TOWARDS A BETTER DISASTER MANAGEMENT METHODOLOGY

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Introduction

A certain Chinese encyclopedia states that "animals are divided into: belonging to the emperor, embalmed, tame, suckling pigs, sirens, fabulous, stray dogs, included in the present classification, frenzied, innumerable, drawn with a very fine camelhair brush, et cetera, having just broken the water pitcher, that from a long way off look like flies." (Foucault, 1970). This delightful illustration reminds us of, among other things, the constraints with which we sometimes saddle ourselves when we carry certain paradigms and taxonomies into areas which call for broad, flexible approaches.

I believe the management of emergencies and disasters is currently advised by narrow models. It would be improved by:

- the adoption of a broader, more holistic view of risk and,
- the development of tools designed to assess community vulnerability.

Traditional referencing methods

Knowledge of disasters has been heavily influenced by reference to location, hazard agent, and time: for example in Australia, Cyclone Tracy, Darwin, *mid-seventies*; *the* Ash Wednesday Bushfires, south eastern Australia, early eighties; and more recently, the Newcastle earthquake, Melbourne's Coode Island fires and the Sydney bushfires. This tradition is significant in several ways. In the case of "industrial" disasters, until recently, it has not identified the company involved; and in the case of "natural" disasters focus is on the hazard agent. A perception develops of disaster caused by the fire, the flood, the cyclone, the particular "externality".

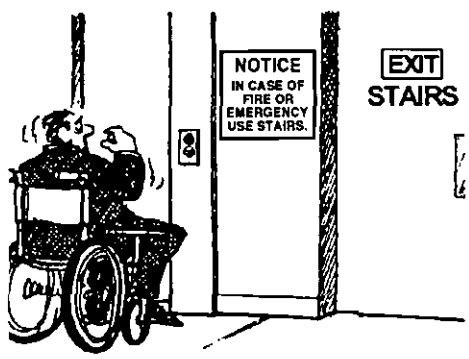
The dominant model still has disasters being caused by hazards. There is recognition of impact but this recognition is generally couched as being due to "man or his works" being in the way of the hazard agent. This orthodox paradigm continues to be advanced in leading forums such as the 1996 Australian Academies combined symposium "Natural Disaster Reduction 96", which proposes the following working definition of natural disasters: "A natural disaster is any natural phenomenon which causes such widespread human, material or environmental losses that the stricken community cannot recover without external assistance" (Call for Papers Flyer, 1995).

These orthodox interpretations of disasters are characterised by the "sense of causality or the direction of explanation... from the physical environment to its social impacts" (Hewitt, 1983). The scientific study of hazards has largely driven the way we view and manage risk. Additionally, "turf" battles by organisations with defined responsibility for public safety in relation to particular hazard agents such as fire and flood have compounded the situation as it moves into public policy and the implementation of intervention strategies. And finally, the attractiveness of the "God as cause" thesis has not been lost on those who can see in it a reasonable basis for either forward liability reduction or the promulgation of ignorance.

Community Analysis

Early attempts to incorporate vulnerability within risk assessment methodologies in Australia can be traced to the late 1980's. These efforts tended to operate narrowly and within the dominant paradigm and as such, only barely "stretched the envelope". Developed within the emergency management community, their emphasis was on how an appreciation of community characteristics could enhance the quality of preparedness and response to hazard impacts. The focus remained on the key, driving role of the hazard agent and as such, merely supported the "linear / hazard as cause" approach. An indicative illustration of this vulnerability "add on" to traditional hazard analysis methodology is outlined in Fig. 1. (page 9) which is reproduced from work by Salter & Tarrant at the Australian Counter Disaster College, circa 1988.

The framework (Fig. 1, page 9) was developed as a vehicle to move people from a focus on hazard agents to a focus on communities at risk. Because it worked backwards from applied tasks such as evacuation, it used only selected characteristics of communities relevant to the particular management context. While this is useful within the context of task definition, the "working back" method is of limited value compared to the potential of using a rich understanding of communities when considering a range of management options.



The leap of understanding to embrace this open-ended potential has yet to be made, and so the traditional approach to disasters remains fundamentally flawed in that it generates a limited, indeed sometimes limiting, set of intervention options. This traditional approach to disasters continues to be the interpretation which advises most public policy considerations in Australia.

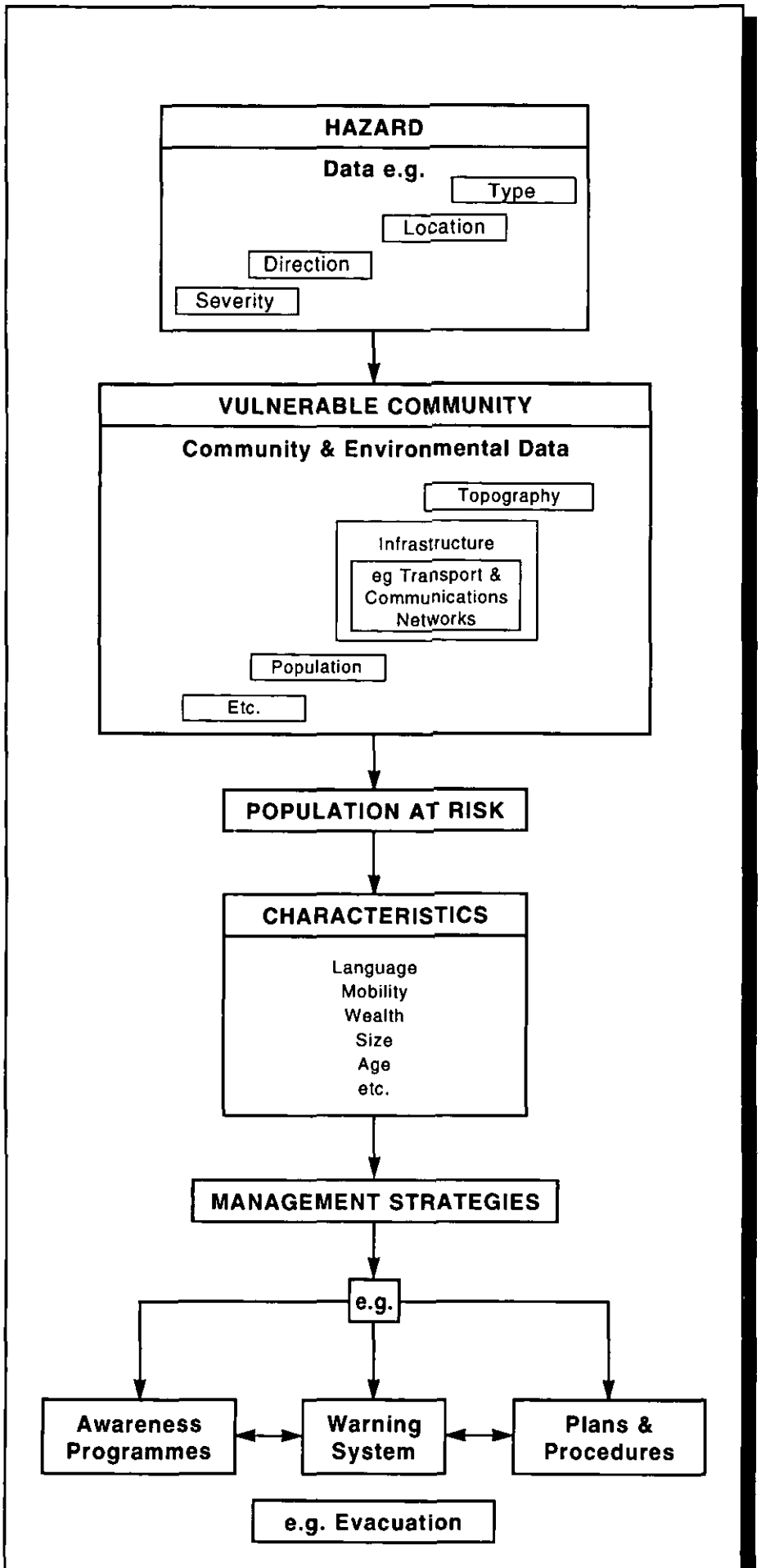


Fig. 1. A community analysis framework (Salter/Tarrant, 1988)

The International Decade for Natural Disaster Reduction

The 1990's have been declared the International Decade for Natural Disaster Reduction (IDNDR). Half way through "the decade" it is sobering to pause and reflect on the role of this international initiative as a "policy driver". The resolution that established the United Nations "International Decade for **Natural** [my emphasis] Disaster Reduction" 1990 – 2000, makes no mention of vulnerability. It focuses on a hazard-centred approach whereby the forces of nature are highlighted and orientation is to scientific and engineering approaches.

This hazard-centred focus is illustrated in the policy paper of the U.S. National Committee for the Decade for Natural Disaster Reduction titled "A Safer Future: Reducing the Impacts of Natural Disasters". The chairman of the committee, Richard Hallgreen, sets the tone with an opening statement that "science and technology now make it possible to anticipate hazardous events and protect people, property, and resources from their potentially devastating impacts as never before" (National Research Council, 1991).

Alexander (1992) notes the (extreme) interpretation, that for some, "the IDNDR has assumed the status of a 'technofix' in which the proponents of technology and hard science use it as a justification for generating yet more of the same. ... an attempt by engineers and physical and natural scientists to concentrate academic power and funding opportunities into their own hands". Vulnerability is recognised only as an adjunct to the main method rather than a root cause.

A recent review of the IDNDR program in Asia has reported a similar critical view. The review notes "science and technology have important roles to play in realising the goals of the Decade, but the extent to which the physical sciences have dominated the IDNDR program must be reconsidered. There is a need to include a broader, multi-sectorial professional community in the Decade's activities. Particular emphasis must now be given to the social sciences, development economics,

planning, public administration, and similar fields of endeavour which condition the acceptance and application of mitigation practice within society".

Australian programs within the IDNDR initiatives may have been initially subject to similar pressures, however it is worth noting that vulnerability-based projects have received increased support recently. A pertinent example is the work Ken Granger is currently undertaking which will test the value of Geographic Information System (GIS) technologies in assessing the vulnerability of Cairns to cyclone-induced storm surge.

However, within the IDNDR approach internationally, the sense of causality from hazard agents is retained in "hazard and risk assessments which combine information on natural hazards with information on human activity to determine vulnerability to natural disasters whereby ... disaster reduction must be grounded in a thorough understanding of the physical forces a community faces and their likely impacts on the human, built, and natural environment" (National Research Council [USA], 1991). This nexus between hazard and society has potential to be explored, to shed light on options at the "front end" of the risk management process. We need a better methodology than that which merely improves hazard and risk assessments by using social science to "research the social factors that govern response to natural hazards" (National Research Council [USA], 1991). While the above elements are true and of value, their context reflects insufficient and inadequate problem definition.

Risk assessment and vulnerability

A rider to the above criticisms is necessary. While policy perspective within the IDNDR is dominated by the "hazard as cause and science as fix" outlook, there is a contending view which places vulnerability at a higher and more central position. Hidden in the appendix to the U.S. policy document is a "hazard reduction checklist" which reflects the move to a qualitatively different perspective of vulnerability (Fig. 2.). This checklist is a more useful tool for both assessing the interface between extreme events and vulnerable populations, and auditing organisations for competence as providers of measures of social protection. It does not however go any further than the model advanced by Salter and Tarrant in 1988 and outlined earlier in figure one.

What is this thing called risk?

Keywords such as "risk", are important in at least "...two connected senses: first, they are significant, binding words in certain activities and their interpretation; second, they are significant, indicative words in certain forms of thought" (Williams, 1983). Risk may well be one of those things we recognise as significant, but can't agree definition of.

Given that expert status is achieved in societies by advancing views which favour those in power, it is interesting to recall the considerations of an "expert" committee of the Society for Risk Analysis (USA) which in 1989 recognised risk as a social construct by identifying fourteen definitions of risk (Gratt, 1989). While most of the definitions

HAZARD AND RISK ASSESSMENTS	COMMUNITY PROGRESS		
COMMUNITY ACTIONS	NO ACTION	ACTION STARTED	ACTION COMPLETED
Identify natural hazards (location, intensity, frequency)			
Map hazard-prone areas, environmentally sensitive areas			
Inventory structures, areas vulnerable to hazards (e.g. unreinforced masonry, mobile homes)			
Inventory critical facilities and resources (e.g. hospitals, schools, utilities, endangered species)			
Inventory sites with hazardous and toxic materials, determine vulnerability			
Inventory special needs groups (e.g. elderly, people with handicaps)			
Conduct hazard and risk assessments (vulnerability of population and natural resources to specific hazards)			
Prepare hazard overlay maps to depict vulnerable areas and populations			
Digitize hazard and risk assessments (e.g. geographic information systems)			
Develop procedures and schedule for updating hazard and risk assessments			
Translate hazard and risk assessments into recommendations for action (e.g. community public awareness, mitigation, preparedness programs)			

Fig. 2. Hazard reduction checklist

(National Research Council [USA], 1991)

reflected the engineering background of the panel and focussed on the dominant paradigm of risk as a function of two major factors – probability and consequence, the committee had the grace and humour to cede as their fourteenth option "risk is (write your own favourite)".

The discipline of engineering has done much to be admired and at the same time, has much to answer for. Many other risk management applications have borrowed from engineering its constructs of risk and hazard, and with them, their methodologies for risk and hazard analysis. According to the engineering based definitions, "in hazard analysis we identify hazards, estimate the probability of occurrence and the consequences and then compare them with a standard or criterion in order to decide whether or not action to reduce the probability or protect people from the consequences is desirable" (Kletz, 1982). The focus of such definitions of hazard analysis have provided the keystone for risk management probability/consequence matrices.

Even if one accepts a probability / consequence framework as being sufficient, there are several points at issue. First, high levels of uncertainty are attached to estimating frequency and consequence of extreme events, even with the most sophisticated techniques. This dilemma is neatly illustrated by the application of "10^{-6} individual fatality risk contours" as target criteria for acceptable risk related to fixed site industrial hazards (this method is promoted in the Australian Draft Standard on Risk Management, DR 94351). This criteria refers to the judgement that where the risk of one fatality is equal to, or less than, one chance in a million per year , it would be regarded as acceptable. If it was greater than this value, it would be unacceptable and risk reduction measures would be required. Quantitative Risk Assessment (QRA) methods output an "acceptable risk" contour around industrial hazard sites. The interpretation given to such "lines on the ground" is – safe outside, unsafe inside. Such interpretations become doubly problematic when examples can be cited of different QRAs for the same site producing risk contours which differ in diameter by a ratio of 1:7. This problem becomes even further compounded when it is the site owner's assessment which draws the "safer" contour.

The above example of "10^{-6} risk contour" also serves to illustrate some of the real social forces operating whereby there is an "...attempt to constrain and define risks so that they appear controllable or manageable. It is the role of such (government) agencies (and companies) to present certainties, and absolute terminology such as 'safety' creates this valued impression of certainty" (Goldstein, 1990). The use of Quantitative Risk Assessment as the fundamental basis for advising public policy decisions related to socio-technical hazards is restrictive.

Second, while information may be usefully defined as "that which reduces uncertainty", much of the information involved in the analysis incorporates an uncertainty range that invites flexible interpretation. This recognition is significant and is neatly illustrated by the decision of the "wind code" committee to place the "cyclone threshold" wind speed isopleth in AS 1170 (1972) above Brisbane. This is not to say the so-called "Jöh line" was wrong, but merely to recognise the key role of economic and political factors in risk management decision making processes where data may be rubbery enough to accommodate flexible interpretation or uncertainty is high.

Probability is burdened by two core problems. First, the data record from which extrapolations are made is too often insufficient. This is due to both duration of record, and the quality of documentation. Second, using probability assumes this concept can be transferred from its origins in "closed set environments" of mathematics and theory, to the uncertain realm of disaster reality where complex accidents occur due to unanticipated permutations.

Several issues of incompleteness are important here. Consequence is perceived primarily as a function of hazard agent force (magnitude and intensity) and is often not related sufficiently to the nature of the (exposed) asset. This failure to build in adequate susceptibility and resilience considerations merely highlights the crudeness of this simplistic matrix. A richer appreciation of risk dimensions can be derived if it is appreciated that individuals, organisations and ultimately, their cultures are all key elements in system design, operation, monitoring and failure.

Successful problem structuring is a crucial first step in developing successful solutions. One is reminded of an important type of incompleteness by the story of the man who was looking for his lost keys under the street-lamp. No, he did not lose the keys there, but it was easier to see! Therefore one must be mindful that "... the limitations imposed by the types of readily available data distort the analysis so that it may judge what is readily measured rather than what is important for social choice" (White, 1988). This error is often compounded when data deficiency is disguised by impressive graphic displays such as Geographic Information Systems.

The probability/consequence matrix (see page 12) retains status as a key advisory tool within the risk assessment stage of risk management. It is used to identify those risks which require management (resources) and thereby identify those which may be dropped as "acceptable". An illustration of some traps underpinning simplistic risk assessment grids can be found in the Risk Assessment Code Matrix from the "Code of Practice for Disaster Management" (extract on page 12), currently being adopted by parts of the emergency management community of the United States of America.

Risk Assessment Code Matrix

(from NFPA 1600-1995, "Code of Practice for Disaster Management" USA)

Risk: is the combination of severity and frequency.

Severity categories are expressed in uppercase Roman numerals from I to IV; probabilities in alpha characters H, L, P, U. The relationship between the two is illustrated in the graphic presentation of the matrix. Risk categories have been labelled as *High, medium, low,* and *very low*. Thus, a hazard with a severity of IV and a frequency of P (IV/P) would be a low risk hazard.

Severity Categories

Each severity category includes consequences.

The hazard is placed in the highest category for which it meets one or more criteria; **i.e. a potential death will be "catastrophic" even if all other consequences are negligible**.

The simplicity promised by matrices such as the above have initial appeal which becomes a concern when one considers issues such as the following. First, the frequency categories may not provide management with useful thresholds, let alone not be in line with general meanings attributed to the terms used. Second, the severity categories are driven by the need to protect individual response personnel. (This is not to deny the importance of an individual life per se, merely to question it as a driving criterion for disaster risk classification.) Third, community impact related to "facility and critical service shutdown" is grossly understated. Fourth, the nature of differential vulnerability within a community profile is unexplored in the generalised and simplistic criteria applied.

Fig. 3. Risk Coding Matrix

Hazard control priorities of high, medium, low, and very low are indicated for each risk code.

	OCCURRENCE FREQUENCY			
SEVERITY CATEGORY	**Highly Likely**	**Likely**	**Possible**	**Unlikely**
Catastrophic	IH	IL	IP	IU
Critical	IIH *High*	IIL	IIP	IIU *Low*
Marginal	IIIH	IIIL *Medium*	IIIP	IIIU
Negligible	IVH *Low*	IVL	IVP	IVU *Very Low*

LEGEND: MEDIUM | LOW | VERY LOW

Assumptions which ignore the plight of specially-vulnerable populations are inappropriate in a policy context. These are fundamental flaws reflecting a failure of understanding in relation to qualitative differences between disasters and incidents. There are fundamental differences between extreme events which impact vulnerable communities and merely big hazard events.

Risk profiling

There is a need to develop a broad risk assessment process to determine the possibility of adverse effects from exposure to hazards. This process should consist of both vulnerability assessment and hazard identification which, when integrated, lead to qualitative understandings which I will call "risk profiling".

While risk quantification is useful for certain, usually narrow or specific purposes, risk profiling provides a richer picture to advise a broad spectrum of public policy considerations. Profiling should include qualitative methodologies centred on such dimensions as the ethical, political and cultural aspects of risk. These methodologies need to be integrated with model- and measurement-oriented quantitative risk analyses to enhance the quality of decision making. Qualitative profiling is crucial in the risk management context of comprehensive disaster management where such variables as economic, social, legal, technical, analytical and political factors are all considerations in the judgements of

Matrix Definitions

Marginal: III

Personnel:
Injury or illnesses not resulting in disability, major quality of life loss, or perceived illness.

Public:
Injury or illnesses not resulting in disability, major quality of life loss, or perceived illness.

Environment:
A major hazardous chemical spill, which is contained. Portion of local organisms negatively impacted.

Economic Impact:
Minor loss of financial base, temporarily incapacitating the entity. Funding not available within 24 hours to initiate recovery procedures.

Facilities:
Complete shutdown of facilities and critical services for more than a week.

Property:
More than 10 percent of the property located in the proximity of the entity is severely damaged.

Frequency Categories

Highly Likely (H)
A hazard whose potential impact is very probable (100%) (within the next year).

Likely (L)
A hazard whose potential impact is probable (10% – 100%) within the next year, or one whose impact has at least one chance of occurring within the next ten years.

Possible (P)
A hazard whose potential impact is possible (1% – 10%). or has one chance of occurrence in a hundred years.

Unlikely (U)
A hazard whose potential impact is likely to occur less than once in a 100 years (less than 1%)."

acceptable risk and the selection of effective intervention options.

Vulnerability defined

First and fundamentally, while hazard agents may be physical events, disaster impacts are social products. That is, disasters are manifestations of vulnerability. Second, vulnerability is differential. We are not all equally vulnerable. Within any group some are more vulnerable than others – generally, and to specific hazards.

Australia's National Emergency Management Competency Standards define vulnerability as "the degree of susceptibility and resilience of the community and environment to hazards" (1995). As a working definition, vulnerability may be usefully considered as "the characteristics of a person or group in terms of their capacity to anticipate, cope with, resist and recover from the impact of a (natural) hazard" (Blaikie, 1994).

What factors make up a vulnerability profile? Current thinking focuses on vulnerability as a function of the resilience of people's livelihood (its strength and its ability to recover), i.e. income, assets, and health; in conjunction with the degree of preparedness, which is determined by the measures and capabilities of social- and self-protection available (Cannon, 1994).

"...the interface between an extreme event and a vulnerable human population."

The central position of the concept of "livelihood" within the "vulnerability thesis" is important in the definition. Blaikie highlights this concept which focuses on the "...command an individual, family, or other social group has over an income and/or bundles of resources that can be used or exchanged to satisfy its needs. This may involve information, cultural knowledge, social networks, legal rights as well as tools, land, or other physical resources". While the above focus is on community, the concept clearly has potential value to be transferred into other risk management contexts such as business recovery.

Underpinning this concept of "livelihood" are issues related to access to resources.

The access to resources theme may be usefully viewed as focusing on four areas:

- *Hazardousness of home and workplace:* which refers to the location of the home and livelihood activities in relation to various hazard triggers.
- *Natural resources:* which refers to productive assets (e.g. land, water).
- *Financial resources:* which refers to credit facilities (e.g. income, market access).
- *Physiological and social resources:* which refer to education, access to technology and information, nutritional status and health (after Blaikie, 1994).

Vulnerability indicators

Vulnerability assessment, which analyses relationships between community, environment (physical, social, political, economic) and hazards will need to tap a wide range of data sources, such as those listed in Fig. 4.

To identify vulnerability indicators, the information sets tabled below

Information set	Example fields
1. Physical	infrastructure, built environment, natural environment, services, utilities, industry, communications, isolation, transportation, equipment, shelter, hazardous substances and processes.
2. Emergency Management	management strategies, plans, evacuation strategies, trained people, public safety ethos, appropriate resources.
3. Demographic	numbers, density, distribution, structure, tourists, migrants, occupation, temporal distribution.
4. Health	disabilities, mental health, patients, age, public health, sanitation, disease, service dependence.
5. Economic	income, production, productivity, wealth levels, welfare recipients, government grants, level of insurance, land valuations, business register, occupation (in region).
6. Communication	public education, warnings, warning systems, awareness, media, inter / intra-agency, public information, access to information, availability of information, ability to monitor, decision-making power.
7. Psychological	coping strategies, experience, knowledge, stress, acceptance, bravado, isolation, realisation.
8. Societal / Cultural	cohesion, ethnicity, language, age, gender, family, education, functional literacy, friends, community leaders, parochial organisations, religion, rituals, beliefs, history.
9. Organisational	networks, communication(s), resources, logistics, government services, non-government services, legal, political.

Fig. 4. Information sets which may underpin vulnerability

(Fig. 4.) are currently being assessed by expert groups within the Australian disaster management community. The information will be reviewed for issues such as:

- how valuable it may be as an indicator of vulnerability;
- how complete the sets and fields are for both necessity and sufficiency;
- what data sources exist;
- what surrogates may be viable;
- what methodologies are required to get the information;
- what methodologies are required to analyse the information.

Risk communication

Problem structuring is one of the most crucial tasks in policy development. Risk communication is a key area of risk management which is strongly influenced by how one views risk. If risk is viewed as a physically-given attribute, risk communication tends to centre on "how to explain" risk. If risk is viewed as a socially-constructed attribute, risk communication focuses on the development of procedures for structuring dialogue with the aim of developing shared understandings about risk and its acceptability.

The role of experts in society is important here. The "problem", especially in industrialised democracies, has often taken the form of experts trying "to explain" the scientific view of risk. This problem had its roots in early debates on risk which were conducted by and between physical scientists and engineers who focussed on the apparent discrepancy between "objective and perceived risks". Scholars in psychology made initial contributions which accepted the objective / perceived risk formulation of the problem. This led to the development of risk communication methods which were based on flawed assumptions.

History in this area is marked by the work of psychology and public relations which were applied to the risk communication problems of the chemicals industry. Originating in the United States in the mid 1980's the techniques have also been transferred to Australia with similar limited success. The techniques purport to listen openly to stakeholder concern, to provide structures which facilitate access to information and, crucially, to promote dialogue. However they are premised on common fallacies. Fallacies about risk perception that continue to disrupt opportunities for improving risk communication include (after Petts, 1994):

- the public perceives risks, experts understand real risk;
- the public is irrational;
- providing more information on the risks will help overcome the irrationality;
- good packaging of the message will enhance understanding;
- risk comparisons provide perspective.

This somewhat patronising view derives from a "planning for" rather than "planning with" philosophy. That it remains the dominant view is reflected by a recent (April 1995) survey of an expert group which has carriage of a risk communication project in Australia related to a large chemical site. The group of nearly twenty consultants ranked over fifty issues they had identified (individually) as being important risk communication issues. The highest ranked six are listed in the table below:

This finding indicates the "objective / perceived risk" formulation of the problem is alive and well in Australia. This is unfortunate as it means the risk communication program will focus largely on form. In short, public relations before participatory process.

This is not to deny the importance of technique per se. In an age where people are exposed to more and more "noise", it is important to employ techniques which ensure your "signal" gets through. The "information market place" is dominated by this "economics of attention" phenomenon. Consequently nutshell advice would have us be mindful of the following.

- write to the "commuting time guide" (i.e., short reading time), using lots of white space, pictures and lower case.
- write and talk in plain and clear language (avoid jargon). For difficult concepts such as probability use "beer can" imagery (e.g. represent one in a million as a single beer can in a stack as high as ... a structure with shared context).
- when talking, learn to deliver your message in the 10-30 second "grab", and if you are going to pause say aaahhh! (which is perceived as reflective and poised) rather than eeerrr? (which is perceived as indecisive).
- recognise there are many publics (plural), and target them with tailored messages which get to them by many channels.
- human brains operate within the confines of "bounded rationality" therefore do not present more than nine key points or else you will erode message impact (the 7 ±2 rule).

However, we continue to ignore the clear lessons of the past. These lessons are simple and revolve around issues of power. The risk communication problem is not about technique. It is about the social context of risk. It is about voluntariness and the imposition of risk. It is about the control of information and the creation of ignorance (especially in the context of

Rank	Issue
1	Explaining the issue in plain English
1	Technical Competence vs Credibility
2	Explanation/bridging between technical risk and perception of risk
2	Understanding the publicís fears
3	Credibility of Communicators
4	Perceived and Actual Risks

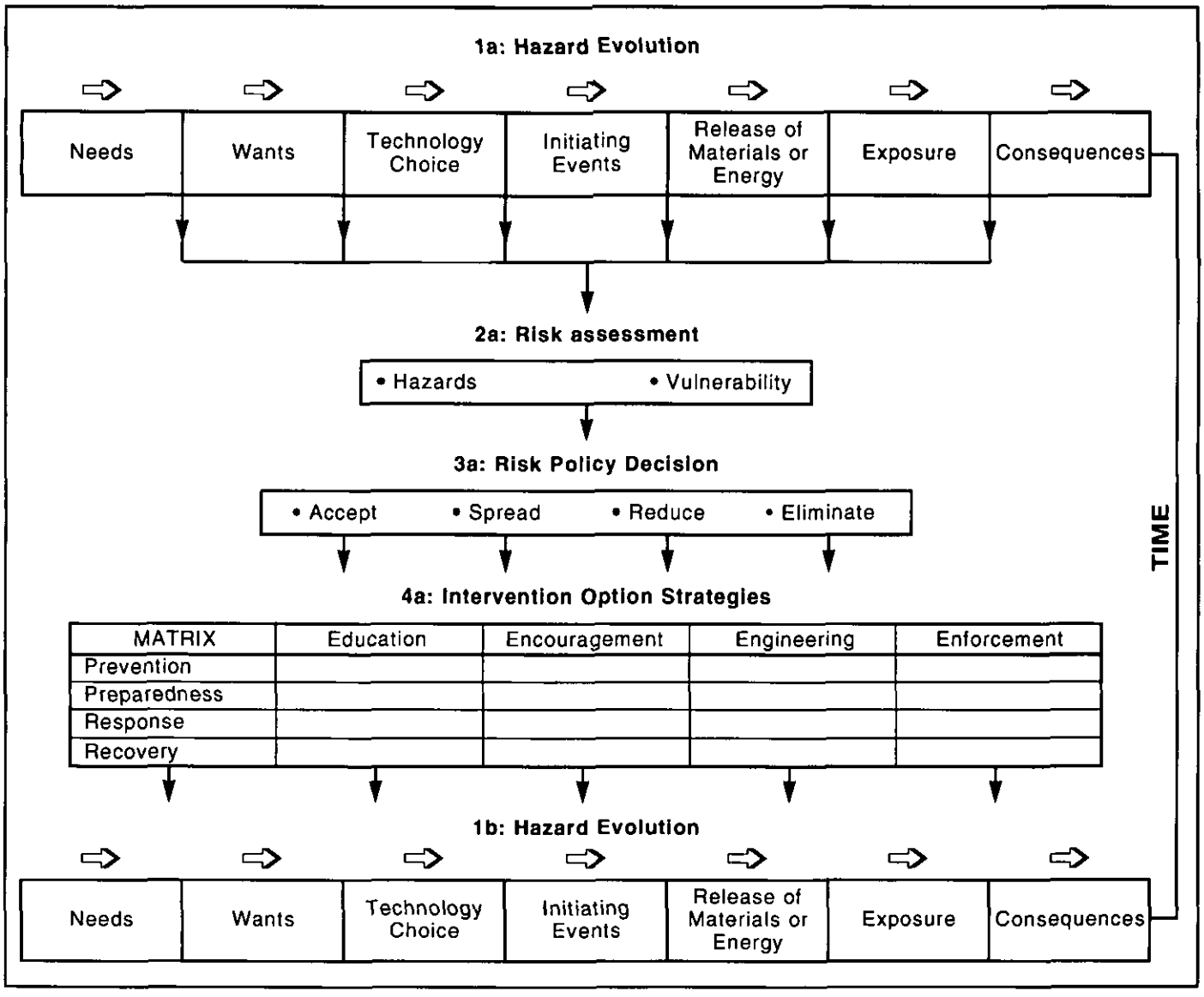
Fig. 5.: Important Risk Communication Issues (March 1995)

imposed risk). The acceptability of risk is more about power and negotiated consensus based on shared information than it is about judgements based on "objective science".

The US National Research Council has characterised risk communication as "an interactive process of exchange of information and opinion among individuals, groups, and institutions; often involving multiple messages about the nature of risk or expressing concerns, opinions, or reactions to risk messages or to legal and institutional arrangements for risk management" (National Research Council, 1989). The usefulness of this definition lies both in its identification of the need for two-way rather than one-way flow of information between parties and perhaps more importantly, in its recognition that the dialogue may be about any concern.

If risk communication is about facilitating meaningful dialogue which addresses any concern (information, attitudes, opinions), it becomes essential to recognise risk communication is a political process. Implications include the need to provide open, democratic processes which are underpinned by enabling provisions such as functional literacy. Risk as a social construct in this context will also highlight the quality and performance of organisations within the risk management / emergency management community. Report cards will feature institutional values related to things such as bureaucratic access, caring, competence, trust and credibility. These social processes will be significant factors in the alignment of risk management towards vulnerability for, as noted by Wisner (1993), any indicators of vulnerability must be chosen by reference to assumptions about underlying processes.

How we think does influence how we do things. The traditional approach to disasters is fundamentally flawed in that its "information", by emphasising hazard agents, generates a limited, indeed sometimes limiting, set of intervention options. Premising the nexus between hazard agent and vulnerable community is a fuzzy but productive line of inquiry. Recognising "vulnerability and human social organisation are critical determinants of both risk and impact... redefines disasters as non-routine social problems" (Alexander, 1992). This recognition of the "ultimate" social causes of disaster, which is central to the vulnerability thesis, has spawned a potentially productive "open-ended" framework developed to stimulate rather than constrain considerations. (The method can be developed within a total generic risk management framework as illustrated below in Fig. 6.) Such frameworks and con-



Figigure 6. Generic framework

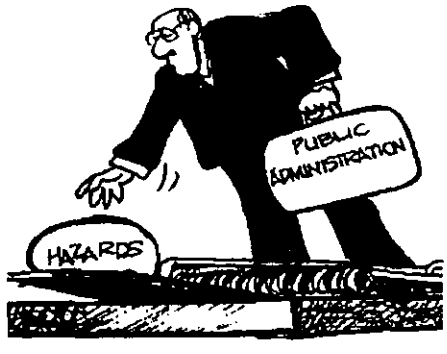
structs are designed to assist decision making, and are called "heuristic devices".

One must be mindful that such devices are only valuable in so far as they stimulate open-ended and creative considerations. They are merely a prompt to thinking, not a substitute for it.

Some constructs, such as the subset of PPRR (Prevention, Preparedness, Response and Recovery) which appears as part of the intervention matrix above, started life with honourable intentions but too often have become an encumbrance. Introduced in the early 1980's by the Federal Emergency Management Agency (USA), PPRR was promulgated as a simple heuristic device intended to promote proactive "comprehensive" emergency management rather than unplanned response and recovery. As such, it served a useful purpose but it has had several disadvantages. First, it has encouraged a simplistic notion that PPRR represents all that emergency management is about, whereas in reality, PPRR only represents strategies for intervention options within a total risk management perspective. Second, it has encouraged a perception that there is a linear and temporal relationship between these elements viz. first P then P then R and finally, R.

Misunderstanding has fostered attitudes of division such as "my R is more important than your P" and few managers have developed an appreciation of the larger risk management context in which response and recovery may be viewed as preventative / mitigative strategies. The "response" to disasters by communities must co-ordinate a tightly-integrated combination of "lead combat" organisation activities against the hazard agent and its immediate effects with any other resources which may be brought to bear to meet community needs. It is time for Australian disaster management to re-invent itself by building on the PPRR element and placing it within a broad risk management-based framework.

All decisions have moral / political dimensions. At the heart of the vulnerability thesis is the issue of dispersive equity. The imposition of risk by social processes is reflected in many philosophies. The utilitarian might aim to minimise the overall average risk. The egalitarian might propose equal distribution and the elitist might contemplate selective minimisation. These considerations prompt us to focus on the social institutions and the social and cultural context in which risk is assessed and managed. Crucial areas for development are the identification and integration of "tools" to sufficiently analyse who is vulnerable, how and why. Part of this task is currently being undertaken by Emergency Management Australia, and will see national guidelines for vulnerability assessment developed in early 1996.



The vulnerability information set and associated methodologies will advise better "forecasting". Forecasting does not refer to the myth and unrealistic promise of "prediction". It refers to the potential of "premising"; of applying a rich understanding of the role the social fabric will play in any disaster scenario. Such consequence analyses will study aspects of society (structural features, characteristics and processes) which underpin the consequence of hazard impacts; and further, will by identifying the social processes that bring about the imposition of risk, highlight prevention intervention options which address the underpinning social feature, structure or process. In sum, the 'vulnerability supplement' to risk management will, by broadening the characterisation of risk and identifying a more diverse set of options for intervention, enhance the quality of risk management policy considerations.

(The views expressed are the author's, and do not necessarily reflect the views of Emergency Management Australia)

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