Public awareness and education – can it lead to behavioural change?

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Abstract

Many landholders living in the Northern Territory, Australia, have experience in managing mimosa, *Mimosa pigra* L. However, since it is mainly a weed of floodplains and wetlands many urban residents may not recognise it. This has implications for public education and awareness programs. Successful programs must influence the target audience's knowledge, attitudes, skills and aspirations, and cause changes in practice or behaviour. Changes in behaviour in urban audiences are important because urban dwellers may be involved in activities that inadvertently spread mimosa between catchments. Keeping mimosa in the "public realm" is important, but may not lead to a behavioural change. Motivating people to change their behaviour has been one of the most difficult enterprises in human affairs. Planning an awareness or education program should involve a number of tools and techniques, such as social marketing, environmental psychology, communication planning and, most importantly, evaluation methodologies. In relation to mimosa, the sort of changes aimed for might be removing seeds from boats and camping gear or implementing a control or management strategy on their property. This paper provides an example of a program that targeted recreational fishers and outlines the mechanisms used that resulted in a behavioural change in this group.

***Keywords*:** mimosa, *Mimosa pigra*, social marketing, evaluation techniques, evaluating change.

Introduction

The challenge for weed managers is to determine the most effective way of achieving a behaviour change that will reduce the spread and consequent impact of weeds.

Techniques used include: public awareness (manipulating the media to protect your interests in the public realm); education (to train or instruct for a particular purpose); and extension (the use of communication and learning to help individuals and communities identify potential improvements to their practices and provide them with the skills and resources to effect these improvements). The way public awareness, education and extension are used for raising awareness or attempting to bring about behavioural change is very important. Weed-management projects should include these techniques.

The Australasian–Pacific Extension Network (1999) states that extension involves "the use of communication and adult education processes to help people and communities identify potential improvements to their practices, and then provides them with the skills and resources to effect these improvements". Therefore, extension deals directly with primary target groups, such as, Aboriginal communities, pastoralists, park managers, rural landowners etc. for the management of mimosa, *Mimosa pigra* L., and may involve

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one-to-one assistance or information exchange, workshops, field days, or staff providing weed-management planning workshops.

Public awareness, however, is probably best suited to secondary target groups such as recreational fishers and hunters, and tourists. Secondary target groups may not be directly involved in managing mimosa but may visit areas where mimosa occurs, and be inadvertently involved in its spread.

Social marketing, public awareness and education

Social marketing deals with intangible products, such as selling weed awareness to urban audiences. Social marketing uses the tools and techniques of education, which were developed in advertising and public relations. Advertising is not about changing behaviour; it is about changing brands. On the other hand, public relations deals with manipulating the media to protect your interests in the public realm. Social marketing extends beyond this to include community development, training, infrastructure, planning, and more. Examples of social marketing are social health programs, and rubbish recycling programs.

Public awareness and education is only the first step along the road to behavioural change. There is a huge gap between providing education and achieving desired behavioural change. Education aims to increase people's knowledge with the motive that this will contribute to changes in behaviour. Unfortunately, changing people's behaviour is one of the most difficult enterprises in human affairs. In the short term, educational approaches work only when the main barriers to action are internalised to the individual (Gardner and Stern 1996).

Education may have important indirect effects and lead to changes in regulations and policies. For example, growing public knowledge about the deleterious effects of passive smoking led to significant changes relating to smoking in public places. Education is only likely to induce changes to people's behaviour that is compatible with their deeper values. Education is unlikely to succeed if it goes against ethics or strongly held attitudes. Such programs are more effective when they are designed according to psychological principles of communication and when they directly address the links between attitudes and behaviour. Attitudes and beliefs are closely linked to personal values as follows.

- People who value wealth tend to highly value power and influence.
- People who value variety in their lives tend to also value excitement and enjoyment.
- People who value honesty also value obedience, cleanliness and family security.
- People who value social justice also value equality, beauty and protection of the environment.

Personal values are likely to be especially strong determinants of pro-environmental behaviour because people tend to react to environmental conditions on the basis of their limited knowledge or experience (Gardner and Stern 1996).

Consequently, it is sensible to design an education and awareness program that covers all limiting factors or barriers that are faced by significant numbers of individuals in the target group. These barriers may include a lack of knowledge, skills or experience, or a lack of technology or equipment. In this way, each individual can take advantage of elements of the program that are most relevant to their situation. A "multi-pronged" approach is suggested in Figure 1, to ensure that all the barriers faced by an individual or community group are dealt with.

A major governing factor in implementing an extension or education program is adequate resources. When resources are limited, choosing the most appropriate method for best gain becomes important.

The target group will be in the best position to identify the barriers preventing changes to their behaviour. There are two strategies that may reveal this information to program designers. The first is carrying out surveys of the target audiences' knowledge, skills and attitude toward particular topics, and about their experiences, such as their dealing with previous problems. The second is including representatives of the target group on the design team to provide feedback.

Evaluating programs

Determining the outcomes of an extension project, good and bad, is important and can be achieved through evaluation (Murray 2000). Developing an evaluation culture will help to make decisions that improve service delivery and provide accountability to stakeholders (Kefford and McDonald 1998). A number of tools that may be utilised for program evaluation are; Wissemann's six steps, Owen's forms, log frames, qualitative and quantitative techniques of information gathering, and benefit–cost analysis.

Methods

An education and awareness program was directed at recreational fishers who are members of the Amateur Fishermen's Association of the

Northern Territory (AFANT). The aim of this program was to change the behaviour of fishers to reduce the risk of spreading weeds, and to determine the best methods of information delivery to this group. This campaign and its evaluation was carried out in three stages.

Stage 1 was a benchmarking survey to determine fishers attitudes towards and knowledge of serious weeds in the Northern Territory (NT), namely mimosa, salvinia (*Salvinia molesta* D.S. Mitchell), Noogoora burr (*Xanthium occidentale* Bertolini) and parkinsonia (*Parkinsonia aculeata* L.).

Stage 2 consisted of a multi-pronged approach comprising: presentations to fishing clubs; articles in the AFANT newsletter; messages on key rings, stickers and posters; newspaper articles; advertisements in fishing magazines; and a three-minute TV segment.

The final stage was to evaluate the effectiveness of the program. The different techniques used to evaluate the project are described below.

Wissemann's (1998) six steps

Wissemann's (1998) six steps were used as the framework for the evaluation stage.

Step 1. Clarify the evaluation request

The purpose of the evaluation was to determine if a behavioural change could be achieved via a program targeting recreational fishers. The author proposed the evaluation, as recreational fishers are considered a target group, i.e. they visit areas where weeds are present and have been seen to tie boats underneath seeding mimosa plants. Members of AFANT were selected as they have over 600 members and access to their postal addresses was available with support of the AFANT Executive Officer.

Step 2. Focus the evaluation

The key questions that the evaluation sought to answer were:

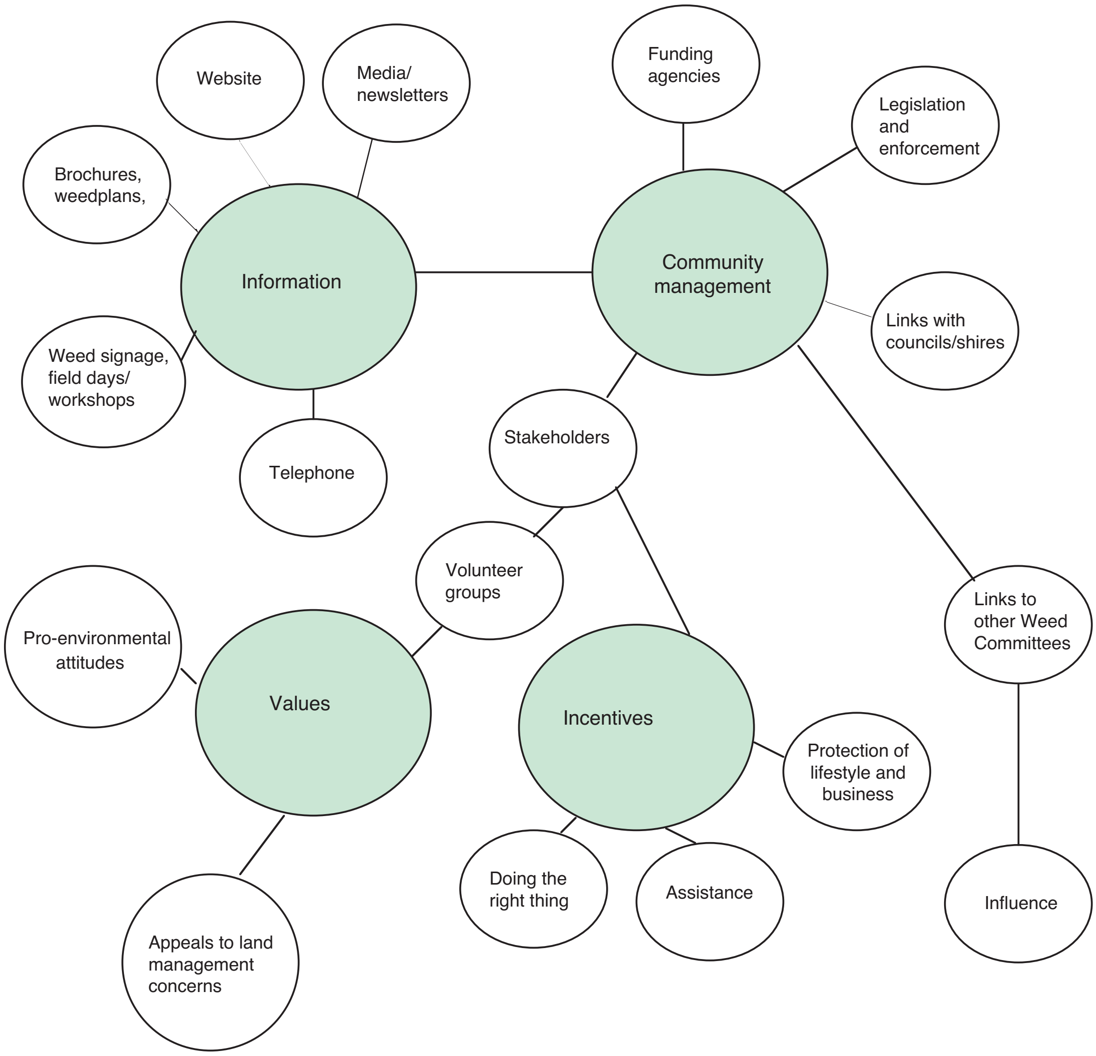

Figure 1. An example of the factors and parameters to consider in a multi-pronged approach.

1. Will an awareness program be effective by provoking a behavioural change?
2. What implications will this have for future education and awareness programs?
3. What are the most effective methods for distributing information about weeds to AFANT members?

Step 3. Identify information needs

The type of information needed to answer the three key questions involved developing further questions relating to **K**nowledge, **A**ttitudes, **S**kills, **A**spirations and **P**ractice change (KASAP). The author was interested in finding out if AFANT members' knowledge about weeds had increased due to the program, and whether this resulted in a behavioural change.

In addition to KASAP questions, other questions sought to determine what products/tools and information-delivery techniques were most effective during the program. The questionnaire was developed to gather qualitative information and not quantitative and so the important component of data collection was missed. This was rectified at a later stage.

Step 4. Identify Information sources and data collection methods

Quantitative data. Quantitative data deal with, how much, how often, and how many.

Information was sourced from AFANT members using a mail survey and involved gathering information such as whether members could identify the weeds mentioned in the survey, or if they knew ways in which weeds could be spread. The questions addressed KASAP changes. Although more than 50% of AFANT members replied to the survey, this data-collection method could have been improved if follow-up reminder by phone or mail was undertaken.

Qualitative data. Qualitative data generally involves gathering information about feelings, experiences, or opinions.

Information was gathered at boat ramps, fishing clubs and an outdoor boat, motor and leisure show. This involved discussion and noting people's experiences (intuitive), asking semi-structured interview questions, documenting comments, and noting behaviour. This technique yielded information such as attitudes toward the government's role in coordinating weed management.

Data collection could have been made more robust and transparent by making the process clear in the program proposal and by developing a more rigorous approach to data collection. This could have involved developing a spreadsheet to record data at a presentation to AFANT members, including such fields as the number of questions asked, positive or negative reactions, the number of times people interacted, requests for further information, etc. Another alternative could have been to include qualitative questions within the questionnaire using scales to indicate feelings towards weeds, or including an area for comments or stories relating to weeds.

Applying both quantitative and qualitative techniques in any evaluation improves both rigour and transparency.

Step 5. Decide on the methods of data analysis and reporting procedures

An Excel spreadsheet was developed to record the information gathered from the returned questionnaires.

Step 6. Record the sequence of evaluation activities and produce a written evaluation plan, including timelines and assigned responsibilities (where necessary)

PERT and GANNT charts were used to record actions, plans, timelines and responsibilities.

Table 1. John Owen's forms of evaluation.

	FORM A	FORM B	FORM C	FORM D	FORM E
	Proactive	Clarification	Interactive	Monitoring	Impact
ORIENTATION	Synthesis	Clarification	Improvement	Justification fine tuning	Justification accountability
FOCUS	Program context	All elements	Delivery	Outcome delivery	Outcome Delivery
TIMING	Before	During	During	During	After
Examples	Needs assessment, review of best practice	Logic, accreditation evaluability assessment	Action, research, responsive	Tracking indicators over time	Objectives-based Needs-based Goal-free

Owen's forms

Impact evaluation, Owen's form E (Table 1), (Owen and Rogers 1999) is used to assess the impact of a settled program and assumes some logical end-point analysis. Form E was used to help assess the awareness program that targeted recreational fishers. In this case, Owen's Form E was used to make a decision about whether or not the AFANT program produced a behavioural change and where improvements could be made to future programs. It is important to remember that it is not used to measure whether an area of land was "saved" from the accidental introduction of weeds, or the associated benefits.

Impact evaluations are often used to justify expenditure. The major approach used with John Owen's Form E is an objectives-based evaluation, i.e. judging the worth of a program by the extent to which the program achieved its stated objectives.

Bennet's log frame

Bennet's hierarchy (Table 2) was used to summarise the activities and outcomes of the program. It is a seven-level ladder that conceptualises hierarchical levels of program outcomes. Where evaluation is concerned, it can also be used as a framework for focusing the activities that are to be undertaken. It can also assist evaluators to think about the desired outcomes of a particular education program, as well as highlight some of the assumptions that may not always be obvious.

Benefit versus cost

A benefit–cost analysis is difficult to undertake where the immediate benefits may not be tangible. For example, could the absence of weeds in a freshwater fishing area be a result of the campaign? Jones (2000) pointed out that "Benefit–cost analysis recognises that expenditure on weed control represents an investment and that the benefits from that investment can be spread over a number of years. Therefore, the immediate benefits may not be known".

Results

Fifty two percent of respondents replied to the questionnaire mailed to AFANT members. The first four questions related to members knowledge base and the following information was gathered.

Knowledge of weeds. As a result of the weed awareness program 51.2% of respondents felt that they knew a little more about weeds than they did before the program and 21% indicated that they new a lot more.

Increase in understanding. Nearly 70% of respondents indicated that they had a greater understanding of the extent of the weed problem in the NT as a result of the program. Seventeen percent indicated that they knew no more about weed problems in the NT after the program than before, and 5% were undecided. Similar results were gained from the question asking whether respondents had a wider understanding of the impacts that weeds have on the environment, i.e. 70% indicated that they did have a wider understanding as a result of the campaign.

Preventing the spread of weeds. Seventy-three per cent of respondents indicated that they were more aware of how weeds are spread. This was an improvement from the initial benchmarking stage (44%).

Removal of weeds. Over 80% indicated that they had checked their boat, motor and camping gear before departing an area when they were asked whether they had attempted to remove weeds or plants/seeds from their boat, motor and camping gear. This section also provided respondents with an opportunity to provide examples of what they had done if answering "yes" to the question.

Weed recognition. Question five (Figure 2) was also a skills-based question as it asked whether respondents were better able to recognise weeds such as mimosa, Noogoora burr, parkinsonia and salvinia as a result of the campaign. Respondents indicated that they had improved their recognition of mimosa and salvinia, followed by noogoora burr and parkinsonia.

Reporting of weeds. The results in relation to whether respondents were more likely to report strange or different looking plants to a Weeds Officer were positive. The majority (65%) indicated that they were more likely to.

Value and costs of information sources. Rankings and costs in Australian dollars for products seen during the campaign are shown in Figure 2. Rankings were determined after asking participants where they had seen information on weeds. The most cost-effective means of distributing information to members was via the AFANT newsletter, which is distributed to all AFANT members free of charge. Surprisingly, weed signage was the second most seen awareness product. There are only six signs currently in existence in NT all at launch sites. This is an interesting result as there are over 50 launch sites across the northern NT. In the future it may be useful to collect data on boat ramp usage to assist with survey design and data collection. The least effective means of distributing information was via the Internet. This may change in the future as

Table 2. Bennet's log frame.

Hierarchy level	Level objectives	Indicators	Information sources and collection techniques	Assumptions
7. Overall community level outcome	A reduction in the spread of weeds. Reduced likelihood of weed introductions. Increased percentage of AFANT members being aware of weeds.	Weed free waterways remain weed free or further spread prevented.	GIS maps, surveys, satellite imagery. Link in with surveillance programs. Anecdotal feedback.	An awareness campaign will produce a behavioural change
6. Change in practice	Removal of plant parts from boats/persons. Reporting of unusual plants.	Anecdotal feedback. Survey results. Reports of strange plants.	Mail survey (Quantitative data)	An awareness campaign will produce a behavioural change
5. Changes in KASAP (Knowledge, Attitudes, Skills, Aspirations, Practice change)	**K:** Improved knowledge about noxious weeds. **A:** Weeds have a higher priority/ importance. **S:** Weed identification skills improved. **A:** Protection of NT waterways, prevent new introductions. **P**: not tying boats under seeding plants, removal of plant parts etc.	Changes in KASAP	KASAP changes documented Qualitative – Narratives, reactions, feedback	An awareness campaign will produce a behavioural change
4. Reactions	Positive and negative responses. Reporting of noxious weeds.	No of responses Anecdotal feedback quantitative/qualitative	No of enquiries, personal experiences.	AFANT members will contact the Weeds Branch to report sightings of unusual plants.
3. People involvement	AFANT members	Responses Requests for information.	Quantitative Qualitative	AFANT members are genuinely interested in protecting freshwater waterways.
2. Activities	Develop media/education campaign. Communication plan, survey questions, prizes, etc	Presentation, extent type, range of extension material.	Analyse mail survey Report on project to Director/ staff and AFANT members.	Support from senior management.
1. Resources	Time, $$	Details of resources allocated to evaluation	Previous survey Budget	$$ available to carry out the campaign.

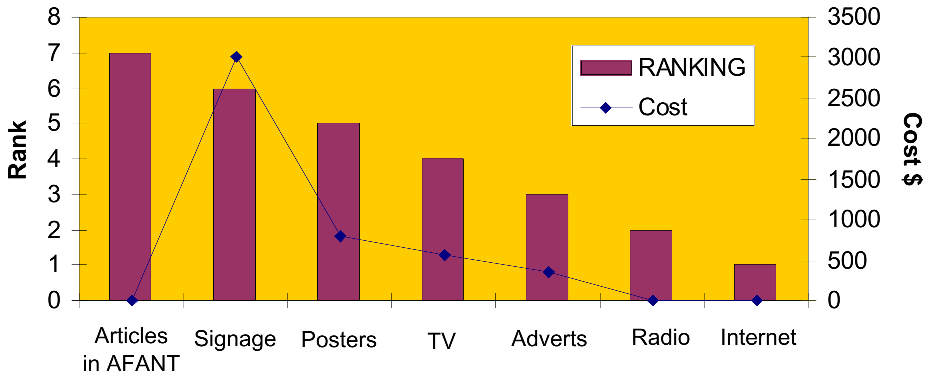

Figure 2. The ranking and cost (Australian dollars) of products used.

more members become aware of the AFANT web site or increase their use of computers.

Conclusion and recommendations

It is almost impossible to achieve 100% behavioural change as the result of any public awareness and education program, but rates of success can be increased with a multi-pronged approach. Providing incentives in the form of prizes valued by the target group is also a consideration, i.e. prizes consisting of lure packs were provided to members if they returned the questionnaires.

The results from this campaign are encouraging, as a significant proportion of members said their knowledge and weed recognition had improved. Unless public awareness and education is planned and evaluated it is difficult to determine or quantify the value of such programs. Clearly, consideration must be given to how and where extension and public education should be used, and to methods, products and information delivery mechanisms to be implemented, the costs involved, and the intended outcomes. Extension or public education needs to be linked directly to weed-management projects and integrated into planning processes.

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