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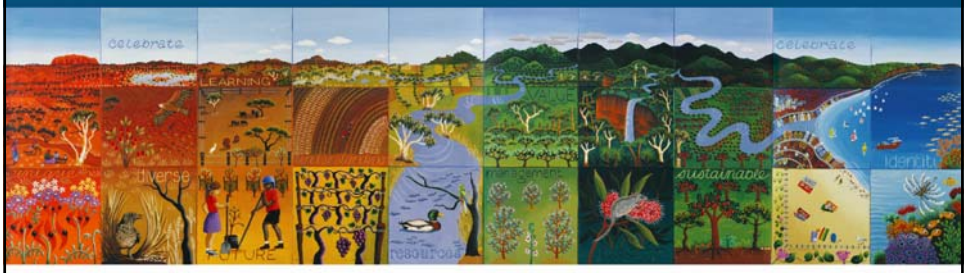
Innovation in the knowledge system supporting Australian agriculture

Andrew Campbell 8 November 2006



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Outline

- Knowledge for Managing Australian Landscapes
- Improving the agriculture and NRM knowledge system
- Zooming in on research and extension
- Understanding the manager perspective
- Some innovations
- Take home messages

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- One of 15 Rural R&D Corporations and related companies - Statutory Authority (PIERD Act 1989)
- research to support sustainable resource management
- we buy, broker and manage research, we don't do it
- managed corporately, independent Board (CAC Act)
- $12.8m appropriation; ~$33m R&D spend (2005-6)
- >30 co-investing partners
- We're in the knowledge business

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R&D Programs

- **Industries**
  - Sustainable Irrigation
  - Grain & Graze
  - Managing Climate Variability
  - Land, Water & Wool
  - Healthy Soils
- **People**
  - Social & Institutional
  - Indigenous projects
  - Land & Water Resources Audit
- **Landscapes**
  - Tropical Rivers (TRACK)
  - Environmental Water Allocation
  - Riparian Lands
  - Native Vegetation & Biodiversity
  - Agroforestry (through RIRDC)
  - Weeds
- **Innovation**
  - Innovation Call
  - Scholars & Fellows

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NATIONAL PROGRAM FOR
Sustainable Irrigation
healthy soils
for sustainable farms
An initiative of the Natural Heritage Trust
LandWater & Wool
Shaping the future
Australian Government
Land & Water Australia
another innovation
MANAGING CLIMATE VARIABILITY
R&D PROGRAM
Grain & Graze™
Profit through knowledge
Visit www.lwa.gov.au and check out our stand here at Fenner


Context:
we need farming systems that are
• diverse, resilient, well-buffered, anticipatory, flexible, responsive, opportunistic
• highly tuned to a variable climate
• optimally leaky
• much more profitable
– eg. twice the production from half the area with quarter the water
• integrated into regional economies
• plugged into new transformative sciences
– nanotech, robotics, photonics, nutriceuticals etc
• attuned to lifestyle aspirations (especially of younger people)


Context:
An equally challenging policy agenda
• clarifying property rights & responsibilities
• sorting out the planning hierarchy
• setting minimum standards
• defining the environmental deliverables
• striking the right balance between:
– Insufficient incentive
– Paying too much for too little
• best-practice regulation
• informing and regulating markets
• monitoring and evaluating impact and ROI
• new institutions at catchment/regional scale
• vertical integration of governments (fixing the knowledge system)


The 'public good conservation problem'
Simple in theory: balance social equity and economic efficiency in delivering defined conservation outcomes
• Equity: the costs of achieving conservation outcomes should be shared fairly
– Spatially: e.g. urban/rural; upstream/downstream
– Through time: adequate long term support arrangements – costs to farmers & others of managing for conservation are real and on-going
• Efficiency
– Use public funds effectively and at least cost to public and private economy
– Minimise perverse or unintended impacts and costs of public interventions
Very difficult in practice
Demands clever integration of knowledge (quantitative ecology and social sciences) into policy (agree with Andrew Young on relative R&D $$)

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Knowledge for Managing Australian Landscapes

Serves three main purposes

- To help managers, planners and policy makers make better decisions
- To support the innovation process
- To help us learn as we go along

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Knowledge

- **Knowledge happens between the ears**
- Not to be confused with data, information or wisdom
- An individual cognitive process and highly contextual:
  - *"I only know what I know when I need to know it"*
- Revealed in artifacts (writing, art, formulae, products etc), skills, experience, rules of thumb and natural talent
- Across quite different domains:
  - Including local, indigenous, scientific, strategic
- people default to known, trusted sources:
  - credibility, dialogue, honesty all critical in a source
  - timing is crucial: knowledge is most useful when it is needed, in context

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The Australian Agriculture and NRM Knowledge System

- No-one set out to build such a system, but we have one, we invest a lot in it (>$1B/yr), and we need to start considering it as a system
- It currently has pockets of genuine innovation but overall is not as purposeful or cohesive as it could be
- Its overall performance is patchy
- **for more detail & recommendations see Campbell (2006)**

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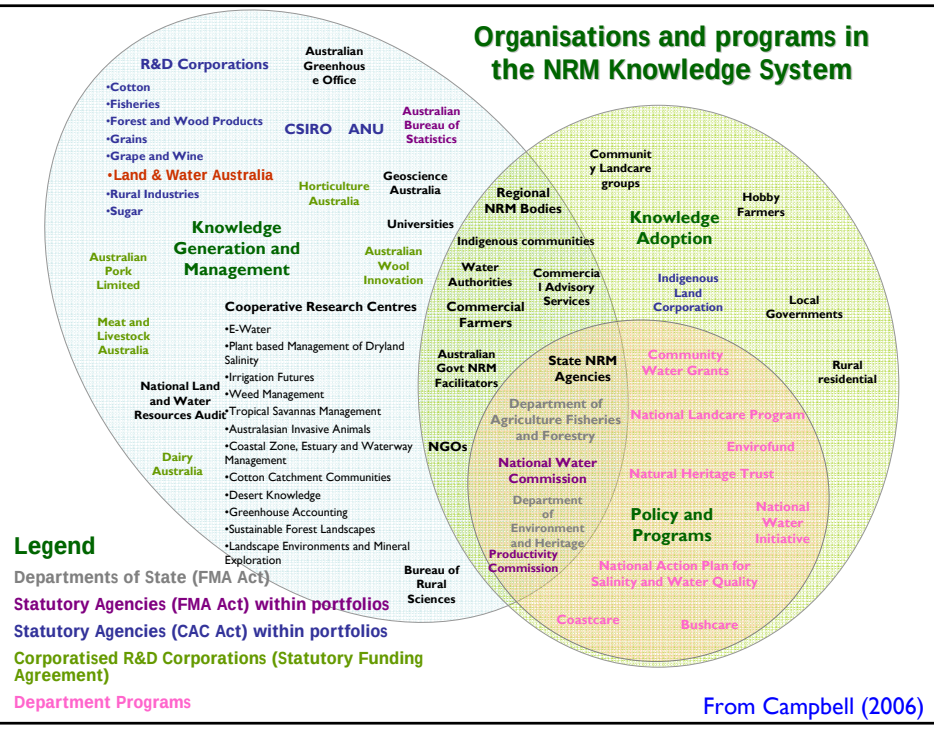

From Campbell (2006)

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Analysing
the Australian NRM Knowledge System
- some good stuff – macro level

Lots to like about Australia's current approach to sustainable agriculture and natural resource management (NRM):

- Agreement on the big issues & need for coordinated, 'joined up government'
- Unprecedented commitment from PM down, reflected in CoAG agenda & $$
- Primary industries increasingly seeing NRM as their business (if not yet 'core')
- Grassroots farmer and community participation – Landcare a great platform
- Hard issues like property rights finally on the table
- Innovative measures to allocate resources – e.g. Bush/Plains Tender
- Australia leading in new approaches to landscape ecology that recognise that landscapes are socially constructed and people are integral
- Vibrant NRM research scene, rural RDC model, some exciting CRC work and some outstanding researchers

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The NRM Knowledge System
- some good stuff – micro level

- **www.aanro.net**
  7,000 current projects, 200,000 completed reports, 90 websites
- Corangamite CMA knowledge strategy
  - Integrates local 'grey literature' with AANRO through **www.ccma.vic.gov.au**
- Farmer-driven groups like Birchip, Kondinin & many others
- Vic Steffensen's Indigenous knowledge work (recording traditional knowledge) through Balkanu on Cape York and now much more widely
- LWA's Knowledge for Regional NRM project
- Clearwater (Victorian EPA, MAV, Melbourne Water joint venture)
  - **www.clearwater.asn.au**
- and countless more….. but how would you find them…

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Knowledge
for the Regional Model

- The knowledge needs of regional bodies are varied
- But there is lots of scope for learning across regions
- And great potential to work with different knowledges
- Need to build more memory and long term learning into the system as a whole, while keeping focus on improving decisions:
  - assuming continued short contracts and high turnover
  - getting the data and information issues right
  - meaningful monitoring and evaluation
- Assisting intermediaries **(facilitators, coordinators, advisers, consultants etc)** to tap into best available people & information

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The regional model: an integrated approach

- The regional model is a world-leading effort to implement sustainable NRM at a landscape scale: it's also a grand experiment
  - **Devolve decision making & resource allocation to appropriate scale**
  - **Tap into and build on deep local knowledge and connection to place**
  - **Work across issues and industries in an integrated way**
- integration means making whole
  - **across scales, issues, land tenures and land uses**
  - **in the users' context**
- BUT: Developing new institutions takes time
  - **Old institutions don't necessarily make way**
  - **Let's try to hang on to the good bits of previous models**
- Remember that on-ground change happens mostly on-farm

Adoption reality check

- Old adoptability rules still apply (Pannell et al 2006)
- Economic & regulatory signals remain weak
- On-farm change is more likely where innovations:
  - Offer relative advantage over existing systems/approaches
  - Are not too complex
  - Can be trialled, tested and evaluated (preferably on a modest scale)
  - "Fit" with the farmer's outlook, capacity and farming system
  - Offer good returns within a reasonable timeframe
- But relative advantage can be defined in interesting ways….

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A farmer perspective

Too many policy instruments remain prescriptive

Farmers have a strong sense of place, built on generations of land management.

Partnerships with landowners, based on trust and respectful of their sense of place are an essential precursor to more successful approaches.

Tom & Cynthia Dunbabin, "Bangor" Dunalley, Tasmania, Winners of the 15th McKell Medal

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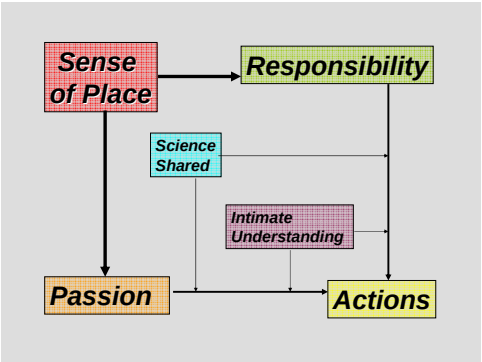
The Dunbabin Sense of Place Model



- **Farmers' strong sense of place drives environmental actions through responsibility towards, and passion for the place (farm).**
- **Shared knowledge (science, cultural history etc), and broader understanding of place, greatly helps in developing and implementing positive actions.**

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The Dunbabin Sense of Place Model (2)

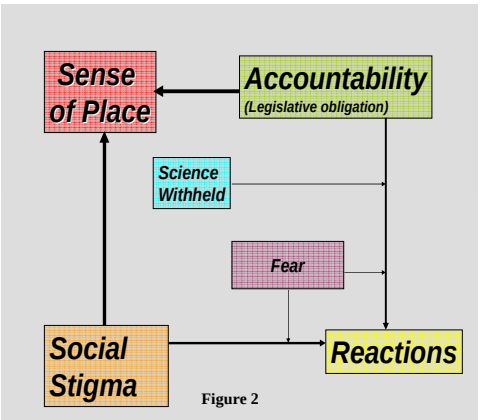

Figure 2

- When legislation, or other forced change impacts on the SoP of the farmer, responsibility becomes accountability and passion becomes social stigma - driving a negative reaction rather than a positive action.
- Measures such as stewardship payments have to be tailored in a way that strengthens the passion and responsibility that drive the positive actions.

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The Dunbabin Sense of Place Model (3)

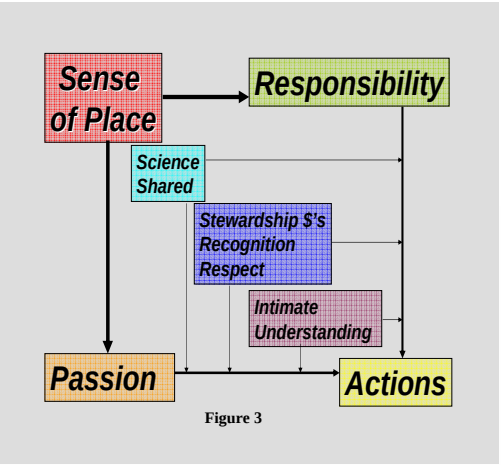

Figure 3

- well designed programs add to the effectiveness of the original model – not overturn it...
- There is no need to change the strong Sense of Place farmers have. It is far better to enhance that by adding additional values, values that are shared by the wider community.

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Sustainability

another form of relative advantage

- **Still a useful term – won't go away**
- Needs to be unpacked & grounded at farm and landscape scale
- Sustain what? Over what area? For how long? For whose benefit? As measured by whom?
- **SAGE farmers**
  - A group of leading farm businesses from across diverse commodities
  - Convened by LWA to look at how leading businesses understand and measure farm sustainability performance
  - Are working on a Farm Sustainability instrument panel

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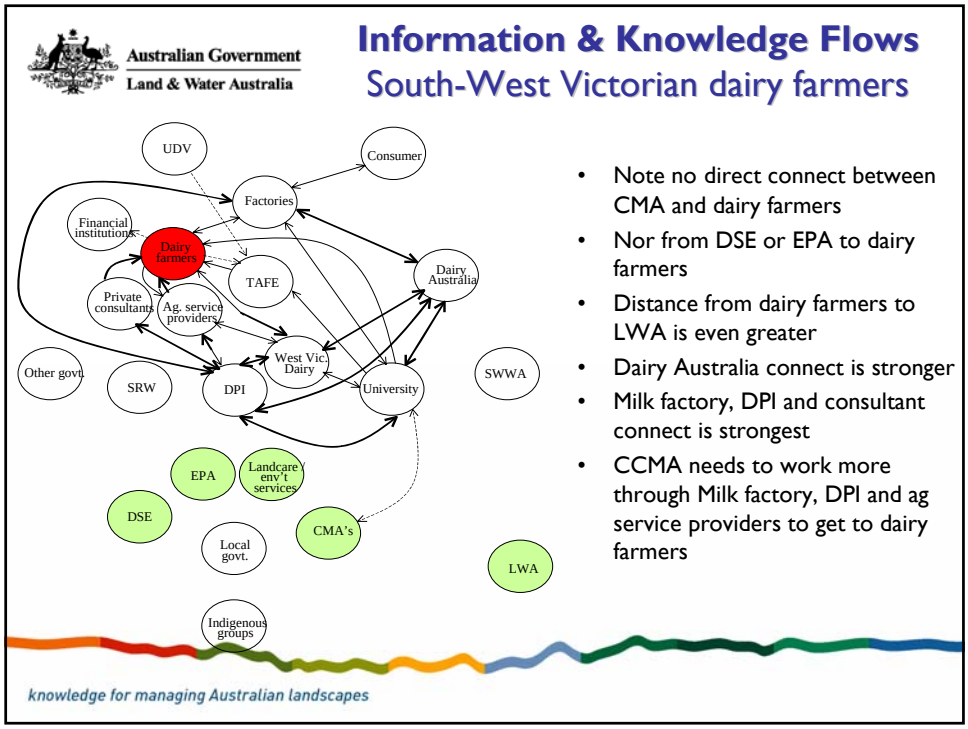
Sustainability Dashboard Concept
Environment
Financial
Social
Resource Stocks (Condition)
Efficiency
Management Practices
SOILS
GROUND COVER
N P K H2O
NET PROFIT
030
050
OWN
BENCHMARK
$/Ha/100mm
PERSONAL BUSINESS HAPPINESS
WATER USE EFFICIENCY kg/mm/Ha
NUTRIENT BUDGET (P)
OUTPUT
INPUT
PRODUCTION EFFICIENCY kg/Ha/100mm
65
$/Ha/100mm
STAFF HAPPINESS
10
AVERAGE YEARS EMPLOYED
ISSUE – REVEGETATION
TARGET
YEARS
PEAK DEBT: INCOME
0.8
ON/OFF FARM INVESTMENT
OFF FARM
ON FARM
COMMUNITY HAPPINESS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Information & Knowledge Flows
South-West Victorian dairy farmers
UDV
Consumer
Factories
Financial institutions
Dairy farmers
TAFE
Dairy Australia
Private consultants
Ag. service providers
West Vic. Dairy
Other govt.
SRW
DPI
University
SWWA
EPA
Landcare env't services
DSE
CMA's
Local govt.
LWA
Indigenous groups
• Note no direct connect between CMA and dairy farmers
• Nor from DSE or EPA to dairy farmers
• Distance from dairy farmers to LWA is even greater
• Dairy Australia connect is stronger
• Milk factory, DPI and consultant connect is strongest
• CCMA needs to work more through Milk factory, DPI and ag service providers to get to dairy farmers
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Regional NRM bodies say:

'Where is it and how do we get to it?'

"I'm aware of websites, but telling staff to look at a website is like being asked to go look at the National Library"

CHIEF CONCERNS among regional/catchment bodies

- Fragmentation of information sources
- Volume, Relevance and Accessibility of information
- Information sharing between regions, between States and between national organisations
- Two-way flow between regions and national organisations

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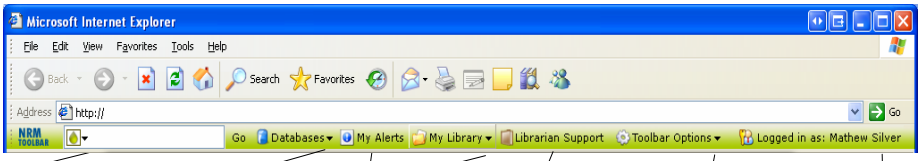
NRM Toolbar interface



NRM search
Google Australia
Organisation assets
Advanced

[Searches on selection]

☐ ***Square icon indicates which search engine is selected***

R&D Directory
This Worked Here!
Knowledge needs
Events and funding
Decision tools
Knowledge market report
Add / Delete databases

[Click name to open My library]

Click dropdown to view list of folders (Playlists) that stays open to allow drag and drop from search results

[Click to see current alerts plus access alert settings]

[Click name to see librarian services]

Includes form for requesting information from the librarian

My profile
Customise my toolbar
Update toolbar
Uninstall toolbar
Help
Contact us

[Click to logout or login as someone else]

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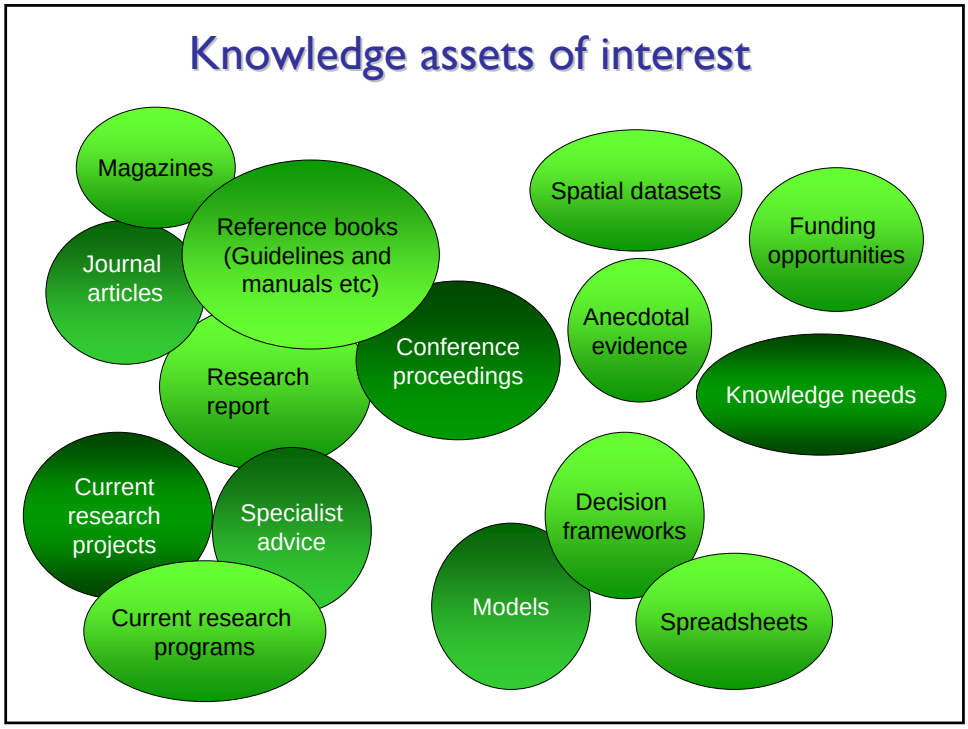
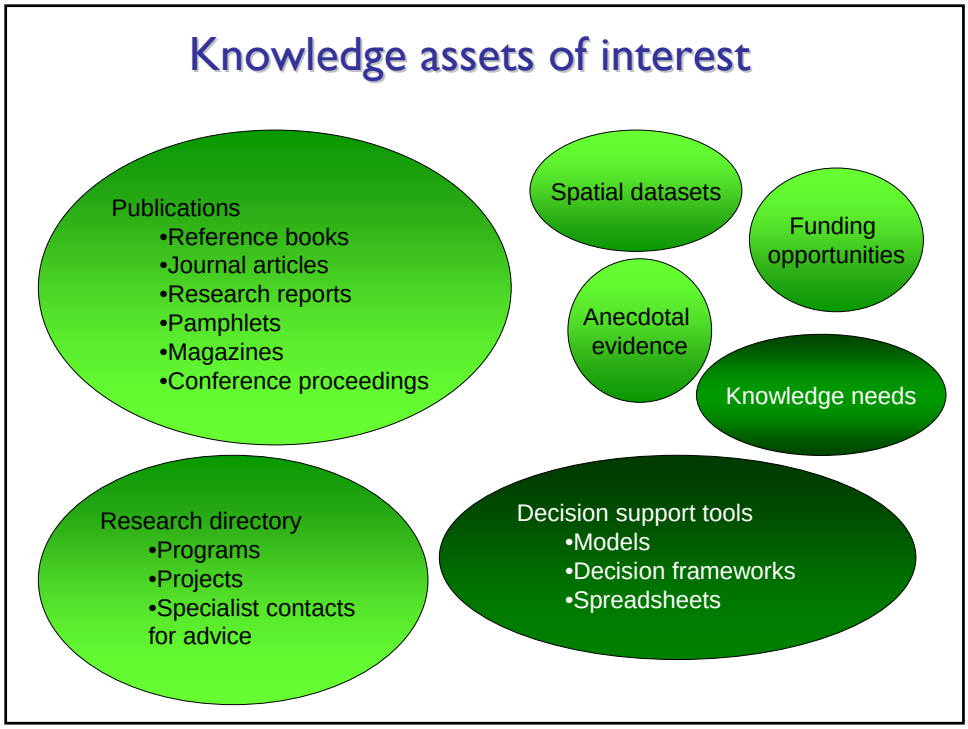

Knowledge assets of interest
Magazines
Reference books (Guidelines and manuals etc)
Journal articles
Research report
Conference proceedings
Spatial datasets
Funding opportunities
Anecdotal evidence
Knowledge needs
Current research projects
Specialist advice
Current research programs
Decision frameworks
Models
Spreadsheets


Knowledge assets of interest
Publications
•Reference books
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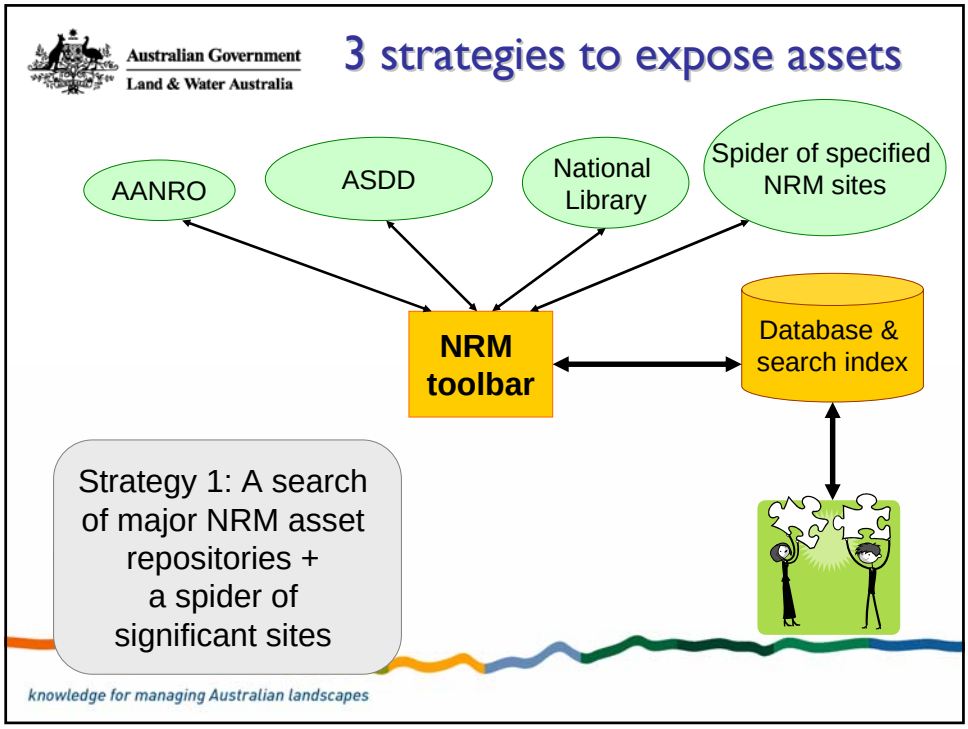
•Research reports
•Pamphlets
•Magazines
•Conference proceedings
Spatial datasets
Funding opportunities
Anecdotal evidence
Knowledge needs
Research directory
•Programs
•Projects
•Specialist contacts for advice
Decision support tools
•Models
•Decision frameworks
•Spreadsheets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3 strategies to expose assets
AANRO
ASDD
National Library
Spider of specified NRM sites
NRM toolbar
Database & search index
Strategy 1: A search of major NRM asset repositories + a spider of significant sites
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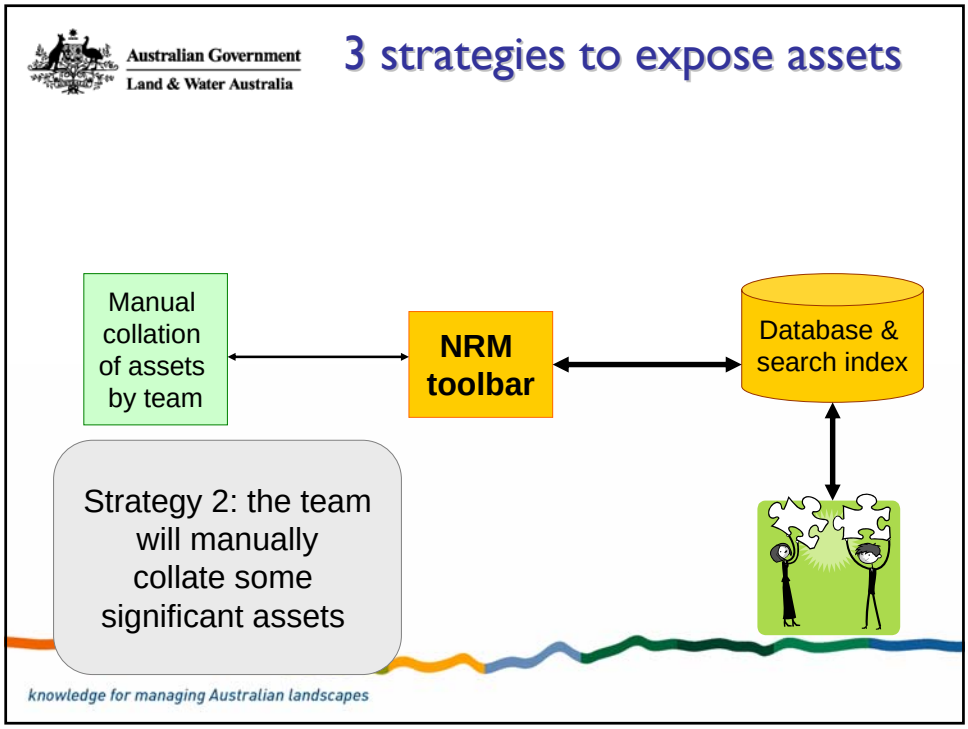
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3 strategies to expose assets
Manual collation of assets by team
NRM toolbar
Database & search index
Strategy 2: the team will manually collate some significant assets
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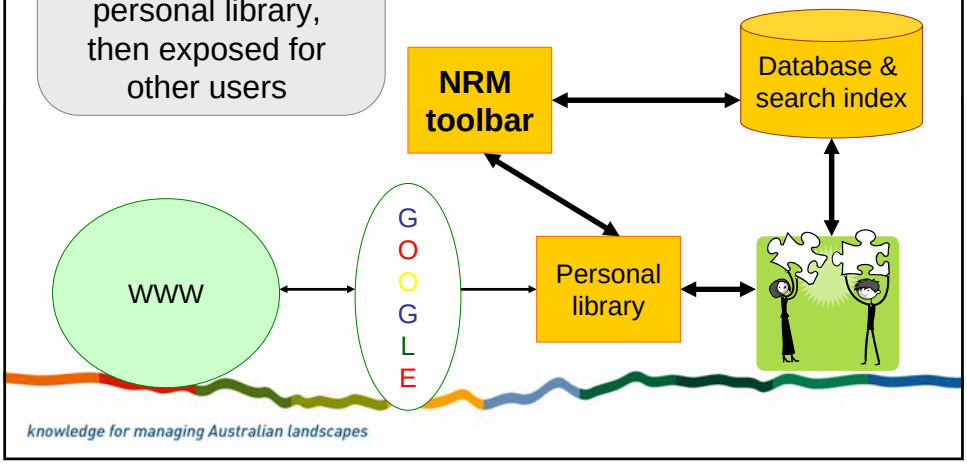
3 strategies to expose assets

Strategy 3: individuals search the www and add assets to their personal library, then exposed for other users



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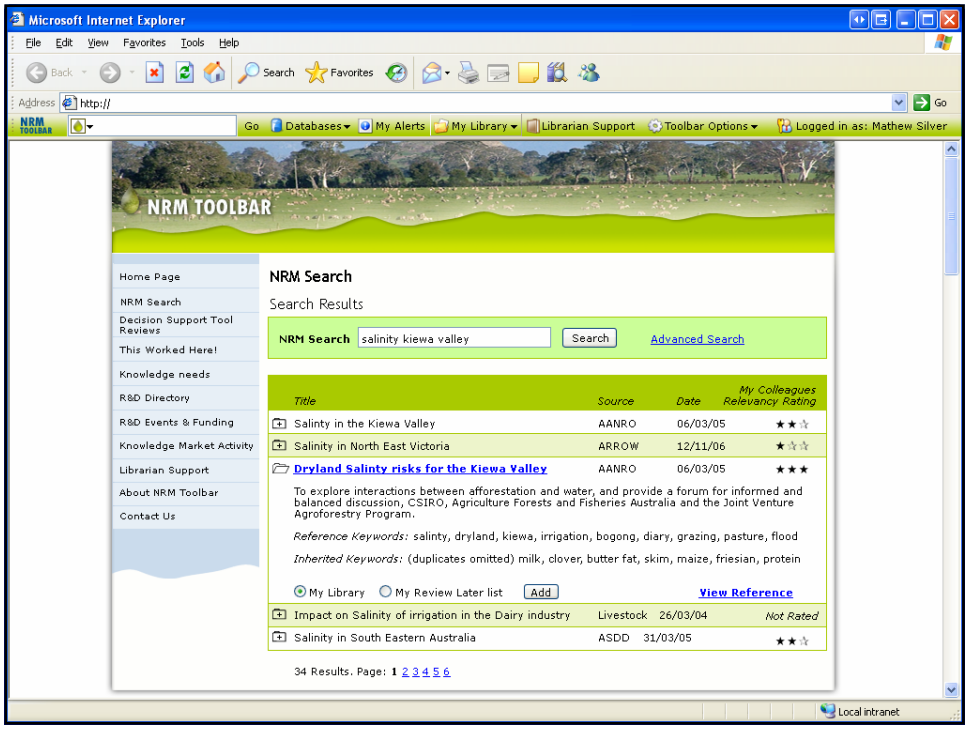

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Conclusion

- **Australia is doing lots of things right in sustainable agriculture and NRM**
- **But we could (and should) be doing better**
- **Better use of existing knowledges and a more systematic approach to innovation and learning is a key**
  - We are not learning from rich experience as well as we might
  - So decisions aren't always as well founded as they should be
  - We risk repeating mistakes
  - We are not innovating enough to generate novel, practical, profitable and adoptable solutions for farmer & other managers on a sufficiently widespread scale
  - But there are lots of isolated examples that point to promising solutions
  - And Rome was not built in a day…..

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Conclusion (cont)

- **We need to start thinking about the NRM knowledge system as a whole**
- **Work at the level of the whole system is needed**
  - To learn from and extend promising ideas
  - To make it more purposeful, cohesive and functional
- **This will be a great investment for Australia**

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