

# final report

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## Facilitation of Weed strategy workshop

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**Abstract & executive summary**

A weed strategy is required to support RD&E investment. A workshop with producers, advisors, researchers, DAFF and other RDC representatives reviewed a discussion paper and provided feedback on that paper to inform the investment strategy. This report captures the output of the workshop.

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# 1 Objectives

By August 30, 2012 to have:

- Reviewed summary briefing documents provided by MLA on weed RD&E
- Based on the “strawman” discussion paper (supplied), design and implement a workshop program to identify an agreed investment framework for weed investment
- Identified strengths and weaknesses of the framework considering technical, geographical or weed related issues, and justification for individual organisational preferences and the proposed structure(s) including risk associated with each structure
- Draft a report from the workshop, collecting the workshop input and final recommendations
- Seek participant feedback on the report, update and submit to MLA

# 2 Methodology

A discussion paper was developed (See B.WEE.0010) and dispatched for review by producers, advisors, researchers and DAFF representatives.

That background paper was discussed at a workshop, and then updated to be the basis of a weed investment plan, from which MLA can commence investment.

# 3 Workshop aims

- To develop a weeds investment framework for the Grazing Industries that will enable the vision (in Discussion Paper) to be realised;
- To identify the next steps / work required to start the investment plan process; and,
- To identify lead organisations who will progress development of each work area.

# 4 Results

## **MLA Weeds Investment Planning Workshop Facilitator’s REPORT Wednesday August 8, 2012.**

Venue: Stamford Hotel Sydney Airport.

*Please note – the following notes are the facilitator’s summary of the main discussion points raised in each session. There is a separate, companion document that contains a revised Weeds Investment Framework based on this workshop.*

### **4.1 Session 1: Welcome and workshop context**

Cameron Allan

*Main discussion points:*

- Weeds are a priority in the national beef and sheepmeat RD&E strategies. PISC agencies and MLA have “signed-up” to implement these strategies. The national RD&E framework seeks to address researcher fragmentation, duplication and competition
- A “Team Australia” approach is required, recognising capacity and capability between partner organisations. The plan is the first step

- Development by participating agencies of the plan, projects and forming project teams is required
- What is the MLA investment in weeds R&D? In Southern Australia - ~\$1M/Yr available as part of feedbase program; Northern Australia – ~\$8-900k / yr. The focus now for the north and south, is work up opportunities and define priorities, rather than being worried about the budget available
- Need a coherent plan rather than just individual projects.
- Higher level?
- Is there a plan to have a northern Aust feedbase plan?
- Vision – why “**leading**” producers? – some producers are impacted by weeds of others / neighbours – how will this relate to them? A lot of landholders take no interest in weeds at all – how will this relate to them? Should this be just about producers – or also their neighbours (wider landscape?)?
- How do you plan to link research / development / extension?
- What should be the role for Incentives and regulation? What should be the emphasis between these two? Suggestion that it would help in developing this weeds investment framework that we should separate legislation from production aspects – there are other avenues to look at legislation.
- How do we get “lifestyle” farmers to act on their weeds?.
- But – how engage more effectively / how do we get those who have little interest in weeds to act responsibly?
- Extension message has to fit the target audience!
- How can we align other research groups and sectors (local government, Catchment Management Authorities, etc) to provide a landscape approach? How will this framework relate to other Plans such as National Weeds Strategy? Weeds of National Significance? State plans for Noxious weeds? Specific information on individual weeds?
- The framework should be Producer Centric – there is a need for more talking to producers - researchers must have a lot of producer engagement – importance of the relevant context – each producer and their farm / paddocks are unique. The researchers will need to understand how producers perceive weeds and what will help them take ownership of problem and act on it!
- Prevention of spread needs to be part of this framework.

## 4.2 Session 2: Overview of ‘strawman’ investment framework

Warren Mason

*Discussion:* a) *initial reactions to what the strawman investment framework proposes?*

- Think that you need a broader landscape approach in the strawman – for example, there is nothing re – invasiveness of weeds – not only your property / need to help producers look at what is going on in the broader landscape.
- Could consider two approaches in the framework – i) widespread weeds on your own property; and ii) invasion by weeds / from outside (could be research into weed ecology - why is invasion occurring in the first place? Might be external factors not just the producers management practices).
- Where does weed seedbank management fit in this framework?
- Need to emphasise that this is an opportunity to build on the “weeds first” approach we have had for a long time – see this as leveraging the work to date.
- Potential risk – too ‘airy fairy’ and theoretical if we cannot also create the human knowledge base required and link this knowledge to the producers.

- Several feedback comments indicated - Refreshing, practical approach – endorse the approach!
- Framework is good in that it recognises each property / producer is unique.
- Need to acknowledge that noxious weeds are not separate / but can get higher priority → framework should include the need for producer/s to prioritise weeds and relevant actions. How can the current regulation / penalty system relate to this framework?
- Concern – we have a lot of existing RD&E - we must recognise this and not reinvent information that already exists → but there could be a need to repackage some information – if we have a better understanding of how producers perceive and make decisions on weeds.
- In some areas we already have all the tools for weed management but are constrained by our ability to engage and deliver – in this framework - how will all weed tools interact and align together across the various producer situations / across years?
- How can we get social science research to stimulate wider community participation in delivery – when we need a production focus?
- Greater emphasis should be on farm managers – their priorities and resources available, knowledge and skills.
- Social responsibility (lifestyle properties). How might you include incentives to control weeds?

*b) work through the OUTPUTS and identify which aspects we agree with / suggest be modified / suggest replacement components.*

*Main discussion points:*

Output (i) This is also about emerging / unknown weeds surveillance, eradication and containment – ie, needs to include high level risk assessment / identification of threats.

Has to be Industry focus not just producer focus.

Lot of information already available, eg endemic weeds, therefore we need RD&E to fill the gaps – information has to be driven by end-user needs.

Suggested re-wording – **“technical knowledge about weed ecology, impacts on pasture and animal performance for weeds of importance (or potential importance) and control / management options”**.

Output (ii) Add a grazing system approach – what pasture composition we want / management plan needs to consider desirable pasture species not just weeds! Critical to look at both long and short term and within and between years – there is a need to understand monitoring thresholds / targets for when you need to act on weeds (links to Output (i)).

Not all weeds are equal! Need to have a process for prioritising.

Needs to include a whole farm / systems approach to management.

Output (iii) **Tools** and knowledge – what will these tools look like? Do you mean a decision tree? This output may not be as high a priority as the other outputs (a lot already exists)?

Suggest we emphasise MECHANISMS (rather than tools) that bridge the gap between weeds research and the practical management of grazing systems (and any gap between researchers and producers) – and that these need to be for producers and others (eg. advisors, other land managers).

Output (iv) Need ethnographic research – information presented in way end-user will accept and act on.

What might be an incentive in this area? But this varies across producers – traditional / lifestyle / etc. – need to account for this variation.  
Does the concept of Social responsibility fit in this output?? Note that peer group pressure is not always effective.  
Can legislative control work in this area?

*c) work through the STRATEGIES and identify which aspects we agree with / suggest be modified / suggest replacement components.*

*Main discussion points:*

Strategy [A] This is not really a R&D strategy – but MLA needs to take on board and act on this – needs a role definition; need to explore synergies with other sectors and plans (but still la question of who will implement or act in this area??)  
This strategy is about alignment and links – need to include all States; other funding bodies and information sources / investment in this area needs to be cognisant of what others are doing (and aim for synergies or leverage)!

Strategy [B] principally an Extension strategy; huge challenge; will have to embrace private and public providers – could be achieved via a system like a livestock research group or committee (that might include other interested parties) – such a group could act as a feedback loop between producers and researchers.  
What can we use or learn from some of the existing mechanisms (eg in North)??  
How do you engage with those who do not act on their weeds? Challenge is - What can we do better or differently to link weed RD&E with livestock producers?  
→ need to have strong links to Output (iv).

Strategy [C] This could be split into two related areas of RD&E:  
Ci – focussed R&D on the needs of producers / end-users as to where and how weeds fit in their decision making and farm management – how they make decisions / what are their business aspirations and priorities?  
Cii – focussed R&D on weed ecology, the relative impacts of weeds in farming systems on pasture and animal performance; and weed control / management options.

Strategy [D] Maybe – integrate with Strategy [B]. Assumption – producer – one voice. Discussion indicated that this “strategy” is more of a way to operate in the other strategies - (b) (ci) (cii) - that is, a means to an end! (not a stand alone strategy).

Strategy [E] See this as a “risk management” strategy – requires RD&E on weed spread mechanisms – but is more at the Industry level not just at the farm level.

General discussion – some people raise questions as to where in this framework is assessment / evaluation – it was noted that this is a given as part of the overall management and implementation of the framework.

*d) Refined investment framework*

**Vision**  
Better decisions being made on the properties of livestock producers because they have the tools and knowledge that allows them to tap into weed R&D (past and present) so as to prioritise, define and customise their livestock/pasture/weed management strategies into the context for which weed management is required.

**Outcome 2**  
Increased capacity and confidence of livestock producers to include weed management in the multiple strategies that are associated with grazed paddocks.

**Outcome 1**  
Increased profit from meat and wool production because of a lower impact from weeds in grazing systems.

**Outcome 3**  
Reduced risk of new weeds and/or increased weed burdens in grazed systems..

**Output i**  
Technical knowledge about weed ecology, impacts on pasture and animal performance for weeds of importance (or potential importance) and control / management options

**Output ii**  
Management plans based on outputs i and iv coupled with economic analysis appropriate to grazing enterprises

**Output iii**  
Mechanisms (knowledge, evidence, methods, compelling case) that bridge the gap between weed R&D and practical management of grazed systems.

**Output iv**  
Social knowledge about on-farm weed challenges, practices and attitudes to inform the development of a compelling case for adoption of improved weed management on grazing properties.

**Strategy A**  
Join with the major / national weed strategies and weed R&D funding arrangements.

**Strategy B**  
Develop effective processes and systems to link weed R&D with the needs of livestock producers.

**Strategy Ci**  
Focussed R&D on the needs of producers / end-users as to where and how weeds fit in their decision making and farm management

**Strategy Cii**  
Focussed R&D on weed ecology, the relative impacts of weeds in farming systems on pasture and animal performance; and weed control / management options.

**Strategy E**  
Industry specific R&D on surveillance & sleeper or emerging weeds likely to impact on the grazing industries.

**Projects**



### 4.3 Session 3: Form working groups for each Strategy. Use proforma to develop initial detail for each Strategy

*Task – to identify / describe the pieces of RDE / projects that need to be done – develop a plan of work, including:*

- *Broad methodology / approach / sequencing.*
- *Technical considerations.*
- *Links to other efforts and existing knowledge.*
- *Interdependencies with other strategies on the board.*
- *What capability is required – who could lead this strategy area.*
- *Indicative timelines and resources (if possible).*
- *Knowledge gaps we need to address and key researchable questions.*

#### **Strategy B) – Link R&D and Producers (engagement / link mechanisms)**

*Projects / activities:*

- 1a) Understanding producer / land manager information needs.
  - 1b) Research into getting existing knowledge adopted.
  - 1c) Research on barriers to adoption in different users; get background on what information exists already; and understand its usefulness / non-usefulness.
  - 1d) Need to be clear about how it will be adopted or delivery resourced.  
(2 or 3 projects at least)
2. Raise awareness of what exists.
  3. Appropriate resourcing to ensure there is a program of delivery – who implements / pays? (especially for difficult areas such as peri-urban landholders). Need to build in flexibility in delivery – we need to think outside the square – what can be done better / differently to what we have done in the past?; understand options for delivery to suit audience. Identify and train alternative trainers (in the absence of DPI).
  4. Flexibility of delivery – for regions and enterprise mixes. Who needs to deliver will vary depending on local needs, existing pathways and providers. No single system or approach but a suite of tools. Capability needs – identify people who provide service now and provide support. Capability in listening to the needs of producers and matching R&D to their needs.
  5. Concern at loss of extension and training and support → government and private. Question - does this need to be managed and resourced more centrally? Loss of IP / programs in decline with declining State resources. Resourcing public / private → felt maybe a role for intervention (by MLA).
  6. Opportunity to use local groups and networks – but need appropriate measures.
  7. Communication tools to help make the research real (eg pasture target compositions) and which embody the concepts on what are useful aspects to get people thinking and acting on weeds – eg. pasture target compositions; “my pasture”. Understanding (national audit) of regional weeds to understand distribution and likely impacts / spread.

## Summary

- Need to understand the existing programs available and people resources that are being / can be applied. Avoid duplication, build on existing knowledge.
- Realise you need flexibility in tools and delivery – differences in regions (they have different issues); differences in enterprises (different motivation / support / business model); differences in people and their motivations – access local groups; differences in support available. No single delivery agent.
- Research needs to be delivered through meaningful concepts, examples could include – “ideal pasture composition of my farm”; “weed maps” – user / farmer generated buy-in. Meet user needs and give user ownership.
- Resourcing / leadership – difficult because it varies with regions. Also withdrawal / decline in government funding. (Question, if you do not know, do not care about weeds why would you be paying for private advice?) welcome ownership / leadership on the issue.

### *Plenary Discussion and Suggested Improvements:*

- How do dairy producers approach?
- Identify coordination / drivers necessary for this to be successful.
- Some existing processes / information – how do you aggregate and incorporate these with new information and approaches?

### **Strategy Ci) – Focussed R&D on need of producers / end-users.**

Boundary / scope – 3 agri / ecological zones (rangelands / cereals / high rainfall zone) by a range of production systems.

Project 1 – Desktop – what has been done on “decisions”? what has been done on motivating change? → in agriculture and other industries. Determine what cells in the matrix can be filled. If not, go to next project.

Project 2 – Social research on motivations and decisions.

Target audience – producers / advisors.

Collect metadata – age / education / farm size / equity / etc.

### Questions –

- What decisions are required in livestock production and land management?
- What weed related decisions are made?
- What information is need to make weed management decisions?
- What motivates actions on land management?
- Where do weeds generally “fit” on your farm?
- What do you do on the farm – annual management cycle?
- What are the barriers to weed action on your farm?
- What is your image of the ideal pasture?
- How do you prioritise your management actions?
- etc

Outputs – database of information; analysis; identify the motivators and decision making systems that need to be used to deliver R&D outcomes.

Capability required – social science with agricultural experience. Use a variety of methods (intensive / phone / focus groups etc). Access livestock producer groups / agents to arrange engagement.

*Plenary Discussion and Suggested Improvements:*

- There is already a lot of existing information on what motivates producers and what barriers they have to adoption – how will this project differ? (see UNE project)
- Need to work on segmentation of producers to help delivery – allow for differences in capacity / triggers / **barriers** to motivate change.
- What scale can this project operate at? How many producers do you hope to change??

**Strategy Cii) – Focussed R&D on weed ecology, relative impacts of weeds on farming systems / pasture and animal performance; weed control options.**

Projects –

- Bio-control.
- Changing weed spectrums in response to pastures / grazing systems.
- Some management strategies for different systems.
- Need to understand where on the spectrum the cell / rotational system provides benefit.
- Social research.
- Understanding weeds (not just a weed) in competitive systems.
- Toxic and native weed impacts.
- Herbicide resistance and using rotations to manage increase in resistance and sustain existing use.
- Managing perennial / native grasses.
- Changing climate, and weed succession – links to new incursions. Catastrophic events.
- \*\* (key project) Relative impact of weeds on pastures / livestock production for landholder.
- Prioritisation / social education – seen as a priority; includes what are threshold levels and trends.

Gaps –

- Some assumptions about common knowledge.
- Specifics about MLA production in general weed survey.

Approach and Priority –

- Audit of where we are – need to audit every bio-climactic system – structured approach.
- Survey – state of knowledge for – researchers / extension / producers.
- Spatial modelling to understand where the major risks are (links to priorities, etc) for weed infestation and land use / animal behaviour.
- Prioritise what species are targets for bio-control for MLA (possible links to what weeds might be joint targets).
- Projects may need to be done in multiple regions.

Capabilities –

- Pasture scientists.
- Producers – for participatory research in different zones – addresses multiple regions.
- Current workshop participants.
- Bio-control – LWA project Paynter 'Prioritising bio-control' report on prioritising bio-control.
- Focussed workshop with MLA (bio-control researchers – identify key species).
- Audit – desktop study. MLA subcontract out to organisations with capacity and reputation to deliver.

- Surveys – include desktop of existing work and MLA subcontract out (as above).

Links – GRDC and RIRDC (other RDC) audit and surveys.

Other considerations? What research has been done in the last decade that has produced best results? –

- Bio-control success.
- Some existing management strategies and tools (in northern zone mostly single weeds)?
- Changing weed spectrums in response to pasture systems.
- Southern systems – need to understand cell / rotation grazing systems better (end-user reiterated need to understand where on the spectrum the “on-off” management gives best return).
- There are some assumptions about common knowledge and need to understand how to manage one or more weeds in a competitive system.
- What about toxic weeds and natives?

*Plenary Discussion and Suggested Improvements:*

- Need to also consider trends – those leading to thresholds.
- What is the role for spatial modelling?
- Councils / CMA's – have catchment condition information – how might you relate to this?
- Superimpose weeds on pasture base.
- Lack of information on DESIRABLE pasture composition??

*Note – discussion on Strategy A) indicated that this was about linking MLA with other key organisations working on weeds, that this needs to happen but may not require specific projects to be developed. The workshop also highlighted the need for the investment framework to contain monitoring, evaluation and communication strategies – as part of good program management.*

### **Strategy e) – Industry specific R&D on surveillance**

Potential projects:

- Develop a weed alert list for the grazing industries by NRM / IBRA regions (weeds not in Australia) and predictions under future climates  
– Capability CSIRO.
- Post border weed risk assessment in context of climate change  
– Capability State and Territory agencies.
- Examination of weed spread pathways mechanisms and probability of spread consider new mechanisms - containers, movement of workers  
– Capability ABARES.
- Potential use of mulches and barriers to deplete sleeper weeds and discredited areas  
– Capability DPI (Victoria).
- Adapting seed bank ecology to the grazing industries / each region (eg. adapting “Weed Wizard” tool of GRDC).
- Develop a national risk map for sleeper weed species based on ecology and frequency of co-occurrence

- Capability CSIRO.
- Practices at the on-ground level that minimise the off target impacts of grazing pasture species.
- Mechanical and other methods for reducing weed spread under mowing conditions.

Biggest Challenges –

- Selling the risk to the stakeholders.
- Demonstrating effectiveness.
- ‘Investing in the future’ argument.

Capability –

- Risk analysts / modellers.
  - Weed ecologists.
  - Agricultural engineers.
- Pilot sentinel sites for developing monitoring of weed spreads including the possibility of pollen monitoring.
- Capability DPI (Victoria).
  - Optimising surveillance methods for the grazing industries –liaise with other RDC’s / programs / NRM regions / Quarantine.
- Capability – CSIRO / ABARES.
  - Improved methodology for reducing weed seed banks and surveillance times. Investigation of growth hormones.
- Capability – DPI (Victoria).
  - Cross sectional risks arising from interference / movement of weeds, eg *Orobanche ramosa*.

*Plenary Discussion and Suggested Improvements:*

- Not for MLA alone – need to do with / through other organisations!

#### **4.4 Session 4: Next steps – Confirm the investment framework and identify activities**

- Specific projects areas will be extracted from the workshop output, and a request to the participants and others, to progress this work.
- As part of the national RD&E framework, MLA’s contribution can be to provide a consultant to work among partners to develop the work area. Agency contribution will be to work up the project detail.
- A “lead” agency will be required in particular work areas (at a Strategy or Output level)
- As part of the “Team Australia” approach under the national RD&E strategies, all inputs (human, financial and physical resources) into the work area will be required, to enable collective management of the weeds investments. That is, each partner can understand who else is, or is not working in a particular area, and so inform their investment decisions.
- Identify what work is required to further develop the strategies.

**Workshop Participants**

Jeanine Baker (DAFF)  
Bertie Hennecke (ABARE)  
John Thorp National Weeds Coordinator  
Sam Nelson RIRDC  
Warren Mason  
Cameron Allan

**Researchers**

Brian Sindel UNE  
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David McClaren (DPI Vic )  
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Hanwen Wu NSW DPI  
Bruce Mullan DAFWA  
Shane Cambell DEEDI NRM

**Private Advisors**

Stuart Burge  
Mike Stephens

**Producers**

Alan Malcolm Vic  
Andrew Wood NSW  
Jeff Hoffman Southern NSW  
Clare Hamilton Central NSW (also NSW Serrated Tussock project Coord)  
Tony Searle Northern Territory

## 5 UPDATED Investment framework following feedback from participants

### STRATEGY A) – JOIN WITH THE MAJOR / NATIONAL WEED STRATEGIES AND WEED R&D FUNDING ARRANGEMENTS

#### **Projects:**

*A1. Inventory of existing or recently completed projects that have direct relevance to the investment framework (ie the Outcomes and Outputs)*

- i) For weeds of significance of the grazing industries, what research has been done in the last decade, what has been produced, what has occurred?
  - a. What has produced the best results?
  
- ii) From weeds of significance to the grazing industries reports (Grice 2004; Thorpe 2012):
  - o What are the costs to industry?
  - o What do we know (management; ecology; biocontrol; delivery needs)?
  - o What are producers doing to manage the priority weeds?

#### **Partners:**

### STRATEGY B) – LINKING R&D AND PRODUCERS - ENGAGEMENT / LINK MECHANISMS

#### **Projects:**

*B1 Getting existing and new knowledge adopted by different users (producers/ advisors/ regulatory staff).*

- i) Evaluate new research and extension strategies including participatory research, partnerships (researcher/ advisors/ regulatory/ agribusiness), communities of interest (dealing with weeds in a landscape context).
- ii) Explore other novel research and extension strategies

**Partners:** NSW DPI (Wu); Clare Hamilton; Stuart Burge; UNE (Sindle); UTAS (Ireson); Mike Stephens; ABARES Social Science Program

### STRATEGY CI) – FOCUSED R&D ON NEED OF PRODUCERS / END-USERS.

*Ci1 Understanding producer / land manager information needs; inventory of current approaches.*

- i) Audit of where we are – knowledge base of producers, researchers, extension staff, regulatory officers - need to audit every bio-climatic system – structured approach
- ii) Existing programs and people resources that are being / can / should be utilised
- iii) Document usefulness / non-usefulness of existing programs / processes

**Partners:** CSU/NSW DPI (Weston/ Wu); Clare Hamilton

Boundary / scope – 3 agri / ecological zones (rangelands / cereals / high rainfall zone) by a range of production systems.

*Ci 2 – Social research on motivations and decisions.*

Target audience – producers / advisors.

Research on barriers to adoption in different users

- i) Document what information exists already; and understand its usefulness / non-usefulness. Link with inventory project from Strategy A.
- ii) Desktop study – what has been done on “decisions”? What has been done on motivating change in agriculture and other industries.
- iii) Determine the ‘needs’ of the end user to make a compelling case
  - a. What decisions are required in livestock production and land management?
  - b. What weed related decisions are made? What information is needed to make weed management decisions?
  - c. What motivates actions on land management? Where do weeds generally “fit” on your farm?
  - d. What do you do on the farm – annual management cycle?
  - e. What are the barriers to weed action on your farm?
  - f. What is your image of the ideal pasture?
  - g. How do you prioritise your management actions? etc

Outputs – database of information; analysis; identify the motivators and decision making systems that need to be used to determine how research output should be presented.

**Partners**

Drivers of practice change in land management (ABARES Social Science program; DAFWA; CSU, NSW DPI)

**Strategy Cii) – Focussed R&D on weed ecology, relative impacts of weeds on farming systems / pasture and animal performance; weed control options.**

*Cii 1 Relative impact of weeds on pastures / livestock production for landholder.*

- i) Audit of where we are – need to audit every bio-climatic system – structured approach. (CSU/ NSW DPI, DAFWA)
- ii) Identify expected financial and ecological outcomes through medium term management programs (DPI Vic)
- iii) Thresholds for decision making on farm and informing a weed impact calculator/prioritisation/management tool on the web (UNE)
- iv) The weed functional group outputs could be made available to producers via an interactive WEB site enabling farmers to use the STELLA weed modelling tool to assess how management options are likely to impact on their situation (DPI Vic)
- v) Grazing trials (different stocking rates / intensity / frequency) that demonstrates the impacts of weeds as well as the importance of maintaining a healthy pasture, grazing approach, grazing approach (use of remote and precision tools?) (QDAFF McKenzie /UNE Sindle)
- vi) Management studies of weeds in differing production systems (UNE, DAFWA, CSIRO)
- vii) Timing and seasonality of weed growth cycles and infestations (UNE Sindle), with impact on changing season / climate (DAFWA)
- viii) Develop models (ABARES – Invasive Spp, Quant Sci and economist teams; DPI Vic modelling of the weed population (eg STELLA models) which factor in production levels, weed levels and the benefits and costs of weeds and their control, to allow for determination of ‘threshold levels’ in various production systems, above which it is beneficial to conduct control



- ix) Adapting seed bank ecology to the grazing industries / each region (eg. adapting “Weed Wizard” tool of GRDC).
- x) Review- Toxic and native weeds; Relative impact of weeds on pastures / livestock production for landholder. ABARES
- xi) Audit of weed system linked to target weed categories, rather than specific weeds, for each region
  - o Deep rooted perennials (link to WONS - SLN); Unpalatable grasses; Broadleaf weeds; Opuntia weeds (link to WONS – Opuntia species); Woody weeds? (link to WONS – Box thorn); Wind-blown weeds such as fleabane, sowthistle, and prickly lettuce (NSW DPI)

*Cii 2 Spatial modelling to understand where the major risks are (links to priorities, etc) for weed infestation and land use / animal behaviour.*

- i) DEHAAN/WESTON CSU (aerial imaging/spatial modelling)
- ii) VIC DPI Weed Risk assessment team has developed a spatial model (serrated tussock); ABARES Spatial modelling (using MCAS-S) - spread pathways / points of entry for new/exotic weeds (link to surveillance)

*Cii 3 Prioritise what species are targets for bio-control for MLA (possible links to what weeds might be joint targets). –*

Partners

- i) Vic DPI to requested to lead this project
- ii) CSIRO – Shepard
- iii) CSU – Weston
- iv) Vic DPI - developed a biological control project investment prioritisation system. Initial candidates - Silverleaf Nightshade, Chilean needle grass (pending outcome of application to introduce, mass rear and release the rust fungus, *Uromyces pencanus*), Serrated tussock, Spear thistle.
- v) Queensland DAFF – Palmer and Dhileepan
- vi) ABARES - Prioritisation of biocontrol R&D projects use the ‘biocontrol prioritisation tool’

*Cii 4 Continue to implement biological control programs on several priority weeds (Queensland DAFF)*

### **Strategy e) – Industry specific R&D on surveillance**

Potential projects:

- Develop a weed alert list for the grazing industries by NRM / IBRA regions (weeds not in Australia) and predictions under future climates
  - o for northern industry, could use NAQS list. May need updating (last update was done in 2007).
  - o CSIRO / QDAFF.
- Improved methodology for reducing weed seed banks and surveillance times. Investigation of growth hormones (DPI Vic).
- Surveillance/detection research at the farm level. How can a grazier ensure they detect new weeds on their property? (UNE Sindle)
- Practices at the on-ground level that minimise the off target impacts of grazing pasture species
- Develop a national risk map for sleeper weed species based on ecology and frequency of co-occurrence (CSIRO; ABARES)

- Optimising surveillance methods for the grazing industries –liaise with other RDC's / NRM regions / Quarantine - CSIRO / ABARES.
- Pilot sentinel sites for developing monitoring of weed spread including the possibility of pollen monitoring. – DPI (Victoria); ABARES.
- Examination of weed spread pathways mechanisms, cross sectional risks arising from movement of weeds and probability of spread; consider new mechanisms - containers, movement of workers. ABARES; QDAFF (Scanlan)
- Post border weed risk assessment in context of climate change
  - a. State and Territory agencies.

**Other stated work areas:**

DPI Vic

Weed control options – weed eradication - DPI Vic lead

- Control of weed seed banks (weed eradication and weed resistance issues). Essential oils and carbon for weed seed bank control (see extended abstract - McLaren).
- Investigations into suicidal seed bank germination (growth hormones, karrikinolide (**smoke water**)).
- Research in use of mulches and barriers to prevent weed spread and control weed seed banks.
- Artificial seed aging to determine potential weed risks of new weed incursions.