
TOTAL	11,009	100

Source: QES Annual Report, 1993-94:21

Significantly, only 6% of Counter Disaster Services outlays were allocated to disaster management. Whether, this percentage should be higher in view of developing a more comprehensive approach to disaster management is debatable.

The focus here has been on Queensland and New South Wales. Citing Annual Reports of emergency service organisation across Australia identifies further different patterns of expenditure. One could suppose that this is a function of hazard and disaster awareness (both actual and perceived), organisational matters, stage in the equipment lifecycle, elapsed time since the last major disaster, differences in the philosophy of disaster management, political/bureaucratic preference, and the like.

CONCLUSION

Disaster management is dependent for the most part on government funding. The scope for private contractual arrangements appears limited. Forcing individuals to recognise hazard risk through the use of courts (Torts) or insurance requires further detailed study and assessment. It is recognised, however, that the mechanisms of individual and community 'enforcement' with respect to disaster preparedness may reduce individual's expectations of the public sector and also provide an avenue for disaster management service providers to bill those they assist for some, or all of the cost. This argument then lends credence to the view that disaster management systems are mainly public sector goods. There is much to be said for seriously considering a stance in which providers of

disaster management services attempt to recover, at least part, of the cost of disaster assistance. It is probably in society's interests to make people as much as possible responsible for their actions and to establish, or give greater effect to, market mechanisms which are often more adept than public accounts committees at exerting pressure for the efficient operation of public services.

Any assessment, however, of economic considerations must recognise the uncertainty and complexity associated with insurance/reinsurance exposure to disaster. With the best will in the world, experts will only be able to give us a range of possible values for a range of risk considerations, because it is not possible to specify any risks absolutely.

It is of concern, that there is much evidence to support that Australians are slow learners when it comes to identifying hazard risk, and this attitude is not helped by the apparent indifferent attitudes of governments. Society expects government protection from all manner of things, and government does its best not to disappoint. Ideally, however, there will come a day when complacency will be challenged through self-realisation, and the result will be greater emphasis given to integrated multi-dimensional mitigation measures.

Chapter Seven is the outline of an IDMS and conclusion to the research project. The IDMS is largely the outcome of a synthesis of information presented in Chapter One through Chapter Six. Chapter Seven will also make a number of future research recommendations.

CHAPTER SEVEN

CONCLUSION

AN INTELLIGENT AUSTRALIAN DISASTER MANAGEMENT SYSTEM

Chapter One examines the nature of disaster;

Chapter Two reviews Australia's existing counter-disaster organisational structure and associated management arrangements;

Chapter Three searches for intelligent effective and efficient organisational structures, system designs, and associated management arrangements with a view to designing, developing, and implementing an IDMS;

Chapter Four assesses inter-organisational relationships among selected emergency service related personnel in New South Wales and Queensland with a view to designing, developing, and implementing an IDMS;

Chapter Five investigates political and bureaucratic impediments with a view to designing, developing, and implementing an IDMS;

Chapter Six investigates economic impediments with a view to designing, developing, and implementing an IDMS; and

Chapter Seven is the outline of an IDMS and conclusion to the research project.

INTRODUCTION

This thesis has shown the nature of disaster to be very complex and variable, and as a consequence, the means of effecting successful disaster management is by no means always clear. A range of socio-political-economic-organisational considerations act as impediments to the successful operation of the current Australian disaster management system, and more importantly, the design, development, and implementation of a new Intelligent Disaster Management System (IDMS). While Australia can be viewed as not experiencing the frequency, magnitude, and level of devastation associated with disasters recorded Overseas, it is wrong to think that Australia is immune from experiencing the effects of extreme hazard events. Disasters do occur, and will continue to occur, albeit infrequently. This is wherein the problem lies.

Infrequent disasters make it difficult to engender community awareness and appreciation of the potential threat of disaster. As a consequence, community apathy and complacency with regard to hazard risk and threat of disaster is strong in Australia. Poor community

attitude is not assisted by what amounts to be indifferent attitudes by Federal, State and Local Governments to hazard risk and threat of disaster.

It is not surprising, then, to find that despite recent improvements in disaster management practice, Australia's inter-organisational "counter-disaster" structure remains weak and inappropriate for dealing with disaster situations. The counter-disaster structure, arrangements and operating doctrine lacks the necessary "intelligence" to be innovative and flexible. The need for such innovation and flexibility in disaster management practice becomes clear when one views the uncertainty and complexity surrounding disaster events and their occurrence. Under such circumstances standard operating procedures often break down. Such breakdown challenges the appropriateness of conventional command and control models in disaster management. Indeed, while the conventional and command model appears to work well in basic incident type situations (ie single organisation/single jurisdiction response), the same cannot be said of disasters, where complicated multiple organisation and multiple jurisdiction response is more the norm. A further complication challenging the appropriateness of command and control models is the occurrence of emergent behaviour in the wake of disaster. Volunteer involvement, both formal and informal, is typically difficult to integrate into conventional command and control models. Indeed, the relationship between trained career-based emergency service personnel and volunteers is, on occasion, anything but harmonious.

The author's questionnaire investigating inter-organisational relationships in New South Wales and Queensland across a range of emergency service related organisations proved sensitive and controversial. Again, results challenged the appropriateness of command and control models to disaster management. Results clearly identified confusion and misunderstanding in the use of the term 'disaster', and what constitutes effective disaster management practice. This has implications for any evaluation of counter-disaster training and organisational capacity in dealing with disaster. The issue of the amalgamation of emergency services also proved sensitive and controversial. Results from a mailed questionnaire and interviewing by phone identified a very complex picture of the organisational culture surrounding emergency service organisations, and more importantly, their inter-organisational relationships. Surveyed and interviewed emergency service personnel revealed a high level of defensiveness, cautiousness, fear, and resignation in their comments. Just how 'unusual' this finding is, is debateable. However, the need for assurances of confidentiality and anonymity in survey and interview participation were very strong. Again, just how 'unusual' this trend is, is also

debateable. It is the opinion of the author, that the questionnaire results identify a bureaucratised counter-disaster management system, in which the command and control mentality is overly strong, dominating, and oppressive.

Indeed, the author's opinion with regard to a bureaucratised counter-disaster management system appears reinforced by the design, development, and implementation of disaster policy. The decision making associated with this process is typically complex and controversial, based on political choices and competing interests. Inevitably, rational attempts at allocating resources for comprehensive disaster management is difficult to achieve because of the availability of limited and imperfect information. The ability, then, of the bureaucracy to alter the design, development, and implementation of disaster policy is enormous. As in all political manoeuvring, it is essential to gain the support of bureaucrats involved in disaster policy making. Furthermore, inter-government communication and support is critical in the policy making process. Such communication and support is important in the avoidance of perceived threats to organisational integrity, role, or 'turf' disputes.

Recognising that different management situations require different approaches in decision making is also important. This is particularly true of crisis and non-crisis situations. Reconciling rational and incremental decision making on the part of State Disaster Councils, State Emergency Management Committees, Regional Emergency Management Committees, and Local Emergency Management Committees is paramount.

A further reinforcement of a bureaucratised command and control approach to disaster management and planning, is the apparent dependence by emergency service organisations and the general public on government funding. The scope for private contractual arrangements appears limited. Part of the reason for this is the recognition of the uncertainty and complexity associated with insurance/reinsurance exposure to disaster. With the best will in the world, experts can only provide a range of possible values for a range of risk considerations, because it is not possible to specify any risks absolutely.

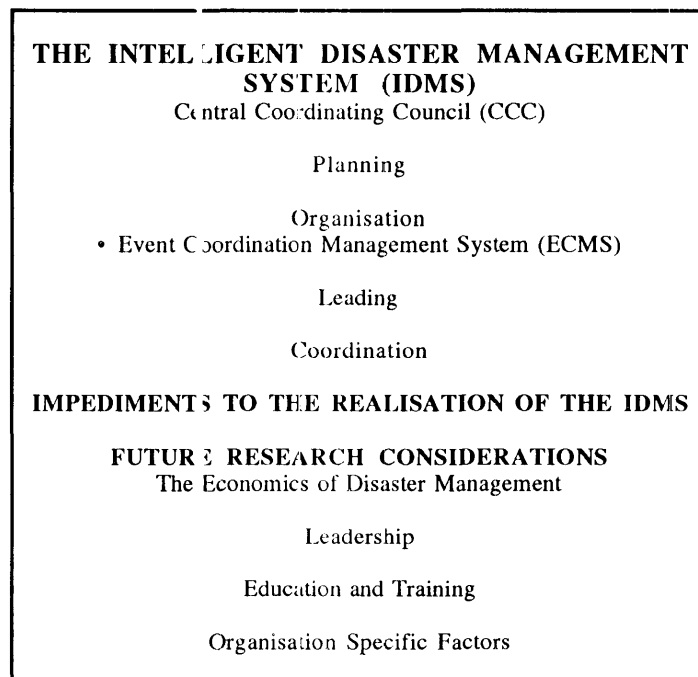
Moreover, it is of concern, that there is much evidence to support that Australians are slow learners when it comes to identifying hazard risk, and this is not helped by the apparent indifferent attitudes of governments. Society expects government protection from all manner of things, and government does its best to not disappoint. Ideally, however, there will come a day when complacency will be challenged through then will be self-

realisation, and the result will be greater emphasis given to integrated multi-dimensional mitigation measures.

How then does one overcome socio-economic-political-organisational impediments? This is the realm of an Intelligent Disaster Management System (IDMS).

The diagram below outlines the sequence of discussion in Chapter Seven.

ORGANISATION OF CHAPTER SEVEN



THE INTELLIGENT DISASTER MANAGEMENT SYSTEM

The IDMS will be capable of delivering operationally effective and economically efficient delivery of services **through mutual-aid arrangements and/or memorandums of understanding based on cooperation and coordination, in preference to the actual amalgamation of services.** How, then, will the IDMS do this?

The most effective disaster management model is one that takes into account the complexity of the community, the organisational forms which make up the pattern of response, and the need for coordination. Disaster planning which assumes a model based on a particular organisational form, type of management, specific type of disaster, and the

need for control, will inevitably fail. To this end, a combined human relations-natural resources model is advocated as the basis for the development of an IDMS. Such a model is sufficiently flexible and innovative to work with new management doctrine; specifically delayering, team-based matrix networks, alliances and partnerships, multi-functional and/or multi-unit teams, and a new employer-employee covenant. Such management attributes provide for an intelligent, flexible, and responsive organisation. Moreover, the intelligence and variety of talents in every individual is encouraged and nurtured.

Naturally, intelligent human resources management is linked to effective management and creative and innovative leadership and mentorship, where coordination, focus, and understanding is instilled. The building of strategic alliances and collaborative relationships is paramount, and the creation of semi-permeable boundaries within the IDMS, whereby individuals and organisations are able to access other emergency service organisation internal information systems is a long term goal. is established (discussed in Chapter Three). Ideally, boundaries will become relaxed to the point where emergency service organisations encourage and develop situations in which personnel can become temporary employees in partner organisations, assigned to team-based projects. Under such circumstances, the hope would be that personnel would forge crucial relationships and gain access to vital information about a partners' culture and modus operandi that will assist them, and thus their organisation, within the IDMS, to effect successful mutual-aid relationships. This would an obvious step towards finding the "Holy-grail" of effective disaster management practice, that of cooperation and coordination.

The complexities of the current Australian disaster management system make clear that the IDMS would be best served with a structure resembling a federation of organisational units that are typically interdependent, relying on one another for critical expertise and know-how. These units would have a peer-to-peer relationship with what the author has termed an independent Central Coordinating Council (CCC).

Central Coordinating Council

The CCC would be responsible for orchestrating the broad strategic vision for the network, and ultimately, the concept of an IDMS. The CCC would develop the shared organisational and administrative infrastructure and create the cultural glue which develops the necessary synergies and ensure unity of mission of purpose in responding to natural

and technological disaster. The CCC established at each State and Territory level would be the focal point (or link-pin) in the disaster-relevant organisational network, facilitating cooperation and coordination between member units. Additionally, the CCC would through its membership and allocation of responsibilities, ensure the development of comprehensive disaster management practice in terms of disaster prevention, preparedness, response, and recovery.

The CCC would be an independent body of members (Figure 7.1). Membership (drawn from appropriate technical expertise) from outside the disaster-relevant organisational network would be sort. The reason for recruiting from outside the disaster-relevant network, is so as to avoid possible conflict and tension stemming from the charge of a particular organisation determining the direction of the network, and of its members. Preferably, membership would be of a civilian-type. Gaining credibility and legitimacy from Federal, State, and Local official and unofficial organisations with an involvement in disaster management would be a principal CCC charter.

The CCC being flexible could have any number, or type of people on its Board. However, the author would suggest a maximum of six, and a minimum of four Board members, from whom would be elected the Chair. This number while appearing small, would ideally avoid the complexity and possible conflict associated with large group interaction. The Chair will be instrumental in ensuring that all organisational issues and concerns are aired and openly discussed, and that where possible, "group-think" on the part of the CCC is avoided, or at least balanced appropriately. Intelligent leadership will figure prominently here.

Establishing the CCC, its position, authority in the network, as well as how members relate to one-another may require legislation. Legislation may also be needed to reinforce cooperative relationships between the CCC and the various disaster-relevant organisations. However, it should be noted that the whole point of the exercise is to establish trust on the part of organisational members towards the CCC, thereby fostering cooperation, coordination, and collaboration. Enforcing the relationship could threaten this; however, it is recognised that some form of State Government 'guidance' (whatever form) may at least initially, be unavoidable.

Figure 7.1
Central Coordinating Council (CCC)

Central Coordinating Council (CCC)

Membership of CCC

**Minister for Emergency Services
(ex-officio member)**

- The CCC would be an independent body.
- Membership would come from outside the disaster relevant organisational network.
- Membership is civilian-based.

Functions of CCC

- The CCC would be responsible for orchestrating the broad strategic vision for the network, and ultimately, the concept of an IDMS.
- The CCC would develop the shared organisational and administrative infrastructure and create the cultural glue which develops the necessary synergies and ensure unity of mission of purpose in responding to natural and technological disaster.

Legislation of CCC

- Establishing the CCC, its position within the network, as well as how members relate to one-another, may require an Act of Parliament.

Replication of CCC Structure

- The CCC established at each State/Territory level would be the focal point (or link-pin) in the disaster relevant organisational network, facilitating cooperation and coordination between member units.
- The CCC would also be expected to liaise with Local Government.

The CCC will identify and work within the parameters and constraints of political-economic considerations. Having said this, it will be a charter of the CCC to address political and economic impediments with a view to overcoming them, and if possible convincing governments to effect change. The Chair will be instrumental in this process. The Chair, then, for the sake of credibility will need to have some political clout and understanding of the policy making process. Indeed, the relevant Minister for Emergency Services, if not an ex-officio member of the CCC, will need to be kept regularly informed and advised.

The CCC will be assisted by an Event Coordination Management System (ECMS) which will ensure that effective planning, organisation, leadership and coordination takes place. The ECMS effectively operationalises the IDMS and the decisions of the CCC.

Planning

The key to successful planning is:

...identifying where you want to go and how you intend to get there...[This] is important to all organizations in today's dynamic and ever-changing world. Effective managers are good at planning, and they help others to establish and implement meaningful high performance plans (Schermerhorn, Jr., 1993:189).

Planning will recognise the importance of identifying and incorporating the principles and components of effective disaster management practice, discussed in Chapter Two.

The successful disaster manager will recognise that disaster planning and managing are different social processes. In this respect, it must be understood that planning is not managing. Disaster planning involves the general strategy to be followed in preparing for disaster. Management involves using particular tactics to handle the specific situational contingencies inherent in disasters.

Organisation

Organising is:

...the process of dividing and coordinating work among many people, is the second management function. Once planning sets the direction, organizing is needed to prepare a system for action. Effective managers are good organizers who can create structures within which individuals and work teams achieve productivity (Schermerhorn, Jr., 1993:267).

The IDMS will adopt organic design principles and structure. This provides for adaptive flexibility and is something that intelligent human resources management policies and practices will assist with. This trend will require a careful re-assessment of selection practice, training and development programs; particularly, in terms of skill categories, training methods, career development, and performance appraisal.

- Event Coordination Management System (ECMS)

The aim of the ECMS is to effect a unified disaster-relevant organisational network, and address poor on-scene and inter-organisational communications, inadequate joint planning, lack of valid and timely intelligence, and inadequate resource management (see Figure 7.2, 7.3, & 7.4). The ECMS, would achieve this through consideration of dependence, objectives, functional clarity, permanent and temporary matrix structures, and appropriate human resources management, in which the emphasis is on network cooperation, coordination and collaboration, in preference to the enforcement of command and control.

Figure 7.2

The Event Coordination Management System (ECMS)

Event Coordination Management System (ECMS)

- Dependence;
- Objectives;
- Functional clarity;
- Permanent & temporary matrix structures; and
- Human resources management.

DEPENDENCE

The IDMS accepts that no single organisation has been prepared for disaster, in terms of all its implications. Disaster management by definition is an inter-organisational undertaking and the design of the IDMS will reflect this. ECMS procedures are designed to effect inter-organisational coordination while protecting individual organisation autonomy. Inter-organisational coordination is designed to encourage the close working relationship of diverse organisations, thereby facilitating cooperation, collaboration, and coordination.

OBJECTIVES

Organisational objectives focus on IDMS needs and requirements. Objectives must be "real" in the sense that member organisations agree that objectives can be met. ECMS uses human resources management strategies to adjust to any IDMS objectives that member organisations cannot accomplish. This assures that plans are realistic and that the IDMS is clearly aware of individual organisational and more general system limitations. ECMS increases the commitment of member organisations to the IDMS, because organisations who help to design their own assignments, have a greater motivation to reach objectives.

FUNCTIONAL CLARITY

The ECMS is designed so that its members can concentrate on a primary assignment and not be unnecessarily distracted by other responsibilities. This facilitates teamwork.

PERMANENT AND TEMPORARY MATRIX STRUCTURES

Flexible operational structures are designed to facilitate deployment of emergency service personnel on disaster mitigation, disaster preparedness, disaster response, and disaster recovery projects.

HUMAN RESOURCES MANAGEMENT

The Human Resources Management Section responsibilities are designed to develop, and maintain a viable system and to facilitate a means for inter-organisational cooperation, collaboration and coordination. Human Resources Management will also be responsible for training and development, job design, recruitment and selection, occupational health and safety, performance appraisal, identifying and fostering leadership, and the like.

An integral human resources management function is teamwork. Teamwork is needed where an event cannot be handled under a single jurisdictional structure. Teamwork is effected through unified coordination. Unified coordination is the first consistent, systematic means of organising a variety of autonomous organisations into one concerted disaster response effort. The concept offers uniform procedures that enable all involved agencies too perform their roles effectively. Unified coordination overcomes many inefficiencies and duplications of effort that occur when functional and geographic jurisdictions, or agencies from different governmental levels, have to work together without a common system.

Figure 7.3

Event Coordination Management System - Operations 1

INTELLIGENT DISASTER MANAGEMENT SYSTEM (IDMS)



Central Coordinating Council (CCC)



Event Coordination Management System (ECMS)



Planning

...the process of identifying where you want to go and how you intend to get there, [this] is important to all organizations in today's dynamic and ever-changing world. Effective managers are good at planning, and they help others to establish and implement meaningful high performance plans (Schermerhorn, Jr., 1993:189).



Organising

...the process of dividing and coordinating work among many people, is the second management function. Once planning sets the direction, organizing is needed to prepare a system for action. Effective managers are good organizers who can create structures within which individuals and work teams achieve productivity (Schermerhorn, Jr., 1993:267)



Leading

"Manager" ... "leader" ... or both? In today's complex workplace, the answer is clear-A good manager must be a good leader. The situation, the people, the organization, demand it. Developing personal success as a leader and helping others to do the same are very challenging tasks (Schermerhorn, Jr., 1993:405).



Coordinating

...the process of monitoring performance and taking corrective action as necessary...Planning sets the direction, organizing prepares a system for action, and leading inspires people to act. Then, effective managers always maintain control to ensure the accomplishment of desired results (Schermerhorn, Jr., 1993:583).

Figure 7.4

Event Coordination Management System - Operations 2

INTELLIGENT DISASTER MANAGEMENT SYSTEM (IDMS)



Central Coordinating Council (CCC)



Planning

PRINCIPLES OF EFFECTIVE DISASTER MANAGEMENT PRACTICE

- All hazards approach;
- Comprehensive approach;
- Integrated approach;
- Consistent and equitable approach; and
- The responsible and prepared community approach.

COMPONENTS OF EFFECTIVE DISASTER MANAGEMENT PRACTICE

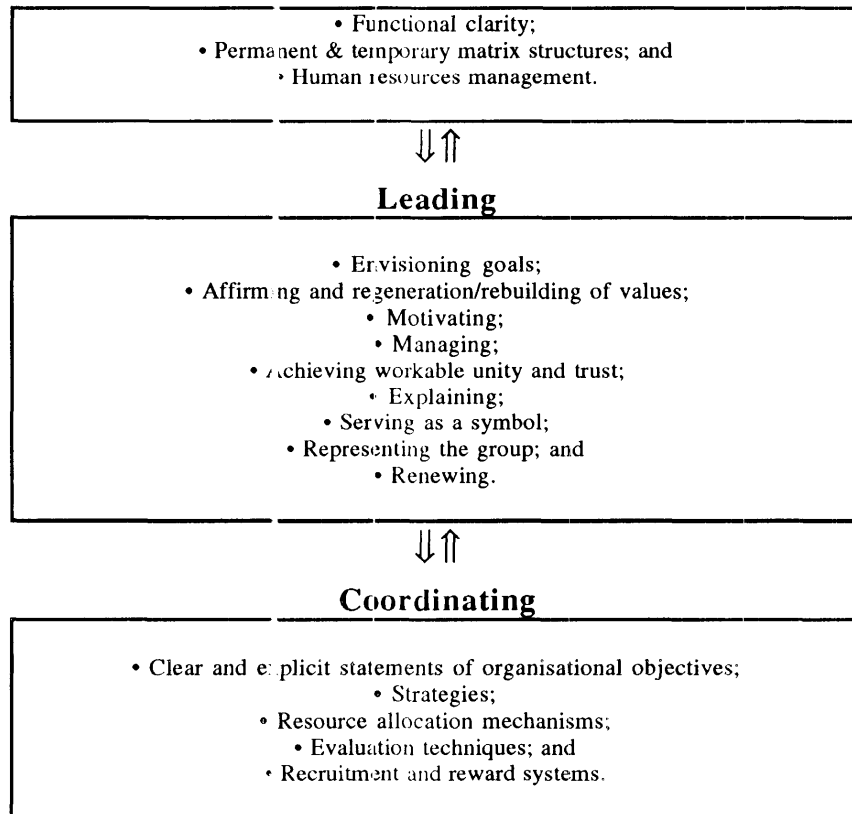
- A planning process;
 - Effective plans;
 - Organisation;
 - Skilled personnel;
 - Actions;
- Inter-agency roles and responsibilities;
- Information management and communications;
- Adequacy of resources and maintenance of readiness;
 - Operational flexibility;
- Capacity to manage extreme events;
 - Funding;
- Parliamentary accountability/ministerial authority;
 - A policy development process; and
 - Evaluation of the results.



Organising

EVENT COORDINATION MANAGEMENT SYSTEM (ECMS)

- Dependence;
- Objectives;



Implementation of the ECMS, when assisted by matrix organisational structures goes some way towards meeting the challenge of confronting the problems associated with disaster planning and organising for:

- A single jurisdiction/single organisation involvement event;
- A single jurisdiction with multi-organisation involvement events; and
- A multi-jurisdiction/multi-organisation involvement events.

Indeed, Chapter Three underlined the usefulness of matrix structures to disaster management, and more importantly, the IDMS. In this regard, matrix structures facilitates:

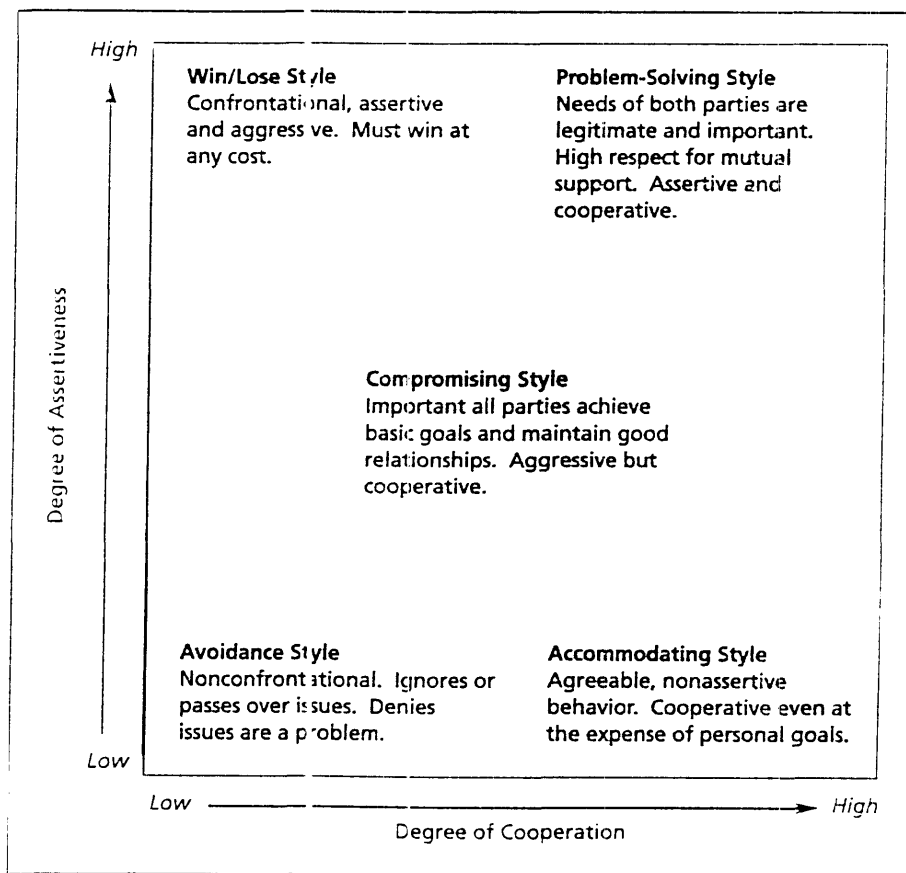
- The focussing of undivided human effort on two (or more) essential organisational tasks simultaneously;
- The human processing of a great deal of information and the commitment of the organisation to a balanced reasoned response (a general management response); and
- The rapid redeployment of human resources to various projects.

The permanent matrix provides the necessary 'stability' for the disaster-relevant organisational network to function as a cooperative, coordinated, and collaborative system. Contrastingly, the temporary matrix compliments the more permanent matrix structure by providing for the critical deployment of emergency service personnel and/or other specialist personnel, as temporary project teams or task groups. Such groups are critical during times of disaster response and recovery. Disaster mitigation and preparedness could perhaps be served by a combination of a permanent and temporary matrix structure? The Chair of the CCC would have the difficult task of reconciling the distribution of power within the disaster-relevant organisational network. Project or task group leaders would need to address and reconcile where necessary the indifferent attitudes of team members.

Reconciling conflicting management styles is an important means of achieving implementation of the IDMS. Maddux (1986) has proposed a model of conflict management styles that may be of assistance (Figure 7.5).

Figure 7.5

Conflict Management Styles



Source: Adapted from Maddux, R. 1986. *Team Building: An Exercise in Leadership*. Los Altos, California: Crisp. p53.

Maddux (1986) suggests that there are five different styles resulting from various combinations of assertiveness and cooperation. Maddux (1986:53-55) takes the position that different styles may be appropriate in different situations:

- **Avoidance Style (Uncooperative/Nonassertive)**
This style is appropriate when the conflict is too minor or too great to resolve the conflict. Any attempt to resolve the conflict might result in damaging a relationship or simply waste time and energy;
- **Accommodating Style (Cooperative/Nonassertive)**
The style is appropriate when resolving the conflict is not worth risking damage to the relationship or general disharmony;

- **Win/Lose Style (Uncooperative/Assertive)**
This style is appropriate when the conflict involves "survival of the fittest", when you must prove your superior position, or when it is most ethically or professionally correct;
- **Compromising Style (Moderately Assertive/Moderately Cooperative)**
This style is appropriate when no one person or idea is perfect, when there is more than one good way to do something, or when you must give to get what you want; and
- **Problem-Solving Style (Assertive/Cooperative)**
This style is appropriate when all parties openly discuss the issues and a mutually beneficial solution can be found without anyone's making a major concession.

Clearly, adopting the appropriate means of conflict resolution is an important part of effecting successful disaster management practice. This, however, requires intelligent leadership and a degree of mentorship, which is discussed in the next section.

Ultimately, the utilisation of matrix design cannot be achieved simply by organisational restructuring. A shift to a totally different mind-set is required, where people learn to work comfortably and effectively in a different way of managing and organizing. This is the key. This comment underlines the fundamental strength of matrix design - that it creates opportunities for people, as well as the network as a whole, and that tension and conflict induced by the matrix can be re-channelled into more purposeful pursuits, rather than become an impediment. Appropriate training assists in facilitating the organisational learning process and the breaking down of organisational cultural barriers.

Leading

Leading is:

"Manager" ... "leader" ... or both? In today's complex workplace, the answer is clear-A good manager must be a good leader. The situation, the people, the organization, demand it. Developing personal success as a leader and helping others to do the same are very challenging tasks (Schermerhorn, Jr., 1993:405).

Managers, and more specifically leaders, are fundamental in the process of facilitating organisational learning and encouraging the break down of inappropriate cultural norms and attitudes. The IDMS requires, and the ECMS delivers through the use of matrix design, leaders:

- Who have knowledge of all functional specialities, particularly those that are most complex and uncertain;
- Who can assess the judgement of the functional specialists and know how to challenge their positions if they are thought to be biased;
- Who are motivated to work collaboratively and has the skills to do it;
- Who are unbiased in orientation toward other functions and can work and maintain a balanced orientation;
- Who use personality and expertise as a source of influence even when formal power is available;
- Who involve others in decision-making rather than making sole decisions;
- Who are not dogmatic and impatient with the participative problem-solving process;
- Who show high levels of inter-personal competence;
- Who have the capacity to develop and maintain a broad organisational perspective; and
- Who have capacity and skills to engage in problem solving in groups.

The primary responsibility of a good leader should be to ensure that there is group commitment towards a task(s); task(s) which everyone in the group can share because they see it has value for the organisation or society and - directly or indirectly - for themselves as well. Achieving a common task(s) is the principal means of developing high group morale and commitment. Moreover, the contemporary leader is an individual who increasingly must be able to work with and through extremely complex organisations and institutions. Much has been of Thomas Drabek's leadership inspired management qualities in this thesis. Quite clearly, intelligent disaster management practice, requires disasters managers who:

- Think through your philosophy;
- Expand your knowledge base;
- Be aware of your managerial style;
- Nurture positive attitudes;
- Build community support; and
- Participate in a professional group.

Mentorship is at the very heart of intelligent leadership inspired management. Both informal mentoring and formal mentoring programmes have the capacity to yield benefits not only for individuals, but also organisations, and the IDMS as a whole. Developing collaborative models of working enables the sharing of ideas and problems that enhances the collective competence of personnel. One-minute-managing assists the process of

mentoring and the development of intelligent leadership. The one-minute-manager can achieve much through one-minute-goal-setting, one-minute-praisings, and one-minute-reprimands. This process clarifies roles and responsibilities and ensures a level of bonding and/or commitment to management objectives which more often than not is missing. The ECMS, then, will give considerable attention to effecting within its human resources management charter, intelligent leadership and mentorship. This would go some way to instilling within the IDMS and its personnel a productive mind-set, where people who feel good about themselves produce good results, and people recognise that the best minute they can spend is one invested in their fellow employees.

Coordination

Demonstration of the ability to coordinate activity within the IDMS is critical. Successful coordination will achieve control by cooperation and not through command and control:

...the process of monitoring performance and taking corrective action as necessary...Planning sets the direction, organizing prepares a system for action, and leading inspires people to act. Then, effective managers always maintain control [coordination] to ensure the accomplishment of desired results (Schermerhorn., Jr., 1993:583).

How, then, can coordination be achieved between emergency service organisations so as to establish a network of response? The disaster relevant organisational network requires:

- The development of clear and explicit statements of IDMS objectives;
- The development of clear and explicit statements of ECMS objectives;
- The development of clear and explicit statements of Planning objectives;
- The development of clear and explicit statements of Management objectives;
- The development of clear and explicit statements of Organisation objectives;
- The development of clear and explicit statements of Leadership objectives; and
- The development of clear and explicit statements of Coordination objectives.

These statements need to form very clear and concise 'memorandums of understanding' between organisations in the IDMS. The statements should foster a 'system' identity and ethos that will foster on-going committed support from all. Naturally, development of memorandums of understanding requires the development of strategies that provide a means of pursuing agreed objectives, based on an analysis of constraints and opportunities present in the external environment. If all this is undertaken, then, one has a good chance of effecting successful resource allocation. An element of on-going self-assessment/evaluation will be very useful within the IDMS and ECMS. Indeed, today's

dynamic environment demands that organizations and their managers adapt and renew themselves continually to succeed over time. Finally, the development of appropriate recruitment and reward systems which encourage total commitment to system-based goals is important.

IMPEDIMENTS TO THE REALISATION OF THE INTELLIGENT DISASTER MANAGEMENT SYSTEM

What then can impede the realisation of the Australian IDMS? Chapter Two cited a number of socio-economic-political-organisational impediments. The author ranked these impediments on a scale from 1-10 (where '10' represents the maximum potential ability to impede) in terms of their potential ability to impede the design, development, and implementation of an IDMS. Ranking is based on personal preference and knowledge. Table 7.1 details these rankings

Clearly, political and bureaucratic processes, policy making, and resource allocation are the principal impediments in the design, development, and implementation of the IDMS. Quite simply where there is the political will, then there is a way to achieving anything. Organisation specific factors (includes human resource considerations) follow a close second. Hazard perception and awareness, jurisdictional divisions and fragmentation, and current official hazard and emergency management practices come in third.

Table 7.1

Ranking of Impediments (on a scale from 1-10 where '10' represents the maximum potential ability to impede) to the Design, Development and Implementation of the Ideal IDMS

IMPEDIMENT	RANKING
Societal hazardousness and vulnerability	4
Hazard perception and awareness	6
Resource allocation	10
Jurisdictional divisions and fragmentation	6
Political decision making processes	10
Public policy administration and implementation	10
Dominant social structural patterns and processes	4
Organisation specific factors	8
Current official hazard and emergency management practices, attitudes and conventions	6

Overcoming impediments requires the IDMS CCC:

- To come to some understanding of the quantitative and qualitative differences separating accidents, emergencies, and disasters and translating this into appropriate training and education;
- To gain the support of relevant State organisations (memorandums of understanding);
- To gain the support of Federal, State, and Local Government;
- To gain the support of unofficial and/or voluntary associations and groups;
- To reach some form of reconciliation re: rational and incremental decision making; and
- To outline a model of professional design in disaster management that is uniquely Australian, where there is intelligent leadership and mentorship, and the development of a learning capacity;

Combined, these processes will result in a powerful clarification of goals for action at the respective jurisdictional levels of disaster operations and the sequential phases of disaster management.

FUTURE RESEARCH RECOMMENDATIONS

Disaster management is a discipline with cross-disciplinary interests. Indeed, looking for an IDMS design that would facilitate a cooperative, coordinated, and collaborative partnership within the disaster-relevant organisational network proved a difficult task; not least because of the multiplicity of factors involved.

This thesis in attempting to address and resolve some of these issues pertaining to disaster management effectiveness, has identified a number of areas requiring further research. Facilitating an intelligent disaster-relevant organisational network, and ultimately IDMS, will be impeded until the following issues relating to emergency service personnel and organisations are thoroughly researched.

The Economics of Disaster Management

The economics of disaster management is highly complex and uncertain. Further research is needed to ascertain answers to such questions as: How much ideally should government spend on disaster management? How should expenditures be allocated between tiers of government? What is the best way for disaster management organisations to allocate their allotted funds? Is the allocation of funds by government optimal or sub-optimal? Are there different optimal allocations of funds across tasks, functions, and organisations? Are resources optimally allocated between prevention, preparedness, response, and recovery considerations? Can the market mechanism assist in the creation and allocation of funds to disaster management? Is there a place for user-pays in disaster management?

Leadership

The role of leadership in effecting inter-organisational cooperation, coordination, and collaboration among emergency service personnel needs further research. What type of personality and style of leadership is best suited to disaster management? How does one effectively overcome forced, contrived, unnatural, and confused human relations among emergency service personnel before, during, and after disaster? Is mentorship of assistance in facilitating boundary spanning? How can teamwork be best achieved?

Education and Training

The role of specialised education and training in effecting inter-organisational cooperation, coordination, and collaboration among emergency service personnel needs further research. What is the ideal or optimal inter-organisational training regime? Are universities adopting the right approach in their provision of tertiary-level studies in disaster management for emergency service personnel? How important is competency-based training? What is the future role of the volunteer worker?

Organisational Specific Factors

Identification and analysis of intelligent organisational design principles and structures needs further research. In the search for economic efficiency and operational effectiveness one needs to continue to refine the design, development, and implementation of the Intelligent Disaster Management System and its various operating components. More specifically, the Event Coordination Management System needs to understand 'what' constitutes effective coordination, and 'how' it is best achieved. Additionally, the Event Coordination Management System needs to understand 'what' constitutes effective strategy-making, and 'how' it is best achieved.

Clearly, then, the thesis raises more questions than it does answers. This was expected. The consideration of the economics of disaster management, leadership, training, and education, and organisational specific factors constitute significant future research requirements. Addressing these future research needs with time will reinforce the need for and the design, development, and implementation of an IDMS. Intelligent human resources management will produce a productive mindset among emergency service personnel. Productivity, ultimately being a function of the following management attribute:

***"The best minute I spend, is the one
I invest in people"***

(Blanchard & Johnson, 1994:39)