final report

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New Approaches to Weed Management Extension in Southern Australia

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Abstract

It has been estimated that weeds in pasture systems have a cost to the Australian economy of up to $792m per annum (Burton and Dowling, 2004[1]). There is a wide range of attitudes to weeds in pastures in southern Australia ranging from "weeds are hardly a problem with good grazing management" to legal requirements to try and eradicate all the plants designated as weeds of national importance from the landscape

This project was designed to identify the views of extension workers across southern Australia on the critical failure and success factors in adoption of best practice weed management, determine the strengths, weaknesses and effectiveness of current weed extension and devise improved approaches to stimulate action by graziers.

The report summarises the views of extension practitioners and highlights the success and failure characteristics of extension strategies and provides a set of best practice scenarios for effective extension.

The primary recommendation is to trial the use of a capacity building approach as outlined in scenario 1 in a region to test the applicability and validity of this approach to improving weed management in high rainfall areas.

[1] Burton, J. and P. Dowling (2004). Pasture management for weed control: a graziers guide to controlling annual weeds in southern Australian improved pastures. NSW Agriculture and the Cooperative Research Centre for Australian Weed Management.

Executive Summary

Meat and Livestock Australia (MLA), in partnership with Australian Wool Innovation (AWI), is developing a weed research and development program across southern Australia. Both organisations are concerned that current extension and information delivery approaches are not leading to optimal advances in weed management practice.

This project seeks to meet the following objectives:

1. From extension workers across southern Australia, identify their views on the critical failure and success factors in adoption of best practice weed management by producers.
2. Determine the strengths, weaknesses and effectiveness of current weed extension processes, activities and information presentation in relation to adoption barriers and success factors
3. Devise improved approaches for the development and delivery of extension processes, activities, tools and information to stimulate action by graziers

The project links with a complementary social research project managed by the Institute for Rural Futures at the University of New England (IRF) which aims to identify and characterise the barriers to adoption of best weed management practices among graziers and the key motivators for change.

Findings

Part A. The key findings from the literature review were:

1. Credibility is a key to extension effecting change – fostered by a history of relevant, practical and useful advice that helps the day-to-day operation of the business.
2. The features of an effective extension agent are:
    - authority and technical expertise of the extension agent;
    - perceived similarity of the extension agent to their audience (in terms of attitudes and values);
    - local profile of the extension agent (e.g., local residence, participation in community);
    - communication skills of the extension agent;
    - personal relationships between the extension agent and farmers; and
    - extension agent acknowledgement of and empathy with the circumstances and problems of farmers.
3. Demonstrations and trialling of new technology/practices is a key step in the adoption process enabling farmers to see and test the change in their own system.
4. Multiple methods of message delivery improves effectiveness – increases the chances of reaching more of the targeted groups, it accounts for different learning styles and the repetition that occurs can reinforce the credibility of the information.
5. Appropriate support activities, whether they are group based or one-to-one opportunities are essential.

6. Engagement with relevant communities of practice can build capacity by bringing together diverse skills and knowledge eg researchers, farmers, agronomists, weeds officers.
7. Market segmentation and a personal approach can increase participation
8. There is a set of principles and practice for the five models of extension which allows effective activities to be designed and delivered.

A summary of the actions or tactics considered by the interviewees and focus groups to be more or less successful is shown in the following table.

Strategy	Measure of success (+ successful, - unsuccessful)
One on one contact with clients	+++++
Demonstrations	++++
Small group activity	+++
Field days	+++
Glossy Brochures	- - -
Internet	- - - - -

Part B. The themes emerging from the "rich picture" created by the interviews, focus groups and N-Vivo analysis were:

- Weeds management and extension has to be seen in the context of related institutional arrangements

- Institutional arrangements related to weeds management, research and extension are fragmented and call for new relationships and consolidation of effort

- Improving weeds management and related services, including extension, is an exercise in capacity building

- Credibility is a product of sound technical knowledge related to the local situation and trustworthiness based on a history of 'delivering the goods'

- Current extension practice is 'shot gun' in nature and assumes an homogenous audience ready to respond to messages our institutions see as relevant – the reality is a differentiated audience ready to hear messages related to what they see as benefits – this constitutes a fundamental strategic mismatch

- Needed changes in extension strategies and related institutional arrangements and practices constitute an innovation that depends on national, district and local leadership

Part C. Three scenarios that represent 'best extension practice' for weeds identification and management are presented. The scenarios are set in the fictitious high rainfall grazing district of Cooladore.

Scenario 1 depicts a capacity building initiative based on a convergence of local and institutional leadership in response to the threat to the district posed by weeds. The setting subsumes the interests of graziers and agricultural extension operatives into concern among diverse stakeholders about the impact of weeds on the wider community.

An outcome of scenario 1 is the establishment of working parties to address different aspects of the weeds situation. One of these is an extension program aimed at the grazing community. This is developed as scenario 2.

Within the scenario 2 situation, the place of applied research on weeds and benchmarking and monitoring related to their incidence is developed as scenario 3.

Recommendations

1. That MLA/AWI trial the use of a capacity building approach as outlined in scenario 1 in a region to test the applicability and validity of this approach to improving weed management in high rainfall areas.

2. That MLA/AWI use the scenarios developed in this project as the basis for developing a training package for weeds related professionals

3. That MLA/AWI use their influence to convene a meeting of key stakeholders in weeds extension funding and develop a strategy for integrated delivery to producers in high rainfall areas.

4. That MLA/AWI develop a strategy to reform communication related to weed management based on social marketing principles and practice.

5. This project and the parallel IRF one constitute a platform for continuous improvement in extension related to weeds management. It is recommended that LWA/AWI nominate this as an ongoing action research project and fund and manage it accordingly.

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1 Introduction

Australia has a national weeds strategy agreed to in 1991 by the Agricultural and Resource Management Council of Australia and New Zealand, the Australian and New Zealand Environment and Conservation Council and Forestry Ministers (ARMCANZ, 1999). This document also highlights the shortcomings of existing approaches to weed management.

Apart from the resistance of some weeds to chemicals in crops and the on-going need to find the right chemical combinations, weed management strategies are quite well defined in cropping systems. Land managers have been assisted in that task by the hundreds of agricultural advisers across the southern Australian landscape whether they work for agribusiness companies, Departments of Agriculture, farm consulting firms or statutory bodies.

Weed-related issues affected 73% of Australian agricultural establishments during 2004-05 (ABS 2006[2]). Similarly, weed-related activities were the most commonly reported NRM activity at the national level, with 80% of agricultural establishments undertaking activities to either prevent or manage weeds.

Weeds occurring in both natural and improved pastures have not attracted the same attention from researchers or the plethora of advisory agencies. It has been estimated that weeds in pasture systems have a cost to the Australian economy of up to $792m per annum (Burton and Dowling, 2004[3]). There is a wide range of attitudes to weeds in pastures in southern Australia ranging from “weeds are hardly a problem with good grazing management” to legal requirements to try and eradicate all the plants designated as weeds of national importance from the landscape.

Australia has an array of organisations responsible for weed control. In the state of NSW alone there are three government agencies with some overall responsibility regarding weeds…..Primary Industries, Conservation and Environment, and Natural Resources. Add to them Shire Councils, Municipal Councils, Rural Lands Protection Boards, Weeds County Councils and more recently the Catchment Management Authorities.

At a professional level there are Weed Societies in each State representing scientists, extension advisers, agribusiness and Council weeds officers. Those Societies come together to form the Council of Australian Weed Societies which is staging the 2006 Adelaide conference “Managing weeds in a changing climate”. There is also a Weeds Officers Association in some States.

Some non-profit conservation/environmental organisations take a special interest in weeds. Of these the World Wide Fund for nature has played a major role in working with the National Government to establish a Senate enquiry into invasive species. It was also a major influence in the Federal Government’s decision in 2005 to ban the import of some 3335 species of plans that are known weeds, and the allocation of funds to the ‘beat the weed menace’ programme.

[2] ABS (2006) Natural Resource Management on Australian Farms. Australian Bureau of Statistics publication 4624.0, Canberra

[3] Burton, J. and P. Dowling (2004). Op cit.

At a Federal bureaucratic level two Departments have a particular interest in and responsibility for weeds…..the Australian Department for Agriculture, Fisheries and, Forestry and the Department of Environment and Heritage. The Commonwealth has established 57 natural resource regions across the nation each of which will be responsible for allocating Government funds to a broad spectrum of natural resource issues ranging from water to soil erosion, bio-diversity, native vegetation and weeds The Commonwealth provides the Secretariat for the national weeds strategy and the on-going assessment of the list of weeds of national importance.

In addition to the hundreds of agribusiness, Government extension advisers and consultants with legal and or best management practice responsibilities in grazing regions many land mangers are members of voluntary groups like holistic resource management, Edge Network (managed by MLA), Grain and Graze (sponsored by AWI, MLA, GRDC and LWA) as well as the very active Grasslands Societies. Although none of them was formed specifically to share research results or on-farm experiences in managing weeds it is an integral part of their experience and advice.

Meat and Livestock Australia (MLA), in partnership with Australian Wool Innovation (AWI), is developing a weed research and development program across southern Australia. Both organisations are concerned that current extension and information delivery approaches are not leading to optimal advances in weed management practice.

This project seeks to meet the following objectives:

1. From extension workers across southern Australia, identify their views on the critical failure and success factors in adoption of best practice weed management by producers.
2. Determine the strengths, weaknesses and effectiveness of current weed extension processes, activities and information presentation in relation to adoption barriers and success factors
3. Devise improved approaches for the development and delivery of extension processes, activities, tools and information to stimulate action by graziers

The project links with a complementary social research project managed by the Institute for Rural Futures at UNE which aims to identify and characterise the barriers to adoption of best weed management practices among graziers and the key motivators for change.

2 Part A. Review of Relevant Literature and Outcomes of Interviews and Focus Groups with Informants.

2.1 Review of literature relevant to Weed Management Extension

While the general principles for weed control have been well established, (for example Burton and Dowling 2003), based on establishing and managing pastures for long term sustainability, the adoption of these practices has been less than satisfactory.

In a comprehensive review of the adoption of conservation technologies by rural landholders, Pannell et al (2005[4]) emphasise the point that extension has been incorrectly viewed as a matter of communication, and that failure to change practices was a failure in the communication process. They question the assumption that landholders are information deprived and relatively passive knowledge recipients and assert instead that they are neither information-deprived nor passive in seeking knowledge. They go on to say that extension needs to be more focused on credibility, reliability, legitimacy, and the decision-making process. Features of current extension that work against the development of credibility include: short-term funding, rapid turnover of staff, the youthfulness and inexperience of many staff, and their lack of technical farming expertise, features echoed by Roberts et al (2006[5]). Pannell et al (op cit) recommend that extension programs should use "multiple extension channels, repetition, multiple deliverers of the message, and harnessing of peer pressure" to be effective. They recommend use of a diverse portfolio of methods and channels and caution against reliance on any particular method (e.g. print articles, verbal presentations, group extension, or advertisements). The use of multiple methods increases the chances of reaching more of the targeted groups, it accounts for different learning styles and the repetition that occurs can reinforce the credibility of the information. The authors also caution against over-use of group-based approaches despite their value in situations where mutual benefits and reciprocal benefits accrue and where collective action might be enhanced by peer pressure. They stress the important role of one-to-one extension in relation to personality characteristics of producers and the credibility of the extension operative. Vanclay (2004[6]) observed that, "credibility is developed over time through the provision of credible, practical, useful answers that assist farmers in [their] day-to-day operations.

[4] Pannell, D.J., Marshall, G.R., Barr, N., Curtis, A., Vanclay, F. and Wilkinson, R. (2005). Understanding and promoting adoption of conservation technologies by rural landholders. Unpublished manuscript, submitted to *Australian Journal of Experimental Agriculture*, http://www.general.uwa.edu.au/u/dpannell/dp0502.htm

[5] Roberts, K., Roberts, J., Ho, E and McCliskey, C. (2006) Funding of capacity building and the implications for institutional arrangements. The Cooperative Venture for Capacity Building Kingston ACT.

[6] Vanclay F (2004) Social principles for agricultural extension to assist in the promotion of natural resource management. *Australian Journal of Experimental Agriculture* **44**, 213-222.

Group facilitators who never provide on-farm advice rarely develop credibility and their ideas are easily dismissed."

Pannell et al (op cit) advise that a history of valuable advice relevant to a farmer's goals is the single most important source of credibility, trust and confidence in extension agents on the part of farmers, but it can be enhanced by a wide range of factors, including the:

- authority and technical expertise of the extension agent;
- perceived similarity of the extension agent to their audience (in terms of attitudes and values);
- local profile of the extension agent (e.g., local residence, participation in community);
- communication skills of the extension agent;
- personal relationships between the extension agent and farmers; and
- extension-agent acknowledgement of and empathy with the circumstances and problems of farmers.

Llewellyn et al (2004[7]) emphasise the role of farmer perceptions of technology in the adoption process. Changes in the perceived short-term economic value of some weed management practices occurred for example where the broader value of the practices to the farming system, not necessarily relating to weed control, could be demonstrated. This also led to more growers deciding to adopt the practices. They point out that determining the perceptions influencing adoption, and then identifying the major learning opportunities related to them can be valuable in focusing extension. Measures of perceptions also allow learning to be evaluated.

Pannell at al (2005[8]) provide a description of the typical sequence that leads producers to make change.

- *"Awareness of the problem or opportunity*: In this context, 'awareness' means not just awareness that an innovation exists, but that it is potentially of practical relevance to the landholder.
- *Non-trial evaluation*: Reaching the point of awareness is a trigger that prompts the landholder to begin noting and collecting information about the innovation in order to inform the decision about whether or not to go to the next step of trialling the innovation. Conducting a trial incurs costs of time, energy, finance and land that could be used productively for other purposes. To be willing to trial an innovation, the landholder's perceptions of it must be sufficiently positive to believe that there is a reasonable chance of adopting it in the long run.
- *Trial evaluation*: Trials contribute substantially to both the decision making and skill development aspects of the learning process. If small-scale trials are not possible or not enlightening for some reason, the chances of widespread adoption are greatly diminished. Landholders will be cautious about leaping to full-scale adoption due to the risk that the innovation will prove a full-scale failure. Untrialable technologies may still be adopted (rotary milking platforms are one example), but generally only after substantial information-seeking, discussion, analysis and reflection.
- *Adoption*: Depending on the trial results, use of the innovation may be scaled up. Typically, adoption is not an all-or-nothing decision – there is a

[7] Llewellyn, R.S., Pannell, D.J., Lindner, R.K. and Powles, S.B. (2004). Targeting key perceptions when planning and evaluating extension. http://www.general.uwa.edu.au/u/dpannell/dp0409.htm
[8] Op cit

grey area between small-scale trialling and the eventual scale of adoption. Adoption is often a continuous process, and may occur in a gradual or stepwise manner, sometimes ending in only partial adoption. In one sense, trialling is never completed, as farmers continue to evaluate the performances of all their practices. However, as the scale of use of an innovation increases on the farm, the balance of reasons for using the technology shifts from mainly evaluation to mainly beneficial use.

- *Non-adoption or dis-adoption*: If off-farm information or on-farm trial results are not sufficiently encouraging (i.e., it appears that the landholder's goals will not be advanced by the innovation), the landholder will reject the innovation. If it is initially adopted but then, say, economic circumstances change or a replacement technology becomes available, use of the original innovation may be scaled down and eventually discontinued."

There are strong similarities between this sequence and the SGS Farm Practice Change Model shown below (Nicholson et al 2003[9]).

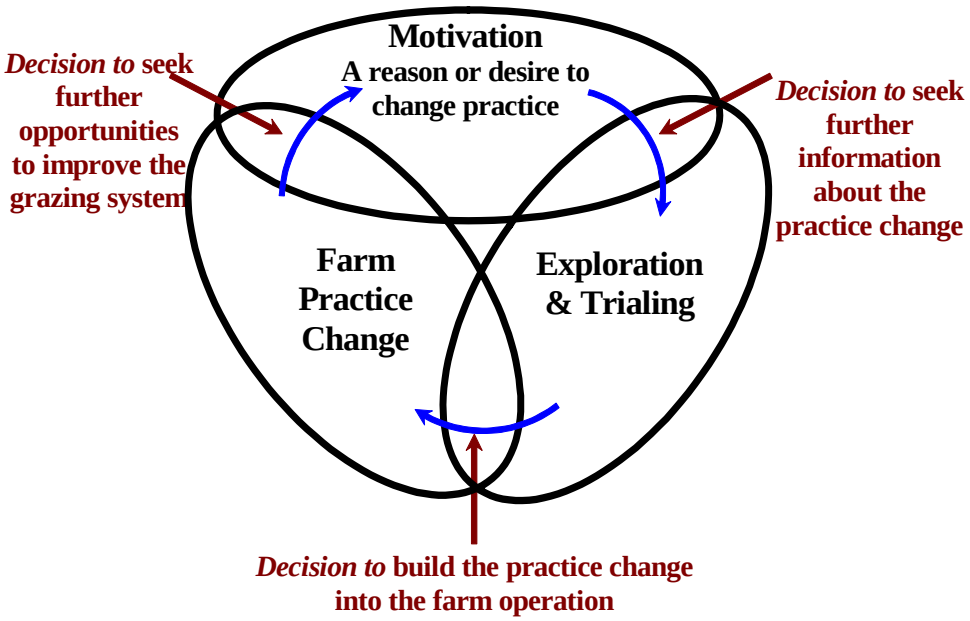


Figure 1. The SGS Practice Change Model

Motivation is created by recognizing a potential gain (eg more production from pastures by weed control) or by anticipating a loss (eg lower wool price because of burrs). Recognising a gain is a stronger motivation to change than a threatened loss. The exploration and trialling phase involves working through a series of logical steps to build confidence in the proposed practice change and to reduce the risks. This

[9] C. Nicholson, N. Barr, A. Kentish, P. M. Dowling, L. H. McCormick, M. Palmer, I. Simpson, K. Simpson and J. Walsh (2003) A research–extension model for encouraging the adoption of productive and sustainable practice in high rainfall grazing areas *Australian Journal of Experimental Agriculture* 43(8) 685 - 694

includes developing the skills and gathering the necessary 'social support' to make the change. Tools that assist in demonstrating (and measuring) the impacts of practice change, both at demonstrations and on an individual's property, are vital (ie that assist in the collection and comparison of 'hard' data). Appropriate support activities, whether they are group based or one-to-one opportunities are essential. The farm scale phase hinges on the degree of confidence in the practice change. This will be harder to maintain if the results are below expectations or are slow to be realised. Tools that allow the impacts of the practice change to be measured at a 'higher order' (farm-scale) are critical (such as changes in farm profit or increased resilience of the production base), and support structures need to:

- Facilitate the discussion and exploration of unexpected issues and consequences that occur during practice change, either through group or one to one activities.
- Provide opportunities for positive public recognition and acknowledgment of the practice change.

Maintaining confidence and commitment to the practice change are the keys to farm-scale adoption.

Nicholson et al (2003[10]) emphasise the importance of providing support through strategic extension interventions at key points in the decision cycle. The SGS project provided support through farmer groups (peer support) and scientists working within the program. The authors conclude by recommending the model as a framework for design and evaluation of extension programs.

Crase et al (undated[11]) propose a stages of change model through which landholders need to move in order to change conservation behaviour. The stages are:

1. Precontemplation – no awareness of the land-use problem. A strategy to move people to the next stage would involve raising awareness of the problem through advertising and promoting the costs or losses.
2. Contemplation – no great knowledge of the problem or of new behaviours to fix the problem. A strategy to move to the next stage would be an on farm visit to point out the problem and the costs associated with it, field days or demonstrations focusing on improving knowledge.
3. Action – lacking skills, equipment and finance necessary to perform the new behaviour. A strategy to move to the next stage would be farm visits, training sessions and financial assistance.
4. Generalised action – able to generalise behaviour to other land use behaviours. A strategy here is to use these farmers to teach others.

Coutts et al (2005[12]) carried out a comprehensive study of extension and education programs across a range of industries and issues in rural and regional Australia. Their work proposes five clearly defined extension models in use across the range of projects reviewed: group facilitation/empowerment; programmed learning; technology development; information access; and the individual consultant/mentor model. It was argued that these models form the supports and rungs of a capacity building ladder

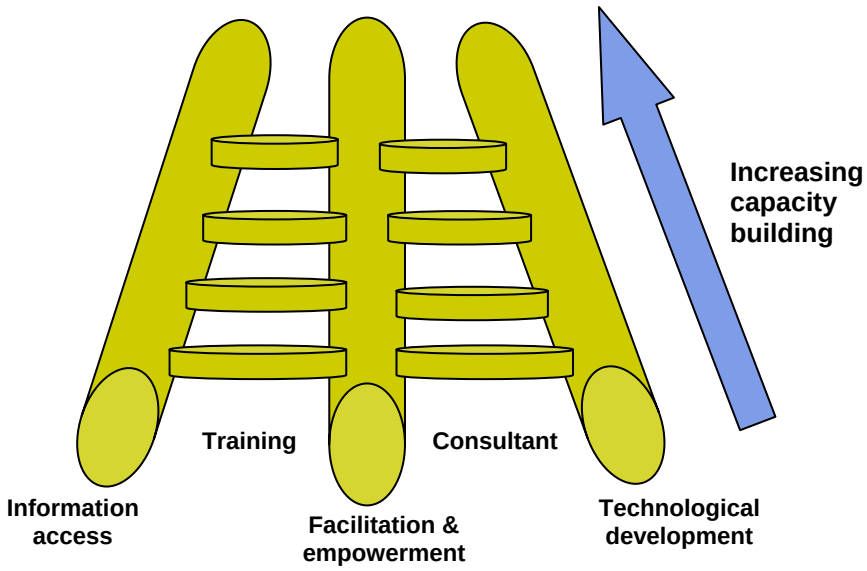
[10] Op cit

[11] Crase, l., Maybery, D and Lamb, P. (undated) Implementation of findings of the social research into the behaviour of landholders in the NSW Murray catchment. La Trobe University.

[12] Coutts, J.; Roberts; K; Frost, F; and Coutts, A. (2005). *Extension for Capacity Building: What works and why?* Rural Industries Research and Development Corporation; Kingston, ACT

and all were seen to be complementary and necessary for the capacity building process. (See diagram below)

Figure 2. The Capacity Building Ladder



For each model there is a rigorous set of principles and practice which allows effective activities to be designed and delivered (see details in Appendix 3). The implications of this work for extension programs is the need to ensure a good spread of activities across the models to take account of different target groups and learning needs and preferences among the overall producer population. The authors also advocate stronger cooperation between funders and providers to develop synergies. It is likely that activities using the different models might be delivered by different providers having specific expertise, for example, R&D Corporations might be best suited to work in the information access area because of the information generated by their research, educational institutions in the training area and so on.

Macadam et al (2005[13]) introduce the notion of relevant communities of practice working together to build capacity around a problem situation. The communities of practice are relevant because they bring needed skills and knowledge to bear, and recognising and engaging them is likely to improve outcomes for weed management. Relevant communities of practice in addition to producers might be for example:

- local weeds officers who know the producers and the local weed issues,
- researchers who know about control measures,
- agronomists who know about pasture establishment and management,
- livestock specialists with expertise on grazing management,
- farm management consultants who can advise on integrating measures into the farm system and on the economics of changing practices, and
- extension and communication specialists.

[13] Macadam, R.; Drinan, J.; Inall, N. and McKenzie, B. 2005. *Growing the capital of rural Australia – the task of capacity building*. RIRDC; Kingston, ACT

Extension agents commonly find it difficult to engage with the full range of potential clients and achieving changes to weed management practices is unlikely to be different. Trompf and Sale (2006[14]) found a facilitated recruitment process to be effective in encouraging greater levels of participation in a pasture management program. The process involved focused face-to-face discussions with individual producers on their properties, with follow-up contact and the organization of a local field day. It resulted in an increase of participation density from 5.6% to 56% in a district in western Victoria (the number of participants from a given area who participated expressed as a percentage of the total number of potential participants).

Griffiths (2005[15]) notes in a report to the Murrumbidgee Catchment Management Authority that resellers are an untapped resource for extension. She also comments that producers were seeking a source of consolidated information on weeds and diseases, a reflection of the diversity of sources and information overload they face.

In a case study for the Cooperative Venture for Capacity Building, Stone (2005[16]) highlighted the increasing role of agribusiness agents in extension and the value of their close contact with farmers.

McDonald (2002[17]) claims that the too-frequent education and training failures are characterised by lack of understanding of the market for the programs, lack of clarity of purpose, or undue reliance on traditional methods. He presents the concept of social marketing as a counter. It calls for the target population to be segmented as a basis for developing strategies to progressively move people from one segment to another. The segmentation of graziers relative to weeds management in the complementary social research project managed by the Institute for Rural Futures at UNE is compatible with this.

Once market segments are characterised, strategies to increase adoption can be formulated. In terms of awareness raising, Crase et al (op cit) discuss loss and gained framing as a way of designing messages aimed at influencing behaviour. Emphasising cost and losses in a loss framed message should result in an increased likelihood of risk taking behaviour while emphasising gains and benefits in a gain framed message results in decreased likelihood of risk taking behaviour. In relation to changes to the farm system, they suggest that farmers are being encouraged to take more risk and therefore a loss framed rather than a gain framed message is more appropriate. For weeds this would result in messages focused on the costs of not controlling weeds for example. To be effective loss framed messages should be accompanied by an efficacy message which reassures the audience that it is possible to minimise the threat by adopting a relatively easy and feasible action.

[14] Trompf, J and Sale P. (2006) The productivity, environmental and social benefits of increasing producer participation in extension http://www.regional.org.au/au/apen/2006/expo/2954_trompfjp.htm#TopOfPage

[15] Griffiths, C. (2005) Extension Methods. Murrumbidgee Catchment Management Authority

[16] Stone, G. (2005) Agribusiness role in extension – a case study. Cooperative Venture for Capacity Building, Kingston ACT.

[17] McDonald, R. (2002). *Learning for Sustainable Outcomes: segmenting the market.* Report to Rangelands Australia. Ithaca Group P/L, Brisbane.

Learning from international experience

A search of international literature indicates little has been published about weed management extension in grazing situations. The emphasis on weeds management in cropping situations is overwhelming in comparison. The IRF literature review also identified the comparative paucity of detailed studies of weeds in grazing systems when contrasted with cropping systems. This issue was further explored in the IRF project, and it was discovered that managers of mixed cropping and grazing enterprises were more 'weed savvy', being both more effective and more innovative in terms of weed control strategies.

Norman et al (1997[18]) discuss the value of on-farm trials and demonstrations as an opportunity to interpret results from technical and socio-economic viewpoints which are critically important in a farm production environment.

Jordan et al (2000[19]) established learning groups that emphasise dialogue among persons having different perspectives on common weed problems. The learning groups engaged farmers, extension educators and weed scientists in the cooperative design of learning activities. The groups were apparently effective in changing the way farmers approached weed problems and supporting fruitful interchange. The skills required of a collaborative learning group included the ability to build relationships and communicate across lines of difference, to tolerate highly ambiguous situations, to analyse the perspectives of others and to organise.

Nerborne and Lentz (2003[20]) found that by convening a multidisciplinary team (the Monitoring Team) that included farmers, university and agency researchers, and non-profit staff; a small group of farmers in southeast Minnesota, U.S.A., contributed to the legitimacy of the sustainable agriculture movement. Through the experience of forming a team and working with individuals who operated within the mainstream knowledge paradigm, farmers gained validation of their knowledge about farming, while researchers came to value alternative knowledge systems. In the context of a socially embedded movement, farmers were empowered by sharing their knowledge with researchers, and ultimately contributed to the sustainable agriculture movement by challenging traditional patterns of knowledge exchange.

McIvor (2005[21]) provides an outline for developing a change management program based on his experience with New Zealand sheep and beef farmers. The elements he deems important are:

1. The program is driven by customer research and identification of needs
2. It involves leadership which considers needs not yet recognised that will have significant future impact

[18] Norman, D., Freyenberger, S. and Schurle, B. (1997) County Extension Agents and On-Farm Research Work: Results of a Kansas Survey. Journal of Extension 35,5.
[19] Jordan, N., White, S., Gunsolus, J., Becker, R. and Damme, S. (2000) Learning groups developing collaborative learning methods for diversified, site specific weed management – a case study from Minnesota. Cow up a Tree INRA Paris
[20] Nerborne, J. and Lentz, R. (2003) Rooted in grass: Challenging patterns of knowledge exchange as a means of fostering social change in a southeast Minnesota farm community. Agriculture and Human Values. Springer Netherlands.
[21] McIvor, S. (2005) Changing practice in the sheep and beef industry – a passionate but struggling practitioner's experiences and challenges. AgResearch Hamilton NZ.

3. It involves understanding the key motivators for change for the issue under consideration
4. It involves a product development process that will deliver an increase in knowledge and a change in behaviour
5. Those involved in the development share the same vision and sense of urgency - ensuring the products are delivered in the right form at the right place at the right time
6. Support resources are in place and prepared for their involvement in the program.

These overseas experiences seem to closely echo the findings cited from the Australian literature in terms of on-farm demonstrations, learning in groups with different skills and perspectives, understanding client needs and motivations, planning and providing adequate resources to support the program.

Box 1

Practical implications drawn from literature review

1. Credibility is a key to extension effecting change – fostered by a history of relevant, practical and useful advice that helps the day-to-day operation of the business.
2. Features of an effective extension agent:
    - authority and technical expertise of the extension agent;
    - perceived similarity of the extension agent to their audience (in terms of attitudes and values);
    - local profile of the extension agent (e.g., local residence, participation in community);
    - communication skills of the extension agent;
    - personal relationships between the extension agent and farmers; and
    - extension agent acknowledgement of and empathy with the circumstances and problems of farmers.
3. Demonstrations and trialling of new technology/practices is a key step in the adoption process enabling farmers to see and test the change in their own system.
4. Multiple methods of message delivery improves effectiveness – increases the chances of reaching more of the targeted groups, it accounts for different learning styles and the repetition that occurs can reinforce the credibility of the information.
5. Appropriate support activities, whether they are group based or one-to-one opportunities are essential.
6. Engagement with relevant communities of practice can build capacity by bringing together diverse skills and knowledge eg researchers, farmers, agronomists, weeds officers.
7. Market segmentation and a personal approach can increase participation
8. There is a set of principles and practice for the five models of extension which allows effective activities to be designed and delivered.

2.2 Interviews and focus groups with informants.

2.2.1 Data Collection

Semi-structured telephone interviews were conducted with 40 extension practitioners engaged in weed management in Southern Australia. The interviews sought to describe the extension activities the practitioners used, the factors they thought influenced participation in activities and the adoption of weed management practices, and those that resulted in non-participation and non-adoption. The interviews also explored the relationship between weed extension practitioners and the motivating factors for improved weed management among graziers. The guiding questions for the interviews are included in Appendix 1. Interviewees were drawn from weeds officers employed by local government, state agency personnel (agronomists and weeds specialists), private consultants and agribusiness agents.

The makeup of the interview group is shown in table 1 below.

Table 1 Distribution of interviewees by state and professional role

	Agribusiness	Consultant	State agency staff	Council weeds officer
NSW	3	3	9	4
Vic	4		1	
SA	3	2	1	2
WA	4	3	1	

In addition four focus groups were held. One of these was with a group of 14 agronomists from an agribusiness company in North West NSW and used the practitioner interview questions as a basis for the discussion. The three other groups were designed to obtain feedback from extension practitioners and farmers on the findings of the interviews. Participants at these were briefed on the project and presented with the main findings from the interviews. They were then asked to discuss their agreement or otherwise with the findings and to offer suggestions on how extension could be improved to achieve greater levels of change in weed management. The makeup and location of these three focus groups was as follows:

- Perth, WA – Five agribusiness agronomists and one farmer organisation representative.
- Yackandandah, Vic – Six local farmers, predominantly small landholders and members of a Landcare group.
- Coolah, NSW – Seven local farmers, two consultants and one agribusiness agronomist.

A list of interviewees and focus group participants is given at Appendix 2.

Data from the interviews and focus groups were transcribed and analysed using N-Vivo, a qualitative data analysis tool. The analysis enabled themes and issues related to the strengths and weaknesses of extension processes to emerge from the data. The frequency of mention of an issue was used as a measure of relative importance.

2.2.2 Results and Discussion

The results from the interviews and focus groups are presented in terms of particular extension strategies being used by practitioners, the strengths and weaknesses of the strategies, and the themes and issues that emerged. Quotes from interviewees are provided as examples of the types of comments typically made about the strategy or issue. Sample interview and focus group transcripts are contained in Appendix 4.

2.2.3 Extension strategies

Key extension strategies mentioned by the practitioners and a judgement on whether they are more or less successful in achieving change in weed management are shown in table 2. (A higher number of + or – indicates a higher level of importance for that strategy)

Table 2 Extension strategies

Strategy	Measure of success (+ successful, - unsuccessful)	Typical Comments
One on one contact with clients	+++++	*"Face to face? You can't beat the fact that one to one communication is the most effective……"* *"I personally think that the personal approach is best if you want to get practice change."*
Demonstrations	++++	*"….unless you give them an experience they won't change their attitude. Attitudes are based on experience. So you've got to give them an experience. How do you do that? Probably the easiest way is a demonstration."*
Small group activity	+++	*"Farm groups are also good in that they get discussions going about topical issues."* *"If you've got like minded people with a similar enterprise that are prepared to have their place looked at and pulled apart, then you'll get interaction. And I think having discussion, interaction is where you'll get your real gains."*
Field days	+++	*"Certainly field days are the most dynamic, taking people to someone's success story. Once you've got adopters use them and use them year after year because initially people will say it's a lucky year"*
Glossy Brochures	- - -	*"I don't think that brochures are any good.* *A lot come in the mail. You just*

		don't put any weight on what they've got in them"
Internet	- - - - -	*"The Internet's speed is too slow to spend all morning trying to find a bit of information."* *"The thing about the farmer that's actually looking for information is usually a successful and an expanding or a commercially pretty astute sort of a farmer and if he's running that sort of an operation quite often he doesn't have time to sit around and stuff around on the internet"*

The degree of importance accorded to these extension activities by extension practitioners closely mirrors graziers' preferences for sources of information about weeds, based on the results of a nationwide survey conducted by the IRF team.

One on one extension was seen to be effective because it allowed the practitioner to develop trust and credibility through developing a relationship with the producer and it allowed specific advice to be given based on knowledge of the producer and his/her system. As might be expected, in looking across the professional role categories, one on one was more popular with agribusiness agents and weeds officers than with government agency staff. More experienced agency staff pointed to the continuing value of one on one activity. These findings are consistent with the discussion by Pannell et al (2005) regarding farmers' trust and confidence in the credibility of extension agents. A one on one approach also has the ability to provide the support necessary for effective practice change as described by Nicholson et al (2003). Coutts et al (2005) propose that the mentoring model (one on one) is an important rung in the capacity building ladder in applying learning to individual situations.

Crase et al (op cit) conclude that successful landholder change requires skills in the service provider such as the ability to develop a positive relationship with the producer, employing a range of techniques to raise awareness about good practice and behaviour change and expecting that suggested changes would be successful for the landholder.

Demonstrations were of value also because of their localised nature and their ability to provide clear practical examples of weed management strategies. The value of demonstrations was recognised across all professional role categories. Demonstrations provide the opportunity for non-trial evaluation and in some cases trial evaluation by farmers as described in the change sequence described by Pannell et al (2005). Nicholson et al (2003) also emphasise the importance of trials and demonstrations in the practice change process.

Field days, generally interpreted as large group events with multiple exhibits and demonstrations, were seen as effective in awareness raising and providing a first point of contact for farmers with information on weed management. Many interviewees highlighted the difficulty in ensuring good attendance and the costs associated with holding field days for seemingly small pay-offs. The comments above

regarding trialling apply to field days but they are likely to be less effective than demonstrations because of the localisation effect.

Small groups enabled producers to gain peer support for change and access to the experiences of others in similar situations. The facilitation/empowerment model of Coutts et al (2005) provides guidance on how to use groups effectively and this model leads to outcomes such as individual and group confidence, skills in information seeking, decision making and management.

While **brochures** were seen as a less effective strategy in general, they were seen as having a role in awareness raising at early stages of a program in conjunction with other mass media tools. This agrees with the findings of Crase et al that the impact of brochures and other media is minimal in changing conservation behaviours. A number of agribusiness agents use a newsletter as a means of awareness raising and information dissemination. They stress the need for the messages to be simple and concise. The "Under Control" newsletter from the Victorian DPI was seen as a valuable source of information.

Extension agents saw the **internet** as effective in meeting their needs for information but were critical of its use for more than a select few farmers. The reasons given include slow access speeds, farmer's unfamiliarity with the medium and the ability to quickly access the relevant information. Interestingly one of the weeds officers interviewed had set up his own website with information on weed identification and control. He claimed six to seven hundred hits a day for the site but was unable to give more information about those visiting the site.

It was clear from the interviews conducted that few if any new extension strategies were being applied to programs targeting improved weed management. A number of practitioners reinforced the need for and importance of planning and the use of multiple methods as recommended by Pannell et al (2005), and discussed under the 'Diversity' and 'Deliberation' components of the 3 D approach developed by the IRF team.

2.2.3.1 Focus groups

The key findings form the focus groups are as follows

Perth

- The use of contractors for spraying and the need for them to be knowledgeable and skilled - *If you've got a good contractor in the area who's got 3 or 4 spray rigs he probably does a fair chunk - with the contractor is he also tending to be doing some agronomy work*
- The targeting of agribusiness services to top performing farmers and lack of interest in the others as clients (Pareto principle) - *There's the guy…the successful farmer who's really effectively using this information and making all the decisions …then there's the other group that are battling so to speak and they're just fishing for information*
- Little information flow between agribusiness and R&D Corporations - *MLA and AWI …any of those groups that have got anything to do with livestock have never said weeds. Goodness me Elders have 30 something agronomists running around and I'm presuming Landmark have got a heap of people. Maybe those guys know a little bit about weeds in pastures. We'll go to talk to them*

- The need for simple concise messages - *If there's a format that MLA want to come out with in terms of getting the information out there very simple messages, because if it's a fifty page bulletin we probably don't have time to read it, the farmers doesn't have time to read it. Go back to some of the old sustainable grazing system type information that came out and it was a tips and tools or whatever they called it - One of the things for communication with farmers is you have one page with two or three lines in a paragraph and this is where you go to if you want more information. Its really bullet point type stuff.*
- Agreement with the findings of the interviews regarding successful and unsuccessful strategies - *I'm saying the key one is the one on one and then they get the confidence from the demonstrations - In many cases if they grazed it properly and put the right fertilizers on the weeds would disappear*

Yackandandah

- Landcare was an effective force for community based weed control but energy and enthusiasm for this has waned – government agencies have relegated many of their responsibilities for weeds management to Landcare volunteers by default - *Landcare is forced to do the role of the agents but we are volunteers with neither the resources, time and energy or authority*
- CMA is not focused on farmers and farming, and their concerns about managing weeds– is more interested in wider conservation issues - *CMAs don't seem to understand the realities of farming or have an interest in it, they are more interested in 'green' conservation that only looks at part of the picture and in an unrealistic way*
- Weed identification is difficult and identifiable expert help is not available - *there is a lot of publicity about Chilean Needle Grass but we none of us are able to identify it, once I know it and whether I've got it I can do something about it. Weeds identification is a fundamental extension task*
- The role of contractors in providing advice (Contractors are an important source of advice for those who employ them)
- The role of economic incentives to control weeds e.g. rates rebate (Incentives such as a rebate on Local government rates are worthy of consideration – carrot as well as more commonly used stick)
- The need for longer term programs (i.e. more than three years) Programs need to be long-term – the on again/off again nature of say 3 year programs leaves the farming community in the lurch
- A facilitation approach and sensitive peer pressure and support has been successful in the past but has to be seen in the light of the tiredness of Landcare volunteers - *Landcare has been very effective but there is too much expected of us as volunteers in delivery of on-ground services, we are tired and not prepared to keep going*
- The importance of understanding both community and place in developing programs - *there is a need for a local plan related to the way we want our district to be*
- Agreement with the findings of the interviews regarding successful and unsuccessful strategies

Coolah

- Grazing management = weed management - *I use my weeds as a monitor as to whether I'm getting my grazing management right. If my grazing*

management is wrong then I tend to get weeds that are more invasive. If my grazing management is right then my weeds are getting smaller and getting less dense

- Range of different providers not well integrated - *The CMAs aren't involved...they're out there giving one message about better grazing management, the Dept of Ag is doing another and the agribusiness guy is giving another. Its just so important that everyone link in. Make sure that they're all aware of the best technology available*
- The possibility that MLA or AWI might play an brokering role in bringing different providers together e.g. at technical updates or field days - *Could there be a way for MLA sponsoring a day and fronting up with the money to put that on and have groups meeting in that area and utilising the local agronomist and perhaps bring one or two people with specific expertise*
- The need for trust and credibility for advisers - *you've got to have someone in that district that's an adviser that's going to drive the advice and is passionate and experienced in the problem …. and that person is experienced, trusted and is passionate about the problem he'll drive people on to adopt*
- The value of local case studies and demonstrations - *I think around here, particularly in little trials we get a lot of value out of*
- The role and value of the holistic management approach - *I think it keeps people on track with the process because it is a difficult thing to do and a lot of it's about land management and weed control, lifestyle and your family and issues surrounding the whole business*
- The value of discussion groups - *I'm harping on a bit about the discussion or group situation but to me I find it invaluable again and again*

The focus groups confirmed the extension strategies defined by the interviews and also agreed with the rankings as to the success or otherwise of the strategies. One member of one focus group disagreed with the high ranking of the one-on-one strategy on the basis of the resources needed to implement it, suggesting that small groups were more effective.

2.2.4 Extension themes and issues

The themes and issues that follow are those raised in the interviews and focus groups as being important for change in weed management or of concern to practitioners.

Need for integration

It was apparent from both interviews and focus groups that programs aimed at improving weed management are being conducted through a range of agencies and there is often a lack of integration between the agencies and individuals. This results in cases of information overload for producers, conflicting messages and waste of resources.

"The CMAs aren't involved. They're out there giving one message about better grazing management, the Dept of Ag is doing another and the agribusiness guy is giving another. It's just so important that everyone link in. Make sure that they're all aware of the best technology available."

The concept of communities of practice in capacity building promoted by Macadam et al (2005) is relevant here as their approach aids in developing a shared agenda and drawing on the expertise of different skill sets.

A number of people suggested a role for CMAs in providing integration at regional level but it was also pointed out that these bodies are struggling to meet current demands made of them and in some states are not sufficiently developed to take this integration task on.

Understanding the system

It was stressed by many interviewees and the focus groups that for any changes to be made to weed management those changes had to fit well into the existing system on the farm.

"You've got to have something going with these blokes and say well "this is how this practice is going to help you with your system" because all farming systems are different whether it's financial or its infrastructure or the farming"

"Farmers don't like changing their production cycles. They've got their whole farm…millions of dollars worth of assets all lined up to go in a certain sequence and to change that causes a lot of grief. So if you came up with something that's a one bullet answer to a problem then you might get them to change their production cycle."

In a similar finding, the IRF project discovered that factors such as age and type of enterprise (e.g. cattle, sheep, mixed livestock and cropping etc.) influenced the effectiveness of weed management, and also the choice of weed control techniques.

CMAs

While government agency and weeds officers acknowledged the increasing role and importance of CMAs in weed management, the agribusiness sector did not recognise this and seemed to be focused on their own products and activities and less likely to work with other players in the field. Some consultants had engaged very closely with CMAs in managing and delivering programs.

"they're very, very proactive in this area and they're very aware of these fundamental aspects of land management. So, I think, in some ways they are at the forefront of this type of thinking and that's largely through a combination of the actual directors of the CMA and the staff as well have a good understanding of the needs of farmers and how farmers think."

Grazing management

A common view among many practitioners was that weed management is simply an issue of good grazing management. This view was also agreed to at two of the focus groups.

"I use my weeds as a monitor as to whether I'm getting my grazing management right. If my grazing management is wrong then I tend to get weeds that are more invasive."

"….sustainable pasture management practices which will encourage better pasture or grassland management which will ultimately control weeds."

Good pasture management / grazing practices were among the key factors identified by graziers as being critical to effective weed control. This suggests that the message of weed control through effective grazing is recognised in the grazier community.

Motivation for change

The key motivators for change were seen to be:

- loss of productivity from pastures due to weed infestations

"Well farmers don't like having weeds in their pastures. Reduces productivity both for grazing animals and their pastures if they're going to cut them for hay and those sorts of things. Reduces palatability. So its an issue. They want to control them."

- economic loss from weeds

"Really its money. Its got to be economic. They've got to see that there's a cost benefit there."

- Peer group pressure

"*they really like their farms to look a picture. And they like other people to think they're a good operator. And I think this whole social interaction with motivating people with extension programmes is very, very important*"

The grazier survey by the IRF team provided some evidence to suggest that awareness of productivity losses was related to better weed management. Similarly, diligence in controlling weeds, for aesthetic purposes or as a result of a 'good farmer' ethic, was a common factor among better weed managers.

Training and accreditation for practitioners

A lack of training in both weed management and in extension methods was raised by practitioners and confirmed at two of the focus groups. The work of Roberts et al (2006) confirms this across a broad range of extension providers. Training can provide an opportunity to bring providers from different sectors together and improve networks and coordination.

The value of the training course at Tocal Agricultural College for weeds officers was recognised and praised. There seems to have been little formal training in extension methods and principles over the last decade and most practitioners feel that they

have learned from experience on the job. Some form of accreditation of practitioners was seen to be of value by the agribusiness sector.
"Tocal has done well it's got a certificate course…a diploma course in diploma of conservation and land management. They actually put us through the course…three or four inspectors"

Role of regulation

When mentioned regulation was generally seen to be a tool of last resort to be used to achieve change in those farmers who had resisted any other method.
"Notices to me are the least effective …. they have there place if someone says I'm not going to do it or whatever But I would say the majority and I'm going to say that about 95 percent of farmers want to do something with their weeds."

"The big stick is not the way to go. It's more about getting on well with the landholder and encouraging them. …pointing up to them it's in their own benefit to do something about weeds."

These results are confirmed by the IRF producer survey, which found that graziers did not consider regulatory action to be a major motivation for weed control.

Planning

The use of longer term planning on farm was also associated with the notion that weed control is about good grazing management. Programs such as "Landscan" run by NSW DPI which takes a planning approach were seen to be effective in promoting change to weed management.
"And there's not nearly enough long term planning with respect to weed management …..weed management is always a long term issue. And it doesn't seem to be easy for a lot of graziers to work with a seven year weed control programme."

According to the IRF 3D approach to weed management, deliberation involving longer term planning, is key to effective weed management. However, it is worth pointing out that the longer term planning tools will only be successfully adopted by a certain (small) proportion of the grazing community, principally due to the complexity of such approaches.

2.3 Conclusions

- There is ample guidance provided in the literature for the development and delivery of programs to change producer practices in weed management. Key elements highlighted above include the need for appropriate "tools" or activities at the various stages of adoption, the need to integrate those activities so that they work effectively in achieving program objectives, the opportunity to engage a range of providers with varying skills and knowledge and the need to plan programs to integrate these elements.
- The interviews with extension practitioners indicated that they were using quite traditional extension methods in working with farmers to effect changes in weed management.
- The most successful methods were seen to be one-to-one extension, demonstrations and small group activities relying on trusted advisers and social networks to ensure credibility and local applicability.

- The least successful methods were the internet and glossy brochures but this has to be seen in the context of their place in a suite of methods.
- Effort to achieve better integration of programs and messages between different providers would reduce wastage of resources and confusion among farmers.
- Agribusiness providers have close contact with certain groups of farmers and can be a key resource for change if there is an opportunity for them to add value to their services.
- Market research to identify target groups and key motivations to change is an important element in developing effective programs
- Training of service providers is a priority and could lead to better networks and coordination between providers.

2.3.1 Extension methods "Do's and Don'ts"

Based on the findings of the interviews and focus groups and from the literature review a set of actions that might contribute to success or failure of extension methods has been developed and is shown below.

Table 3 "Do's and don'ts" for extension

Method	Do	Don't
One-on-one	Develop relationship with producer and get to know his/her system Spend time going around the farm listening and observing Build trust and confidence by giving relevant, useful advice – start by dealing with simple problems first	Make assumptions without exploring the situation in detail Jump to conclusions or solutions
Demonstrations	Involve the host farmer and other local producers in setting up and managing the site Enlist the help of "Champions" to recruit other farmers and promote the demonstration Ensure resources are adequate for all the activities required Ensure that the trial can be observed easily and results are scientifically robust and reliable	Make the demonstration too complicated (simple designs are best) Make the site and conditions too different to those of surrounding enterprises
Group activity	Use where peer support and sharing between participants is important Use where different perspectives and skills can improve the learning	See as a method for all occasions Use with people who are not comfortable in groups Run groups without facilitation training and skills

	outcomes	
Field days	Use as part of integrated strategy for awareness raising Spend time and effort in planning Ensure comfort and safety Allow for different learning styles (eg visual, auditory, kinaesthetic)	Expect major practice change as a result Take too much time in presentations – let the participants explore and observe
Brochures and publications	Target for specific purpose (awareness or information dissemination) Integrate with other methods Make user friendly –simple and concise	Overload people with information Distribute indiscriminately – target the market – eg “point of sale”
Internet	Make site simple and easy to navigate – cater for low bandwidth and unskilled users Target specific market (eg competent users or service providers)	Do your own design – know what you want and employ a designer to get there Substitute this medium for others eg print

PART B. Model Development and Extension Strategies

This section includes a set of themes drawn from the 'rich picture' of the weeds extension situation in Part A and the UNE/ Institute for Rural Futures work on constraints and motivations to adoption. A strategic response to the themes is developed as a model of an effective weeds management extension system.

2.4 Methodology

The project was guided by the principles and practice of soft systems methodology[22]. In practice this meant:

1. Developing a 'rich picture' of the project situation through interviews and consultation with key informants and stakeholders, conduct of focus groups, review of relevant documentation, meetings with the MLA/AWI project management team and the parallel UNE/IRF project team. This is reported in section A of this report.

2. Analysing the data generated and describing themes emerging from the 'rich picture'

3. Using 'soft systems' techniques to:

- define relevant system/s in the light of the 'rich picture' of the situation and the emergent themes;
- develop models of the relevant system/s in terms of their essential functions;
- systematically review the situation through the prism of system/s models and the essential functions;
- highlight the practical implications of this review.

This section documents the outcomes of steps 1-3. Foot-notes are included to explain key concepts related to for example, capacity building and systemic action research.

2.5 Themes Emerging From the 'Rich Picture'

Weeds management and extension has to be seen in the context of related institutional arrangements[23]

[22] Checkland, P.B. 1981. Systems Thinking, Systems Practice. John Wiley and Sons.

[23] These are made up of:
- gazetted laws and regulations
- commonly accepted but not legally binding rules and guidelines
- organisations established by the culture.

Institutional arrangements are moderated and influenced by a culture's beliefs, values, worldviews and mindsets.

- Effective grazing and weeds management is effective behaviour and this is the goal, which means extension has to be seen within the mix of institutional arrangements (formal and informal) that effect what it is that people do – which institutional arrangements help, which hinder, and how can extension work with or around these?

- 'Short-termism' is a characteristic of institutional efforts – we need to provide continuity over time and design and implement strategies that assist people to move through the stages of the adoption process from awareness to effective management practices – we are not doing this well currently.

- Concern about the provision of resources and their allocation – especially funding, is widely shared. What systems need to be in place to support *economically viable production with responsible and sustainable land management practices*?

- We need to build on existing planning tools such as property management, Landscan, and/or vegetation plans.

Institutional arrangements related to weeds management, research and extension are fragmented and call for new relationships and consolidation of effort

- We have to achieve better alignment between key providers of services to resource managers (e.g. DPI, RPLB, Local and county Councils, CMAs) and among resource managers, be they National parks, Forestry, Railways or graziers. Their activities should complement each other.

- We have to consolidate information about weeds management – there are too many organizations putting out partial and inconsistent messages - they need to come together and/or the information needs to be collated and consolidated.

- MLA extension initiatives on weeds management overlap with that of the National Weeds Strategy as it relates to specific weeds but lacks co-ordination and synergy.

- Social and material support for weeds control/management from peers via Landcare is effective but Landcare volunteers are suffering burnout and a sense of being used by other institutions.

- CMAs are probably second only to agribusiness in terms of people on the ground in contact with resource managers but they are perceived by some as focused on "conservation" rather than sustainable production.

- The local media can play a key role. Accepting invitations onto strategy committees is likely to stimulate their contributing time on radio programmes and space in regional papers.

- Obstacles to consolidation and integration of effort between providers include the prejudices different providers have of each other, including distrust and

competitive rivalry eg cultural differences between DPI and agribusiness agronomists

- "No point in doing anything here – bloody NPWS/Forestry etc etc don't do anything about their areas and we get re-infested" Neighbour relations between public and private resource managers have to be improved to avoid perceptions like this.

Improving weeds management and related services, including extension, is an exercise in capacity building

- Learning related to (1) technical aspects of weeds management, (2) extension approaches and methods, and (3) improved institutional arrangements, needs to be integrated and grounded in the local situation. A capacity building approach that results in relevant "communities of practice[24]" learning together is consistent with this, and to the need for building relationships and aligning the efforts of providers.

- Transaction costs associated with a capacity building call for injection of the resources needed to achieve realistic outcomes.

- We need providers to work and learn together in responding to graziers (and vice versa) such that they develop mutual respect based on a realistic appreciation of what each is bringing to the table.

- There is a need for training and accreditation of advisers and contractors that is related to best practice and is supported by an accreditation process that promotes professional standing. The accreditation program being developed by the Australian Institute of Agricultural Science and Technology is based on an assessment of competence and is a potential tool.

Credibility is a product of sound technical knowledge related to the local situation and trustworthiness based on a history of 'delivering the goods'.

- Research that establishes the economic benefits of controlling weed/s in pastures is a pressing need.

- Many resource managers are unable to identify weeds, particularly grass species

- Credibility – about what and possessed by whom, is a recurring theme. Local advisers be they consultants, agribusiness agronomists, Department of Agriculture people or farmers know the district, its production systems and people. There is however confusion about roles, responsibilities and goals.

[24] Communities of practice are groups of people who share a concern or a passion for something they do and who interact regularly to learn how to do it. What people in a community of practice have in common is what they do, underpinned by common beliefs and values, e.g. poultry farmers who utilize an intensive system such as caged battery hens constitute a different community of practice to free range growers of organic chickens and eggs. Communities define what constitute competence for the people who belong to them and hence what is expected of them.

- Agribusiness constitutes a widely distributed resource that is increasingly focused on providing management services rather than a narrow emphasis on sales of inputs such as chemical products.

- Contractors enjoy a particularly high level of credibility with many of their clients because they blend practical weeds management skills and local and wider technical knowledge with an awareness of pertinent institutional arrangements and expectations.

- Service providers tend to prefer 1:1 contact with clients as an extension approach. They see it as a source of and contributor to credibility and are comfortable with it. The IRF project found that person to person contact was also highly valued by graziers. This may however act as a barrier to participation in more collaborative and sophisticated extension strategies based on alignment of provider effort.

Current extension practice is 'shot gun' in nature and assumes an homogenous audience ready to respond to messages our institutions see as relevant – the reality is a differentiated audience ready to hear messages related to what they see as benefits – this constitutes a fundamental strategic mismatch.

- Messages have to be couched in terms of benefits perceived by recipients – knowing what these are for different categories of graziers/resource managers is the first step in designing effective messages – the UNE study of grazier categories based on the '3 Ds[25]' of effective weeds management is providing this sort of information

- Social marketing is a communication strategy designed to move a targeted audience through the stages of adoption (indifferent, aware, ready, active). It calls for (a) segmentation of the market and attaching of priorities to particular segments, (b) design of messages that relate to benefits perceived by people in a particular segment i.e. messages they are 'ready' to hear, and (c) a strategic intent to move the audience from a lower level to a higher level segment in terms of the adoption process.

- Social marketing calls for research into and segmentation of the intended audience. This leads to information about segment size and where the greatest leverage will be obtained. The UNE segmentation study is a sound basis for a social marketing strategy.

- A social marketing strategy calls for its initiator to place a priority on the intended audience – on broad cost/benefit grounds for example e.g. hobby farms in some districts, or control of a particular weed.

- A social marketing strategy is equally applicable in moving institutional players from awareness to adoption of practices that support *economically viable production with responsible and sustainable land management practices.*

[25] Deliberation, diversity and diligence in relation to weed management.

- The key message related to management of weeds in high rainfall grazing systems is that it equates with good pasture management, and in turn, with good returns from livestock.

- Messages that are localized in terms of practices, people and situations will ground the communication strategy in peoples' experience.

- Supplying service providers with up-to-date and topical information enables them to build credibility (a benefit to them) while delivering consistent messages to graziers and resource managers e.g. the GRDC Advisor Updates.

- Well managed, labelled and communicated demonstrations with continuity over time are a proven extension method. Conducting them as a multi-agency initiative avoids fragmentation and is an incentive for better alignment of providers.

Needed changes in extension strategies and related institutional arrangements and practices constitute an innovation that depends on national, district and local leadership

- The cropping boom over the last 20 years relegated consciousness of grazing systems and the importance of weeds management within them.

- The current MLA/AWI project on weeds management in the high rainfall grazing zone is a significant leadership initiative.

- MLA and AWI are well placed to facilitate engagement of service providers and resource managers in an on-going process of realignment in addition to redesign of their own communication strategies

- Leadership is a vital ingredient and can come from any sector, as evidenced by the 'Keep in Touch (KIT)' grazier initiated group at Coolah and the Yackandandah Landcare Group's work on weeds management among hobby farmers. Leadership initiatives at the local, district or national levels will be helped or hindered by compatible initiatives at the other levels.

2.6 Relevant System/s in the Light of the 'Rich Picture' and the Emergent Themes

A central component of soft systems methodology is the definition of a relevant system (relevant in the sense of providing a conceptual framework for addressing the problematic situation revealed by the preceding analysis). The methodology calls for the definition of the six factors which constitute a human activity system. These are its:

- Transformation - what the system does;
- Clients - who the system benefits;
- Actors - the people who run it;
- Owner - those with the power to activate or terminate the system;
- Worldview - the set of values that underpin its operations;

- Environmental forces - forces acting to advance and/or inhibit the system.

The decision as to what constitutes a relevant system and its components is a matter of judgement. Our responses for this system are as follows:

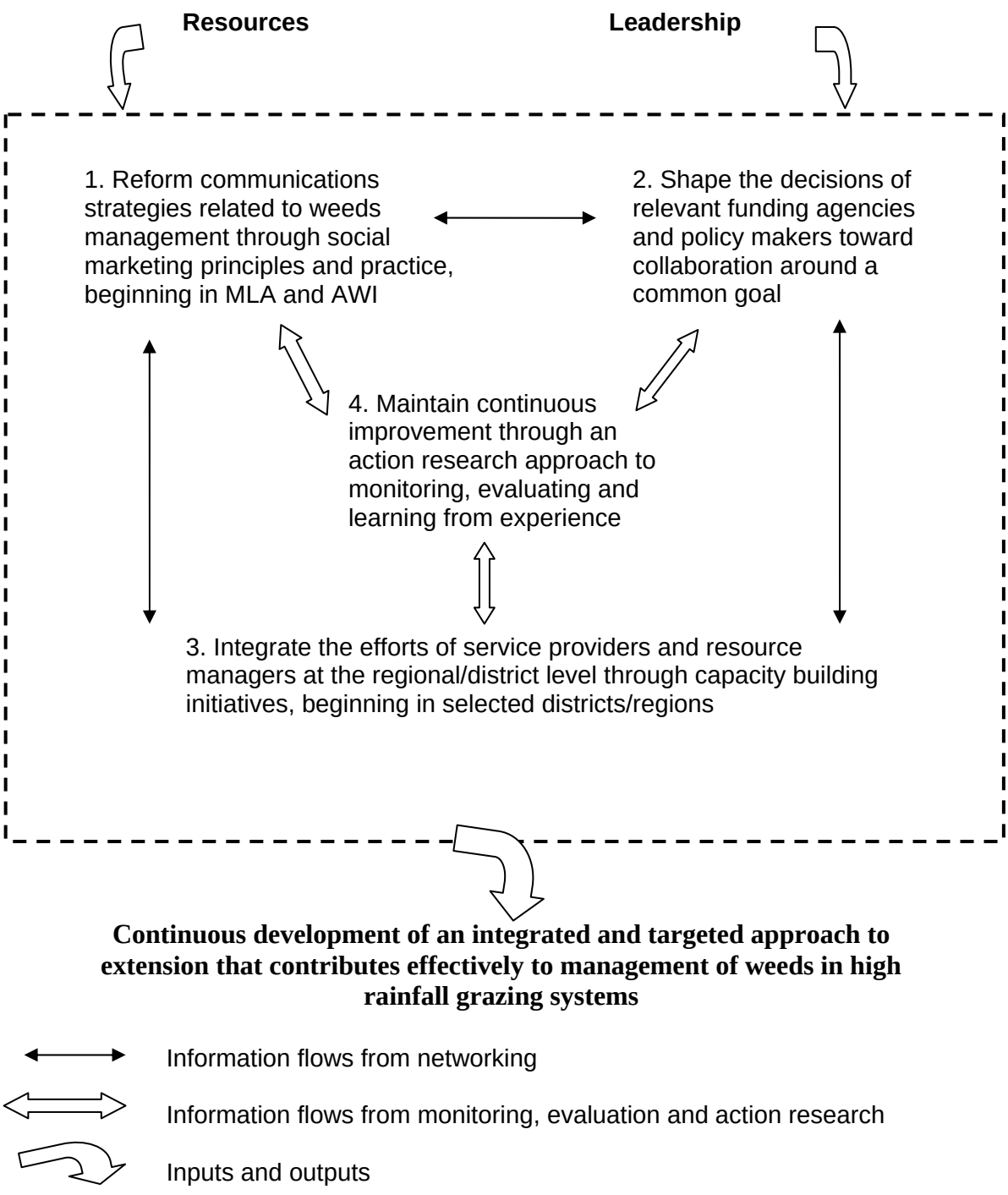
Transformation –continuous development of an integrated and targeted approach to extension that contributes effectively to management of weeds in high rainfall grazing systems
Clients - service providers and resource managers
Actors - those recruited on the basis of needed expertise and/or leadership

Owner – MLA and AWI
Worldview – the realisation that ongoing leadership and action research is needed to integrate the known elements of an effective extension strategy, its co-ordination and operations
Environmental forces – institutional inertia associated with the current approach, countered by diffused ability and willingness to improve the situation

2.7 A model of the relevant system in terms of its essential functions

Having defined a relevant system the next step is to develop a model of it. This is done in terms of its essential functions. A model of the system defined above follows as Figure 3.

Figure 3. Conceptual model of system



Items 1-4 within Figure 3 are sub-systems. Each is subsequently expanded into its component functions. The expanded list of functions is the basis of the next stage of the methodology.

2.8 Expansion of Each Sub-System into its Component Functions

1. Reform communications strategies related to weeds management through social marketing principles and practice, beginning in MLA and AWI

- Contract an agent with relevant expertise to manage the reform process
- Prioritise publications for reform
- Implement the reform strategy by:
  - Specifying outcomes sought i.e. which category/s of resource manager will be doing what if the strategy is a success
  - Segmenting the target category/s as indifferent, aware, ready or active as far as the outcome sought is concerned
  - Identifying what might drive people in each segment to engage in the adoption process
  - Designing (or re-designing) messages to engage specified audience segments in the adoption process
  - Selecting the most appropriate mix of media to communicate the messages to the target audiences
  - Transmitting the messages using a planned media program
- Monitor the impact of the communications and adapt accordingly

2. Shape the decisions of relevant funding agencies and policy makers toward collaboration around a common goal

- Identify relevant funding and policy agencies
- Communicate benefits to them of engaging in collaboration with MLA/AWI
- Develop common goals
- Engage in collaborative effort toward goals
- Monitor the outcomes and adapt accordingly

3. Integrate the efforts of service providers and resource managers at the regional/district level through capacity building[26] initiatives, beginning in selected districts/regions

- Select regions/districts
- Identify relevant communities of practice (CoPs) [27] and communicate benefits of engagement to their leaders

[26] Capacity building occurs "when relevant communities of practice use their stock of human and social capital and their access to financial, physical and natural capital to improve problematic situations and effect improvements in the stock of capital in the process". The underlying premise here is that people consciously utilise the full gamut of resources needed to improve a particular situation, and that the outcome is two-fold: (i) the situation is improved, as is (ii) the overall stock of capital, that is - what the participants know and can do, how well they relate and organize, their access to investment funding and infrastructure, and the quality and sustainability of the natural resource base. No matter what the initiating issue is a capacity building approach alerts us to what and who should be involved, and the benefits to them of doing so.

[27] Community of practice is a more useful concept than stakeholder. The latter too often refers to those who have a stake in the outcome but not to achieving it. For any given issue there will be communities of practice that are relevant in terms of their expertise and leadership, their access to different forms of capital, and the hold they have on members. They may be based within the region or outside it.

- Facilitate engagement of the CoPs in a capacity building process [28] related to improving the local 'weeds situation'
- Collaborate in the design, conduct, monitoring and evaluation of extension initiatives (using a diverse range of methods) to improve weeds identification and management
- Monitor and evaluate the outcomes and incorporate lessons learned into similar initiatives in other districts/regions

4. Maintain continuous improvement through an action research approach to monitoring, evaluating and learning from experience

- Nominate continuous development and improvement of an integrated and targeted approach to weeds extension as an action research project and fund accordingly
- Appoint a research leader/team to manage the project
- Involve members of capacity building initiatives in regions and those involved in reform of communication strategies as members of the research team
- Monitor and evaluate the process and outcomes of initiatives related to (a) policy makers and funders, (b) capacity building in regions/districts and (c) reform of communication strategies (including initial benchmarking)
- Incorporate what is being learned in each of the three arenas into decision making in all three
- Document and communicate the process and outcomes

Identifying and engaging them is a critical aspect of capacity building. The fact that they often have conflicting worldviews and interests has to be addressed in the process.

[28] The process will enable:

- definition of the situation to be improved and what will constitute an improvement;
- a set of m&e benchmarks based on the current state of the various capital/s that might be accessed to improve the situation;
- collegial relations and growing commitment around a sense of shared purpose related to improvement of the situation
- appreciation within and acceptance by the relevant CoPs of their role in implementing plans they collaborated in developing
- awareness within the region that the particular problematic situation is being addressed via the project

2.9 Review of Situation through Prism of the Relevant System and its Essential Functions

Having defined and developed a model of the relevant system (Figure 1) the next task is to use it to review the situation revealed by the analysis of the 'rich picture' of the situation with a view to determining (a) if the function is being carried out and if so how effectively, or (b) if it is not, why not, and (c) how under the circumstances it might be done most effectively.

The table below lists the functions of the 4 sub-systems. A commentary related to the context surrounding each function and a proposal for its implementation is also included. A definition for each subsystem of its Clients, Actors, Transformation, Worldview, Owner/s and Environmental Influences is contained in Appendix 5.

Feedback on the themes developed, the systems model and its essential functions was obtained from weeds extension peers as a means of testing the validity of the process and its outputs. The feedback is contained in Appendix 7.

1. Reform communications strategies related to weeds management through social marketing principles and practice, beginning in MLA and AWI

Function	Analysis	Implementation
Contract an agent with relevant expertise to manage the reform process	The IRF[29] project is a sound basis for a social marketing approach to reform and highlights the expertise needed to manage it	MLA/AWI nominates the reform process as one of the suite of action projects and
Prioritise publications for reform	MLA and AWI produce a number of publications related to weeds management that can be reformed and provide a model for other agencies, particularly those responsive to MLA/AWI's collaboration initiatives (sub-system 2). The capacity building initiatives (sub-system 3) will provide a focus for the reform of existing publications and the emergence of new ones	The contractor will assist MLA and AWI to: 1. Review their existing publications and decide which ones to reform 2. Use the reform strategy to complement the capacity building initiatives in selected regions (see sub-system 3) 3. Communicate these initiatives to collaborators
Implement the reform strategy by: o Specifying outcomes sought i.e. which category/s of resource manager will be doing what if the strategy is a success o Segmenting the target category/s as indifferent, aware, ready or active as far as the outcome sought is concerned	Elements of the strategy occur within projects but are not conceptualized and managed as such – the emphasis is on getting the message out rather than organizing it to achieve a specified purpose.	Contractor will: 1. Build on the work of the IRF to design the reform strategy and manage its implementation, monitoring and evaluation.

[29] The Institute for Rural Futures at the University of New England

o Identifying what might drive people in each segment to engage in the adoption process o Designing (or re-designing) messages to engage specified audience segments in the adoption process o Selecting the most appropriate mix of media to communicate the messages to the target audiences o Transmitting the messages using a planned media program		
Monitor the impact of the communications and adapt accordingly	Outcomes of communication programs related to weeds management are monitored on an individual agency and project basis at best and an effective m&e component of the reform process will guide the process and both contribute to and benefit from the over-riding action research program (sub-system 4)	Implement a monitoring and evaluation strategy

2. Shape the decisions of relevant funding agencies and policy makers toward collaboration around a common goal

Function	Analysis	Implementation
Identify relevant funding and policy agencies	These agencies are known to MLA and AWI but have not been formally identified in this way	1. Compile list of relevant agencies 2. Determine appropriate contact people for each agency. 3. Contact these people to determine their

		willingness to participate.
Communicate benefits to them of engaging in collaboration with MLA/AWI	Communication occurs at various levels between these agencies and MLA/AWI (e.g. Pastures Australia) but not in terms of benefits of collaboration about weeds. The IRF and Rural Enablers projects initiated by MLA/AWI provide a rationale and modus operandi for collaboration.	1. Approach each agency on the list to determine their needs in respect of weeds management 2. Prepare presentation describing the benefits of collaboration in terms of delivering on agency needs 3. Meet with contact (s) from each agency to discuss participation and secure agreement to attend workshop
Develop common goals	There is limited understanding of commonalities	1. Hold a workshop where the benefits of a common approach are explored. 2. Develop goals and strategies for implementation 3. Agree on actions and responsibilities for each agency
Engage in collaborative effort toward goals	Occurs on a limited scale	Implement agreed actions
Monitor the outcomes and adapt accordingly	Outcomes are monitored on an individual agency basis if at all	Implement a monitoring and evaluation strategy as part of above and review and re-plan on an annual basis. Ensure this allows partners to recognize and “badge” outcomes

3. Integrate the efforts of service providers and graziers/resource managers at the regional/district level through capacity building initiatives, beginning in selected districts/regions

Function	**Analysis of context**	**Proposed action**
Select regions/districts	MLA/AWI will get maximum leverage by acting as a broker, catalyst and facilitator in areas where collaborative leadership across institutions and community and a desire to manage weeds systemically is already	1. Appoint a capacity building agent to facilitate the process. 2. Decide on the number of areas to target initially e.g one per State 3. Select areas on basis of existing collaborative relations and shared concern about weeds

	apparent e.g. Coolah in NSW. Effective action occurring as a result will serve as a model for initiatives in other areas. An MLA/AWI input of capacity building and action research expertise will provide for process leadership, continuity of effort and documentation of outcomes.	between for example leaders in CMA, State and Local Govt agencies, agribusiness and farming community organizations 4. Select and invite a key organization to participate in and lead locally a national capacity building project related to weeds management
Identify relevant communities of practice (CoPs) and communicate benefits of engagement to their leaders	An appropriate 'contract' with the local lead organization will identify reciprocal input. The first step will be collaborative identification with key informants of the relevant CoPs, and engagement of their leaders. Relevant CoPs will include those with local, regional, state and national interests. The engagement process will be supported by publicity about the project.	1. Contract a lead organisation in each area and enable communication between them through video-conferencing[30] 2. Facilitate a process where the lead organisation works with key informants to identify relevant CoPs 3. Communicate the advantages of engagement to CoP leaders and recruit their participation in project planning 4. Publicise the project and expected outcomes (see sub-system 1 – reform of communication strategies)
Facilitate engagement of the CoPs in a capacity building process related to improving the local 'weeds situation'	The process will enable: ▪ definition of the situation to be improved and what will constitute an improvement; ▪ a set of m&e benchmarks based on the current state of	1. Conduct a 1 day workshop in each area to collaboratively plan a capacity building strategy and gain commitment of resources i.e. get CoP imprimaturs for further participation 2. Nominate and establish a small project

[30] Video-conferencing emerged as a key component of a successful postgraduate student exchange program focused on sustainable agriculture at 4 Australian (UNE, UWA, UQ and UWS) and 4 European universities (Wales, KVL – Copenhagen, Kassel- Germany, Wageningen – Netherlands) evaluated by Bob Macadam during 2005.

	the various capital/s that might be accessed to improve the situation; ▪ collegial relations and growing commitment around a sense of shared purpose related to improvement of the situation ▪ appreciation within and acceptance by the relevant CoPs of their role in implementing plans they collaborated in developing ▪ awareness within the region that the particular problematic situation is being addressed via the project	management team (3-4) in each area 3. Publicise the outcomes of the strategic planning workshop. 4. Communicate the process and outcomes across selected lead organizations in each area via tele-conferencing.
Collaborate in the design, conduct, monitoring and evaluation of extension and related initiatives (using a diverse range of methods) to improve weeds identification and management.	The project team in each area will discern sought after weeds management behaviour among private and public resource managers in the area and the most effective way to achieve this for different sub-categories. e.g. indifferent, aware, ready, active. It will match this with available resources and, given the CoP imprimaturs established earlier, influence and co-ordinate the use of the resources to achieve the desired outcomes e.g. the work of agribusiness and Ag Dept agronomists, weeds officers, CMA	<u>Project team/s:</u> 1. Use the concepts and outputs of the use by the UNE team of its 3-D model to map sub-categories of resource managers relative to sought after weeds management behaviour. 2. Identify the resources available and how they are being utilized relative to moving sub-categories forward. 3. Discern how resources could be more effectively deployed. 4. Communicate the desirability of and facilitate a collaborative re-deployment of resources. <u>Resource partners:</u> 5. Modify their work to more effectively contribute to the shared goal

	staff, consultants, Landcare and other community groups. An over-riding consideration where appropriate is that good grazing management equates with effective weeds management.	MLA/AWI capacity building agent: Facilitates the appreciation and utilization of capacity building principles and practices by project team/s and through them to the work of the resource partners
Monitor and evaluate the outcomes and incorporate lessons learned into similar initiatives in other districts/regions	A key component of m&e is to track changes in the stock of capital the collaborators can access to initiate and continue improvement in weeds management. This is a targeted process – "who and what do we need, who and what have we got, and what effect are we having ?" are relevant and practical questions at any point in the process. They draw attention to the range and level of available expertise (human capital), the status of the collaborators and the project (social capital), the funding they can access (financial capital), the equipment and infrastructure they can utilise (physical capital) and the incidence and effect of weeds (natural capital). Auditing changes in these capitals over time will be tied in with and complement a cyclical action research orientation i.e. plan – act – observe-	MLA/AWI capacity building agent: 1. Facilitates (a) an appreciation of the role of m&e in building capacity, improving the weeds situation and learning from the experience, (b) the establishment and use of a set of m&e benchmarks based on the state of the various capital/s 2. Report on process and outcomes as an input into the overall action research project (see sub-system 4) Project Team/s: (a) Manage the establishment and use of the m&e benchmarks to effectively manage the project and discern what is learned in the process Resource partners: Provide data for m&e

reflect (see sub-system 4)

4. Maintain continuous improvement through a systemic action research approach[31] to monitoring, evaluating and learning from experience

Function	Context	Implementation
Nominate continuous development and improvement of an integrated and targeted approach to weeds extension as an action research project and fund accordingly	The IRF and Rural Enablers projects are a platform for integrated action and LWA/AWI are committed to achieving it. An overt systemic action research approach will enable them to (a) manage this, and (b) communicate it to partners	LWA/AWI state and explain their intention to invest in continuous improvement in weeds management extension
Appoint a research leader/team to manage the project	The current arrangements where Cameron Allan acts as the 'owner' of the Rural Enablers and IRF projects on behalf of MLA/AWI and Bob Hannam as the 'operations manager' is a useful model	Nominate an LWA/AWI project 'owner' and an 'operations manager' as the leaders of the systemic action research team
Involve members of capacity building initiatives in regions and those involved in reform of communication strategies as members of the research team	The intent is to ensure that the capacity building and communications reform sub-projects complement each other – having their leaders as members of the overall action research team is key to this. Other agents might join the team as a result of the efforts of LWA/AWI to promote collaboration toward a common goal	1. Appoint the contractors leading the capacity building and communications reform strategies as team members together with the LWA/AWI 'owner' and 'project manager' 2. Team meets and designs a process that ensures the sub-projects operate as elements of

[31] **Systemic action research.** Measures of improvement represent the outcomes of the *action* component of the action research process. How this is achieved and what is achieved is the focus of the *research* component. Bench-marking and monitoring and evaluation related to selected bench-marks is central to this. Central to action research is the notion of recursive and documented cycles of planning, action, observation and reflection.

The systemicity in *systemic* action research is the appreciation that practice change is a product of a host of inter-related internal and external drivers and constraints experienced by individuals and institutions. The research takes this into account and seeks to enhance this appreciation and a willingness to act on the implications among those affected by the research, hence the emphasis on participation in the research process.

		a wider systemic action research project 3. Project manager manages the agreed upon process
Monitor and evaluate the process and outcomes of initiatives related to (a) policy makers and funders, (b) capacity building in regions/districts and (c) reform of communication strategies (including initial benchmarking)	Monitoring and evaluation of the sub-projects is the basis of m&e related to overall project purpose – and the deliberations of the action research team	Sub-project leaders are responsible for m&e of their projects and Project Manager relative to project goal – 'continuous development of an integrated and targeted approach to extension that contributes effectively to management of weeds in high rainfall grazing systems'
Incorporate what is being learned in each of the three arenas into decision making in all three	On-going communication across sub-projects will be enhanced by use of IT technology (eg videoconferencing) and periodic workshop meetings	Project and sub-project inputs and outputs will be modified in the light of lessons learned
Document and communicate the process and outcomes	Important from an R&D perspective are the published outcomes	MLA /AWI will require a publishable suite of reports

3 PART C. Scenarios – Implementing best practice extension

The authors grappled with the question of how to tie together the practical implications drawn from the literature review (Box 1) with practitioners assessment of the effectiveness of different extension methods (Table 2) and their judgements about extension "dos and don'ts" (Table 3). They saw too the need to link into this the outcomes of the parallel IRF project and to do all of this in the context of strategic response elicited from the systems modelling.

They responded by incorporating these diverse elements into three scenarios that represent 'best extension practice' for weeds identification and management. The scenarios are set in the fictitious high rainfall grazing district of Cooladore.

Scenario 1 depicts a capacity building initiative based on a convergence of local and institutional leadership in response to the threat to the district posed by weeds. The setting subsumes the interests of graziers and agricultural extension operatives into concern among diverse stakeholders about the impact of weeds on the wider community.

An outcome of scenario 1 is the establishment of working parties to address different aspects of the weeds situation. One of these is an extension program aimed at the grazing community. This is developed as scenario 2.

Within the scenario 2 situation the place of applied research on weeds and benchmarking and monitoring related to their incidence is developed as scenario 3.

Each scenario includes a description of the situation, the strategy employed and its rationale, the process used to implement the strategy, and the expected outcomes. Detailed descriptions of elements such as relevant extension techniques, effective message design and delivery are included as supplementary boxes.

Included in the terms of reference is the requirement to "determine the strengths, weaknesses and effectiveness of current weed extension processes, activities and information presentation in relation to adoption barriers and success factors."

The project goes further in responding to this than the data collection and analysis associated with the literature review, interviews, focus groups and meetings with the IRF collaborators. Incorporated into each of the scenarios is a SWOT analysis of the scenario. The scenarios depict best practice and the SWOT analyses highlight the practical implications of actually putting this into practice.

3.1 Scenario 1: District Level Capacity Building

3.1.1 Situation

Cooladore has a population of 2500 and is the service centre for a high rainfall grazing district. Services include agri-business agronomists linked to merchandise stores run by stock and station agencies, a District agronomist, a farm management consultant, a Weeds Officer employed by the Council, stock inspectors employed by the Rural lands Protection Board. Local graziers are active in

community and industry affairs and are represented on the boards of the RAS, Farmers Assn, Catchment Management Authority, Women in Agriculture and AWI. They have good networks within and external to the district. A feature of the district is the Cooladore Agricultural Research Group.

The Group is a semi-formal network of graziers and service providers, both government and non-government, that works to identify and highlight problems and opportunities and stimulate a response. The latter includes on-farm research and extension, with local and external institutional input when the Group is able to get it. It is in effect a leadership group motivated by the notion that prosperity means productive farms and businesses based on good quality infrastructure, with people making wise use of natural resources while participating in community affairs and educational activities.

The Group is aware of the insidious threat to district prosperity posed by the proliferation of weeds. It draws together a number of insights linking weeds, grazing and natural resource management, and economic development. Specifically:

- Exemplary weeds managers diligently use a diverse range of methods in a deliberate strategy, but are in a minority
- Good grazing management usually equates with good weeds management.
- Weeds control is not economically rational from an individual view-point on sub-viable properties and relatively unproductive country, and public investment may be needed to stop weeds getting out of control
- Even on viable and more productive properties the return/cost ratio of investing in weeds management is uncertain and inhibits action by many managers
- Difficult terrain, herbicide resistance and reluctance to use chemicals suggest the need for technological innovation
- There is generalized community and institutional concern about the proliferation of weeds on private and public lands and the economic and environmental consequences, and a sense that “something must be done”

The Group realises the situation calls for innovative action. Sarah, the wife of a grazier member, takes a leadership role to this end. She sees as relevant experience her role as a facilitator in development of the Macquarie 2100 Draft Plan - a community, environmental and economic plan initiated in 1995 by the Macquarie Valley Landcare Group[32]. The Research Group is aware of the related concept of capacity building through its links with the CVCB, and in the MLA/AWI interest in using it in weeds management.

The convergence of local and institutional interests, leadership and expertise leads to the initiation of a capacity building project related to management of weeds in the Cooladore district. The project is managed by the Department of Agriculture with Isobel, the District Agronomist as the designated leader. She has the imprimatur and active support of the Cooladore Agricultural Research Group.

[32] Macquarie Valley Landcare Group 1999. A summary of the development of the Plan and how it meets capacity building criteria is included as Appendix 6

MLA/AWI provide matching financial support for financial and in-kind support from district and regional businesses and service providers.

3.1.2 Strategy

Capacity building[33] occurs "when relevant communities of practice use their stock of human and social capital and their access to financial, physical and natural capital to improve problematic situations and effect improvements in the stock of capital in the process". The underlying premise is that people will consciously utilise the full gamut of capitals available to them to improve the weeds situation, and that the outcome is two-fold: (i) the situation is improved, as is (ii) the overall stock of capital.

Capital in this definition embraces not only access to financial resources but also knowledge, skills and attitudes (human capital), how well we relate and organise (social), the quality and quantity of infrastructure (physical), and the quality and sustainability of the natural resource base (natural). The various forms of capital are inter-changeable – an obvious example being the way we transform forests, fisheries and minerals into financial resources. Conversely we can combine knowledge, relationships and finance to transform a degraded natural environment (for example through the activities of a Landcare group).

An illustrative metaphor is that of a 'winning football team'. You do it by playing the game successfully – practicing is not enough. The ability of players has to improve (human capital) but so does the relationship between players, coaches, managers and supporters (social capital), funds (financial capital), facilities and equipment (physical capital) that utilise land and water (natural capital).

The impact of weeds on farm productivity is of particular concern to graziers, extension operatives and weeds researchers. Other players are equally concerned about weeds however and a capacity building approach alerts us to what and who should be involved in addressing the problem, and the benefits to them of doing so – the relevant communities of practice.

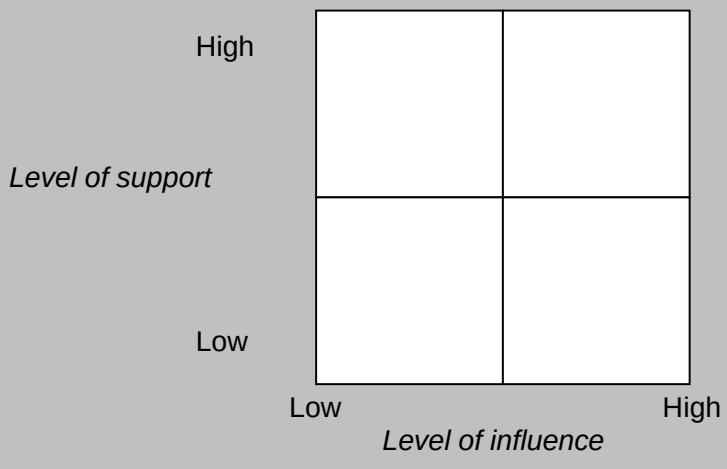
[33] Macadam, R.; Drinan, J.; Inall, N. and McKenzie, B. 2005. *Growing the capital of rural Australia – the task of capacity building*. RIRDC; Kingston, ACT

Box 2. Stakeholder Analysis – a technique for identifying and assessing stakeholders and relevant communities of practice

Source: Action Learning Project Management Workbook, Centre for Systemic development, University of Western Sydney

- Brainstorm a list of the individuals, groups and organizations who might have (a) an impact on the project, (b) an interest in it, or (c) be affected by its implementation – be as specific as possible
- Place each person, group or organisation on the matrix below in terms of (a) their potential level of interest and support, and (b) their level of potential influence
- The entries in the top quadrants are of particular significance – your aim is to work with the people in the top right quadrant to pull as many as possible in the left quadrant across to the right.
- List these key persons, groups and organizations and record below your assumptions about the wants and needs of each, and particularly the leaders
- Categorise the key persons, groups and organizations as either (a) project initiators – the relevant communities of practice, and (b) those with a stake in the outcome - those who will have to be consulted and kept informed
- Use this analysis to devise a strategy to get participation and/or support, based on an assessment of their wants and needs

Stakeholder analysis chart



Community of practice is a more useful concept than *stakeholder*. The latter too often refers to those who have a stake in the outcome but not to achieving it. For any given issue there will be communities of practice that are relevant in terms of their expertise and leadership, their access to different forms of capital, and the hold they have on members. They may be based within the region or outside it. Identifying and engaging them is a critical aspect of capacity building. The fact that they often have conflicting worldviews and interests has to be addressed in the process.

A capacity building approach will enable the relevant communities of practice to:

- define the weeds situation and what will constitute an improvement;
- assess the level and availability of various capitals they might access to improve the situation (and develop a set of M&E benchmarks in the process);
- develop a growing commitment to work together to improve the weeds situation;
- take concerted action;
- monitor, evaluate and learn from the on-going experience;
- effect improvements that meet their diverse goals e.g. improved farm productivity for graziers, commercial opportunities for agri-businesses, uptake of new technologies based on sound science for extension and research operatives, control of weeds on public land for Councils, improved community relations for local political leaders.

Leadership is the key to joint effort and may come from within any one or more of the relevant communities of practice.

3.1.3 Process

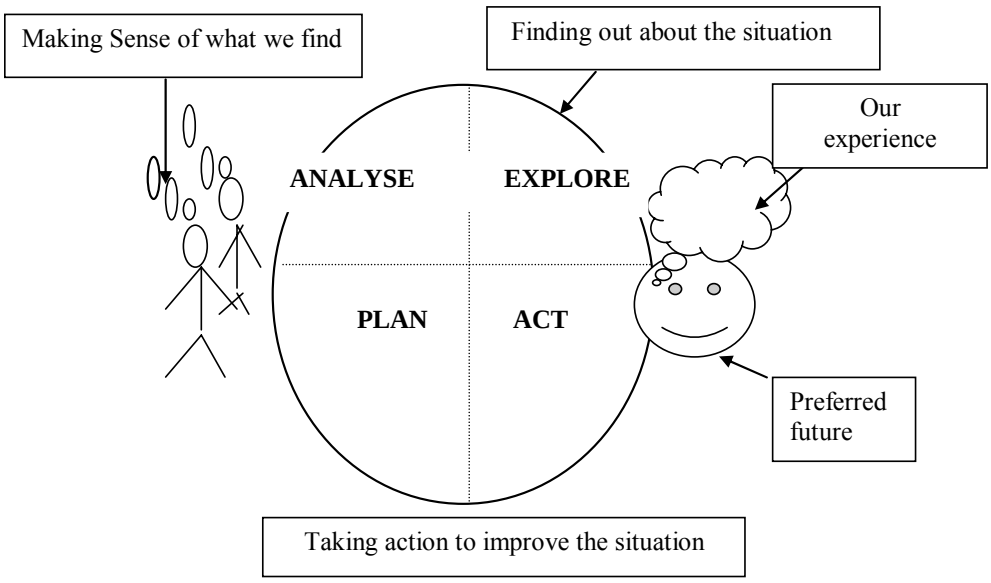
Engage an initiating group. Sarah and Isobel, the District Agronomist, enlist the support of 5 others they know are interested in the wider issue and an innovative response to it, and who have facilitative leadership and communication abilities. Sarah facilitates use of action learning techniques to explore and analyse the situation – including its technological, environmental, social, political, economic and cultural dimensions. This leads to a plan to engage communities of practice that the initiating group sees as relevant. These include influentials from among agri-business agronomists, Council weeds officers, the CMA, Landcare groups, the Farmers Association, Greening Australia – together with local business and community leaders …

Engage relevant communities of practice. In framing the problematic issue related to proliferation of weeds the initiating group does so with a view to attracting diverse communities of practice. Some are interested in technological innovation and R&D; others in the commercial, social or environmental implications; and others with regulation, communication and education responsibilities. They have different and in some cases conflicting perspectives. Initiating group members present engagement as an opportunity for members of the communities of practice to pursue their own interests while contributing to the common good. Engagement is sought as interested individuals rather than representatives. Initiating group members approach invitees in person.

Facilitate collaborative learning around the problematic issue. Workshops facilitated *by* Sarah and colleagues enable the diverse communities of practice to develop new and better informed relationships as well as develop a shared knowledge of the 'weeds situation', its significance and

possible responses. The action learning techniques used are based on the experiential learning model developed by Kolb[34]. It is presented below as Figure 4. Facilitated experiential learning is seen as the key to developing new ways of seeing the weeds situation as a precursor to responding in new and more effective ways.

Figure 4. The learning cycle



Sarah and her fellow facilitators find the guide for facilitators produced by Jim Woodhill and Lisa Robins [35] a valuable source of techniques and tips. An important aspect of these tools is that they ensure everyone is an equal contributor, and counter the impact of dominant individuals or cliques (see Box 3).

[34] Kolb D. 1984. Experiential learning: experience as a source of learning. Prentice Hall, New Jersey
[35] Woodhill J and Robins L. Participatory Evaluation for Landcare and Catchment Groups: a guide for faciliators.

Box 3: Countering the influence of dominant individuals and cliques.

The techniques incorporated into the workshop outline in Scenario 1, and described in Box 4, have as a common element equality of input among participants. They counter the otherwise common phenomenon of dominant individuals and/or cliques monopolising discussion and distorting outcomes.

The card sorting technique described by Woodhill and Robins illustrates how this is achieved. It is used to cluster, organize and rank information. For example, each person in a group can be asked to nominate on 3 separate cards his or her responses to the question 'what do you see as the 3 main constraints to more effective weeds management on local farms?' A large number of workshop participants (say 70) can each respond to the question. They can then be formed into 10 subgroups of 7 and asked to share the cards, collate them into categories and write the subgroup's descriptor for each category. Each subgroup can then share the output in a plenary session. The facilitator explains the task, forms the subgroups and sets and controls the time allocated to the task.

The workshops are patterned on the workshop structure outlined below:

1. Explain the background and context for the workshop, and the hoped for outcomes.
2. Get participants to introduce themselves and, if appropriate conduct some sort of 'ice-breaker' that establishes rapport and generates a few laughs.
3. Explain the agenda and process of the workshop and the role of the facilitator.
4. Invite participants to make a statement about what they would like to see achieved from the workshop. For example, pose the question. 'What would make this workshop a success for you? If necessary and appropriate revise the agenda based on participants' needs.
5. Run a series of activities (moving around the stages of the learning cycle) that will enable the workshop objectives to be achieved. For example:
    a. rich picture of situation
    b. historical analysis (see Box 5)
    c. stakeholder analysis (see Box 2)
    d. SWOT analysis
    e. identification of priority actions using card technique (see Box 3)
    f. action planning
6. Clarify the outcomes of the workshop and agree upon future actions.
7. Ask participants to provide a written evaluation of the workshop.
8. Close by inviting participants to say what the workshop meant for them.
9. Write up the workshop and provide a report to participants asap.

Box 4: A facilitative skills development program being developed in conjunction with APEN.

The proposed program uses real-world learning experiences as the core 'training and development' medium. These learning projects have the dual aims of improving the real-world situation the project is focused on, e.g. management of weeds - the 'field activity', while concurrently developing the participants' competence to lead capacity building. The program will utilize participative workshops to introduce capacity building principles and practice, facilitate design of the 'field activity', enable reflection on activity experience and its implications, and encourage an innovative response. The program will incorporate mentoring during the 'field activity' phase.

The practicalities of offering the program will be negotiated with APEN but a possible model might be to offer it in centres where a minimum of 15 participants sign up. They could for example be from an agency or agencies or drawn from a wide cross-section nominated by agencies in response to their mission – be it health, natural resource management, business or community development.

Participants learn to lead by responding to issues in their work and life. They are challenged and supported by colleagues and mentors, and by a process that encourages leadership initiatives that result in real improvements in the problematic situations they are addressing..

Participants would be required to commit themselves to 3 x 2 day workshops over a 12 months period and to the conduct of the core 'field project'. The scope for accreditation of the learning outcomes through the VET system and/or the accreditation system being developed under the auspices of AIAST will be investigated in program planning.

Box 5. Tools for gathering and interpreting intelligence

'Listen, look and learn' is harder than it sounds if extension operatives work on the assumption that they have to demonstrate expertise by offering advice. Effective extension workers will know what to say, to whom and when because they have a well grounded understanding of the context they are working in.

The following tools, extracted from 'Participatory Evaluation for landcare and catchment groups – a guide for facilitators' by Jim Woodhill and Lisa Robins, are effective and easy to use.

Semi-structured interviewing is used to gain information from an individual or small group such as a family. The interviews are relatively informal but are guided conversations where broad questions are pursued and new ones allowed to arise during the conversation. Ideally you are seeking an outcome from the interview which fits in with the objects/context of your project.

How? The interviewer presents the context and objectives of the interview. A set of simple questions is prepared that follow a logical sequence. They are open enough to allow interviewees to express opinions and are best tested prior to the interviews Allowing pregnant pauses often produces valuable and unexpected inputs from interviewees who feels the need to keep talking! This system was used extensively in the ABCs' television series Checkerboard .Training of interviewers may be needed and should address interview context, sensitive listening and questioning, judging of responses and recording the interview. Interviews usually take about one hour.

Focus groups are used to collect general information from a selected small group through discussion, and are particularly useful for ascertaining attitudes, prejudices and the extent and depth of knowledge about the issue being investigated. Groups are selected to represent a cross-section of the community of interest e.g. a poor weeds managers group, an exemplary one, and one in between. Ideally the people (5-7) in the group will know and be comfortable with each other.

Locality mapping draws on the knowledge of local people to develop a map of the area. It is a good way for example, of identifying who is undertaking weeds management activities, or not.

How? Using large sheets of paper draw an outline of the local area - roads, villages, creeks, property boundaries, etc, e.g. by projecting a map onto butchers paper and tracing the required information. Then get local informants to add information directly to the sheet or by using 'post-it' notes.

Historical analysis will enable understanding of the history and background to the weeds situation – how change has occurred, why things are the way they are and why different groups and individuals hold the views they do.

How? Set up a sheet of butcher's paper with rows and columns. Put dates in the first column and topics in the others e.g. key local and external events, influence of personalities and groups, major changes (social, environmental, economic) and key trends. Work with local informants to fill in the table. This takes one or more hours.

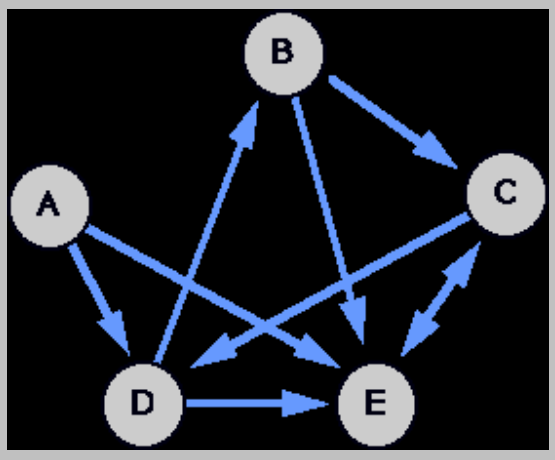
Institutional linkage (Venn) diagrams illustrate the extent to which individuals, organizations, projects or services interact and the importance of each to the issue at stake –support for improving weeds management for example.

How? Draw a circle or use cut-outs to represent each entity. The larger the circle the more important it is and the closer the circles are to each other the more interaction there is – overlapping represents interaction and a small circle within a larger represents a component. Participants might develop their own diagrams and discuss differences while developing a composite diagram.

Issue analysis is used to identify issues arising from use of other tools (focus groups, Venn diagrams etc) and then group them into major themes.

How? Go through the notes or recordings arising from the earlier data-gathering activities and identify and record the issues raised. Group common issues arising from the different activities and then nominate underlying themes that link them.

A **sociogram** can be a useful technique for determining patterns of influence in a community. The strength (by the size of arrows) and direction of network links between individuals can be represented graphically (see diagram)



3.1.4 Action Outcomes

The outcomes of the workshops include (i) a perceived need to act on a number of fronts, (ii) commitment by workshop participants to lead initiatives and report back on progress and outcomes, and (iii) establishment of a co-ordination team that includes Isobel and selected members of the Agricultural Research Group.

Each initiative becomes a collaborative learning process in its own right and uses the insights and expertise into how to do this acquired during the earlier workshops, including getting Sarah and/or her colleagues to facilitate workshops to plan the initiatives.

The leaders of each initiative identify potential partners and engage them in the process. These range across local, regional, state and federal jurisdictions.

This enables synergy between initiatives at the institutional and local level based on perceived benefits from collaboration.

Working parties are established related to:

1. Extension related to weeds identification, impact and control and aimed at the grazing community (developed as scenario 2)

2. Applied research into weed control options, including benchmarking and monitoring the incidence of specific weed (developed as scenario 3)

3. Establishing the cost of weeds on farm productivity

4. Mobilising community groups to manage weeds, particularly on public lands

5. Public investment in weeds management on sub-viable private land and the control of weeds on public lands.

6. Co-ordination of the working parties and public relations

3.1.5 Swot Analysis of Strategy and Process

What follows is an analysis of the strengths and weaknesses of the strategy and process outlined in the scenario, and of the real-world opportunities and threats to mounting a similar approach in other contexts.

Strengths

- Harnesses local leadership
- Draws in relevant stakeholders as it proceeds
- Increases likelihood of confluence of community and institutional agendas
- Holistic approach to situation

- Scope to develop innovative ways to see and respond to situation
- Potential for multiple benefits – social, cultural, economic, environmental, political, technological
- Synergy resulting from integration of effort of various players
- Shared ownership of problem and response
- Heightened community awareness of problem and response
- Builds on diverse motivations, abilities and resources
- Avoids premature conclusions based on pre-existing expectations and/or prejudice
- Enables collaborators to develop relationships based on the experience of working together
- Does not exclude potential contributors by pushing particular solutions
- Process enables development of coherent and integrated strategy, tactics and methods
- Enables participants to learn from each other
- Enables participants to develop facilitative and systemic leadership skills
- Surfaces significant differences and dissolve insignificant ones, and provide a basis for subsequent negotiation
- Allows integration of existing projects and functions into new initiatives

Weaknesses

- Assumes existence of local leadership
- Assumes cordial relations between local co-ordination and regulatory bodies, communities and businesses
- Requires a high level of facilitative leadership skills
- Assumes facilitative leadership skills are available and/or can be developed
- Development of facilitative leadership skills is outside the professional experience of most 'extension professionals'
- Assumes confluence of interest in weeds management
- Assumes diverse perspectives and expectations of different communities of practice are bridgeable
- Is innovative in nature and likely to attract scepticism
- Requires commitment over time, particularly of leadership groups
- Medium to long term perspective may clash with felt need for quick results
- Medium to long term perspective may be incompatible with shorter term horizons and expectations of funding bodies
- Development perspective and shared leadership may be incompatible with 'command and control' ethos of key organizations
- May be incompatible with the pervasive 'expert-client' extension perspective

Threats

- Initiator/s and/or initiating group may not have wide enough credibility to attract interest of a diverse range of communities of practice
- Initiating group may show bias in approaching leaders of communities of practice, and alienate important others in the process (see Box 2 for a relevant tool)
- Initiating group may not be able to communicate the benefits of engagement to a diverse range of communities of practice
- Competitive and/or world-view perspectives between different communities of practice may appear unbridgeable

- Individuals approached may be unable or unwilling to commit time needed for initial collaborative learning workshop
- Special interest groups and/or dominant individuals might alienate important others (see Box 5 for a relevant method – including card-sorting)
- Enthusiasms during initial relationship building and planning phases not maintained into commitment to action
- Variable quality of leadership and ability in working groups membership results in tensions between groups over expected outputs
- Co-ordination team does not monitor working group activity and establish expectation of quality outputs, and fails to maintain momentum
- Funding bodies not prepared to commit needed funds because capacity building is outside their experience and expectations

Opportunities

- The necessary pre-conditions in terms of credible local leadership, networks and cordial relations (and concern about weeds) exist in many high rainfall grazing districts
- Management of weeds impacts on farm productivity, public amenity and infrastructure, natural environment and community aesthetics and offers benefits to a diverse range of stakeholders and communities of practice
- A competitive process of bidding for funds to initiate a capacity building approach to weeds management is likely to trigger a response from suitable districts, given it is well communicated
- Within apparently unbridgeable gaps between different communities of practice are 'boundary riders' who are able to work with 'the opposition' and act within their own communities of practice on what they learn – they are key players in capacity building
- Capacity building and development of facilitative leadership skills is rising on the agenda of 'extension professionals' and funding bodies
- Facilitative leadership skills are not necessarily the province of 'extension professionals' – they are embedded in most communities, often unacknowledged
- Training in facilitation skills can be an integral part of the project – learning with and from the experience (see Box 4 for an example of a complementary skills development program)
- Visits to successful community-based capacity building initiatives serve to demonstrate what can be achieved, and stimulates goal-setting
- Bench-marking the situation at the start and monitoring changes over time is key to building enthusiasm and momentum – and should encompass social, political, economic and cultural parameters, as well as technological and natural ones (different players will be interested in different aspects)
- New relationships and knowledge arising from capacity building related to weeds management is likely to stimulate initiatives related to other issues.

The implications of the SWOT analysis are that the potential benefits of a well managed capacity building initiative are worth the risk of mounting it. The necessary pre-conditions in terms of credible local leadership, networks and cordial relations (and concern about weeds) exist in many high rainfall grazing districts. The risks associated with a capacity building project will be largely overcome through a partnership with community organisations that meet these criteria. A competitive process of bidding for funds to initiate a capacity building approach to weeds management is likely to trigger a response from these organisations, given it is well communicated. Project funding should include appointment of a person with a successful track record as a facilitator

of capacity building, and provide for the ongoing professional development of the appointee. Funding the long-term time horizons associated with capacity building can be partly accommodated by providing support to the point where action initiatives stemming from the capacity building strategy are expected to attract their own funding. The emphasis on bench-marking in the initial stages of the capacity building process, and on subsequent monitoring, will enhance funding prospects.

3.2 Scenario 2: Weeds Management Extension for Graziers.

3.2.1 Situation

Education and information is the focus of one of the working groups established in Scenario 1. The team includes Isobel, the District Agronomist; Bill, a local agribusiness agronomist; Dave, the Council Weeds Officer; and Evelyn, a postgraduate student with an interest in action research and rural extension. Isobel, Bill and Evelyn are inexperienced operatives, and newcomers to the district. Dave is an 'old hand' who knows the district well.

The team begins the task by reviewing relevant documents as a basis for developing an extension strategy and process. The work on weeds management and extension funded by MLA/AWI helps them 'make sense' of what they know about the pre-disposition of local graziers to manage weeds more effectively. They agree:

Improvements in weeds management will involve moving along an adoption path ranging from *poor* to *exemplary* weeds manager - where *poor* is characterized by those who place a low priority on weed control and/or use a few methods in an unplanned, reactive way; and *exemplary* by those who diligently use a wide range of methods in a planned, strategic way. Between *poor* and *exemplary* are a number of sub-optimal categories.

The adoption path for poorer mangers can include any combination of increased diligence, range of methods (diversity) and planning (deliberation) – the 3D's of weeds management. The IRF project classified sub-optimal categories as, for example:

- *simple diligents*- those who are diligent and deliberate but only in the use of a single method i.e. not diverse; or
- *reactive spray toppers* – those who use a range of methods, but in an unplanned, reactive way i.e. neither diligent nor deliberate.

The key to moving poorer weeds managers is increasing the priority they place on weeds and diligence in their control, even if initially with a limited range of methods. In time this might lead to participation in educational programs whose outcome is planned strategic management of weeds e.g. ProGraze. There are however a range of factors contributing to lack of diligence in controlling weeds' including:

- Weed control has traditionally received little attention in grazing industries. The exception is declared (noxious) weeds whose incidence incurs financial penalties.

- Plants not listed as noxious are often not recognized as impacting on farm income. This is particularly so with grass weeds. Raising awareness about less well known grass weeds should lead to increased effort to control them, at least where some priority is placed on

weeds control. Key to this is the grazier's ability to identify the weed's presence, and economic data that demonstrates its impact on productivity (Isobel and her colleagues know MLA/AWI have commissioned a project to establish this data).

- Lack of time for weeds control relative to other priorities is a factor, particularly for those who work off-farm, so an extension emphasis on time and cost effective methods is implied.

- Climatic variability leads to concomitant variability in weeds management – it tends to have a low priority in drought years and becomes an occasional rather than integral part of farm operations.

- Farm profitability is not an incentive for some graziers, particularly those approaching retirement – but awareness of a reduction in the capital value of the property due to presence of weeds might be.

3.2.2 Strategy

Evelyn introduces the team to the concept of 'social marketing'. It calls for (a) segmentation of the market and attaching of priorities to particular segments, (b) design of messages graziers in a particular segment are 'ready' to hear i.e. that highlight what they see as benefits, and (c) a strategic intent to move the audience from a lower level to a higher level segment in terms of the adoption process.

They are influenced too by their knowledge of the relationship between the type and sources of information people utilise[36] at different stages of the adoption process i.e. from *awareness* to *non-trial evaluation* to trial *evaluation* to *adoption,* and possibly to non-*adoption or dis-adoption*[37]*.* They know that:

- whatever they do should be based on sound intelligence – and their knowledge of the situation is limited and piece-meal

- the mass media can help set an agenda for discussion if it catches audience interest – they will have to capture the interest and support of editors and media managers

- in the early stages this agenda is likely to be pursued with intimate acquaintances rather than anyone with specialist knowledge i.e. with people they are comfortable with – family and close friends

- this discourse is commonly poorly informed and prejudicial unless it leads to dialogue with people with technical knowledge,

[36] Salmon and Underwood
[37] Pannell 2005

- a social gap often precludes the needed dialogue but it can be bridged, and this is most likely if the people with the technical knowledge take the initiative e.g. extension staff, weeds officers and/or well informed graziers

- once underway the dialogue can be promoted by judicious use of the mass media – with an initial focus on why weeds should be managed and local stories about what is being achieved and how

- different people have different wants and needs, and different learning styles, and treating graziers as an homogenous group, or relying on a single or even a few extension techniques will not work

- as people move through the adoption process the information they seek becomes more technical and focuses on what to do and how

- adoption is a product of a complex of forces that includes relevant knowledge and practical skills together with real-world factors such as available finance, equipment and materials; social pressures, and penalties for non-compliance.

The team also knows that audience research is an essential element of successful communication. When this is linked to the social marketing practice of market segmentation it means finding out about who belongs in each segment and what their prejudices and predispositions related to weeds management are. This knowledge is the basis of decisions about what to include in an information campaign and who to approach to bridge social gaps, and how to do this.

They know too that an effective extension program will take advantage of available resources and for this to happen they need to know what these are and what will motivate the people who manage them to participate.

The team decides it will approach the task as an action research project with sequential cycles of research where each cycle involves planning, action, reflection and revision. In the first cycle it will:

1. Identify as an intermediate audience and/or collaborators the businesses, agencies and community with an interest in weeds management.

2. Recruit collaborators and work with them to gather and interpret intelligence about the weeds situation.

3. Focus on the sub-optimal (i.e. the categories between poor and exemplary) weeds managers and find out who fits into these segments. They do so on the grounds that the situation of poor weeds managers is such that they are probably unable to effect significant improvements in weeds management, no matter how effective an extension campaign might be.

4. Conduct an extension campaign whose primary audience is the sub-optimal weeds managers, and base it on the assumption that a successful campaign will (a) capture the interest of the target audience; (b) stimulate it to seek relevant information, and make this as easy as possible; and (c) provide support for more effective weeds management behaviour.

3.2.3 Process

The strategy has two phases (i) intelligence gathering and relationship building; and (ii) interpretation and response.

Intelligence gathering and relationship building

The initial stages of the strategy involve the team researching (a) the businesses, agencies and community groups who might constitute an intermediate audience and/or become collaborators, and (b) the grazing community.

(a) For the potential ***intermediate audience*** the team uses the Stakeholder Analysis technique (see Box 2 scenario 1) to identify relevant businesses, agencies and groups and assess their likely interest and support for the work. Isobel or Bill, who are new to the district, meet with the principals on a 'getting to know you' basis and take the opportunity to listen to their views, in general and as it might relate to weeds management extension.

The team reviews what they now know about the interests, activities, programs and projects of local businesses, agencies and groups. They revisit the Stakeholder Analysis and revise it. On the basis of the revision they categorise the agencies, businesses and groups in terms of whether they constitute an important intermediate audience, and if so how supportive they are likely to be. They also assess the likelihood of recruiting collaborators in the subsequent data-gathering and interpretation, and invite potentially valuable recruits to do so.

It then engages with the recruits in intelligence gathering and interpretation. They use a variety of tools to develop a multi-faceted understanding of the situation. The tools utilised are simple and easy to use. They serve also to stimulate interest and enthusiasm for the task, and contribute to a deepening of relationships. A selection of relevant tools is described in Box 5.

(b) In the case of the ***grazing community*** the team seeks to ground-truth the results of the UNE/IRF project on segmentation. The project listed the characteristics of graziers who fall into sub-optimal segments. Which graziers in the district fit the characteristics set out in the IRF work, and does the match-up ring true? Dave, the experienced Weeds Officer, is able to identify graziers who fall into the categories. The collaborative data gathering and interpretation using the tools outlined in Box 5 is used to triangulate with and verify the UNE/IRF characteristics and Dave's input.

Still in researching mode the team and their collaborators sets out to (a) develop a relationship with the graziers identified, and (b) find out as much as they can about their knowledge, skills, attitudes, networks, the incidence of weeds on their farms, and their potential for becoming better weeds managers. They do this by way of an informal survey involving farm visits where practicable, and utilising the semi-structured interviewing technique outlined in Box 5.

Interpretation and response.

The team now collates and interprets the intelligence gathered to date. It does so with a view to acting on five complementary questions:

1. How to communicate with and influence the intermediate audience? The aim here is to (i) channel information to graziers through the contact and influence the intermediate audience has with them, (ii) move the intermediate audience to an appreciation of the merits and nature of a diverse, diligent and deliberate strategy for weeds management, and (iii) develop collaborative relationships.

Key individuals and leaders of the organisations, projects and services identified as an intermediate audience through the intelligence gathering phase are invited to attend a workshop. The workshop is designed to inform them and get their response to (a) the concepts of diverse, diligent and deliberate weeds management and market segmentation, and (b) the outcomes of the intelligence gathering and interpretation. It seeks also to sensitise them to their potential as an intermediate audience.

Relationships and shared ownership of the project developed with the intermediate audience and especially with collaborators during intelligence gathering and interpretation are maintained by keeping them informed and inviting them to participate in subsequent activities.

2. How to utilise the mass media? The aim here is to (i) generate audience interest in the project and the need it is addressing, and a weeds management agenda; and then (ii) feed the agenda with stories and information.

The data and insights into the local scene developed during intelligence gathering and interpretation are a prime source of content about the issues at stake, as is the output of projects like the current MLA/AWI ones. A basic assumption is that the messages should focus on local personalities and cases, and highlight credible sources of information. They are mindful of the example of ‘The Woodies’ (on home maintenance) and the Swain family (on gardening) on ABC talk-back radio.

As the campaign develops there is an increasing emphasis on the benefits of a sophisticated weeds management strategy. An appreciation that what a grazier will see as a benefit depends on his or her situation is taken into account (see Box 6 for further

explanation and examples). The campaign features local examples of best practice and the benefits, with a focus on cases the target audience can identify with.

The media campaign is systematic – it identifies and uses all channels, provides regular content, and maintains mutually beneficial relationships with media managers, editors and journalists.

Box 6. Message variety must be commensurate with differences within the audience.

The IRF project highlighted the fact that treating the audience for weeds management as homogenous and expecting it to respond to a uniform message is bound to fail. The reality is that different members of the audience will be motivated by different incentives and will encounter different obstacles in improving weeds management. Some examples:

- Those for whom the financial bottom line is the imperative are likely to respond to information highlighting the financial benefits of weeds management – this calls for credible information that substantiates the message that weeds are a cost and their management an investment
- Managers proud of their management expertise are probably more open than others to the message that good farm planning incorporates decisions about weeds and grazing management
- For older farmers approaching retirement and looking to sell the effect of weeds on capital value of the property may be more relevant than the effect on operating profit
- For younger farmers working off-farm time saving associated with good weeds management is a likely attractor
- For the growing number of *chemophobes* who are averse to using chemicals the message that good grazing management equates with good weeds management and reduces chemical usage is relevant
- For *calendar followers* seasonal information about optimal timing will counter tendencies toward habitual and probably inappropriate practices
- *Seed reactives* are likely to respond to advance media warnings of seed maturation
- *Spread reactives* are probably open to messages that shift their threshold from visible plants to potential propagules

Variety of message delivery is as important as variety in the message – some in the audience are radio listeners, others TV viewers or newspaper readers, some collect brochures, others use the internet. Within each of these categories there are variations – some tune habitually to the ABC, others to commercial stations.

3. How to communicate with and influence the practice of the target segments of the grazier population? The media campaign and work with the intermediate audience is intended to create a favourable environment for a weeds management learning agenda. The extent to which this materialises depends on whether the target audience moves

outside its comfort zone and considers new options and their merits. This is unlikely unless their situation changes dramatically, or they are pulled into the process. Personal contact is the key to this i.e. an invitation to participate by credible and respected others.

The extension team:

- Recruits as mentors colleagues identified through the intelligence gathering phase. The mentors invite and enable graziers in the target segment to join with a small group of 6-7 others drawn from the target audience. The mentored groups visit each others farms and engage in farm walks with a view to identifying weeds and discussing the weeds situation.

- Conducts a series of locality 'weeds forums' to which the farm walk groups from the sub-district and their mentors are specifically invited, but are also open to others. The forums are an opportunity for the team to present the 3-D concept of weeds management and for the farm walk groups to share observations from the walks experience.

- Identifies local examples of good practice that are likely to appeal to graziers in the target segment on the grounds of who is doing it and what they are doing, including Research Group demonstration sites (see scenario 3).

- Conducts a series of open demonstrations and field days on the good practice sites and specifically invites graziers and mentors who attended the 'weeds forums' to attend. It incorporates into these events a pooling of information about factors that promote or constrain adoption of good practice.

- Highlight the availability and sources of information related to good practice at the events and through the media.

- Encourages one-on-one consultations between graziers and technical resource people, with an emphasis on agri-business operatives in the latter role (see Box 6 for further explanation).

- Publicise the events in terms of what was demonstrated, who attended and what the outcomes were and foreshadow that this information is being digested by the action research team and the Cooladore Agricultural Research Group with a view to planning the next phase of the weeds management program.

Box 7. One-on-one consultations and the role of agri-business operatives

Rural Enablers interviews and focus groups with extension informants highlighted the importance of one-on-one consultation with credible resource people, and the salient role of agri-business operatives in its provision.

The latter are playing an increasingly important role as advisors and consultants. Their numbers and technical qualifications and expertise are rising. Graziers feel free to call on them because they buy from them, and the relationship is commonly a close one. The firms that employ them are tending also to offer management services to customers in addition to or as a complement to product sales.

Government extension operatives on the other hand are expected to concentrate on group extension rather than individual consultation. The one-on-one relationship between Weeds Officers and graziers is frequently a good one, but there are fewer Weeds Officers than agribusiness operatives and the relationship is complicated by their regulatory functions.

Agribusiness operatives constitute an important intermediate audience for weeds management extension, and assuming they see the benefit, are ideally placed to play a frontline role as technical resource people and one-on-one consultants. They are typically seen as practical 'hands-on' people who enjoy good community and customer relationships and as such, able to broker exchange of information and experience between customers.

An effective one-on-one consultation is a learning facilitation process rather than a product sales one. When agribusiness operatives are seen in this light by customers the employing firm benefits from the goodwill generated through sales of its products.

An effective consultation will typically involve an on-far visit where the grazier is enabled to (a) explain his or her situation and explore its context, (b) develop a new understanding of the situation and practical options for responding to it, and (c) get the information they need to decide on a course of action. The latter will often entail information about how others in a similar situation are responding, to the extent that a visit to see what they are doing may be brokered. A recent project by Coutts et al (unpublished) has provided insight into the development of effective client-consultant relationships (see appendix 3)

How to meet information needs related to weeds management? The aim here is make it as easy as possible for graziers to contact resource people with high credibility, and/or access information they need at a particular point in their learning journey.

The team facilitates agreement among local providers (including DPI staff, Weeds Officer/s and agribusiness operatives) on what constitutes the most useful information for sub-optimal graziers seeking to improve their weeds management. It road-tests the resulting package with a sample of graziers in the target group and modifies the package in response to feed-back. It arranges for the package to be displayed and available at outlets used by local graziers.

Given that goods weeds management commonly equates with good grazing management it ensures the package includes a step-by-step guide to good grazing management and its link to effective weeds management.

It also programs and publicises regular talk-back radio sessions with local and external experts like Jeff Sainty.

To avoid the not uncommon situation where enquirers are shunted around and eventually give up the team enables agreement among providers that (a) the Weeds Officer's office be a focal point for enquiries, and that it (b) maintains a database of expertise and directs enquirers to likely sources, and (c) maintains a log of enquiries and the response to them.

How to monitor and evaluate progress, or lack of it – and act on this? The team knows that bench-marking the situation at the start and monitoring changes over time is key to building enthusiasm and momentum – and should encompass social and economic parameters, as well as technological and natural ones.

Van den Ban and Hawkins (1996) outline of Bennett's Evaluation Hierarchy provides the holistic perspective they are seeking and they develop the framework outlined in Table 4 to guide the monitoring and evaluation process. The initial intelligence gathering phase provides data for the 'benchmark at the start' column. Annual assessment of the situation relative to each level measures changes during the year. The goals for each level are re-set after reflection on progress or lack of it during the year.

Table 4 Framework for monitoring and evaluation

	Evaluation Levels	**Benchmark at start**	**Goals**	**Measures Year 1, 2n**
Outcomes	VII. Socio-economic and environmental consequences for society and target group			
Outputs	VI. Behavioural change in target group			
	V. Changes in target group's knowledge, skills and attitudes			
Processes	IV .Participant opinions about program activities			

	III. Target group participation in program activities			
	II. Opportunities offered to target group by the program			
Inputs	I. Resources used to mount the program			

3.2.4 Swot Analysis of Strategy and Process

What follows is an analysis of the strengths and weaknesses of the strategy and process outlined in the scenario, and of the real-world opportunities and threats to mounting a similar approach in other contexts.

Strengths

- Appreciates that the weeds problem warrants and requires new and more effective extension
- Focuses and utilises existing but fragmented resources and services more effectively
- Has the imprimatur of the locally prestigious Cooladore Agricultural Research Group
- Is based on an appreciation of phases in the learning and adoption processes and what helps and hinders them
- Gives a high priority to intelligence gathering as the basis for planning, execution and evaluation
- Recognises the central role of monitoring and evaluation in building enthusiasm and maintaining support.
- Integrates the use of mass media, an intermediate audience and personal contact into a plan to contact, influence and inform all graziers in the target categories
- Is participative in nature
- Engages providers, intermediate audience and targeted graziers through direct invitations
- Promotes equality of input and counters influence of dominant individuals and cliques
- Builds on existing resources and leadership
- Provides mutual support between organisations, agencies and individuals seeking to improve weeds management
- Enables providers to work and learn together and develop mutual respect in the process
- Incorporates the extension methods highlighted as most effective in interviews and focus groups with extension providers – 1:1 contact, demonstrations and field days
- Makes use of providers and graziers with high credibility
- Utilises the increasingly wide reach and close relationships agribusiness operatives have with graziers
- Establishes mutually beneficial relationships with media editors, managers and journalists
- Recognises diversity within the target audience and utilises diverse message and channels to reach them

- Messages are grounded in local practices, people and situations the audience can identify with

- Packages and road-tests existing information and makes it readily accessible
- Incorporates mentoring and advocacy
- Ties applied research on weeds management into the extension process through on-farm trials, demonstrations and field days

Weaknesses

- Assumes a level of concern about weeds sufficient to motivate the needed inputs
- Requires a high level of project management ability and commitment maintained over time
- Assumes a level of facilitative leadership skills beyond the expertise of most extension operatives
- Assumes project management and inputs will be 'in kind' – as will the inputs of collaborators
- Does not have external recognition and support
- Is based on local leadership and resources – the community pulling itself up by its own bootstraps
- Does not allow for 'dropping out' – assumes continuity of leadership and commitment
- Assumes a sophisticated appreciation of extension and communication, and related skills
- The commitment to intelligence gathering and relationship building is costly and may be incompatible with key stakeholders' calls for 'on ground results'
- Assumes functional relationships between community, providers and graziers
- Assumes collaborators will recognise benefits to them of participation
- Assumes collaborators with different worldviews will collaborate eg altruistic NGO vs commercial agribusiness
- Does not incorporate a conflict resolution component
- Assumes exemplary weeds managers are demonstrating the benefits of good weeds management

Threats

- Initiators are unable to communicate project purpose and outcomes and generate enthusiasm for it
- Competitive attitudes between categories of extension providers (eg agribusiness and DPI) may preclude effective collaboration - 'like herding cats' to quote focus group
- Silo mentality within and between organisations may preclude collaboration
- Unequal 'expert – client' relationship inhibits collaboration between some graziers and extension providers
- Required resources are beyond capacity of local community and organisations
- Key people drop out and are not replaced
- Needed extension and communication skills are not available and cannot be developed
- Needed external support, resources and mentoring are not identified and/or cannot be sourced
- 'Strings' attached to external support frustrate local leadership
- Lack of clarity about project ownership and accountability results in haphazard reporting procedures and responses
- Uncertainty about level and length of commitment of resources by collaborators results in activity failures

Opportunities

- The necessary pre-conditions in terms of credible local leadership, networks and cordial relations (and concern about weeds) exist in many high rainfall grazing districts
- The project provides scope for diverse stakeholders, internal (eg Council, DPI, agribusiness, Greening Australia) and external to the district (eg MLA and AWI, Weeds CRC) to meet their goals through participation
- A competitive process of bidding for funds to initiate and test a collaborative approach to weeds management is likely to trigger a response from suitable districts, given it is well communicated
- Partial funding from a lead external agencies (eg MLA/AWI) can stimulate substantial local input and external input from other stakeholders – both in kind and financial
- Conditions for external funding (eg for project management and training) can establish needed project reporting and accountability procedures
- The innovative nature of the project can be used to attract the attention of relevant local and external organisations and individuals
- The project provides an opportunity to test and evaluate extension methods, techniques and materials
- Organisations like The Community Participation Network in Victoria is a source of input and mentoring related to participative extension methods
- Extension training programs similar to the APEN Leadership Series (see Box 4) and CRRI-Q's extension development programs can provide for on-the-job development of skills needed within the skills project – and funding for it would be a valuable external input

The implications of the SWOT analysis for scenario 2 is that the overall strength of the proposed extension strategy is the way it integrates extension principles and creative use of a diverse range of methods with the practicalities that emerged from practitioners' assessment of extension "dos and don'ts" and the outcome of the IRF/UNE project.

Its main weakness is the high level of project management ability required and the expectation of collaboration and commitment maintained over time by a diverse set of stakeholders. The principal threats are ones that increase the risks associated these weaknesses.

As with scenario 1 the strategy proposed is an opportunity for a conjunction of interest between local leadership networks and funding organisations that see the need to take a systemic and innovative approach to management of weeds.

3.3 Scenario 3: Applied research, benchmarking and monitoring

3.3.1 Situation

The analysis from scenario 1 has led to the formation of a working group to develop some applied research to study local grazing management and weed control strategies. A team comprising Isobel, the District Agronomist, Bill, the local agribusiness agronomist and two local farmers make up the group. They work through the check list on technology development projects from the CVCB (see below) to check they are on the right track.

3.3.2 Strategy

Isobel is aware of the SGS practice change model and the importance of helping producers to see new strategies in demonstrations and to trial strategies on their own place in achieving practice change. To this end the team decides to organise some small demonstrations on key farms in the district and form a couple of farm groups to mount on-farm trials on a range of properties implementing the strategies seen to be most effective at the demonstration sites. Bill agrees to provide some chemicals to the demonstrations and trials and the two farmers agree to recruit farmers from the sub-optimal manager target groups identified from the UNE/IRF project to participate in the trial groups.

Isobel's role is to consult with researchers form the Weeds CRC and with MLA/AWI to access materials on best management practices and to design the demonstrations. She is aware of the work that MLA/AWI are doing on management and economics based on district case studies and hope to use that material adapted for Cooladore. She also agrees to bring in one of the researchers to assist in setting up the demonstrations. The researcher will be asked to assist in trial design and analysis to ensure scientific rigour and valid interpretation of the results.

The team realises the importance of monitoring the progress of the trials and works on designing a simple tool based on the SGS tips and tools for botanical composition which will allow farmers to monitor the incidence of the weeds in the trial plots. They also use the SGS pasture ruler to measure pasture production in the trials. A protocol for sampling and analysis is also developed so that farmers can use it to get consistent measurements and compare these across sites. They see these simple tools as likely to be used by farmers in the field once they start trialling strategies themselves. A process to set benchmarks at the start of the trials is devised and this is also applied to the on-farm trials later in the project.

The team agrees to support the farmer groups for as long as it takes to have the changes to practice implemented on the farms involved. The support includes visits by Bill to individual farms and group meetings on farm to inspect and discuss the trials at key times in the control cycle.

The group also prepares a submission to MLA for a PIRD grant to help support the process by providing resources to assist and train the farmers in taking the necessary measurements.

Element	**Comments**	**Ranking** (1-5 where 1 is fully covered and 5 is not covered)
Issue or need identified by industry or community or endorsed by representatives.	The perceived need may arise for any group, but all key stakeholders need to be convinced of the need. *The Cooladore group has identified the need for local research.*	
Facilitation provided to mobilise and help in process.	Facilitative extension skills are critical in gaining broad involvement and providing a mobilisation framework. *Facilitation skills are provided by Sarah and Isobel.*	
Process to inform and involve stakeholders in problem definition	Steps need to be explicit as to how the stakeholders will become engaged.	

and determining approaches to tackling it.	*This is tackled through the process described in scenario 2.*	
Committees or forums or both to provide ongoing local input and feedback apart from hands-on participants in process.	These formal mechanisms have been shown to have real benefit in providing 'safe' places for inputs and needed feedback. *A coordination team has been set up with processes to collect local input and feedback.*	
The process is designed to allow researchers/experts and producers/ community participants to work together.	This should be a participative process recognising the strengths of all. *The process of engaging relevant communities of practice provides the framework for this to happen.*	
There is a strong on-farm/on-site trial and demonstration and assistance component.	In some cases, on-farm trials may mirror, or extend, formal research sites. *The primary sites for this work are located on-farm.*	
Benchmarking is a key feature of tracking benefits and progress.	Change and impact needs to be measurable for stakeholders to gauge benefits and progress. *Monitoring and evaluation of the trials is built in from the start.*	
Other supporting mechanisms are available to help development and integration, such as incentives and policy.	It is in the context of the mix that assists in motivation and action on desirable changes. *Support mechanisms to motivate and support producers are part of this strategy.*	
Training in relevant areas is made available.	Training can help participants catch up with pre-existing knowledge about the technology or management issue. *See scenario 2.*	

3.3.3 SWOT analysis

Strengths:

- Answers locally relevant questions about weed management
- Engages the relevant communities of practice in the research and demonstrations
- Provides support through to the incorporation of practice changes on farm
- Practical tools for measurement and analysis
- Based on sound theory and principles
- Integrated with the activities described in other scenarios

Weaknesses:

- Requires significant resources and motivation from the project team
- Relies on the goodwill of team members and local farmers on whose properties the trials and demonstrations occur
- Will require time for management practices to change

Opportunities:

- Provides a sound case for PIRD funding
- Integration with other strategies increases chance for practice change

Threats:

- Lack of support from any key stakeholder will significantly reduce the effectiveness

- Climate risk can reduce effectiveness of trials
- Lack of motivation from cooperating farmers
- Project team suffers significant change of personnel over time through staff changes etc.
- Sub-optimal project design, analysis and interpretation.

4 PART D. Recommendations

Recommendation 1:

This project has argued that improving extension delivery and weed management on grazing farms in the high rainfall areas of Australia is an exercise in capacity building. It is therefore recommended that MLA/AWI trial the use of a capacity building approach as outlined in scenario 1 in a region to test the applicability and validity of this approach to improving weed management in high rainfall areas.

Recommendation 2:

The project has highlighted a need for further training in some basic and more advanced extension skills and theory for professionals engaged in servicing the needs of producers for improved weed management in the high rainfall zone. It is recommended that MLA/AWI use the scenarios developed in this project as the basis for developing a training package for weeds related professionals

Recommendation 3:

Institutional arrangements related to weeds management, research and extension are fragmented and call for new relationships and consolidation of effort. It is recommended that MLA/AWI use their influence to convene a meeting of key stakeholders in weeds extension funding and develop a strategy for integrated delivery to producers in high rainfall areas.

Recommendation 4:

Current extension practice is ‘shot gun’ in nature and assumes an homogenous audience ready to respond to messages our institutions see as relevant – the reality is a differentiated audience ready to hear messages related to what they see as benefits – this constitutes a fundamental strategic mismatch. It is recommended that MLA/AWI develop a strategy to reform communication related to weed management based on social marketing principles and practice.

Recommendation 5:

This project and the parallel IRF one constitute a platform for continuous improvement in extension related to weeds management. It is recommended that LWA/AWI nominate this as an ongoing action research project and fund and manage it accordingly. Central to action research is the notion of recursive and documented cycles of planning, action, observation and reflection. The IRF and Rural Enablers projects represent an initial cycle.

5 Appendix 1

Weeds Project
Interview questions

Good morning/etc, my name is _____ from Rural Enablers Pty Ltd. We are conducting some telephone interviews for a project on weed management for Meat and Livestock Australia and Australian Wool Innovation. We are interested in your experience and opinions on the management of weeds in grazing lands in southern Australia. The interview will consist of open-ended questions and should last for about 45 minutes. You will not be identified in any report and your responses will be kept confidential. Are you happy to participate? If so are you happy that I tape the interview?

Firstly some quick questions about your background in weed management:

How many years of experience have you had in working with land managers in weed management?

Have you had any training in extension methods?

How much time do you spend on weed management related work? As a percentage of time – in direct contact with farmers?

Now we have a set of questions related to land managers:

1. Can you tell me what your experience is with helping farmers improve their weed management?
2. What is it that you are aiming to achieve with this work? May need promting.
3. What sort of activities do you use to enable this to happen?
4. What would you say are the most effective activities? Why?
5. What activities are less effective? Why?
6. What is it that determines whether a land manager takes action to control weeds?
7. What would attract more people to take action to control weeds? What would attract them to participate in weed management activities
8. Who else do you work with to achieve outcomes in weed management?
9. What would you say about the way you work with others? How could it be improved?
10. What would be the single most important thing that would help you achieve more in improving weed management in grazing systems? Are there extension or communication methods that would assist this? How do you learn about new communication/extension methods?
11. Who else would you suggest we talk to about this?

Finally would you be interested in being a member of a peer review panel later in the project to provide feedback on the extension strategies the project develops?

Thank you for your time and input in helping us develop a picture of weed management in southern Australia.

6 Appendix 2

List of interviewees and focus group participants

Deb Agney, weeds officer, Yorke Peninsula, SA
El Bruzzese, Weeds specialist, DPI Vic
Stuart Burge, consultant, Cooma NSW
David Cameron, Elders, Moora WA
Doug Campbell, Weeds officer, Muswellbrook NSW
Richard Carter, Weeds Program Leader NSW DPI, Orange NSW
Bruce Clements, NSW DPI agronomist, Bathurst NSW
Jim Dellow, Weeds researcher, NSW DPI, Orange NSW
Bob Freebairn, consultant and former DPI agronomist, Coonabarabran NSW
Mark Gardner, consultant, Dubbo NSW
Eric Hall, consultant WA
Ken Henry, Weeds project officer, PIRSA SA
Lachlan Hurley, Landmark, Hamilton Vic
David Keamy, CRT, Merredin WA
Charles Kidd, Landmark SA
Jon Lamb, consultant SA
Peter Martin, Communications manager, Weeds CRC, Adelaide SA
Kevin Matthews, weeds officer New England Weeds Authority, NSW
Annette McCaffery, weeds communication specialist, NSW DPI, Orange NSW
Lester McCormick, NSW DPI agronomist, Manilla, NSW
Tim McNamara, CRT, Rutherglen Vic
Ron McTaggart, Dept of Agriculture agronomist, Albany WA
Bill O'Neil, consultant WA
Peter Orchard, NSW DPI, Wagga NSW
Mark Pedlar, Elders, Adelaide SA
Luke Pope, NSW DPI agronomist, Cooma NSW
Bryson Rees, weeds officer, Wellington NSW
Jason Scott, CRT Bendigo Vic
James Skerritt, consultant WA
Les Spenecer, Landmark WA
Steve Sutherland, NSW DPI agronomist, Wagga NSW
Les Tanner, Weeds officer North West Weeds Authority, NSW
Sam Taylor, Landmark, Bunbury WA
Greg Toomey, Landmark, Bendigo Vic
Simon Veitch, CRT, Naracoorte, SA
Craig White, Bayer Ltd, Merredin WA
Jim Wright, consultant, Harden NSW

Pursehouse Rural Pty Ltd agronomists:
Quirindi
Adrian Nelson
James Urquhart
Dave McRae
Duncan Hill

Gunnedah
Nick Park
John Nott
Kelly Angel
Muswellbrook
Troy Richards
Cameron Barton
Narrabri
Hugh Urquhart
Coonabarabran
Tony Stewart
Callen Thompson

WA Focus Group

Bevan Addison, Manager, Technical and Professional Services, Elders WA
Laurence Carslake, Landmark, Narrogin
Ross Hardwick, Executive Officer, Economics, Transport and Farm Business with the Western Australian Farmer's Federation.
David Stead, Landmark covering York, Quairding and Meckering
Sam Taylor, Landmark, Bunbury
Stuart Witham, Landmark, Tambellup

Yackandandah Focus Group

Glenda Hall
Cathy McGowan
Dianne and Peter McGowan
Helen McGowan
Jenny Lucas

Coolah Focus Group

Doug Arnott, farmer
Bruce Bowman, farmer, Dunedoo
Michael Davies, farmer
Robert Freebairn, consultant
Simon Goddard, farmer
Bruce Howard, grazier
Klara Schultz, Coonabarabran District Agronomist
Glen Hanson Turrant, psychologist and farmer
Ross Watson, consultant, Scone
Christine White formerly of Monsanto and now Coolah farmer
Chris White CRT Coolah

7 Appendix 3

Principles and Practice for Capacity Building Models (after Coutts et al 2005).

From a detailed examination of a range of projects, their underlying philosophies and the way they operated, Coutts et al confirmed that extension projects fell easily under a number of models. These models operated across industries and communities, with each playing key and complementary roles within a capacity building framework. An important factor to remember is that models are just that, i.e. they are an artificial mechanisms to help us gain insights and to have discussions within common frameworks. Some projects may not fit neatly into any of these models, others may have components which relate to more than one model.

These guides embody the lessons learned in the review, 'what works and why?'. They provide a basis for thinking about elements to incorporate when developing projects under each model and managing them. The guide is not intended as a mindless tick-the-box exercise, but to provide a basis for consideration and dialogue about potentially funded projects.

1. Facilitation and Empowerment Model

Element	Comments
Potential participants express or endorse a need for facilitation assistance.	Impetus could come from either a project team or potential participants themselves. The key point is that it is not imposed.
Groups are self selected.	There are various approaches to self-selection.
There are participant champions within groups.	Groups work best when there are participant champions who provide leadership and enthusiasm rather than reliance on the facilitator.
Facilitators are selected or endorsed by the group participants.	These could be public or private or community people.
A planning cycle is incorporated into the process, including reflection on progress.	A planning cycle provides some confidence that issues will be dealt with in a systematic way.
Group members have opportunity to receive training in group process and planning.	An assumption cannot be made that people know how to work and plan together and some allowance should be made for this.
Groups meet regularly.	This would be affected by localities and types of issues facing the groups.
Boundaries for use of funder resources and reporting needs are negotiated and agreed to by funders, project team and group members.	Funders need some boundaries and broad objectives for monitoring and accountability purposes. These need to be clear as well as the type and level of reporting against these.
Opportunities are made for professional development of facilitators and to develop facilitator networks.	Facilitators need to be connected between each other and further develop their facilitation and 'technical' knowledge to ensure they are of maximum benefit to the groups.
Opportunities are made for groups (representatives) to meet and share experiences.	Actions and learning of other groups can provide a significant stimulus to like-groups in other localities.
Group members are encouraged to benchmark their knowledge, attitudes and practices.	Benchmarking is a way of measuring and reinforcing individual and group progress and growth.

Group members contribute an increasing level of their own resources to group activities.	This assists with ownership and sustainability beyond the life of a project.
Courses and workshop opportunities need to be made available to facilitators and groups as part of the smorgasbord of opportunities available to them.	Assurance that groups will hear of potential training opportunities is important so they can make appropriate choices for their needs.

2. Training Model

Element	Comments
The project is based on extensive market research or demand or both.	Projects should result from identified or expressed need and supported by representatives of potential participants.
Up-to-date information is accessed from the full range of potential sources and integrated into a cohesive package.	Some effort needs to be made to ensure that information is balanced and incorporates the most up-to date- information.
A transparent and defendable quality control mechanism is in place in the development and implementation of the project.	There are some off-the-shelf QA mechanisms that work for training or those used need to be obvious and defended.
A facilitators' guide is developed that can easily be used by qualified presenters who have not developed the course itself.	Having developers separated from deliverers assists in testing this aspect.
The course material is aligned with competencies under training packages in the VET system.	This should be a given for new projects under this model.
There is a clear explanation of the VET pathways to allow presenters and participants to understand how the package can contribute to formal qualifications.	There is a lot of misunderstanding about VET accreditation. Including an explanation in course materials will help in dealing with it.
There are participant booklets that allow participants to easily follow the activities and learnings and will serve as refreshers after the course.	Booklets should be professionally developed with appropriate spaces for writing and illustrations.
The training is gender sensitive in terms of timing, content and recommended facilities.	Gender also includes cultural sensitivity and should be assessed.
A range of media inputs are available to break up presentations.	Consideration also needs to be given to remote locations with lack of equipment.
Pilots are undertaken and rigorously assessed.	Before launching a project training product, pilots can refine their potential usefulness.
Adult and experiential learning is incorporated into the delivery.	These are about recognising participant experience and engaging people in the process of learning.
Participant feedback is provided for and made available to funders.	Feedback sheets should be developed as part of the process. It is also good to seek feedback six months after an event.
Provision is made to support participants between workshops/and or at completion.	Approaches may include email contact, local mentors, phone hook-ups etc.
Local examples and field trips are incorporated into content.	Local case studies help people identify with the learning.
Direct opportunities to relate learnings to own businesses and situations are included.	This is a crucial component and exercises can be designed to this purpose.

3. Technology Development Model

Element	Comments
Issue or need identified by industry or community or endorsed by representatives.	The perceived need may arise for any group, but all key stakeholders need to be convinced of the need.
Facilitation provided to mobilise and help in process.	Facilitative extension skills are critical in gaining broad involvement and providing a mobilisation framework.
Process to inform and involve stakeholders in problem definition and determining approaches to tackling it.	Steps need to be explicit as to how the stakeholders will become engaged.
Committees or forums or both to provide ongoing local input and feedback apart from hands-on participants in process.	These formal mechanisms have been shown to have real benefit in providing 'safe' places for inputs and needed feedback.
The process is designed to allow researchers/experts and producers/ community participants to work together.	This should be a participative process recognising the strengths of all.
There is a strong on-farm/on-site trial and demonstration and assistance component.	In some cases, on-farm trials may mirror, or extend, formal research sites.
Benchmarking is a key feature of tracking benefits and progress.	Change and impact needs to be measurable for stakeholders to gauge benefits and progress.
Other supporting mechanisms are available to help development and integration, such as incentives and policy.	It is in the context of the mix that assists in motivation and action on desirable changes.
Training in relevant areas is made available.	Training can help participants catch up with pre-existing knowledge about the technology or management issue.

4. Information Access Model

Element	Comments
There are clear objectives and clear identification of information client groupings.	The default option of providing information 'because it is there' should be avoided.
There is opportunity to monitor usage, and obtain on-going feedback and client needs.	This is a critical element that is central to this model. It may include external evaluation.
There is opportunity to link to 'real people' and peers who may be searching for similar information, or have relevant information.	There are a number of mechanisms, both virtual and physical, to link people in with other 'searchers' and staff.
Information pathways are clearly provided to meet individual needs.	One size doesn't fit all. It is the facilitation and guidance of people accessing information so that they don't feel 'overwhelmed or lost' that is critical.
QA systems are in place to ensure currency, relevance and quality of information.	There are a range of QA approaches – the transparency and rigour is important.
Creativity and 'risk-taking' is encouraged and provided for.	This is an area that is still in its infancy and action research would appear to be a needed component.
Staff and information providers are well	The assumption can't be made that staff managing and

supported and training is available where needed.	providing information know how to do this best.
There is 'space' for people to 'play' and experiment with their information seeking.	The Museum example reflects a greater principle that information access projects should be fun and allow user experimentation.

5. Consultant/Mentor Model

Element	Comments
Client is organised and is clear about what they want.	This is different to 'ad-hoc' visits. It is about having a purpose and goal in-mind.
The client and consultant negotiate a written 'contract' in terms of time, costs outputs, timeframe.	Written contracts ensure a "business-like" relationship. It provides a basis of assessing how well the relationship has met expectations.
The client has as much relevant farm business data as possible for review by – and discussion with - the consultant	Decisions are best based on the most up-to-date data available – it maximises the potential value of the time used.
Both parties see it as a two-way relationship.	It is not just about a consultant 'telling' a client what to do – but a two way flow of information and ideas.
The client 'walks' around with the 'consultant' and participates in information gathering, analysis and decision-making.	This is about using the time most effectively and maximising the two-way flow of information. Also landholders will be able to draw attention to things easily missed by an occasional visitor.
The client makes the ultimate decisions themselves.	This is important in terms of litigation. Some consultants are reluctant to "take risks" – but this can be minimised if the client takes the responsibility for decisions made.
Continues the relationship over time.	There is value in consultants/mentors knowing a situation over-time and hence can make suggestions in context.

8 Appendix 4

Sample transcripts of interviews and focus groups

INTERVIEW WITH DISTRICT AGRONOMIST NSW DPI

What is it that works with land managers in getting them to do something about their weeds?

You'll hear…all sorts of people will tell you that its production orientated that or its profit driven. I don't think it is. I think its driven by their desire the have a better property

To look good do you mean?

To look good or if you can tell them that a weed is a menace.They'll often spend lots more dollars because they're aware it's a menace.You also need to teach them how to control it. Different levels. Some weeds are controlled but never eradicated. Other weeds are very, very difficult to even control to a satisfactory level for most producers. They're the intractable ones that producers have played with and played with and played with until they become sick of it in many cases. Its also part…the difficulty in the grazing districts is the type of land fellows have. If its nice and flat and arable it probably shouldn't have any major weeds, if its hilly and rough and its always had weed problems then he will wlays have weed problems often the only way we get around our more intractable landscapes or rough bits of country under control is when someone from Sydney buys it and they have the dollars to throw at the problem and they get 48 ½ cents in the dollar tax deductability for every dollar they throw at the problem. Whereas as your poor farmer he gets nothing…he has to pay the full 100 percent of costs.So even tough in many ways a lot of the country that I see that's been left to go for a loong time can actually be made quite productive again the weed problem will always be there but it can be made quite productive ….it takes an injection of dollars often to do that with …I won't say courage…someone who doesn't care about the dollars to have a go. I can take you to properties that have been badly infested with serrated tussock and blackberries up the gullies, tussock on the ridges give it to the right entrepreneurial type with a bit of advice they can run with the technology package that's there, increase the carrying capacity of the country and get the weeds under control.

So there is a very strong motivating factor in your place looking good?

I think for a lot of farmers that's true They seem to be driven by ….its genetic, they were unlucky enough to get it but it's a gene inside them that makes them want to be improvers. They've got the world's "scrathiest" mob of ewes they will always try and but the best ram they can. If you gave them $5,000 there's always a fence that needs replacing there's an improvement need in people who are farmers. It might lay latent in those who live in Sydney for a long time but eventually it will get them and they'll have to but a farm

So its not the law?

I don't know that it is the law. The law may work with some but all you're going to get out of them is minimal co-operation. They're not actually out there trying to get rid of the problem .They'll give minimal co-operation to avoid a fine. But they're the odds ones out…they're the ones I think are

quite different in fact ..they're the ones you need a law for. If you don't have a law then you have no way at all of imposing peer pressure or any other sort of mechanism of forcing them to do something or even trying to do something

The tools that work for you….face to face…show on a computer screen…going around the paddock you mentioned earlier……..

It depends on the type of weed situation. You can put on a simple field day demonstrating control techniques on small and that will often be as good as anything as a focus group for them to come to-gether and what techniques are available and then you talk to them about taking that home and applying it to the one that most appropriate to their landscape. And I think that's one of the things that we in DPI would like to look at again or would love to look at again. Its this extension model of weed demonstration.

Is it easy to get people to come to field days about weds?

Sometimes its difficult. If you're in an area where there's a heap of serrated tussock …and unless you tell them they are going to learn something new, they're not going to come. If they're in an area that's outside serrated tussock and you tell there's a field day on serrated tussock they're not going to come because they don't know they've got a weed problem. They just don't know how to recognise it properly.But if you're doing a field day on native grasses and you just happen to show them a bit of serrated tussock and talk with them about the issues of identification and management as its invading an area I guesa that's another way of doing it rather than saying we're going to have a big field day on tussock because its coming to your place. Yet there are other issues like blue heliotrope where often you get producer initiated requirements because they don't have any answers and they're actually looking for or hoping that you can come along and give them a technique that may work in their situation.

So the demo is still a good tool in your kit bag?

As far as I'm concerned I think its one of the best. It's a means…maybe not with serrated tussock because there's nothing new to show them. But with a lot of other weeds producers are unaware of the control techniques, they're unaware of which herbicide might work, they're unaware of what the problem can get to. And so if you can take them out into a paddock and show them that and show them that it can be controlled with an appropriate method they'll often take that message home much better than if you present them with a 60 page glossy pamphlet which they won't bloody well read anyway.

Lets talk about pamphlets..obviously there are pluses and minuses with them? How important are they in your kitbag?

I think that's really important. I think since landscan I'm trying to develop a new technique within our DPI Tablelands agronomists a thing called paddock plants. They're a really simple farm walk type concept where you'll go over a paddock and you'll identify the 15 most common plants in that paddock and discuss with a group of producers what they are, why they are there and what are their requirements, how to modify them to get rid of them or how to foster them if you want to increase them. Pretty simple techniques.You can't that with books because you don't know what the other 14 plants are. You can talk about a particular plant and control methods but you have to know what else

is there for the timing of the operation and those sorts of things. Its surprising that when you go out with a group of farmers and actually ask them to identify something they have no idea still. Yet a lot of these things are based on the belief they know as much as we do. And they really don't. They understand as much as we do if you explain it but they really don't know it in the first place. Most producers…and I would venture to say that as much as fifty percent in this part will have trouble picking phalaris from crops in the vegetative stage. They'll know barley grass and they'll vulpia but you get beyond that and they'll start to struggle with weed species identification especially. They'll know the weeds their own local problem weeds but they don't know invaders.

The brochure is important for helping people to identify things?

It can be as a handout on that field day where we show how to identify them in a standing position. These ones where you have to go and look at the third hair on the bum of a grass farmers won't do it. If there are features that can be seen from the standing point you've got some chance of identify it.

You are fairly sceptical about pages and pages to read, would we better with a card system instead….glove box guide

I think that in terms of the individual plant sheets that's more….if we can ever get this thing going…we'll have a rule that each page will be no more than one A4 page sheet with a couple of colour photos and the words on it will be very "minalmist" and they'll be descriptive. And on the back of that sheet the way we hope this thing will operate will be we'll have them slide in plastic sheet with actual book here…this sort of thing. So that if you're out in the field part of the day for those who want it will be how to take a plant sample and press it and slide it in the back of the thing so when they read about it they can turn it over and look at the thing in a better light. And that then becomes the book of their farm..of the things that are found in paddock A or paddock B or whatever. But Joe Bloggs from next door he's also got a paddock That's very similar to paddock A so he comes along. And so they not only learn how to identify they also learn how to control in the presence of the other plants. I mean you see it so many times… Paterson's Curse. Right now there's a lot of people round here hate Paterson's Curse because they're horse mad, you know….hobby farmers. A lot of those use products that are registered for Patterson's curse control. They do a wonderful job and they're very cheap. Now in their eyes they're doing the right thing by the Patterson's Curse and by their horse or pony. But, you now a lot of those products they're using are deadly to all legumes in the system. I mean Ally,etc are very, very good at killing Patterson's Curse but you won't have a single clover plant left in the system. Now I'm not going to say to them look you're dead set wrong because its cheap and it works protects their pony perhaps…but you can't transpose that and put it into broadacre agriculture because you've just lost your legumes out of a grassy based pasture system. And yet that's becoming a fairly common herbicide treatment so of promoted by the re-sellers because its cheap and its works

I want to ask if a landscan type kitbag is the way to go as far as weeds are concerned

I don't think you'd re-run landscan just to talk about weeds issues unless you had a very dedicated group of farmers with a very intractable weed problem like serrated tussock. Then you could talk about where are yu going to get the best value for your dollar in weed control to start with. Part of the pay off with these guys but would be getting rid of the weed but also increasing carrying capacity to a level where it'll offset some of the cost. But…..the concept of taking them out into the field and

talking with them about those issues is where I think its got to go. You have produced locked in a room or you can hand out a million pamphlets…. without some concept of how it can fits into their system often they're not going to adopt it I mean its simple you know spray it every year it'll work fine but if you start getting complicated and saying spray it every year and lets look at competitive species, grazing management techniques or fertilizer techniques to make your pasture more competitive …most producers will understand innately but they need to be taught how that can be done. Ah……without shifting everything else on their farm.

Could a weed package be incorporated into something like Prograze?

Ummm…some of those courses run out of puff after a while. I'm not saying that Prograze has yet but in this area it is. I mean you get to 10 percent of the producers. I think if there were something with a weeds type (I won't say course) because they won't come to a course.I fit ewere something like a series of weeds learning sessions and you targeted those around the countryside you'd get a bigger audience than you would out of Prograze because more farmers are concerned about weeds on the Tablelands than grazing management.

Is that right?

It would depend on how you structured it. If I tried to put on a Prograze day at Sofala I would be flat to find four or five .If you put on a weeds day out there you'd get forty or fifty from out of the hills on the anticipation that you're going to tell them something that's of value. It just depends on whats appropriate for them.

So lets sum this up. If unlimited funds were available…where would you spend it…..

I think that's the model. You know if you go into a particular area and blue heliotrope will be a problem north west of Bathurst…Serrated Tussock at the bottom of the hill country north of Bathurst and in various patches south of Bathurst…somewhere else it'll be bent grass at Rydal or somewhere like that and you can take that and work with a group of farmers until they understand that particular problem pretty well. I mean there's lots of information out there on how to control bent grass The Victorians and we've done our own research…But that's not really despite all the publications getting into the hands of farmers who often don't understand this system that well. They read that you can use gylsophate but they won't understand when and they won't understand how to go to the next phase . Glysophate, cultivate, good old fodder crop glysophate, cultivate maybe sow a second fodder crop and back to a pasture. And at the same time repairing what's wrong with the country…I mean often its poorly drained, quite acid at the surface and low fertility.If you don't fix that well the bent grass is back in six years anyway and you're flat out to recoup your costs other than two fodder crops.

Let me look at the mass media?

I think they are of use. The level they are of use is alerting people that there is a problem and saying this is coming to a farm near you .This identifying feature is what you look for if thin you've got5 it rather than inundating the local weeds authorities with thousands of weeds samples and maybe very, very simple control advice. But its more in the realms of identification and spot spraying rather than control of some weeds. Much you start to get the levels where the weed can be

simply dealt with glysophate…spot spray or the old hoe over the shoulder sort of treatment then you need to understand it all more and you can't do that on a thirty second grab on TV.

Would you say the same thing about the internet.

The internet is good for those that like reading stuff off screens. And farmers …it'll work with a percentage but it seems to have become well we've done our bit we've put it on the net. Therefore the jobs over. Or we've produced the glossy 60 page pamphlet on how to kill the weed and therefore all farmers know it. Ahhh…or should know it. Its out there in the public domain somewhere…ummmm.There are sorts of publications like this one winter cops 2005 and widely used by…….huge amount of information….pictures, tables, drawings…and it takes a bit of learning how to use it. But its been around for a lot of years and a lot farmers know how to use it and it ….they disappear…..there are some booklet type things that people can have ……give them the listing of what's possible. Often they're too long and complicated for what a farmer really needs. Serrated tussock is managed by this backpak. I mean OK it was done with good intent. But most tussock managers are not going to read it.

Obviously plenty of printed material around?

Yes. Often farmers do not know that its accessible. That's where the net may have some advantages if you can broadcast that there is information available on the internet at CYZABC they could see where its of use or value.

If there were unlimited funds? Other tools you'd like to have?

I'd like to go back to the old weeds research and demonstration units demo units. Where my TO goes out and conducts a series of spray trials..for maybe a landholder group….and that's used as a focus for the group for what are realistic options for control in their own landscape.
Ah…it does 2 things…its acts as afocal point to bring them together to concentrate on weeds, it demonstrates the available techniques but its also a very, very good training programme for a lot of our younger staff who've not seen herbicides operate And so therefore they have confidence. They don't know what else they'll kill, they don't know that other than the target species they'll damage in the mix. As I say the other concept the paddock plant thing you know if you're going to use allied or brushoff at ten grams/ha to kill Paterson's Curse what else are you killing? You might successfully kill the Paterson's Curse but what are you actually doing to your pasture?

Agribusiness? People who work for the commercial firms…should the system be enveloping them?

I try to. I mean whenever I get issues of these things I mail them to all the rural traders in the district who then manage to lose them fairly quickly.But ah…I think there is an educational role there although in some districts the rural re-seller fellows are probably in front of some of the DPI staff in terms of herbicide application technology particularly in the cropping game. They get to go out and see a thousand crops a year and make recommendations on herbicide control so us in some circumstances trying to teach them might be a bit over the top. In other circumstances I'm sure there are plenty of them who are not actually trained people who sell the chemicals …here in Bathurst for example most of the staff are not would not call themselves agronomists…have called themselves agronomists…they certainly have a big effect on which tin of chemicals the cocky takes home to-day.

And they talk with them face to face?

Yes, they do.

You fairly credible be around

That's where the credibility of running some trials on an intractable weed problem will make Neil Inall (junior agronomist!!) a hero. Not necessarily a hero but at least will say he's doing something. Having a go.
There's a cerdibility and kudos for those people in the trial work. I don't think we should all be rushing out doing trials but if are going into that model again we need some people who are capable of going into an area and doing the trail work and maybe coming back and assessing…perhaps not even that. Surely the person whose asked for the trails can do the assessments. Find a site and do the assessments you just need somebody to there just that many hoops to just through probably in terms in putting in for herbicide application off label application permits different rate permits and things like that to put down a trial site and most of us are not
going to have any time for that sort of stuff. You tell the farmer to try a few swipes himself and you don't have to worry unless 6 or 10 of his neighbours come and have a look.

Institutional arrangements in NSW?

NSW farmers are putting on an extension person on weeds. Putting in for funding and yes the CMAs have catchment people…weeds facilitators or weeds co-ordinators. And that's happening in a number of the catchments
That's aowrry..there are a lot of people out there who are armchair experts and they very quickly get seen as armchair experts too. You k now its difficult for those people to develop that credibility and kudos. They're young, they move into the area and all of a sudden they're telling farmers how easy it is to control …poor bloody cocky has had it for thirty years……and that smacks of XXXXXXXXthe hairs o the back of his neck are rising and ummm…….they've got to be very careful how they do it. That's all. The catchment system may in the end through some sort of incentive funding which the Catchments haven't realised that weeds are one of their biggest issues yet …they still have to worry about salt …those things that farmers see as a problem some where else ..and they can do something about it but not a lot. But they can do a lot on their own area about some sorts of weeds.

Are weeds really within the CMAs ballywick?

If they want to out their arms around the community they're going to put their arms around weeds. That's what the community on Tablelands sees as their most intractable problem…weeds. They don't realise that yet but they will come to it.

How much in terms of problemsimproving ..are hobby farmers??

They know very little. They need one and half litres of MCPA in August to control their saffrons…they want to know how are they going to put 1 ½ litres on and it multiplies with difficulty hugely. There are some that are very anti any sort of chemical…they're lifestylers who don't believe their neighbours should be spraying either because its affecting them. They make it really, really difficult to institute an sort of weed control programme across that 40 blocks particularly some weeds

that blow from block to block. There are also a large number of them that like their landscape and they want that park appearance. That's what they came here for…..so once they realise a weed is a weed and it has off farm effects and on farm effects on their place they are more than happy to do something about it. They may not want to do it themselves and that raises a whole lot of different issues about how you get around that. You get them together and show them the weed and organise someone to come in and spray them for all of them

Better off CMAs doing the whole weed thing?

They don't have enough knowledge base. They're cocking lots of other things pretty badly even their incentive funding. They've plucked a little piece of knowledge out of here and there…like top dressing lime. It'll take them a few years. Insist that no one sow anymore than 30 percent by weight of legumes in pasture mixes.

INTERVIEW WITH PASTURE AND LIVESTOCK AGRONOMIST WITH LANDMARK WA

How long been working in weed management?

Weed management? I guess 8 years now. Since the beginning of 2003 I've been involved more with the pasture side of it.

Always been with company?

In its various forms. I started with IAMA up in Geraldton, then Wesfarmers Landmark and now Landmark.

Training in extension?

Probably not in a formal sense. No. Most of the work we do is probably done in two ways…..one on one with clients who ring up and want advice about a specific problem they need advice about or with some of our clients we sit down with them at beginning of the year and we work out a programme of how they're tackle weed control on their properties and that generally…could be through generally the cropping regime but more so in this part of the world the pasture regime as well. Doesn't always involve selling them a drum of chemistry or chemicals. That can be done through grazing management and fertilizer applications and things like that as well. And then I guess the other approach we have we as a comercial group we see a group of clients in the same amount of time as…in some areas we run cellgroups…like Topcrop group type of scenario. Bring a group of farmers to-gether and we discuss current topical issues.

Deal with people in both cropping systems and in grazing systems?

That's right, yes..

What percentage it would be ?

Myself personally, It'd be 85 percent grazing.

How much of time face to face.?

Just recently changed roles. So Ideally it'd be 60/70 percent of my time on farm or in direct contact with clients. That varies a fair bit with the time of the year.

What motivates your clients to manage their weeds?

It depends on the enterprise of the clients you're talking about. Examples that come to mind in the wool industry or guys with grazing sheep…..if they run into problems with you know physical problems with their sheep..maybe grass seed in their eyes…things like that…..VM contamination in the wool…the fat lamb guys seeds in the bellies….down grading of carcases…those types of issues trigger them to try and do something about it. And I guess we're…part of what I deal with the company is working with growers to really show them the benefits of having improved quality pastures so that ….or have the ability to increase to increase their stocking rates and their growth rates as well which means getting the weeds out of the way and getting more productive species in there.

What's in your kit bag for getting people to do those things?

Uh….a lot of the things I carry around in my head, I guess. It depends on the enterprise again. Everyones got a different trigger which gets them going. If I can sit there and demonstrate to someone that they'll be able to get an increased growth rate in prime lambs for example…ummm.. by improving their pasture….you know that they can get them to market 2/3 weeks earlier when the prices are still a little bit high …..that gets them in to have a go at that. Also just by doing feed budgets …..that type of thing with people demonstrate that they're getting increased stocking rates.

When you say demonstrate is it your words or what else might it be?

It's a lot of things. I guess it's the way I sell the message.. Its me being the conduit for some of the research and information that I've come across and can demonstrate to people that it'll increase their production. For example the time right programme…..which is, you know, AWI funded I guess. Demonstrate to people if they control their red legged earth mite population…based on typical averages which is always a dangerous thing…and you know, and they'll have X amount of more feed available or they'll have a better regeneration of pastures the following year…….the research that CSIROs done shows that the average amount of earthmite present in the pasture in spring time is equivalent to 3 DSE….so that type of information helps people make decisions. The other thing which is obviously very visual and very much in the front of farmer's minds..if they see a paddock which is completely yellow because of capeweed or if its purple because of Paterson's curse or whatever the weed might be…that's the real trigger for trying to do something about it as well.

Ok its your words…your experience. Do you have special nights for clients?

We have them with the core group of clients with the branch that I work from….. earlier in the year we actually employed an independent consultant to run some meetings for us. He actually gave presentations of the benefits of improving pasture and how to approach that. We do run farmer meetings…like that from time to time there's always a commercial spin off to it with organisations like ours. We had one recently where a guy….a guy across from the UK was well versed in silage production and management and those types of things and they gave a presentation to growers on the benefits of getting their silage programme right. Similarly when you rang the other day we were

taking a group of farmers up to the trial site to look at some of the new and emerging pasture species to sow on their properties. So we're extending information like that to help them with their production and there's also a commercial benefit for us as well.

Pasture systems and pasture management a major factor in the business of controlling weeds.?

Without a doubt. Particularly in WA…….in my previous experience and that of my colleagues in the wheat belt.…particularly rye grass and to a lesser extent becoming a bigger and bigger issue on a daily basis. They're running out of things they can put into the boom spray to control those weeds and the guys who haven't had a hoof on the property for ten or 15 years are seriously looking at going back to livestock as a method of controlling the weeds .

Heck of lot of young farmers who've never run a sheep in their lives?

That's very true.

Bus trips, demonstrations….What works better than anything else on that list?

Yes, I guess….It's….. the person has got to want to do something about it. And if they're not genuine about wanting to do something about it…um.. none of those things will work…some of those things may be a trigger to get them thinking and but….some people in this part of the world…particularly in the south-west of WA they don't have the gear to do some of those things themselves ..then they rely on contractors and that becomes expensive…and then it all becomes too hard and they keep on doing what they've doing for three generations …they don't really do anything.

More effective than abc?

Probably the things that have the biggest impact on managing weeds so to speak would be manipulation of pastures…that's generally done through the spray graze technique…probably secondly via spray topping …still involves sprays/ herbicides…they are probably the most effective things but that probably doesn't answer your question to get people to do it.

I thinking getting people to do it they actually have to…they really have to cope it in the neck from the problem before they really do something about it…so if they sent a consignment of lambs off and they got penalised 30 to 40 cents a kilo because of seeds or whatever it might have been …. wool downgraded because there was a lot of seed coming in at that time of the year…then they probably look at doing at doing something about it. Not until they've really taken a hit like that that will it be identified as a problem

In the end it's the dollar

I think it probably is yea.

It's their on farm experience where of their management whether it be good or bad has left them to suffer financially I guess……you know…I guess at the end of the day. Maybe they haven't suffered financially…but there's an opportunity cost in all they've experienced so they've had to treat a whole

lot of sheep that grass seeds in their eyes and it took them a day to do that and they were planning on doing some other operation that was pretty time critical at that stage ..So its not always the actual dollars in the bank it can be those opportunity costs as well.

Work with any other groups?

We probably don't have the same network of community groups in WA that I think exist in the east. So from that perspective no, not really. I don't work with those types of people. As a commercial business we do sell some product to the likes of the Ag. Dept….and that type of thing here. Occasionally those guys come in and ask which product do you think we should use to control this particular type of weed. We work with them on a commercial basis like that but as far as really community groups getting out there trying to control weeds and myself being involved I those groups, no that link is not really there.

Authorities like the RLPBs…….

Yes, we really only have the…...I guess the APB…..the Ag Protection Board which is similar to your Rural Lands Protection Boards but that's not a local sort of authority…its an offshoot of the Ag. Department, I guess and really they just concentrate on the exotic and declared type weeds. They're not concentrating on the main stream weeds you know farmers are dealing within crop or in pasture.

Noxious weeds or production?

Paterson's Curse is….I cannot remember the terminology…there is an obligation on farmers to try and control Paterson's curse over here.

Focus Group: 10.30 – 12.15 am, Sticky Tarts Café, Yackandandah, 9.3.06

M starts introductions (G arrived after introductions):

H = part-time farmer with little time for extension contact
P = interested in weeds, possibly fixated – slash and burn
D= balance to P, see need for targeting weeds with a real impact on productivity, President of landcare and frustrated by inability to identify agents responsible for weeds control, they wont own up
J = grew up on an Indigo farm (managing 2 now), like Peter fixated with weeds and frustrated with the mentality of many farmers in valley – whereas I has virtually eliminated weeds others reckon it cannot be done
C= I pay a lot of money to contractors - my preference is for biological control – am a member of landcare and we have targeted Paterson's Curse and kept it out of the valley, but have had no input from any agency to support this

Conversation ensues:

J – frustration when neighbours don't come to the party and wont or cant see that there is a problem; constant danger of conflict when neighbours argue and backbite because we have to live and work with each other

C – weeds don't seem to be integrated into our farm productivity-oriented learning/extension programs

M uses butchers paper display to outline outcomes of program to date – asks for group response:

H - how can we get a handle on who is getting (our) funding for weeds work and control what they do for us?
D - Landcare is forced to do the role of the agents but we are volunteers with neither the resources, time and energy or authority
H - we need to map where the weeds control dollars go
D - increasing role of CMAs makes me mad, they don't know what there role is relative to weeds, just window dress with expensive glossy brochures
J - frustrating when you clean up along a creek and it gets reinfested from upstream , CMAs don't seem to understand the realities of farming or have an interest in it, they are more interested in 'green' conservation that only looks at part of the picture and in an unrealistic way
C - CMA priorities are not weeds and they are not alert to farmers and farming, they come with an engineering and/or conservation orientation and are only beginning to appreciate farming
P - I am not surprised by your findings so far, the need for training that integrates technical and extension aspects of weeds management and control is a high priority need around a sensitive issue in farming communities

M – I am interested in your thoughts about peer pressure

D – Our Landcare group has targeted farmers who need to control weeds and you sensed they were feeling victimized until we volunteered to go and help clear the weeds, then they felt embarrassed, but it was effective because we developed a good relationship – but this is a huge task for volunteers and we are not able to continue with this

C – this raises the question of the willingness and ability to control weeds on public lands, the Govt is our neighbour too

C – there is a lot of publicity about Chilean Needle Grass but we none of us are able to identify it, once I know it and whether I've got it I can do something about it. Weeds indentification is a fundamental extension task

J and C – books and pamphlets are no use to us, we need someone we can trust and who knows about weeds that we can ask but there is no agency that plays this role

G – weed indentification? If in doubt pull it out

D – Needle Grass is on the roadsides and was brought in by Council machinery and the like – we need a local person we can refer these issues too

J – Councils and Telstra etc spread weeds through dirty vehicle and we have a myriad of visiting contractors who do it too

C – is weeds extension focused only on farmers?

M – some farmers actually quarantine visitors

D – on our small hobby farms the lack of awareness of weeds amongst the farmers means the idea of quaranting is irrelevant

C and D – the welcome kit to newcomers Landcare prepared had information about weeds and sources of information about them

M – how do you deal with it after identifying it?

P – who accumulates the knowledge about how to respond?

C – in my case I leave it to the contractor

H – I tend to live with the questions – what is it? What do I do about it? A warm invitation to discuss them would get me in

P – I am not prepared to utilise chemicals myself but will pay contractors to do it, I am willing to do chipping, slashing, grazing etc but I stay away from sprays

J – I see neighbours actually spreading weeds either through ignorance or laziness

H – what about finding out who is friendly with the farmer/s and going through them?

D- is this our job as volunteers?

J – if the bad farmers are not members of our groups and have their head in the sand what do we do?

C and H – kids are a potential source

C – can we introduce rewards into the situation? Making people feel OK will get better results
D – Our Landcare group has a map of the valley with weeds and their location identified, does anyone else – RTA and Council for example?

D – we took a risk when we worked on the neighbours weeds because none of us has a Chemical Users Certificate, our Landcare could be legally liable

G – in response to John's question about farmers doing things better it is the people who see themselves as farmers who are doing something, but a lot of local landholders are lifestylers, not farmers

P- we are mainly small landholder farmers and our battle is to educate our neighbours about the nature of and need to address weeds

C- it is not just a question of knowing (which is the extension issue) but also of taking action to do something about it

G – groups can help neighbours become aware and stimulate a response, an example is a farm visit I participated in as a part of a grass utilization program

M – there is a contrast between the person who is ignorant but will respond versus the intractables

D – it was only when we volunteered to do the control work on bad farms that we got over the them v us feeling and the group pressure they were experiencing

C- there is the example of the CMA mapping salinity, what about mapping weeds?

C – the DPI set up a vibrant task force a few years ago that stopped after 3 years, we have to persist

M – conclusions about what should be done?

J – it is a long term issue needing persistent programs in response

G – need to prioritise

D – we have organic farmers who oppose spraying and their numbers will increase in this area and ones like it

P – what would make a difference? First is identification, followed by recognition and then response- our Landcare softly-softly approach has worked – we need Council to benchmark and to take weeds seriously – neighbours dobbing on each other is fraught with danger – we need an independent authority/faciliator/weeds expert, I don't know who plays this role anymore, it used to be the Lands Dept

D – the message from Govt by way of legislation and the like is confused, there seems to be more emphasis on trendy topics such as native vegetation than on mundane matters such as weeds and their management

C left at this stage with visitor friend Annie
M – lets capture the main points: there seems to be agreement with the conclusions from our earlier interviews, with some good ideas about a way forward such as

- **Rates incentives**
- **Value of but non-sustainability of volunteers**
- **Question of who is going to take the initiative if volunteers don't**

H – there is a need for a local plan related to the way we want our district to be in the future which includes the issue of weeds and their management

M- the importance of understanding both the community and the place came through strongly

J – dealing with conflict will be an important aspect, there is for example a recent arrival in the district who has started a viticulture enterprise and expects to be notified when one of us intends to

spray for weeds but for whom it is never the right time, he expects us all to change the way we do things to suit him

M- as far as information provision is concerned, what do you prefer?

Responses:

- Talking to someone who actually knows the situation and appropriate responses
- Locals are reluctant to relate to agencies they see as remote such as CMAS so it has to be local
- We used to have persons in the Lands Dept who filled this role as far as noxious weeds and their control was concerned, but not weeds management in the broader farming context
- There are no people on the ground now, they are too busy preparing glossy brochures
- Landcare has been very effective but there is too much expected of us as volunteers in delivery of on-ground services, we are tired and not prepared to keep going
- Leadership quality across Landcare groups is variable and changeable and landcare cannot be relied upon to deliver
- The ethos of Landcare is incompatible with the idea of muscling locals to control weeds
- CMA priority seems to be more on conservation issues and weeds in farming is dropping down the priority list, perhaps this project could get it back up the list

G – the issue seems to be “you need to control (this weeds infestation) - can we help?”

9 Appendix 5

A definition for each subsystem of its Clients, Actors, Transformation, Worldview, Owner/s and Environmental Influences

A central component of soft systems methodology is the definition of a relevant system (relevant in the sense of providing a conceptual framework for addressing the problematic situation revealed by the preceding analysis). The methodology calls for the definition of the six factors which constitute a human activity system. These are its:

- Transformation - what the system does;
- Clients - who the system benefits;
- Actors - the people who run it;
- Owner - those with the power to activate or terminate the system;
- Worldview - the set of values that underpin its operations;
- Environmental forces - forces acting to advance and/or inhibit the system.

The decision as to what constitutes a relevant system and its components is a matter of judgement.

The following provides the researchers' judgements on the definitions for the subsystems described in the model (figure 1).

1. **Reform communications strategies related to weeds management through social marketing principles and practice, beginning in MLA and AWI**

Target clients = graziers and relevant resource managers in high rainfall zones
Actors = staff and associated contractors in MLA and AWI who are engaged in weed management research and extension
Transformation = communication strategies are reformed using social marketing principles
Worldview = social marketing is an outcomes – oriented communications strategy
Owners = MLA and AWI
Environmental influences = social marketing represents 'new ground' and will encounter institutional inertia associated with current ad hoc and poorly targeted communication strategies

2. Shape the decisions of relevant funding agencies and policy makers toward collaboration around a common goal

Target clients = funding agencies and policy makers
Actors = key influentials in MLA and AWI and contact people in the agencies
Transformation = agreement on and collaborative action towards a common goal
Worldview = collaborative effort is more effective and efficient than individual uncoordinated effort in achieving practice change
Owners = MLA and AWI
Environmental influences = Need to "badge" outputs and outcomes/ high transaction costs of communication and developing shared goals/silo mentality among agencies and funders.

3. Integrate the efforts of service providers and graziers/resource managers at the regional/district level through capacity building initiatives, beginning in selected districts/regions

Clients = local service providers and graziers/resource managers in selected regions/districts
Actors = contracted project leader/manager and lead organization nominees in selected regions/districts
Transformation = enhanced capacity to manage weeds/improved weeds status/lessons learned generalized to other regions/districts
Worldview = capacity building incorporates extension into a systemic approach to situation-improving
Owners = MLA and AWI
Environmental influences = a capacity building approach is gaining institutional support its overt application represents a significant R&D initiative

4. Maintain continuous improvement through a systemic action research approach to monitoring, evaluating and learning from experience

Clients = extension and weeds management agencies and associated community groups in high rainfall grazing zone
Actors = appointed project and sub-project manager/leaders
Transformation = continuous improvement in weeds management extension effectiveness
Worldview = a systemic action research approach to monitoring, evaluating and learning from experience across the spectrum of weeds management extension is the key to continuous improvement
Owners = LWA and AWI
Environmental influences = a pervasive 'silo mentality' in institutional arrangements fosters short-term goals and encapsulated learning – this is countered by the desire, particularly among graziers/natural resource managers, for integration of effort and learning from experience

10 Appendix 6

The Macquarie 2100 Draft Plan - a community, environmental and economic plan initiated in 1995 by the Macquarie Valley Landcare Group. The following analysis considers the plan against the criteria for capacity building proposed by Macadam et al (op cit).

1. *Diverse and relevant communities of practice collaborating in creating a shared agenda.* The acknowledgments section of the Plan states:

> Macquarie 2100 was developed by a fluid team of community members, professionals, government agency staff and local government councillors and staff. People became involved because they were interested or were invited to bring in their expertise and knowledge in a particular area. They were involved as individuals, not representatives. Macquarie 2100's strength is that hundreds of people have been generous enough to give their time, ideas or energy to make it work.

2. *A systemic approach to situation improvement.* The Plan includes long-term strategies, medium-term aims and initial projects within each strategy area. The seven interrelated strategies encompass all aspects of capital improvement—human, social, physical, financial and natural:
   - salinity—minimise its extent and impact on the region
   - river—improve the riverine environment and water quality
   - vegetation and land use—preserve and regenerate biodiversity, soil and vegetation while encouraging diverse and innovative land use
   - health and lifestyle—improve quality of life
   - youth, family and culture—foster pride, security, integrity and trust within the community
   - economics and tourism—work towards a sustainable economy through employment, industry and business development
   - education and information—improve the availability of and access to quality information, education and training.

3. *Stated assumptions that reflect a collaborative learning paradigm.* As its underlying set of values and beliefs, the Plan states
   - It is our responsibility to improve and protect our region for future generations.
   - The quality of the whole is shaped by the integrity of the individual.
   - Working together brings greater community control, strength and unity.
   - Strength lies in valuing and developing local talent and resources.
   - Stability and health lie in diversity of nature, enterprise and culture.

- Relationships based on respect, discipline and tolerance are the foundation of strong communities.
- Individuals need to be responsible and accountable for their own actions.
- Incentives, quality information and cooperation turn change into opportunity.

4. *Scope for continuous improvement being offered by consistency between desired outcomes, methodology, and the monitoring and evaluation strategy.* The program timeline for 1995 to 1999 was:
   - 1995. Macquarie Landcare Group members visit southern New South Wales irrigation districts, become excited by possibilities of developing a regional plan, and appoint a steering committee.
   - March 1996. The committee presents a planning structure and timeline to the wider community in public meetings and appoints a salaried coordinator.
   - October 1996 to March 1997. An open interview process is conducted with 500 locals to 'find the issues'.
   - February to April 1997. Interview transcripts are collated into a database—a 'picture of the Valley'.
   - April 1997. Public meetings are held in Warren, Trangie and Narromine, presenting to the community 'This is Our Life', a document based on the database.
   - November 1998. A skeleton plan is presented to community groups, government officers, local professionals and community members for comment and feedback.
   - March to June 1999. A mailed benchmarking survey of 246 school students and 499 adults generates quantifiable data for measurement over time.
   - July to December 1999. The Draft Plan is released for public comment at Macquarie 2100 Muster and then is modified and released as the Final Plan. It includes a four-phase monitoring and evaluation strategy—short term (1–5 years), short to medium (5–15), medium to long (15–50) and long term (50–100).

5. *Improvements in the stock of physical, financial, natural, social and human capital.* These are generated through participation in:
   - situation-improving activities
   - identification of learning needs
   - relevant topic-based education and training programs offered by various providers and/or tailored learning activities.

11 Appendix 7

Feedback from Peers

At the time of writing feedback has been obtained from two of the 22 extension practitioners asked to comment.
Comments obtained were:

Mark (consultant):
Thanks for the report. I have had a read through it and offer the following comments:

1. I reckon the approach you have suggested is excellent, as it focuses on the people and their capacity to ID/manage/overcome their own regional issues. I am not sure however how this will be received within MLA/AWI, as often they don't think this way. Often they are focused on product creation/problem solving ("shorterm ism"), and I am not sure how a different approach like yours will be received ("medium term ism!!")

2. Having said this, if you could add in some more examples, it would help them. If you can put in some practical illustrations it may help the concrete thinkers better understand your suggestions.

3. Plant and weed ID is a major issue, and there are some gaps in this, that AWI/MLA could co-invest with other organization to get good value (eg Weed deck could be broadened out). This is a concrete example of what you have suggested that may help AWI/MLA understand where you are coming from.

4. Your comments on state departments/agribusiness are spot on, and there is a rivalry. What would be in it for agribusiness to cooperate better with the state departments (and maybe other agronomists) in their region, through this project….when they see themselves as competitors? How would they maintain their competitive advantage? This might be worth thinking about. Bringing them together could be quite resource intensive, as it's a bit like mustering cats. In addition, only some may want to become involved in such an approach, and the others may undermine it. Some sort of regional champion/regional committee as you have suggested may help establish credibility, but it will take resources and at least 12-18 months to establish.

5. I reckon there is great potential to link (co invest) with GRDC in many areas, particularly given their regional adviser update approach seems to have good credibility.

6. I reckon there is also tension between some state departments and CMA's, so that's another layer of relationships to manage!

7. many organizations don't focus on the cause of weeds, this must underpin the project, and is an action learning program in itself, as people grapple with why the weeds are there!

The approach you have outlined is fresh and new. I would suggest a focus on the benefits to each of the organizations of such an approach may help. From AWI/MLA perspective, why does this

approach offer any advantages over the existing approach or alternatives? Same for the regional players.

Bob (ex NSW DPI agronomist):

I have just read your report. Quite comprehensive and covers the complexity of the issue and approach required.

Overall I have no major changes to suggest.

Key Players. You may already have this well covered. Bodies like NSW and Vic Grasslands Society I think are key organizations with strong community support and some very good personnel. Some agribusinesses like WesFarmers, Elders, Landmark, and CRT etc would be very worthwhile having on board. There are some strong private consultants that have a major impact in high rainfall areas. CMAs you have mentioned and if you can get them involved they currently have heaps of money (depends if you can get them to think this is a good investment, but that should be possible).

You cover the need for coordination and cooperation. Obviously this is going to be critical. Maybe a meeting of Dept DGs, CEOs of keys other organizations and then when they all agree it will be easier to organize further down the line.

Getting agreement on what are key issues to attack, both at national, state and local level will be a challenge. And as you indicate an inclusive approach to this is going to be the only way it will work. For example some groups will nominate a given weed as the major issue. Others will say a given type of pasture with given management is the way to go rather than being too concerned about a given weed.

There already are a number of very good publications out and coordinating these and perhaps badgeing under the one label would be great.

It should be possible to marry productivity with NRM outcomes (including weeds) for most of the problems identified. You identify this as a very important area and I couldn't agree more.

Courses like weed identification, weed management etc could be a very important part of a successful campaign. There are good institutions, like Tocal, Tamworth Research Centre, that have good facilities and staff good at putting together appropriate short courses for a variety of clients.

Your comment about media involvement is great, but may be difficult to achieve. They perhaps are best approached by supplying good stories, kept in regular touch, and invitations to relevant functions and meetings.