Chapter 12

# Using program theory in evaluating bushfire community safety programs

*Alan Rhodes and John Gilbert*

## Chapter summary

There is an ever-increasing need for evidenced-based practice in all aspects of emergency management, and bushfire community safety programs are no exception. Over the past few years the value of programs that increase awareness and preparedness among communities in high bushfire risk areas has risen dramatically. There is now a wide range of programs run by agencies across Australia and the evidence suggests these are diversifying and occurring in greater numbers each year. To date, information about whether these programs are really working has been largely anecdotal and success has quite often been determined by quantity, i.e. how many community meetings have been run, rather than a deeper understanding of how a program works and whether it is achieving its intended outcomes. The net result can be evaluations that only measure simple outputs rather than exploring more complex outcomes.

This chapter describes the use of a program theory approach to evaluating complex multi-site programs, based around a workshop or interview methodology. The rationale behind the approach, the process of developing a program theory matrix and relevant case studies help to illustrate how it can be extremely worthwhile in determining what programs work, for whom and in what contexts. It provides a deeper understanding of what can be expected from a program, and more reliable information on which to base decisions about how best to allocate community safety resources for bushfire.

## Introduction

Programs are interventions intended to bring about change in a social condition or issue. Where there is an unmet need among a group of people, or another social problem that a community wants addressed, organisations often initiate programs that involve activities and the allocation of resources that are intended to address the need or ameliorate the problem.

In developing such programs, the question of whether the program will actually address the need or problem often receives less attention than a range of other personal, organisational and situational factors. There is a diverse range of circumstances that can influence the development of programs. For example, competition among organisations for funding and recognition, the enthusiasm of an individual overriding the planning and development of initiatives, or time and cost pressures. Programs can also become entrenched as 'part of the way we do business' and continue without appropriate review and revision to take account of new or emerging circumstances. The rapidly changing context in which organisations operate can also make it difficult to develop effective programs in response. If these circumstances alone drive program development, there is a risk that programs may be ineffective or unsustainable. However,

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identifying these circumstances does not suggest they are illegitimate or should be ignored. On the contrary, they identify some of the competing demands on program developers.

In order for programs to address a need or problem, the various circumstances that can drive program development need to be reconciled with a sound understanding of what is likely to constitute an effective program. We need an approach that can guide program development and support effective and efficient program management. Such an approach would help answer common evaluative questions:

- What problem is being addressed or what need is being met by the program?
- What is the program intended to achieve?
- How does the program work?
- Where and when does the program work most effectively?
- How do we monitor the implementation and outcomes of the program?
- How do we know whether the program will work in different situations?

The focus of program planning and development has often been on observable aspects such as the activities, resources, funding and practicalities of delivery with little attention to how the program actually works to achieve the intended outcomes. Lipsey and Pollard (1989) referred to this as the 'black box' model of a program, i.e. how the program works remains hidden. Without an explicit understanding of how a program is expected to work, it is likely to be difficult to determine whether it has worked, and if it hasn't worked then why it didn't work. Improving program delivery also becomes problematic if program processes are poorly understood or articulated. Similarly, without an understanding of how the program works it may be difficult to determine whether it can be transferred successfully to another location or meet the needs of a different group. Understanding how programs work, for whom and in what circumstances is critical to effective program development and management.

## Program logic/program theory approach

An increasingly popular and useful approach to understanding programs is the use of program logic models and program theory (further discussed in Ch. 13 this volume). It is worth discussing the distinction between the two terms as it is vital to understanding how they can be used in conjunction as an effective evaluation tool. In essence, program logic is a simplified picture of how the objectives of a program could be achieved through a series of outcomes. These are frequently put together in the form of a hierarchy of intended outcomes. The limitation of this is that while a program logic identifies the anticipated or desired changes, it does not necessarily shed much light on how these changes will be brought about. A program theory is an extension of this program logic that helps to link intended outcomes of a program to the program activities and the underlying assumptions about how a program works. It helps to explain how the program elements are related and how they might work together to bring about the effects of a program. As such, developing a program logic can often be a natural first step in the development of a more comprehensive evidenced-based program theory.

This approach was adopted by Funnell (1997; 2000), who devised a program logic matrix. It is also worth noting that similar logic model approaches were conceptualised by Campbell (2005) in the related emergency management field of counter-terrorism and by ECONorthwest (2006) in a review of the National Fire Protection Agency Firewise Arcview program. In that review, a logic model was used to develop a framework for the Firewise Arcview program. It was developed through interviews with program staff, and described how the program was intended to work and the actual implementation of Firewise Arcview. The expected outcomes were largely substantiated in the results from a participant survey and in-depth interviews. Funnell's matrix

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works as an effective summary of a program theory and includes a hierarchy of outcomes as well as several corresponding columns that pose a series of questions:

- What are the criteria of success for this outcome?
- What program factors will determine success for this outcome?
- What 'non-program' factors will influence success for this outcome?
- What, specifically, is the program doing to address the success factors?
- What performance information should be collected for this outcome?
- How will this information be collected (e.g. what kinds of data)?

A modified version of this program logic matrix, combining a hierarchy of intended outcomes with a program theory approach that highlights how the program is expected to achieve the outcomes and in what contexts (Pawson & Tilley 1997), was developed by Program C7 of the Bushfire CRC to evaluate bushfire community safety programs. The approach examines key components of the program including:

- problem specification – the actual 'need' to be addressed by the program
- outcomes – the intended program outcomes as identified through the initial program logic development
- input/activities – the resources and components that make up the program
- mechanisms – the ways in which the desired changes are brought about
- context – the environment in which the program is implemented.

## Processes to develop a program logic/program theory

There are several possible approaches to developing a program theory. The first approach is to develop the theory from existing social science theories and from the results of field studies and other investigations. The second method is to build a program theory from the knowledge and experience of those involved with the program, both practitioners and recipients of the program. Patton (1997) emphasised the value of this user-focused approach, arguing that it allows those involved in the program to test what they believe happens against what actually happens. In this way practitioners and program planners develop a greater understanding of how the program works. Chen (1990) noted that generating program theories from social science theories emphasises the value of objectivity, whereas the stakeholder approach emphasises responsiveness. The different methods could also be used together, combining existing theoretical knowledge in the social sciences, fieldwork results and input from stakeholders.

This section outlines a workshop approach that involves stakeholders such as practitioners, program managers and participants developing a program theory, and hence reflects a user-focused approach. An alternative approach to obtaining user input can be through interviews with program practitioners. This approach can often be more time-consuming but may provide greater detail and clarity about a specific program. The program theory workshops and interviews have been used to develop several program theories as part of the Bushfire CRC Program C7 research agenda, working with fire services in several states in Australia. These are presented later in the chapter to illustrate the uses of program theory in evaluation.

### The workshop

The workshop involves 8–15 people with knowledge and experience of the program. One option is to involve a mix of practitioners, managers and participants to debate and negotiate the final program theory. Alternatively, separate workshops could be conducted, each comprising representatives from only one group, enabling a comparison of different perspectives on the program.

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The workshop is a facilitated process using a combination of individual brainstorming and small- and whole-group discussion, supplemented with opportunities for reflective writing on experiences of the program. The workshop progresses through a series of focus questions, collecting and discussing workshop participants' ideas, discussing and negotiating these contributions to reach a consensus, or if necessary identifying points of difference. Typically the workshop takes four to six hours, with breaks. The contributions in the workshop are written up on A4 sheets and arranged on the wall to construct a matrix of the program elements as described below. The headings listed in Table 12.1 are used to make a series of columns on the wall so that the workshop discussion progressively populates the columns.

**Table 12.1** Key components of the program examined in the matrix

| | |
|---|---|
| Problem specification | Identify what problem the program is intended to address, the key themes or components of the problem and the specific relationships involved |
| Intended program outcomes | Participants develop a hierarchy of intended outcomes for the program, starting with the ultimate outcome and working backwards to identify and logically order the outcomes for each stage of the program |
| Activities and resources | In small groups, participants identify relevant program activities and resources that are mobilised to achieve particular outcomes |
| Mechanisms | In small groups, possible mechanisms are identified by asking participants to consider how each activity or resource might affect people's thinking or actions |
| Program context | The context in which the activities or resources are likely to lead to the intended outcomes are explored by asking participants to consider for whom, when and where the program works. Consideration is also given to the contexts in which the program is not leading to the intending outcomes and the possible explanation for this |

Finally, participants can be asked individually to identify examples of an aspect of the program which they believe to be a success, describe that example and suggest aspects of the example which they believe made it a success story. These are written on a template. These examples often provide very clear illustrations of context–mechanism–outcome configurations, in effect mini program theories that can be used to further elaborate the program theory.

Occasionally, contributions during the workshop raise issues, make suggestions or provide comment on the program but do not contribute directly to the question currently under discussion. These contributions are 'parked' on another wall then reviewed and discussed later. They often identify more contentious matters, suggest improvements or extend ideas on how the program works, and as such provide additional valuable input as well as ensuring that all contributions are recognised and recorded.

The matrix that is built up on the wall is reviewed and any final comments are collected. This is transcribed along with the problem specification and other data from the workshop and provided to participants as a record of the workshop outcomes. The data are then available for development of a more refined program theory by integrating them with the output of other workshops, program documentation, fieldwork or social science theories, depending on the approach being adopted. The workshop provides a useful and efficient method of gathering stakeholder input in the process of developing a program theory. Participants also benefit from the experience by gaining greater insight into the program, hearing other perspectives and collectively developing a shared understanding of how the program works.

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### The interview approach

Interviews follow a very similar pattern to the workshops – specifying the problem, identifying the hierarchy of intended outcomes and populating the program theory matrix with information about the activities and resources, mechanisms and program context. However, the approach centres on a series of interviews with relevant key stakeholders in the program. These can be conducted on an individual or small-group basis. A rich level of detail can be obtained using this approach and it is extremely helpful to record and transcribe the discussions. Interviews also provide a greater level of anonymity, which can be useful if there are contentious issues to discuss.

## Case studies

A program theory has many possible uses and the following case studies illustrate the application of the workshop approach and the different uses of the program theory developed in the process.

### Community Fire Units (New South Wales Fire Brigades)

Community Fire Units is a well-established community based program conducted by the New South Wales Fire Brigades. The program is intended to provide a first line of property protection by training and equipping residents in high bushfire risk areas, predominantly in interface areas. Units receive a standard set of firefighting equipment and are trained by local fire crews in fire behaviour, use of the equipment, and safety. If the local area is threatened, the unit is activated to protect houses until the arrival of the fire brigade. Unit members then assist the fire crew and deal with mopping-up operations, allowing full-time fire crews to move to other areas.

In nearly ten years, over 300 groups have joined the program. Major fires in recent years have given the program a high public profile, with many groups being threatened by fire and successfully defending homes. The program is widely regarded as successful and has expanded significantly – more groups apply to join than can be accommodated in the program. Following the 2003 Canberra fires, the program has been implemented in the Australian Capital Territory (see Ch. 3 this volume for a detailed description of CFUs).

Although the program is popular and seen as a success there is only anecdotal evidence about community perceptions of the program and in what situations it works best. In the context of rapid growth, high community demand and strong government support to expand the program, the program managers believed there was a need to review where it fitted in the overall strategy of dealing with the interface bushfire risk. A program theory-based approach was suggested as a way to help clarify how the program worked and in what circumstances. This understanding could assist both in planning further evaluation work and in developing a strategy for the future of the program (see Ch. 3 this volume for an alternative methodology but complementary discussion).

Workshops with unit members and local station staff were conducted in three locations north, south and west of Sydney. The workshops followed the process outlined above to produce a theory of how the program is supposed to operate. This section discusses the workshop's results on two aspects of the program theory – the problem specification and outcomes, and how the program enables particular mechanisms. The implications of these findings for further evaluation and program planning are briefly considered.

The workshops identified several different dimensions of the perceived problem the CFU program is intended to address:

- the risk to life and property from bushfire
- residents' lack of awareness, understanding and capacity to deal with risk in bushfire-prone areas

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- the fire service's inability to deal alone with the bushfire threat during major fires
- the lack of community involvement in dealing with bushfire risk.

The program seeks to achieve particular outcomes, and there was broad similarity in the outcomes identified in the three workshops. The program outcomes can be considered in three broad phases – group formation, acquisition of firefighting knowledge, skills and equipment, and groups maintaining the capacity to respond effectively. The program logic underpinning these intended outcomes appears to be that:

> *IF* residents form local community groups *THEN* they develop a motivation and collective capacity and
>
> *IF* group members are trained and equipped *THEN* they have the understanding and ability to deal with the threat and
>
> *IF* groups deal effectively with a fire threat to their homes *THEN* they can support fire brigade crews and release these resources for other activities
>
> *RESULTING* in reduced losses and impact and a safer community.

Having clarified the outcomes and the underpinning program logic, the workshops then identified the program activities, possible mechanisms and contexts in which the activities are more likely to lead to the outcomes. The full program theory is being developed, however, some initial considerations are briefly outlined. They suggest some of the ways in which a program theory approach can assist with evaluation and planning.

The program involves processes operating across several different levels, from individuals and households, to local neighbourhoods and stations, to the level of organisations, government and wider social pressures and trends. Achieving program outcomes depends on the activation of particular mechanisms in particular phases of the program. For example, if a group is self-initiated its formation is seen to arise through two processes: individual concern about the threat generated either through the occurrence of fires locally or major fires elsewhere, or through long-standing concern about local issues such as access. However, it is also suggested that these concerns need to find common expression among neighbours, in a context where there is interaction, a sense of belonging and community spirit. It is also critical that there be a local champion who can bring people together, and people who are willing to commit time to the program.

Mechanisms at the level of individual psychology, such as fear and anxiety about a risk, connect with mechanisms of social interaction at the neighbourhood level to enable a collective response through the formation of the group. This represents a context–mechanism–outcome configuration that provides a possible explanation of group formation. It suggests links to notions of social capital, with the implication that in communities where there are weaker associational networks, groups may be less likely to form, leaving households more dependent on fire brigades for protection (Pope 2006). In terms of program planning, this explanation suggests that different approaches may be required in different areas and measures of social capital may provide useful indicators of where groups are more likely to form.

A second example concerns the second phase of program outcomes, in which groups acquire knowledge, skills and equipment. The core of the CFU program is training sessions delivered by local fire crews. Several key mechanisms were identified such as self-confidence, trust and empowerment that enabled people to engage with the training and successfully acquire the skills. These mechanisms were considered more likely to be activated where there was a positive relationship between the fire crews and the local community, where the same personnel trained

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the group rather than different crews on each occasion, where the fire crew had credibility and demonstrated commitment to the program, and where the sessions provided hands-on practice and participants received positive feedback during the training. A clear context–mechanism–outcome configuration is evident in this phase of the program, where the importance of community brigade interaction and training approaches based on principles of adult learning are essential.

A number of the issues identified in the workshops related to brigade–community relations and the role of firefighters in the training, and suggest that the program theory as it is supposed to operate is not always evident. Given that knowledge and skills to use the equipment is central to the logic of the program outcomes, anything that reduces the effectiveness of this skills transfer is likely to reduce the program's effectiveness. There were significant differences in the program approach and implementation between different regions which appeared to affect the nature and extent of brigade–community interaction, and hence potentially the effectiveness of the training. Similarly, some firefighters were considered to be highly enthusiastic about the program whereas others were seen to be only fulfilling their duties or showed less expertise in delivering the training.

This brief analysis suggests the benefits of further empirical studies to investigate the extent to which the training reflects adult learning principles, the role of organisational arrangements that differ from region to region and their effect on brigade–community interaction and the delivery of training.

## Street FireWise Evaluation (Blue Mountains Rural Fire Service)

Street FireWise (SFW) is a community education program run by the Blue Mountains Rural Fire Service (RFS) that involves delivering street corner meetings in communities in targeted high bushfire risk areas. Since the program was piloted in 2000 over 100 meetings have been run. The meetings are essentially scripted presentations to members of the general public with the aim of raising awareness of the bushfire risk in their area and the need to prepare for fire. They are delivered by volunteer community education facilitators from the local brigades in the Blue Mountains and supported by the Community Education Group at the RFS district office in Katoomba. After several years of running SFW, the Community Education Group was keen to gauge the effectiveness of the program and whether it was an efficient use of resources.

SFW evolved out of similar street meeting formats developed by the Country Fire Authority in Victoria and the Country Fire Service in South Australia. Over the five years that the program had been running, the content of the street meeting had been modified extensively to adapt it to the context of the Blue Mountains. The basic street meeting premise had been further modified to meet the specific needs of local brigades. The challenges in this evaluation were:

- to work out precisely what the program was intended to achieve (what the intended outcomes were)
- to identify where the program was successfully achieving its intended outcomes and where it was not
- to gain an understanding of the contexts and mechanisms conducive to the program outcomes being achieved
- to utilise this new understanding of how the program works, for whom and in what circumstances, to help with future program planning and implementation.

An alternative but related methodology to running program theory workshops was utilised in this evaluation. It involved conducting semi-structured interviews with a range of stakeholders in the SFW program. These included:

- program developers (particularly members of the Community Education Group)
- practitioners (trained FireWise facilitators)

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- local RFS brigade volunteers
- members of the public who had attended SFW meetings.

The interviews were run in two stages: first, initial consultation meetings with key stakeholders to help clarify the intended outcomes of SFW (an initial program logic), and second, more extensive interviews with a wider range of stakeholders to help develop the overall program theory. Other sources of information also proved invaluable, particularly in the initial phase of developing the hierarchy of intended outcomes (see Fig 12.1). These included various documents related to the SFW program (e.g. meeting scripts, annual reports) and the results of two concept-mapping workshops run in the Blue Mountains as part of a related component of Project C7. The second-phase interviews were particularly important for capturing many of the aspects of the underlying program theory. An interview schedule was designed to elicit information about the contexts in which the program was achieving its intended outcomes and the likely mechanisms that were being triggered.

| | |
|---|---|
| **Ultimate outcomes** | *Reduced impact from bushfires on communities in the Blue Mountains (fewer houses and lives lost)* |
| | *(Formation of neighbourhood networks)* |
| **Intermediate outcomes** | *Residents use awareness and understanding to develop a realistic survival plan, decide whether to stay and actively defend or leave early, and adopt appropriate preparations around their property, i.e. they become more self-reliant* |
| | *Residents gain increased awareness and understanding of the bushfire risk and how it applies to their specific context* |
| **Initial outcomes** | *SFW meetings are positively received by residents* |
| | *Targeted residents hear about meeting, are motivated to attend and do so* |
| | *Brigades must actively participate in SFW by targeting high-risk communities and running meetings* |

**Figure 12.1** Simple program logic for Street FireWise program represented as an outcomes hierarchy.

Overall, the findings of the evaluation highlighted the importance of context in the implementation and success of this program. People living in the Blue Mountains often refer to the 'upper', 'middle' and 'lower' Blue Mountains and this became a useful way to think about the contextual findings of the evaluation (see Fig. 12.2).

In appropriate contexts, SFW was found to have a degree of success in achieving initial and intermediate outcomes. This tended to be more likely where residents have attended two or more SFW meetings, or been exposed to other forms of bushfire community education activity. In contexts where SFW had not worked it had led either to program abandonment or program adaptation. Some of the adaptations proved successful but succession and sustainability issues have arisen. The report concluded that the attainment of ultimate outcomes could only realistically be achieved in conjunction with other community safety programs, policies and initiatives, both directly and indirectly linked to bushfires.

The Community Education Group of the Blue Mountains RFS developed a response to the report and has been able to factor some of the key findings into the future planning and development of the program. A major aspect of implementing the evaluation findings has been the careful consideration of the program logic matrix. This has provided a useful tool to consider the implications of aspects of the program logic, and the actions the group can take to enhance

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the SFW program. It has also helped the group to devise more effective ways of monitoring the program in future and to identify where alternative strategies are required for satisfactory community safety outcomes.

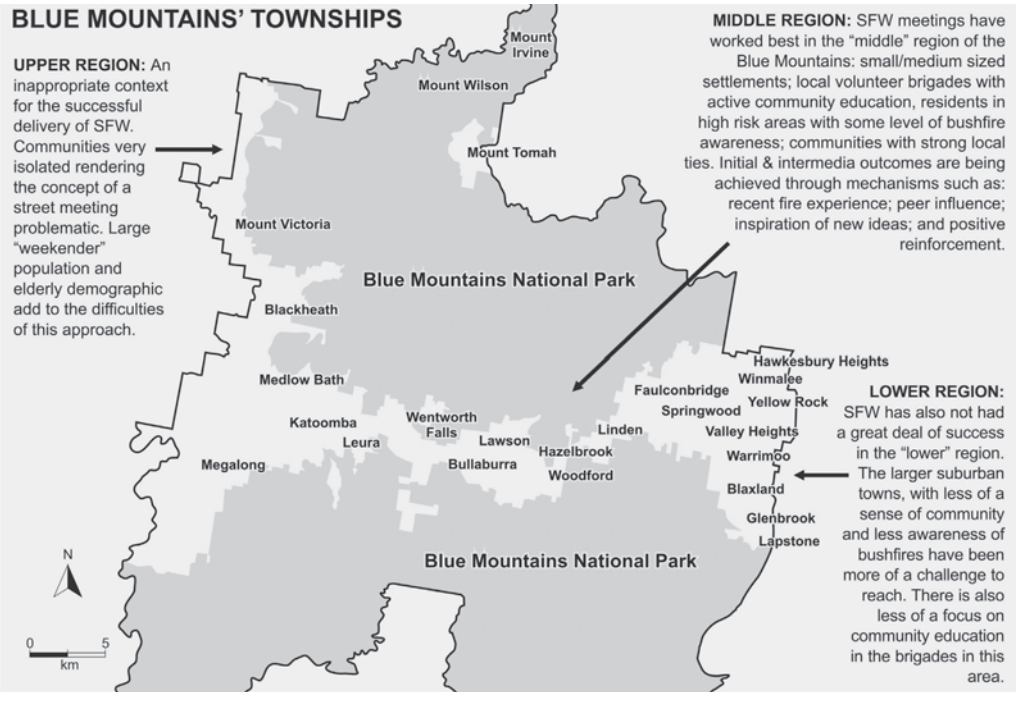


**Figure 12.2** Context is a major factor in determining program outcomes.

## Conclusion

The two case studies illustrate the potential for using a program logic/program theory approach in evaluating bushfire community safety programs. Workshops or interviews involving program practitioners provide a valuable source of local knowledge about programs and their implementation. This local knowledge is particularly important in terms of understanding how programs work. Practitioners have a wealth of first-hand knowledge about how programs operate, and this experience provides insight into the way programs actually work to activate particular mechanisms in particular contexts. The two case studies illustrate the value of working collaboratively with users to develop program theories. Whether gained through interviews or workshops, this local knowledge illuminates both the mechanisms and the contexts in which programs operate and thus informs program evaluation. In addition, the program theory approach helps to highlight why a program might work in some contexts but not others. This is particularly relevant when a program is implemented in different localities and communities, as often happens with bushfire community safety programs. In these cases it is paramount to think beyond the intended outcomes to the underlying processes and contexts that facilitate their operation.

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