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Technological versus Socio-Psychological Risk Management

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Summary:

This article is an ideological rather than scientific piece, although it's based on the author's work in applied research settings. The intent is to reiterate that socio-psychological means are as important as technological measures for emergency preparedness and coping with disaster impacts, and to argue that this needs to be better reflected in the allocation of resources for emergency management itself, as well as for pertinent research. The bushfire example is used as a typical and topical case; yet the conclusions are likely to be valid for other kinds of hazards too.

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Technological versus Socio-Psychological Risk Management

1 Types of hazards and disasters threatening residents

People as well as the environment in countries such as Australia are exposed to a multitude of natural and technology-induced hazards, many of which have the potential for a disaster. As outlined in *Box 1,* these hazards create different types of risk to either the state of the environment or the life, health, well-being and assets of humans. The impacts may be physical, financial or socio-psychological, lead to acute (current, immediate) or chronic harm, have local or wider reach, and occur straight away or at a later point in time. Furthermore, the causation structure is heterogeneous. For example, many natural hazards are 'spasmodic' events (e.g., earthquakes or volcano eruptions), others re-current episodes (e.g., bushfires or floods). Technology hazards can comprise regular harmful emissions (e.g., noise or gases) or result from accidents (e.g., an explosion in a factory, a train crash).

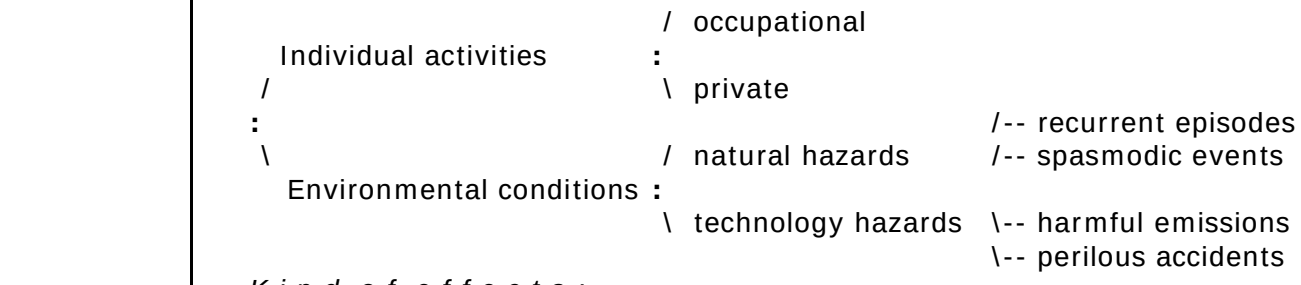
Box 1:

TAXONOMY OF HAZARD IMPACTS

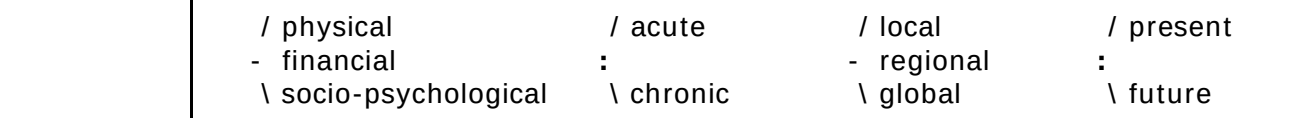
Subject of risk:

/ Risks for the state of the environment
:
\ Risks for humans' life, health, well-being and assets

Types of personal risk exposure:



Kind of effects:



Many hazards can be eliminated or avoided, at least principally (e.g., house fires); others cannot (e.g., hurricanes), and consequences rather than causes are to be dealt with. Consequently, risk management entails very different tasks, dependent on the nature of the hazard (Blaikie et al. 1994, EMA 1997, Paton et al. 1999, Salter 1997). Furthermore, the exposed population, ranging from individuals to communities at large, and their specific vulnerability need to be reflected in any mitigation effort.

2 Technological versus psychological means for risk mitigation

Risk management deals with the preconditions, causes and impacts of hazards. Its multiple tasks need to be implemented and executed before, during and after an emergency or disaster; preparedness, damage control and recovery are three crucial aims.

Box 2:

DISASTER MITIGATION: SOCIO-PSYCHOLOGICAL ASPECTS				
Type of measure: / *The* bushfire *case - Tasks include:*	ADM	TEC	MED	*PSY*
Preventive actions re disaster management				
> Organization of fire authorities & emergency services	!!			
> Forest work (eg: ground-clearing, breaks, back-burning)		!!		
> Community education about risks for life/health/assets	!			!
> Development of local cooperation & preparedness				!!
> Constructing safe shelters etc		!!		
> Establishing and evaluating warning systems	!	!		!
> Informing residents about preventive actions	!			!
> Improvement of residents' technical protection devices		!	!	
> Personal preparation (home, car, food, etc.)		!		!
> Thinking ahead, discussion in family, training				!!
Tasks during and after a disaster				
> Warning community re impending or acute danger	!!			
> Informing exposed people about necessary actions	!			!
> Searching for confirmation of information				!!
> Firefighting by authorities		!!		
> Residents' fighting against disaster impacts		!		!
> Evacuation (regarding oneself and others)		!!		
> Care for injured people			!!	
> Providing shelter for those who lost their home	!!			
> Search for missing persons	!			!
> Psychological rehabilitation			!	!
> Reconstruction of house/property		!!		
> Reestablishment of social community structures	!			!

Such tasks require administrative, technological, medical and socio-psychological means and resources; for the majority of hazards each of these is needed. As an example, the bushfire case is used in *Box 2*. Risk mitigation measures range from purely technical means, such us preventive forest-clearing or fire-fighting, to psychological programs which aim at, e.g., establishing neighbourhood collaboration or aiding family decisions about evacuation. While nothing can substitute fire prevention and fire suppression, it is also very obvious that neither comprehensive preparedness of residents nor optimal behavior and survival during a fire or recovery and rehabilitation after a disaster can be achieved without careful socio-psychological grounding. Modern fire risk management therefore includes community education and support in order to

raise awareness of risks for life, health and assets, to familiarize people with warning systems, to help them with choosing and implementing preventive actions, to instruct them regarding behavior in emergencies and so on (Daniel in press, Lloyd & Roen 2002, Rhodes & Reinholtd 1998, Rohrmann in press, Webster 2000). Furthermore, fire authorities are aware that they cannot provide full protection of all residents at risk, given the restricted numbers of fire-fighters and equipment such as fire trucks or planes and the large areas to be covered. Therefore residents must take responsibility, think ahead, discuss their personal fire risk management in the family and with their neighbours, and then optimize preparation - all this requires at least as much psychological as technological means.

3 Community involvement: The case of "Fireguard"

As with other types of hazards, risk reduction and impact mitigation are imperative and permanent tasks of agencies responsible for bushfire management. As outlined above, a combination of technical and organizational and socio-psychological measures is necessary, including comprehensive risk communication. This is also stated in the Australian/NZ Risk Management Standard. Authorities have to compose pertinent emergency planning, prepare coping strategies, and communicate the relevant information effectively to residents and communities as a whole (Barham 1996, Chase 1993, Robertson 1989). This is especially true if residents are expected to take responsibility for their fire preparedness. Consequently, community involvement is indispensable, given that fire authorities cannot provide safety for all citizens in all urban, let alone rural areas. Such tasks go far beyond the 'classic' fire-fighting missions of fire authorities. In fact, a 'paradigm shift' in the general orientation of fire risk management seems obvious (see, e.g., Marsh & Buckle 2001, Rhodes & Reinholtd 1998, Smith et al. 1996).

Box 3:

THE 'PHILOSOPHY' OF "COMMUNITY FIREGUARD"

> encouraging residents to take responsibility for their fire safety
> helping people to understand the implications of actions (or non-action)
> ownership of preparedness measures taken
> interactive (two-way) fire safety education
> recognizing the individual needs of people
> establishing collaboration between neighbours before an event
> conducting joint activities ('neighbourhood working bees')
> focussing on small groups (providing a sense of belonging)
> inducing & supporting rather than directing community fireguard groups
> use of experiences and respected group facilitators to assist the participants

A salient example is "Community Fireguard", a novel approach to fire safety introduced about a decade ago by the Country Fire Authority (CFA) of Victoria. This program - cf. *Box 3* - is based on community participation and aims at enhancing individual responsibility for fire safety and survival strategies (cf. e.g., Beckingsale 1994, Jones 1987, Whelan 1987). Facilitators from the CFA support but do not direct the activities of residents' groups.

There are many reasons why preparedness campaigns based on genuine community involvement are likely to produce valuable and tangible outcomes, as much research in social psychology and political science has shown (cf. e.g. Kaiser & Shimoda 1999, Mulilis et al. 2001, Oskamp & Schultz 1998, Renn 1998, Rohrmann 2000, Rowe & Frewer 2000, Sanoff 1994, Syme & Nancarrow 1992). Essential motives include: people want a say in matters affecting them; 'ownership' of a process enhances commitment; participation augments understanding of the underlying structure of a problem; learning by doing is more effective for knowledge gain than passive information reception; self-chosen decisions and plans are better adhered to; and embedding activities in a community context encourages involvement and counteracts lethargy and inertia.

Therefore campaigns should try to incorporate local town councils, neighbourhood groups and local interest parties, as well as individuals who may be or become "shakers & movers". Programs will be more effective if the needs of residents are carefully researched first and then reflected in the campaign. Beckingsale (1994, p. 7) sums this up as follows: *"Community Fireguard is very much a 'bottoms up' process, i.e., client-driven. It is about the fire authority assisting individuals in a group setting to develop their own strategies rather than a 'top down' approach of an agency telling them what to do"*.

Box 4:

LIKELY OUTCOME OF PARTICIPATING IN A COMMUNITY FIREGUARD GROUP

Increased ...	*Reduced ...*
> risk awareness	> naivety about risk and controllability
> knowledge re bushfires	> worry/anxiety about future disasters
> understanding of own responsibilities	> risky features of house/property
> collaboration with neighbours	> expectations about authorities' duties
> technical fire preparedness	
> psychological preparedness	
> preparatory actions taken	

Evaluation research has shown that the Community Fireguard approach works well (e.g., Rohrmann1999); *Box 4* provides a brief summary. For example, participants are more likely to accept their own responsibility for bushfire preparedness and safety than seeing this predominantly as the authority's task; their risk awareness and knowledge regarding bushfires is higher than for other

residents; they engage more often in risk-reducing activities, both technical and 'social' ones, such as house preparation, ground-clearing, writing down their planning for bushfire events (including the crucial stay-or-leave decision) and joint planning with neighbours. All this enhances the disaster preparedness of communities.

4 Integrated strategies: Research needs

While socio-psychological approaches have significantly contributed to improving disaster preparedness, many questions about the preconditions for a successful linkage of risk information/communication/education with techno-logical and administrative means are not yet sufficiently clarified.

Box 5:

SIGNIFICANT RESEARCH ISSUES
> Cost & benefit comparison for technological vs socio-psychological measures
> The relevance of non-technological measures for groups with specific needs
> Long-term efficiency of preparedness-enhancing campaigns
> Optimal combination of technological and psychological preparedness
> Organizational preconditions in emergency services for 'cultural change'

In *Box 5*, five pertinent topics are listed. Critical issues include: How can the cost/benefit features of socio-psychological measures (e.g., a fire risk awareness campaign) in comparison to technological means (e.g., fire-fighting equipment) be operationalized? How can programs be tailored to the characteristics and needs of specific societal groups? How about the long-term efficiency of preparedness-enhancing campaigns? Which are optimal combinations of technological and psychological preparedness regarding specific types of hazards (floods, fires, hurricanes etc), and how can technical, social and psychological barriers to involvement and implementation best be overcome? Are organizations ready for 'cultural change', and which are essential preconditions?

Finally, information and communication problems are a significant concern in multi-cultural societies such as Australia; thus the degree to which campaigns are effective with 'ethnic' (non-anglo) residents needs more attention as well.

On-going research into these issues will provide requisite knowledge for enhancing and refining hazard mitigation and disaster preparedness campaigns and help authorities to decide about strategies and budget allocations. The utilization of such knowledge then requires an open-minded interdisciplinary collaboration of researchers and public authorities which are responsible for best-possible preparedness of the community.

5 Implications for resource allocation

Arguing for the relevance of socio-psychological means of risk management may sound like "carrying owls to athens", given that most agencies have long broadened their perspectives and procedures - - yet are the resources to realize all these concepts and strategies on a larger scale actually available?? Observers of the current scene may doubt this; in fact it appears that the traditional hardware-focussed culture is still quite prevalent. To use the "Community Fireguard" case again, this program seems to have constrained resources - yet the costs for, e.g., group facilitators, while substantial, are certainly lower than those for fire-fighting trucks, let alone planes ... And importantly, socio-psychological programs are likely to provide long-term benefits for community safety. Furthermore, compared to the enormous costs induced by disasters (Bureau of Transport Economics 2001) costs for preventive measures are likely to be rather moderate.

Thus it seems necessary to argue, once more, that 'non-technological' approaches deserve to be better reflected in the allocation of budget and personnel resources for emergency management itself, as well as for pertinent research.

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