RMIT UNIVERSITY

Developing and Evaluating Effective Bushfire Communication Pathways, Procedures, and Products

Briefing Report Seven – Scenario Methods

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About this Report

The Effective Communication Pathways project aims to identify effective strategies for raising awareness of the Victorian Bushfire Information Line (VBIL) or similar service. During phase two of this research a series of focus groups was conducted with residents as end-users in five localities. This Briefing Report outlines one of the methodological approaches utilised in this examination, that being scenario analysis.

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Executive Summary

- The Effective Communication Pathways project aims to identify effective strategies for raising awareness of the Victorian Bushfire Information Line (VBIL) or similar service. During phase two of this research a series of focus groups was conducted with residents as end-users in five localities. Scenario-based methods were one of the methodological approaches employed in this phase of research.

- This briefing note outlines the rationale behind scenario methodology, its aims and outcomes, and how these techniques were used in this project.

- Three types of scenario methods are identified that have potential as powerful knowledge-elicitation tools for emergency services agencies. These are: a) extreme scenarios, b) pre-mortems, and c) event-driven end-user scenarios.

- The methods and advantages for each technique are discussed.

- Different scenario techniques are appropriate for different research questions. Further, these scenario methods are not mutually exclusive and discrete. Rather, the three types of scenarios identified have overlapping approaches and relationships. They provide a selection from which the most appropriate method can be blended to suit both the research aims and the time and resources available. We provide a brief description of how each of the approaches considered in this report might be best applied.

The Project

The Effective Communication Pathways project aims to identify effective strategies for raising awareness of the Victorian Bushfire Information Line (VBIL) or similar service. For the second phase of research a series of scenario-driven focus groups was conducted with residents as end-users in five localities. This research was undertaken in the context of a future move to a multi-agency, multi-hazard model of incident preparation and response. This will include the establishment of the Victorian Emergency Information Line (VEIL).

Background and Context

The use of the scenario methods represents a particular way of thinking. It is 'a mode of inquiry and analysis that enhances knowledge and understanding in order to inform and support planning' (Wright and Cairns, 2011: 14). There are a wide variety of types of scenarios and methods that are used to construct them. These range from long-term global scenarios prepared by futurists to short- to medium-term local scenarios prepared by involved parties, with or without external facilitation.

The advantage of using scenarios is that they provide a rich and complex set of methods for eliciting different types of knowledge. Further, they provide a means for creativity in imagining both positive and negative future states.

Work conducted by the Centre for Sustainable Organisations and Work (CSOW) has successfully employed a range of scenario techniques. For example, the 'Structural Adjustment in the Latrobe Valley' (Fairbrother *et al.* 2012) and 'Skilling the Bay' (Fairbrother *et al.* 2013) CSOW research projects carried out workshops with stakeholders using extreme scenarios. These focussed on broad regional industrial and economic changes over a timeframe of years and decades.

In contrast, the current project employed event-driven end-user scenarios with community members as those engaged with emergency information services. The aim of this project was to gain an understanding of the perceptions, needs, and expectations of potential end-users.

In this briefing note we identify three distinct ways of working with scenario methods. These are:

- Extreme scenarios
- Pre-mortems

- Event-driven end-user scenarios

These methods constitute tools available for researchers (and agency personnel) in order to support a variety of lines of inquiry. It should be noted that these scenario methods are not mutually exclusive. Rather, the three types of scenarios identified have overlapping approaches and relationships. They provide a selection from which the most appropriate method can be blended to suit both the research aims and the time and resources available.

In this report we make the distinction between <u>stakeholders</u> and <u>end-users</u> as participants in these activities. Stakeholders may include, for example, CFA operational staff, local council representatives, or Fire Services Commissioner personnel; that is, those with domain expertise and investment in the topic. End-users include community members with potentially little domain knowledge, widely differing backgrounds and levels of engagement in the issue.

The goal of research or strategic planning will inform the selection of the scenario methodology and participants. In long-term strategic level planning, for example, extreme scenarios involving key stakeholders with domain expertise may be most appropriate. Conversely, for the development of new community services event-driven scenarios with naïve end-users may be used.

The approach employed in the current research can be characterised as event-driven end-user scenarios. In the following section we provide a brief description of how each of these approaches might be applied.

It is noted here that this does not constitute an exhaustive list of the range of scenario methods available to researchers and practitioners (for an overview of scenario techniques, see Bradfield *et al.* 2005 and Bishop *et al.* 2007). These do, however, represent techniques that are particularly suited to practitioners in the emergency services.

We also acknowledge that the concept of scenario methods is not new to agencies. Scenario techniques have been employed in natural hazards research (for example, Cary *et al.* 2012). The use of scenario-driven field exercises has been utilised by fire agencies for command and control training. The use of pre-mortems is documented and promoted as an industry training tool in the most recent AIIMS-ICS training manuals (version 4).

Three Scenario Methods for Emergency Management

1. Extreme scenarios

One approach that has been used by researchers is the 'backward logic method of constructing extreme scenarios' (Wright and Cairns, 2011: 132-141). Rather than moving from analytic consideration of the present, in terms of the driving forces that currently exist, in order to construct systemically logical scenarios of some future end state, this approach involves the initial presentation of an end-state extreme scenario. This end-state may be one of 'best possible and plausible outcomes' – where the group aspires to be at the scenario horizon year. Or, it may outline 'the worst of all possible worlds' – the future that the group wishes to avoid at all costs.

This approach is designed to support structured analysis of the key strategic aims of individuals and organisations. It has the advantage of focusing participants' attention on the possibility of extreme impacts on an organization's or group's objectives. The use of extreme scenarios for such quick-fire exercises can disrupt linear thinking, with both a discomforting but also an insightful opening up of minds to new possibilities.

The steps of the backward logic approach to scenario development are focused on identifying causality, but causality that is established by going backwards from an extreme, but still plausible, outcome through to its precursor causation in the present day.

Although extreme scenarios can conceivably be used with end-users as participants, the level of detail and conceptual thought required by this technique often require a level of domain knowledge that community members are unlikely to possess.

An example guide to running such a scenario activity is as follows:

1. Introduce participants to the concept of extreme scenarios

2. Introduce the first scenario activity. A high degree of detail is likely to be necessary in order to paint a broad picture of the hypothetical future in which stakeholders are operating. The scenario is intended to be extreme, whether positive or negative.

3. Ask participants to contemplate and discuss the scenario with reference to questions such as:

a. What might cause the worst extreme direction to unfold?

b. Who would take what decisions that might accelerate this trajectory?

c. What decisions and actions can be taken and what policies implemented in order to attenuate this development?

d. What decisions and actions can be taken and what policies implemented in order to guide the future towards the best extreme?

4. Repeat steps 2 and 3 with the use of another scenario of a different outcome. Participants will have therefore considered at least one extreme positive scenario and one extreme negative scenario by the end of the workshop.

5. Enable participants to reflect on the findings from the workshop process, and to identify 1) factors that are deemed open to influence and direction through intervention by stakeholders, and; 2) factors that are not open to such direction, and the implications for mitigation and adaptation to negative outcomes.

Potential advantages of extreme scenarios:

- Considers both best and worst case outcomes

- Focuses participants' attention on the possibility of extreme impacts on an organization's or group's objectives

- Disrupts linear thinking

- Focuses on action to avoid or mitigate worst extreme outcomes

2. Pre-Mortems

The Pre-Mortem scenario approach (Klein 2007) is a tool that has emerged from the intellectual discipline around High Reliability Organising. The term is derived from the medical term *post*-mortem. Unlike post-mortems that aim to determine the cause of a critical negative event, this technique aims to uncover any potential adverse outcomes of a situation before they occur. Participants are very briefly provided with the context of a scenario and then told that something has gone wrong. The brief is to both provide a detailed

description of what went wrong, as well as the how, why and what of potential errors or decision biases that might have contributed to the outcome.

An example guide to running such a scenario activity is as follows:

1. Introduce participants to the concept of a pre-mortem

2. Describe a scenario in a small level of detail, and introduce the failure. Emphasise that it is a total, devastating failure. However, we cannot make out the reason for the failure. Then ask, 'What could have caused this?'

3. Spend some time generating reasons for failure. Each person writes down all the reasons why they believe the failure occurred. Here is where intuitions of the team members come into play. Each person has a different set of experiences and a different mental model to bring to this task. You want to see what the collective knowledge in the room can produce.

4. Consolidate the lists. When each member of the group has finished compiling their list, the facilitator asks each person to state one item from his or her list. Each item is recorded on a whiteboard. This process continues until each member of the group has revealed every item on their list. By the end of this step, you should have a comprehensive list of the group's concerns with the plan at hand.

5. Revisit the plan. The team can address the two or three items of greatest concern, and then discuss ideas for avoiding or minimising other problems.

6. Periodically review the list. Keep the spectre of failure fresh, and re-sensitise the team to the problems that may be emerging.

Potential advantages of pre-mortems:

- Brings together the collective knowledge of the group

- Reduces attachment to current plans

- Identifies where more resources might be needed

- Group members are sensitised to where things might go wrong (weak signals)

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- Creates a climate where people can voice their concerns

3. Event-driven End-user Scenarios

While some scenario activities engage stakeholders in comprehensive future possibilities, covering a range of political, economic, social, technological, ecological, and legal factors, this level of detail is not always appropriate. Where researchers seek to reveal the understandings, needs, and expectations of a lay social group about official policy and practice, such as community members with respect to bushfire agency activities, a simpler mode of enquiry may be appropriate.

In this approach, end-user hazard scenarios are developed from the concept of end-user (or use-case) scenarios that are frequently employed in interaction design. These scenarios are typically conducted during the development stage of new human-computer interfaces or systems (e.g. airline booking website, public transport ticket machine). The goal of this technique is to predict how end-users will interact with a new system. This approach is particularly useful for establishing how people understand the system, and for anticipating potential system errors or difficulties before they occur.

In contrast to the stakeholder focus of extreme scenarios and pre-mortems, end-user scenarios focus on lay members. This technique provides a means for imagining potential user situations and interactions with official programs or systems. This, for example, is done by introducing scenarios that could cause community members to seek the services of relevant agencies. Such a procedure therefore can help to guide the development of maximally effective communication pathways, procedures, and products. These methods can be applied at different stages of system design, and can range from simple story-telling, to physical interactions with physical mock-ups of potential systems.

An example guide to running such a scenario activity is as follows:

1. Introduce participants to the concept of an event-driven end-user scenario, emphasising their expertise as defined by the research goals (that is, gaining an understanding of their perceptions, needs, and expectations).

2. Describe an event to participants, providing contextual information at a level of detail suitable for the research aims (for example, the time, day,

and month, the type of event, its location, and some relevant weather and environmental information).

3. Give each participant an opportunity to present their scenario narrative. For example:

    a. Where they are most likely to be during the hypothetical event?

    b. What are they most likely doing?

    c. How are they most likely to find out about the event?

    d. How is this likely to affect their next activities?

    e. What are their greatest concerns?

4. Introduce 'spanners' (that is, unforeseen circumstances) into the participant narratives, forcing them to contemplate failures they would not readily consider.

5. With an understanding of how participants are likely to interact with relevant agencies in the course of the event (and therefore an understanding of their attitudes, behaviours and requirements), now ask participants to reflect on how they could *best be* supported by agencies in their activities (for example, ideal information provision and technological mediums).

Potential advantages of event-driven end-user scenarios:

- Useful for anticipating how a yet-developed system might be adopted by end-users

- Helps uncover users' false beliefs or mental models

- Helps to overcome false assumptions of system-developers regarding end-users

- Helps to uncover the different contexts in which a system might be used

A summary of the defining features of the three scenario methods discussed here is presented on the following page (Table 1).

Table 1: Summary of three scenario methodologies

Scenario Technique	Purpose	Participants	Example Agency Application
Extreme	Analysis of key strategic aims of individuals and organisations	Stakeholders	VEIL service model planning for 2023, given climate change and urban sprawl
Pre-mortem	Anticipating, planning and mitigating for potential 'errors' or system failures	Stakeholders	During the 2014 fire season there is a catastrophic failure involving information delivery to the public
Event-driven End-user	Understanding how users relate to and interact with a service or system	End-users	When and how will end-users access a multi-hazard telephone service

Current Project

During the current project a series of focus-groups were carried out in order to enhance an understanding of residents' perceptions of and requirements for information provision across multiple hazard types. These focus groups included use of scenario-driven enquiry as one tool for eliciting information from community members. This approach provides a means for imagining potential user situations and interactions with the new system.

Scenario methods are ideally suited for exploration of issues that, as here, are of central interest to the participants but are subject to considerable uncertainty as to how they might unfold. An expanded service model incorporates hazards which may occur more frequently and are potentially more salient for community members' everyday activities. Information seeking behaviours may therefore be different for the VEIL than for the existing VBIL. In using this methodology, we are able to determine plausible responses to perceived hazards and threats. A group discussion allows for reflection and critical comment that is unavailable by other research methodologies.

The scenario exercises were conducted as follows: Hazard scenarios were introduced to the focus groups, and participants were asked to reflect on these. Information provided by the facilitators included the time, day, and month, the type of hazard, its location, and some contextual weather and environmental information. These scenarios were developed as both possible and plausible, with the addition of some 'spanners' (that is, unforeseen circumstances introduced by the facilitators during a participants' answer). Participants were asked to talk about how and when they were likely to learn about the hazard, what kind of information they would require, and how they would seek to access that information.

A series of written prompts were distributed to participants for reference while they responded to scenario exercises. This approach helped to draw out key information as well as driving participant's narratives. In doing so, the procedures enabled an understanding of information requirements as they emerge in discussion, while capturing different actors' perspectives. These prompts included:

- Where are you most likely to be?

- What are you most likely doing?

- How are you most likely to find out about the developing hazard situation?

- How is this likely to affect your next activities (what will you do)?

- Would you be likely to look for more information? How/where?

- What are your greatest concerns?

Participants were provided with minimal details, and therefore not necessarily constrained or focused in relation to their answers. The rationale for providing minimal context to participants was to elicit 'mundane' aspects of their day-to-day activities as presented in their own narratives. An understanding of where people are and what they are doing, as well as how they might access technology or communication pathways were central to the research, and thus a relevant consideration in the focus groups.

Participants were required to adhere to some simple 'ground rules' that are applied within all scenario workshops. These are:

- All participants are allowed time to speak and to present their information, views and opinions;

- No contribution can be challenged by simple dismissive statements – 'You're wrong', 'That's nonsense', etc.,

- Questions of exploration and clarification can be asked (e.g. 'Who would… ?', 'How might… ?', 'Why would… ?')

Concluding Statement

Scenario methods provide a rich set of tools for agency personnel. Scenario activities do not require large amounts of overheads and resources; they are straightforward and cost-effective. The key challenge is to state the problem clearly and to focus it so that it drives the selection of the appropriate scenario method. Activities can involve agency personnel to meet planning and strategic challenges, or can involve community members/end-users to help inform upon community safety issues.

In comparison with other tools, scenario methods:

- Are cheap, quick, straightforward

- Are useful for exercises and operational planning

- Do not require complex calculations or estimates of uncertain values such as likelihood and consequence

- Are both a methodology and means of analysis

Appendix: VBIL – ECP: Focus Group Running Sheet

Structure of session

- Introductions
- Risk analysis
- Scenarios - Reality
- Structured discussion
- Wrap up, thank you, anything else?

Introduction

- Welcome everybody and thank for time
- Introduce members of the team

Some housekeeping about this Session

- The session should last approximately one hour

- The goal of focus groups is to explore a range of opinions, and to do this by creating a friendly and informal environment and to encourage a creative atmosphere and discussion

- Importantly there are no right or wrong answers. We have invited you here because as end-users of these services, you are the experts, not us.

- The session will be broken up into a few different activities. We'll look at what you think are the biggest risks living in this community, we'll run through a brief scenario to understand how a crisis event might affect you and finally we'll run through some follow-up questions. If time permits we can try something a bit more creative.

- As a token of appreciation of your time we have a small gift to present to you at the end of the session, so please don't let us forget or allow you to leave without it.

Background

- The project is being conducted by RMIT University; on behalf of the CFA. It is a 12 month project that is investigating how community members attend to emergency information and how we might raise awareness of certain services. However, the reason we have invited you here tonight is a little bit different.

- Instead of looking exclusively at bushfires, we are interested in all types of natural hazards and emergency events, and how information can best be provided to you to support your safety.

- The idea behind conducting a focus group is to get a diversity of perspectives and opinions, so we appreciate that you come here with different occupations, backgrounds and time lived in these suburbs.

- When we talk about hazards we include both those that can be caused by nature such as floods and bushfires, as well as those that are man-made such as road accidents and gas explosions, etc. In other words we are thinking about events that have the potential to affect a lot of people as opposed to individual crimes such as assaults or robberies.

- We are interested in how people might find out about these events when they occur and the types of information you would need to support your actions and/or how you could seek more information.

  In other words we are interested in your opinions as end-users of information systems.

Informed Consent

- With your permission we'd like to record the session

- It is important as university research that you understand your rights as participants and that participation is voluntary and that you cannot be identified at any stage of the reporting process.

- If there is anything you say that you don't' think you want on tape we can go back and remove it from the transcript.

- Before we start we just want to set a couple of ground rules. The one main rule is that you are welcome to ask questions of each other, but we ask people to refrain from disparaging anyone's remarks. For example it is okay to ask questions of clarification – e.g. why do you think that might assist you?

- Before we move on, are there any questions about the focus groups session?

Multi-hazard exploration

A. Subjective Risk Analysis

The first thing we'd like to do is to develop a better understanding of what you see as the greatest risks to you and/or your family living in this community. We want to do this in two contexts; one is with respect to your physical safety and the other is respect to emergencies and hazards in your environment that have the potential to disrupt your day-to-day activities.

A. What sort of hazards you have thought about before and/or found out more information about or prepared for?
B. What sorts of hazards do you think are important to residents of this community in general?

So to begin we'll open it up to the table to let us know what you think the major risks are to the local area

- **Prompt** Susceptibility?
- **Prompt** Severity?

- **Prompt** (if required): And with respect to hazards that may not threaten your safety, but are likely to disrupt your activities and for which you would like/need to know about them?

B. Scenario

The main focus of why we are here is to be able to support community members' decisions and safe behaviour during emergency events. In other words, how can emergency agencies best provide you with information you need, when you need it. We appreciate that it might be a bit tricky to imagine some scenarios you haven't been in before.

The goal is to provide you with an emergency event with a time and day. We want you to take a minute and imagine yourself, where you would be and what you would be doing in the course of your day. We will ask you to describe how you see the events as most likely unfolding (including at what stage and how you would seek more information). From time to time one of the team might ask you some questions or prompts to follow up on an idea. To help with some prompts as to the kind of information we are looking for, we have a sheet we can pass around as each person speaks.

The scenario we present will be deliberately vague, as we are wanting you to tell us the story as you see it unfolding. We are interested in how information can guide your decision-making and safe behaviour. Please don't worry how 'mundane' you feel the information is, as we are interested in hearing any details you can provide. We will

give everybody a chance to tell a story. Again, we want to emphasise that you are the experts in this scenario and there are no right or wrong answers.

The types of information we are interested in are:

- Where are you most likely to be?
- What are you most likely doing?
- How are you most likely to find out about the developing hazard situation?
- How is this likely to affect your next activities (what will you do)?
- Would you be likely to look for more information? How/where?
- What are your greatest concerns?

[Introduce locality-specific scenario here and facilitate participant narratives and discussion]

C. Focused Questions

We would now like to ask you a few general questions about a potential multi-hazard emergency information phone line. The context for this is that the Fire Services Commissioner is looking to implement a service called the Victorian Emergency Information Line. It will be, so to speak, a "one-stop shop" for emergency information.

For this next activity we can relax the rules and whoever would like to start the ball rolling is welcome; we can treat it as a bit of a round table think tank if you like.

If we talk about **visibility** first, knowing [your locality] and its exposure to various hazards, how would you go about raising awareness of a new emergency information line?

- A participant in another focus group mentioned receiving the VEIL number on her mobile phone as a message from her mobile service provider, is this something you would be open to?
- Obviously you don't use these sorts of information systems spontaneously; what sort of general alert might best prompt you to seek safety-related information?
- _____

If we could now talk a little about **accessibility**; that is, making the service as user-friendly as possible and being able to use it when you most need it. It may help to think back to your scenario story. What sort of artefacts or technology could be employed to make the emergency information line most accessible to you when you are most likely to need it?

Is it a service you **can see yourself using**? If not, why not?

Who do you think is the main target **audience** for a service like this in [your locality] and therefore how could we best raise awareness of the service to this population?

What are the **features** of a potential system that would mean you are more likely to use it (in all-hazard context)?

- Which types of hazard are you most likely to use it for?
- Would you be likely to use it for general information as well as crisis information (e.g. how to **prepare** your home, **recovery** – what support you are entitled to?)

What are the **potential scenarios that would discourage you** from using an all-hazards information line?

Finally, we'd like to give you the opportunity to tell us anything you think may be important that we might not have discussed so far by opening up the session for comment.

D. If time permits

'Ideal World' Scenarios

Now we are going to try something a bit different by opening up the discussion to the group as to what an ideal world might look like.

Let me give you one brief example of what I am talking about. I was having coffee yesterday morning with a colleague and he was telling me about his recent experience of driving through the Burnley tunnel. He was saying he was impressed as information about the tunnel; traffic conditions, safety issues, etc. were transmitted through his car radio by interrupting normal broadcasting. This contrasts with a system in which a driver would need to tune their radio to a specific frequency in order to receive tunnel information.

This is one example of passive versus active information seeking. Or, otherwise stated, information 'push' versus information 'pull'. In my colleagues experiences the information is 'pushed' on to you; it does not require you to actively engage by seeking out a specific radio frequency.

Before the conversation with my colleague, I only envisaged the active information seeking (drivers tuning their radio to the tunnel information frequency) as the best way to get the information, but now I can see there were better ways.

So let's say that the technology genie comes down and waves their magic wand, thinking back to your scenario story before, is there anything that the magic genie could have done to make your life easier?

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