# Project C7: Development of an Evaluation Framework for Community Safety Policy and Programs for Bushfire

# A Composite Solution for Concept Mapping of Community Safety Outcomes

Fire agencies across Australia have generally acknowledged that when a major bushfire occurs they do not have the resources to defend every home that may be in danger. For this reason community safety programs are playing an increasingly important role in efforts to increase the number of community members who are aware of the risks posed by bushfire as well as implementing appropriate planning and preparation, ultimately leading to less reliance on the fire agencies. However, at present there is little understanding of how effective these programs are, and, if they are, why? The project C7 research team has conducted eleven concept mapping workshops to identify what fire agency personnel and community members believe needs to change or improve in order for the community to be safer from bushfires. The following provides two examples of concept maps as well as descriptions of the composite solution developed by the researchers, and how the identified themes will be used in the development of a program logic. There will also be brief descriptions of each of the themes identified in the composite solution.

**Figure 1: Three Dimensional Concept Maps (Agency Group)**

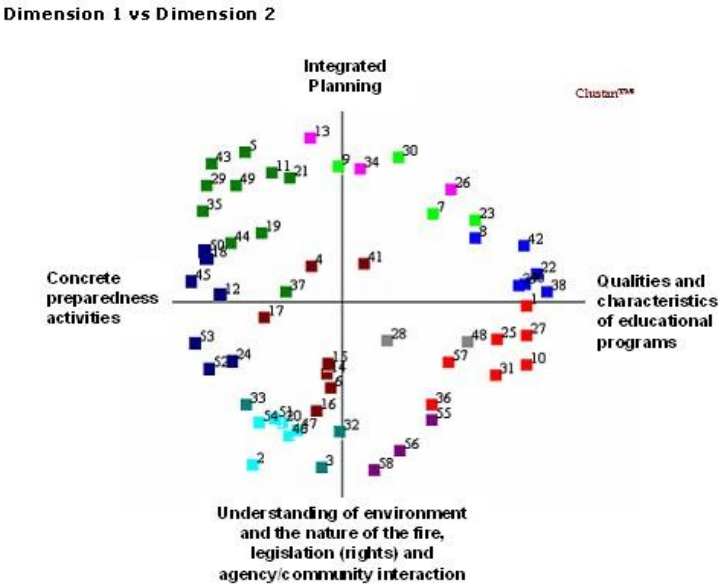



**Figure 2: Three Dimensional Concept Maps (Agency Group)**

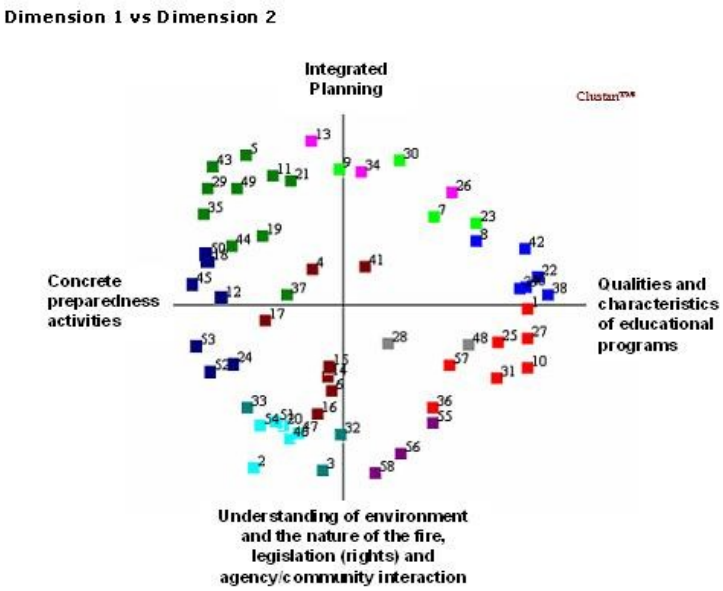



**Figure 3: Three Dimensional Concept Maps (Community Group)**

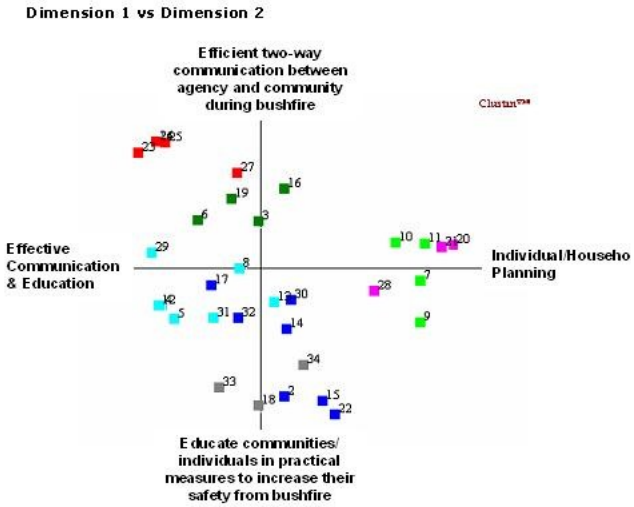
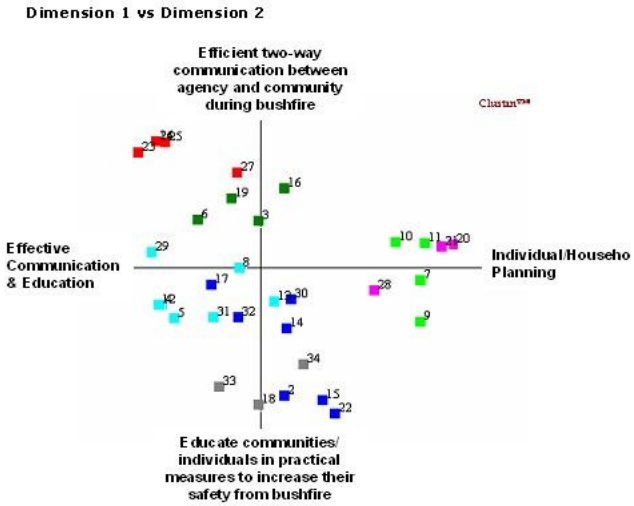



**Figure 4: Three Dimensional Concept Maps (Community Group)**



The above maps are examples of concept maps that have been created by researchers involved in the Bushfire CRC project C7 (*Development of an Evaluation Framework for Community Safety Policy and Programs for Bushfire*). They represent ideas that fire agency personnel (Figures 1 and 2) as well as members of the community (Figures 3 and 4) believe are important when considering community safety for bushfire. Computer assisted analyses of the data collected during concept mapping workshops were conducted using Clustan™. Multi-dimensional scaling (MDS) and cluster analyses were used to determine how each point (statement) was related to all the others and therefore its position on the map, as well as showing which points were most closely related to each other (thus forming clusters). After the maps had been produced the researchers, individually, then as a group named each of the clusters and dimensions. These 14 general clusters are described below.

Following the completion of the individual concept maps, the researchers identified common themes running through all the workshops that had been completed (seven of eleven). The cluster names for each workshop were sorted by the researchers into 14 general clusters that represented the changes or improvements that workshop participants believed need to be achieved to make households and neighbourhoods safer from bushfires.

The concept mapping process is a means by which the C7 research team has identified a range of views and interpretations about what is important to people who may be affected by bushfire. Building on this first step, the researchers are using the 14 general clusters to create a program logic model of community safety initiatives. The construction of this model will facilitate the researchers' understanding as to how and why a particular program works.

The concept mapping process allows large amounts of data to be presented in a meaningful way, illustrating what can be complex relationships between a range of ideas. This complexity does, however, present problems for the researchers when attempting to classify the data. Each participant interprets the statements and how they relate to each other differently. It is this interpretation that allows the concept map to be produced (through the sorting of statements followed by multi-dimensional scaling). However, this process does at times lead to statements ending up in a cluster that does not seem to match its meaning. For this reason the researchers are mindful of the need to validate the cluster names that have been constructed.

**Description of the General Clusters**

Below are the fourteen general clusters that make up the composite solution as well as a short description outlining how each concept can improve community safety for bushfire.

**1. Agency/Community Interaction**

Interaction between community members and agency personnel (fire agencies and/or other government bodies) was a theme running through all of the first seven workshops. Statements in this cluster are generally concerned with the flow of information between agencies and the public, before an incident occurs, with the aim of increasing resident awareness of the risks posed by bushfire as well as encouraging preparation to mitigate those risks.

Cluster 1 and cluster 12 (*Effective Communication of Information during Bushfire*) are linked by the notion of the necessity for interaction between community members and agency personnel, the difference being the time during which this communication takes place, ie prior or during a bushfire.

It is interesting to note that while communication between agencies and community members would seem to be a prerequisite for increasing preparedness, neither agency personnel nor residents rated it particularly highly on the importance scale.

**2. Household/Neighbourhood Planning and Preparation**

Statements concerned with the formulation of a plan that outlines an appropriate response to a bushfire and preparation that enables the chosen plan to be implemented make up the largest of the general clusters (approximately 17% of the total). Statements within this cluster cover a range of aspects dealing with individual and community preparation and planning.

In relation to the original seeding statement (Thinking as broadly as possible, generate statements that describe specific changes or improvements you think need to be achieved to make households and neighbourhoods safer from bushfires), cluster 2 is perhaps an important one. There is a statistically significant difference between the community and agency perception of the difficulty in achieving adequate planning and preparation. The reasons for this difference are not clear at this stage of the project, however, if community members are taking the messages about planning and preparation on board but failing to properly prepare, they could be placing themselves in danger. Alternatively, the perception among community members that appropriate planning and preparation are relatively easy to achieve may be related to the population participants were drawn from. Community members who took part in the concept mapping workshops had all been involved in some form of community safety program possibly indicating that planning and preparation had already been carried out by participants.

**3. Deciding and Planning for 'Stay or Go'**
Cluster 3 is seen as relatively important by both community members and agency personnel. This is perhaps unsurprising as a decision to stay and defend a property or to evacuate to a safer area will influence subsequent planning and preparation. Despite this perceived importance, cluster 3 is the smallest of the general clusters, consisting of only ten statements taken from two workshops (one fire agency and one community group). One possible explanation for the small number of statements that make up this cluster may be that the fire agency has an official 'stay or go' policy as part of its efforts to increase community safety from bushfire and the community members had all been exposed to messages based on a similar official policy.

It is important to note however, ideas similar to those expressed in this cluster also appear in statements from other workshops, in different general clusters, for example the more general 'Household/Neighbourhood Planning and Preparation'.

This data raises the question, is there a difference in the preparedness levels of those community members exposed to messages explicitly concerned with 'Stay or Go' compared with those who may have made decisions about what they will do in the event of a bushfire threatening them, without exposure to this type of statement? There could be benefit in more research being carried out in this area. However, the population from which the participants were drawn may again be affecting the responses, because the community members, who participated, are more likely to have already decided that they will stay and defend.

**4. Use of Incentives to Achieve Preparedness**
The use of incentives to encourage preparedness (or, conversely, the use of penalties to discourage inappropriate or risky behaviour) was an idea raised during three of the seven concept mapping workshops (one with agency personnel and two with community members). The incentives most commonly mentioned were financial, for example, discounts on insurance rates for those who properly prepare their properties. The other element in this cluster is one of social pressure. A suggested method to increase the level of compliance was to publicise the names of people whose behaviour was illegal or risky.

The use of incentives to improve the level of preparedness in the community did not rate highly for importance among either community members or agency personnel. At the same time a perception exists that measures such as those proposed would be very difficult to implement. This suggests that if incentives were to be adopted as a strategy to improve community safety from bushfire they should be introduced after a range of other approaches are in place.

**5. Understanding/application of Regulations for Bushfire Safety**
Cluster 5 is very much about a 'top-down' approach to improving community safety from bushfire. The focus of this cluster is not only the need for appropriate legislation to be put in place and enforced but ensuring community members and local governments understand why those laws are necessary. For example, it was felt that regulations restricting development in high risk areas should be more strictly enforced by local government.

**6. Policy Framework for Agency and Organisational Roles**
The statements in cluster 6 are concerned with the means needed to improve the policies and procedures fire agencies implement in response to the drive to increase community safety initiatives.

The majority of the statements in cluster 6 originate from concept mapping workshops consisting of agency personnel. The single workshop that contributed statements by community members stands out because of the very high importance and difficulty ratings. While there is a statistically significant difference between the views of agency personnel and community members over how difficult it will be to implement improved policy frameworks for agency and organisation roles, both groups consider this cluster to be important to efforts to increase the effectiveness of community safety programs for bushfire.

**7. Principles Underpinning Program Development and Adult Learning**
Community education is one element of a community safety approach to reducing the risk posed by bushfire. It is, however, a major element, as can be evidenced by the fact that all the concept mapping workshops produced statements related to the provision of education and information (cluster 9). However, cluster 7 consists entirely of statements from a single agency workshop. Whether this is the case because other fire agencies have not considered the theoretical aspects of program development and delivery at the same level as the agency that contributed the statements that make up cluster 7 or these notions were not raised during the workshops for some other reason is at this stage unknown.

**8. Individuals/Community have a Realistic Understanding of Risk**
Cluster 8 consists only of statements from concept mapping workshops conducted with agency personnel. The focus of the statements in this cluster is on the importance of community members <u>understanding</u> the range of factors that influence risk. For example residents are not only aware of how a bushfire is likely to behave if it threatens their property, but are well enough informed so as to have been able to reduce the

risk posed by that event.

Cluster 8, as can be seen in figure 5 was judged by agency personnel as the most important cluster, indicating the centrality of this mechanism in making community members safer from bushfire. Work on the program logic model will provide insight into how a realistic understanding of the risk posed by bushfire is achieved.

**9. Appropriate Information/Education Activities**

The label 'community safety programs' is often used inter-changeably with community education programs. While education is only one aspect of a much wider suite of interventions that make up a community safety approach, it is an important one.

Six of the seven participating groups contributed statements related to the provision of education, to a range of groups and using a number of different methods, including; regular programs delivered at schools, site specific street meetings as well as more general information campaigns using different forms of media.

As with a number of the clusters in the composite solution, there is a statistically significant difference between the agency and community groups in relation to the perceived difficulty in implementing appropriate information/education activities. As can be seen in Figure 7, agency personnel believed the task identified by this cluster as more difficult to achieve than did community members. Cluster 9 is also the only cluster where a statistically significant difference occurs for the importance rating. As with earlier clusters, questions relating to the population are relevant. Those community members who participated in the workshops may have felt that they had sufficient information, whereas, agency personnel may have had more of a focus on the wider public, many of whom have had little or no exposure to appropriate education or information campaigns.

**10. Community Ownership and Responsibility for Bushfire Safety**

Community safety programs are one response to the realisation by fire agencies that they do not have sufficient resources to protect every property that may be threatened during the course of a major bushfire. Cluster 10 is one of the desired outcomes so far identified by the researchers. The statements in this cluster are about community members taking responsibility for their own safety, planning for themselves and the communities they belong to. Most importantly, however, this process needs to be self-sustaining. That is, individuals and communities, with the support of fire agencies, will be able to reach appropriate decisions about what they will do in the event of a bushfire, implement those plans as well as update them as circumstances change.

**11. Agency/Inter-Agency Responsibilities and Co-ordination**

Within cluster 11 the researchers have identified two related, yet distinct concepts. The first relates to agency responsibilities for the community. Two examples of this are, providing education programs as well as making sure agency members understand the legislative requirements that will affect them and members of the public when carrying out their duties. The second element within this cluster relates to the intra-agency relationship between the operational branches of an agency and those concerned with community safety initiatives. Many of the agency personnel who took part in the concept mapping workshops believed that a balance between the prevention/preparation and response was important in ensuring communities are safer from bushfire.

**12. Effective Communication of Information during Bushfire**

Cluster 12 consists of statements generated by both agency personnel and community members. The majority of statements in this cluster are concerned with the way in which fire agencies deliver information to community members during a bushfire. The other element expressed in cluster 12 is that to improve community safety from bushfire, systems need to be implemented that enable community members to communicate information to fire agencies, making use of local knowledge. The former group of statements were made by members of fire agencies, the later by community members.

While the sample size is small, it is nonetheless interesting that during bushfire, fire agency personnel would like more efficient ways to communicate with the public (advise them of appropriate action) while the public feels there are no/few effective mechanisms available that allow them to have meaningful input.

**13. Community Networks and Partnerships**

The majority of people are, in some way part of community networks. These networks will influence the capacity of communities to self-organise, and to work in effectively with fire agencies, and other authorities. The networks will also influence community resilience and sustainability of community safety efforts.

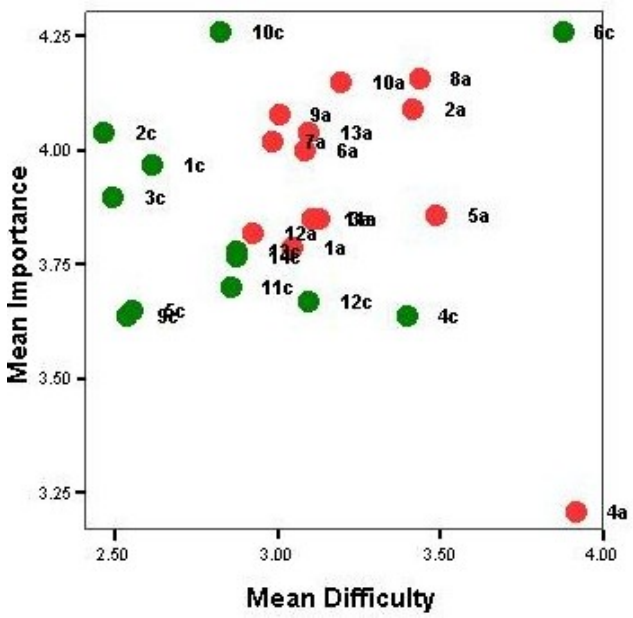
**14. Community and Agency Responsibilities to Address Specific Needs**

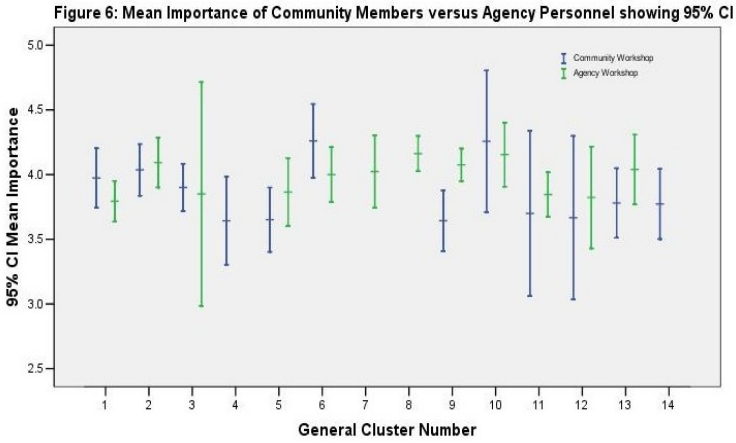
The final cluster in the composite solution consists only of statements from workshops with community members. In general, statements in cluster 14 are related to very specific, local issues, as well as being practical solutions to identified problems. For example, the installation of safe barbeques in the local park or better management of roadside fuel loads.

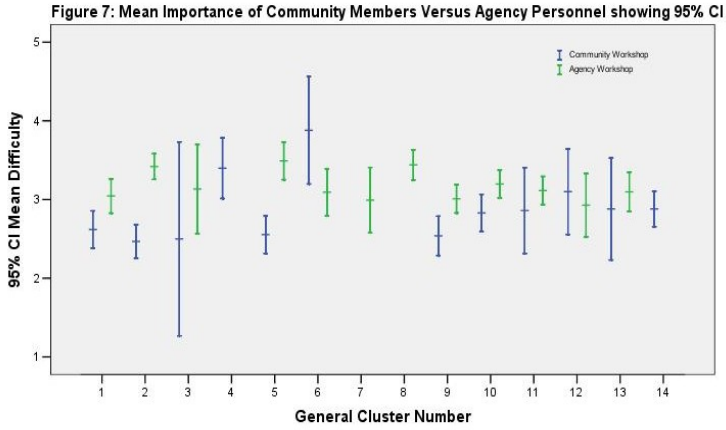
## Importance and Difficulty Ratings

In each of the concept mapping workshops participants were asked to rate each statement on a scale of 1 to 5 in terms of its importance to making households and neighbourhoods safer from bushfire and the difficulty in implementing the proposed changes. Figure 5 is a scatter plot of the mean ratings for importance and difficulty for each of the 14 clusters described above. It also enables comparisons to be made between the community members and agency personnel. The major difference between the two groups is the comparative ease with which participants from community groups believed the suggested changes could be achieved. Only clusters 6 (*Policy Framework for Agency and Organisational Roles*) and 12 (*Effective Communication of Information during Bushfire)* were rated as more easily achievable by agency personnel. As with a number of the differences described above, the difference in the difficulty ratings may be attributable to community members who have taken part in a community safety program of some description achieving a sufficient level of preparedness, whereas, the participating agency personnel were thinking of the general population. However, at this stage there is not enough data to arrive at a firm conclusion.

**Figure 5: Mean Importance by Difficulty: Community Members (c) versus Agency Personnel (a)**




Figures 6 and 7 show error bars for the 14 clusters, comparing the importance and difficulty ratings given by community members and fire agency personnel. The error bars provide a measure of whether or not there is a statistically significant difference between the participating groups (community versus agency) as well as the different clusters. For example, there is a statistically significant difference between community members and agency personnel in relation to how difficult they believe it will be for the wider community to adequately plan and prepare for bushfire (cluster 2).

The data presented in Figures 6 and 7 provides some interesting insights into what the public and agency personnel believe to be important factors in community safety programs for bushfire. However, some important points need to be made. Firstly, due to the small number of statements, fire agency data was removed from cluster 4 during the analysis. Secondly, it should be kept in mind that due to multiple testing there is a possibility that false positive results will occur.