

**SRDC Research Project  
Final Report  
CSE009 Appendices**

**APPENDIX 6: PUBLICATIONS.....2**

## APPENDIX 6: PUBLICATIONS

### Book Chapter

- [1] Jakku, E. and Thorburn, P. (2008). A sociological analysis of the participatory application of agricultural decision support systems, In Hatfield-Dodds, S. Van Kerkhoff, L. and Proctor, W. (Eds) *Reflecting on integrated mission directed research: learning from experience in environment and natural resource management*, Elsevier IDEA series, in press.

### Referred Conference Papers<sup>1</sup>

- [2] Everingham, Y.L., Jakku, E., Inman-Bamber, G., Thorburn, P.J., Webster, T., Attard, S. Antony, G. (2006) Understanding the adoption of knowledge intensive technologies in the Australian sugar industry - a pilot study. *Proc. Aust. Soc Sugar Cane Technol.* 28:76-85.
- [3] Inman-Bamber, N.G., Attard, S.J., Haines., M.G. and Linedale., A.I. (2008). Deficit irrigation in sugarcane using the WaterSense scheduling tool. In: *Share the water, share the benefits. Proceedings of the Irrigation Australia Congress*, 20-22, May, 2008, Melbourne, CDROM.
- [4] Inman-Bamber, N.G. and Attard, S.J. (2008). Water savings and water accounting in irrigated sugarcane. *Proc. Aust. Soc. Sugar Cane Technol.*, 30 (in press).
- [5] Inman-Bamber, N.G., Attard, S.J., Verrall, S.A., Webb, W.A. and Baillie, C. (2007). A web-based system for scheduling irrigation in sugarcane. *Proc. Int. Soc. Sugar Cane Technol.*, 26, CDROM.
- [6] Inman-Bamber, N.G., Webb, W.A. and Verrall, S.A. (2006). Participatory irrigation research and scheduling in the Ord: R&D. *Proc. Aust. Soc. Sugar Cane Technol.*, 28, 155-163.
- [7] Inman-Bamber, N.G., Attard, S.J., Baillie, C., Lawson, D. and Simpson, L. (2005). A web-based system for planning use of limited irrigation water in sugarcane. *Proc. Aust. Soc. Sugar Cane Technol.*, 27, 170-181.
- [8] Jakku, E. and Thorburn, P. (2007) 'A sociological framing of the participatory development of agricultural decision support systems', *Proceedings of TASA and SAANZ Joint Conference 2007*, 4-7 December, Auckland University, Auckland, CDROM.
- [9] Jakku, E., Thorburn, P., Everingham, Y. and Inman-Bamber, G. (2007) Improving the participatory development of decision support systems for the sugar industry, *Proc. Aust. Soc Sugar Cane Technol.*, 29: 41-49.
- [10] Jakku, E., Thorburn, P. and Gambley, C. (2004) 'Sociological concepts for understanding agricultural decision support systems', *Proceedings of TASA Conference 2004*, 8-11 December, La Trobe University, Beechworth, CDROM.
- [11] Webb, W.A., Inman-Bamber, N.G. and Mock, P. (2006). Participatory irrigation research and scheduling in the Ord: Extension. *Proc. Aust. Soc. Sugar Cane Technol.*, 28, 164-172.

### Poster Paper

- [12] Jakku, E., Thorburn, P. and Gambley, C. (2004) Decision support systems for farm planning: a theoretical framework from the sociology of science and technology. In: *Proceedings of the 4th International Crop Science Congress*, 26 September-1 October, Brisbane.

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<sup>1</sup> Papers 6 and 11 were included in a previous SRDC final report (CSE007). Paper 7 was included in a previous SRDC final report (CSE001).

**Popular Articles**

- [13] Everingham, Y. and Jakku, E. (2005) Understanding the science-industry link, *Australian CANEGROWERS*, November 2005: 15.
- [14] Jakku, E., Thorburn, P. and Gambley, C. (2004) 'Developing decision support systems for farm management: A conceptual framework from the sociology of science and technology', *ExtensionNet*, 12 (1): 1-3.

**SRDC Research Project  
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**APPENDIX 7: WORKSHOP REPORT.....2**

## APPENDIX 7: WORKSHOP REPORT

### Milestone Report No. 9B

<b>SRDC project number:</b>	CSE009
<b>Project title:</b>	Moving from case studies to whole of industry: Implementing methods for wider industry adoption.
<b>Research organisation(s):</b>	CSIRO
<b>Chief Investigator(s):</b>	Emma Jakku Yvette Everingham Geoff Inman-Bamber
<b>Objectives:</b>	<ol style="list-style-type: none"> <li>1. Extend knowledge of the participatory technology development process to improve understanding of the adoption of complex technologies.</li> <li>2. Build understanding and application of complex and emerging technologies (climate forecasting and crop model based decision support tools) through case studies across multiple regions.</li> <li>3. Identify pathways that can potentially lead to the wider adoption of complex technologies.</li> </ol>
<b>Milestone number:</b>	No. 9b
<b>Due date for milestone:</b>	1.2.2008
<b>Milestone Title:</b>	Sharing experiences about adoption processes for complex technologies
<b>Achievement criteria:</b>	<ul style="list-style-type: none"> <li>• Project team to conduct workshop on adoption process of complex technologies.</li> <li>• Experiences of workshop participants documented.</li> <li>• Relevance and limitations of the CSE009 conceptual adoption model reported.</li> </ul>

## **Milestone Achievement:**

### **1. Project team to conduct workshop on adoption process of complex technologies.**

The project team conducted a workshop on the adoption processes of complex technologies on 30th August 2007. The workshop was held at CSIRO in Meiers Road, Brisbane. The workshop agenda and invited participants can be found in Appendix I. Appendix II contains the PowerPoint presentation made by the project team to the workshop participants. This PowerPoint presentation provided an overview of the theoretical framework that describes the participatory development process of complex and knowledge intensive technologies (e.g. decision support systems). Appendices III to V summarise information captured at the workshop that pertained to the experiences of the workshop participants and their perceptions of the theoretical framework. A workshop evaluation has been presented in Appendix VI. The feedback provided by the workshop participants about the organisation of the workshop was constructive and rewards the project team and facilitator for the time spent planning the day.

### **2. Experiences of workshop participants documented.**

Participants were asked to share their knowledge and experiences about adoption processes, models, frameworks and extension programs. Appendix III summarises the experiences and knowledge of each of the workshop participants in context of the application. The context varied among the workshop participants from NRM, whole of industry adoption, farmers, researchers and extension officers to name a few. In terms of adoption processes, it was clear that participatory approaches were commonly applied. This reinforced the importance of understanding the participatory development process.

### **3. Relevance and limitations of the CSE009 conceptual adoption model reported.**

The thinking hats technique was implemented to identify the relevance and limitations of the CSE009 theoretical framework. The full details of the thinking hats exercise has been summarised and is presented in Appendix 4. This exercise revealed that the CSE009 theoretical framework is indeed very relevant and useful to consider when addressing and describing the adoption of complex technologies (yellow hat thinking). It was clear though, that one framework will not work for all situations and the success of the adoption process is largely influenced by the boundary object and the skills of the facilitator (black hat thinking). Opportunities for further improving the theoretical framework exist and options for further testing the theoretical framework with other boundary objects and applications (e.g. fisheries, government planning) were recommended (green hat thinking). Appendix V shows that the overall opinion of the workshop participants regarding the theoretical framework was quite high.

## **Intellectual Property Issues**

Nil.

## **Communication and Adoption of Outputs**

This workshop was intended to be an exercise in communication and adoption of outputs from the project CSE009. Based on the encouraging feedback from this workshop however, further awareness-raising about the potential of the theoretical framework should be considered. Pathways for raising this awareness about the framework will be actively pursued by the project team.

## **Proposed variations**

Nil.

## **Personnel Changes**

Nil.

## **Confidentiality**

Nil.

## **Summary**

A workshop was conducted to gain a common understanding of the key elements needed to increase adoption levels of complex technologies. This workshop established linkages between the participants' and project team's thinking about adoption processes and provided an environment to critique the project team's thinking in relation to the theoretical framework developed as part of the CSE009 project.

A wide range of participants that included researchers and extension staff within and external to the Australian sugar industry attended the workshop. Organisations that were represented at the workshop included BSES, Canegrowers, Charles Sturt University, J&R Coutts Consulting, CSIRO, James Cook University and SRDC. The participants had expertise across a diverse range of areas that included – climatology, farming systems, facilitation, sociology, investment management, agronomy, extension, irrigation management, people management, soil science, mathematics, small business operations and private consultancy.

After four years of work, it was very positive and rewarding for the project team to finish on such a high note with the workshop participants endorsing the theoretical framework, the main theoretical output developed as part of the CSE009 project. The workshop also identified future research areas that would lead to an even more improved theoretical framework.

## **List of Attachments**

Appendix I: Agenda.

Appendix II: Presentation of theoretical framework by project team.

Appendix III: Experiences of workshop participants.

Appendix IV: Hats exercise.

Appendix V: Evaluation of theoretical framework.

Appendix VI: Workshop evaluation.



This Appendix contains the agenda for the CSE009 project workshop. Contact details for the invited participants, the project team and the facilitator have been provided.

### CSE009 Project Workshop

#### Exploring Adoption Processes for Complex Technologies

**Location:** CSIRO, Meiers Rd, Brisbane

**Time:** 8.30am - 4.30pm

**Date:** Thursday 30<sup>th</sup> August 2007

#### Workshop purpose:

- To gain a common understanding of the key elements needed to increase adoption levels of complex technologies.

#### Workshop outcomes:

- To establish linkages between participants' and project team's thinking about adoption processes
- To critique the project team's thinking in relation to the conceptual model developed
- To increase the communication flow between researchers with regards to adoption strategies for complex technologies.

#### Meeting outline:

1. Thoughts and experiences about processes for achieving adoption of complex technologies
  - a) Invited participants' thoughts and experiences.
  - b) Project team's thoughts and experiences.
2. The development of linkages between our thinking.
3. Where to from here? What do we need to do now, given how our thinking has developed here today?

**Invited Participants:**


Attended workshop	Name	Affiliation	Location	Email Address
yes	Dianna Maldonado	SRDC	Brisbane	<a href="mailto:dmaldonado@srdc.gov.au">dmaldonado@srdc.gov.au</a>
yes	Bianca Boseley	SRDC	Brisbane	<a href="mailto:bboseley@srdc.gov.au">bboseley@srdc.gov.au</a>
yes	Robert Troedson	SRDC	Brisbane	<a href="mailto:rtoedson@srdc.gov.au">rtoedson@srdc.gov.au</a>
yes	Jeff Coutts	J&R Coutts Consulting	Toowoomba	<a href="mailto:jeff@couttsjr.com.au">jeff@couttsjr.com.au</a>
yes	Jeremy Whish	CSIRO	Toowoomba	<a href="mailto:jeremy.whish@csiro.au">jeremy.whish@csiro.au</a>
yes	Maurie Haines	BSES/Canegrowers	Bundaberg	<a href="mailto:mhaines@bses.org.au">mhaines@bses.org.au</a>
no	Peter Hayman	SARDI	Adelaide	<a href="mailto:hayman.peter@saugov.sa.gov.au">hayman.peter@saugov.sa.gov.au</a>
yes	Peter McGuire	BSES	Condong, NSW	<a href="mailto:pmcguire@bses.org.au">pmcguire@bses.org.au</a>
yes	Peter Stone	CSIRO	Brisbane	<a href="mailto:peter.stone@csiro.au">peter.stone@csiro.au</a>
yes	Tony Linedale	BSES	Bundaberg	<a href="mailto:tlinedale@bses.org.au">tlinedale@bses.org.au</a>
yes	Zvi Hochmann	CSIRO	Toowoomba	<a href="mailto:zvi.hochmann@csiro.au">zvi.hochmann@csiro.au</a>
yes	Tony Darbas	CSIRO	Brisbane	<a href="mailto:tony.darbus@csiro.au">tony.darbus@csiro.au</a>
yes	Kerri Whittenbury	Charles Sturt University	Albury	<a href="mailto:kwhittenbury@csu.edu.au">kwhittenbury@csu.edu.au</a>

**Project Team Participants:**

Name	Affiliation	Location	Email Address
Emma Jakku	CSIRO	Brisbane	<a href="mailto:emma.jakku@csiro.au">emma.jakku@csiro.au</a>
Peter Thorburn	CSIRO	Brisbane	<a href="mailto:peter.thorburn@csiro.au">peter.thorburn@csiro.au</a>
Steve Attard	CSIRO	Burdekin	<a href="mailto:steve.attard@csiro.au">steve.attard@csiro.au</a>
Yvette Everingham	JCU	Townsville	<a href="mailto:yvette.everingham@jcu.edu.au">yvette.everingham@jcu.edu.au</a>

**Facilitator:**

Name	Affiliation	Location	Email Address
Maria Nolan	SeeChange Consulting	Brisbane	<a href="mailto:maria@seechangeconsulting.com.au">maria@seechangeconsulting.com.au</a>




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## Exploring Adoption Processes for Complex Technologies


A sociological framework

Emma Jakku and Peter Thorburn  
CSIRO Sustainable Ecosystems  
30 August, 2007



## Overview

- **The framework**
  - Rationale for the framework
  - Key concepts in the framework
- **Applying the framework**
  - Irrigation scheduling case study
  - Seasonal Climate Forecasting case study
- **Implications and future work**



## Rationale for the framework

### • How can a theoretical framework help?

- **Generalises lessons** about participatory DSS development
- Draws attention to: **context, process and outcomes**
- Emphasises the importance of **co-learning**
- Clarifies steps to **improve efficiency and effectiveness** of DSS development

### • Framework based on concepts from sociology

- Sociology examines:
  - Patterns of relationships among individuals and groups of people
  - How people make sense of and interact with the world they live in
- Sociological concepts from science and technology studies:
  - Examine the social factors and processes that influence the development and application of technologies
  - Provide new ways of thinking about participatory DSS development



## Key concepts in the framework

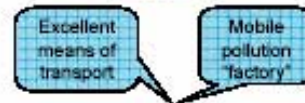
### • Interpretative flexibility

- Technologies can have **different meanings** for different people



### • Technological frames

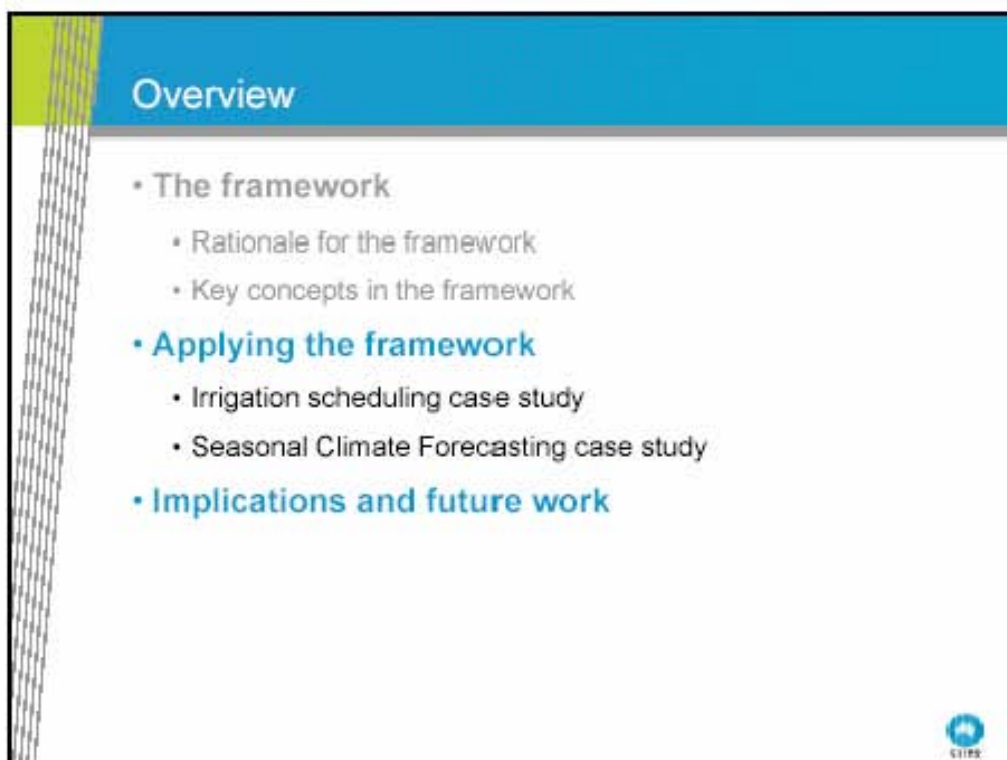
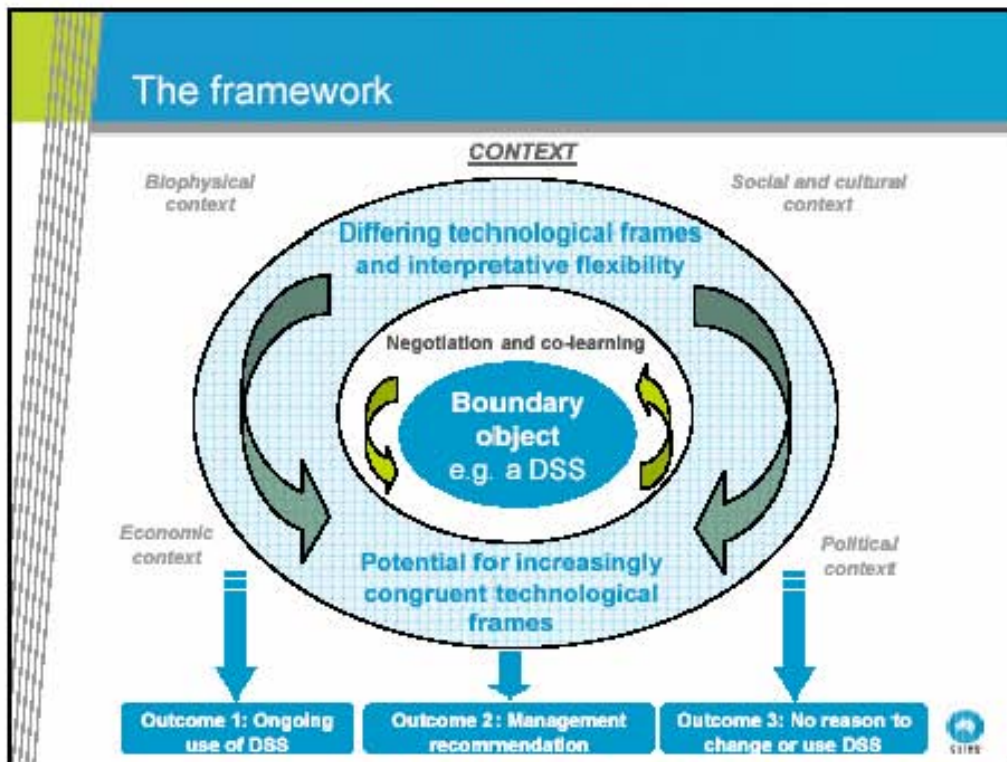
- **Different perspectives**, beliefs and expectations that people hold about a technology
- Congruent vs. incongruent technological frames



### • Boundary object

- **Common focus** or point of reference to allow for communication, negotiation and cooperation







## Irrigation scheduling



Opportunity for participatory DSS development

**Problem:**  
Irrigating with limited water & uncertain rainfall



**DSS:**  
WaterSense








## Irrigation – Action learning themes

- **Participatory development of WaterSense**
  - Explored different perspectives on when to use limited water
    - Different perceptions of soil water balance and crop response to stress
    - Different perspectives are partly based on situational factors
  - Illustrates **interpretative flexibility**
  - Illustrates different **technological**

The right ingredients to have in the respect from the different parties involved has a respect that the issues at the ground level can feed back into the research got to be a respect from the grower and to say that the research findings are for...when you respect those parts you have a collaborative-type project and I think that project had those ingredients. (Extension Officer)


...it's just they [the growers] don't think numerically, they don't think in terms of models. But when they grasp something and you get a guy jumping up with, oh I see what you're doing, and then he explains it back to you and adds a whole load of ideas that you never thought of, that is really quite thrilling. (Scientist)

## Irrigation – Action learning themes

- **WaterSense as a boundary object**
  - WaterSense provided a common focus point between participants

...it was bridging that gap between what was seen to be pretty good science, but making sure that it was paddock useable. [WaterSense]...could've been developed in an office in Townsville and it could've been spat out on a disk, and I don't think anybody would've used it. ...the process of developing it and taking the science to the people and the people to the science and bringing the two together so as at the end of the day, something was useful to the grower at his level rather than the scientist at his level, has been the real deal. (Extension Officer)




## Irrigation – Action learning themes

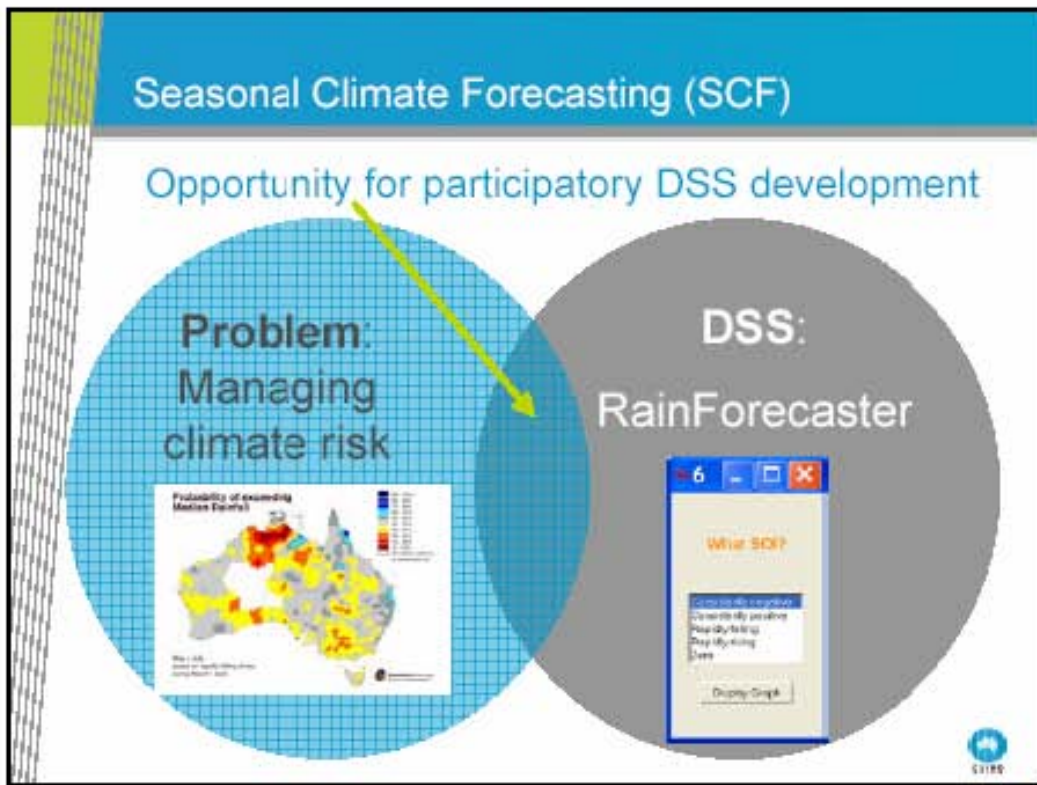
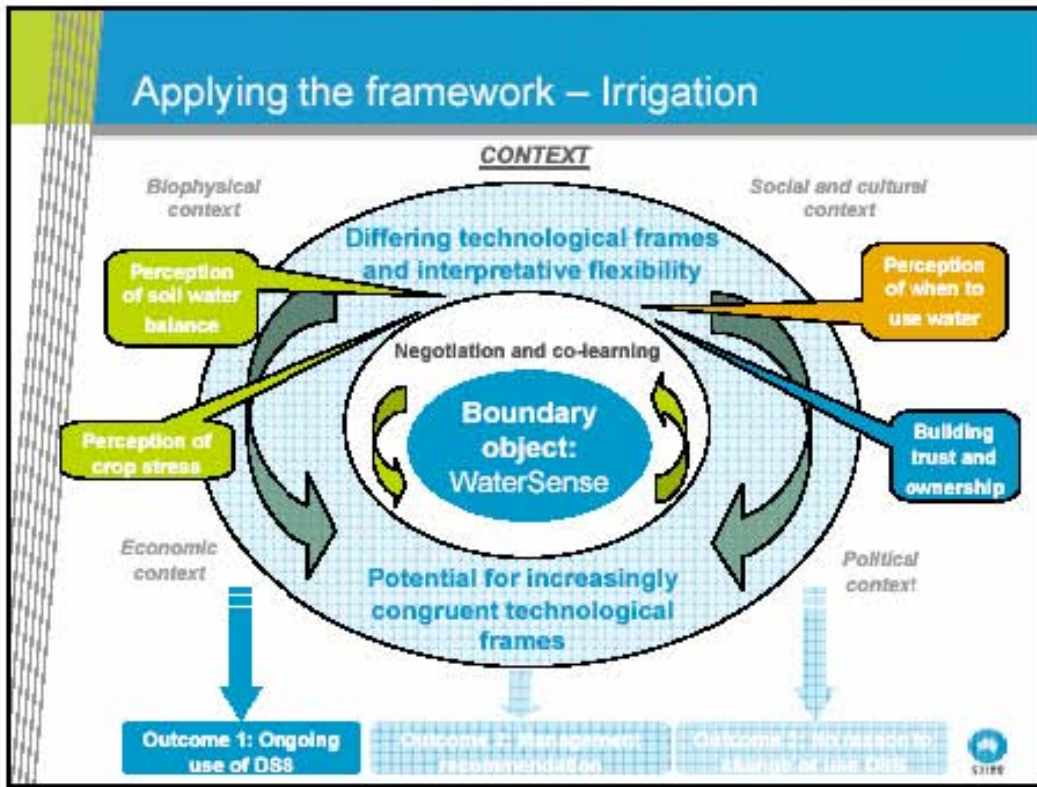
- **Building trust and ownership**
  - Participatory development of WaterSense based on co-learning and collaboration
  - Allowed for the development of more congruent **technological frames**

...it comes back to the confidence side of things; there was growers involved with it [WaterSense]. Whereas...sometimes, some ideas are put up and growers may not have had much input into what they wanted, what they expected out of it. I feel we got a fair bit of input into what we expected of it, and yeah, I like it [WaterSense], it's good. (Grower)

...they were committed, they took ownership, and they felt that we valued their input. And I believe also that for these people were all...really

...the difference was that the growers were being asked to tell the scientists what they didn't know, that brought growers onboard, at...the growers thought the scientists didn't know, I suppose is a better way of putting it. They were bringing their point of view listened to. (Extension Officer)








## SCF – Action learning themes

- **Climate vs. weather**
  - Different meanings for different people
  - Illustrates **interpretative flexibility**

I've learnt that there are differences between climate forecasting and weather forecasting. And neither of them are exact sciences. (Miller)


When they say climate forecasting, the first perception was weather forecasting. I went there with the total wrong idea. Soon modified. ...I learnt the difference between weather and climate. When I thought there was no difference at all. (Grower)



## SCF – Action learning themes

- **Understanding probabilities**
  - Different perspectives, based on different risk perceptions
  - Illustrates **interpretative flexibility**

Because I think one of the problems with it all [SCF], we're not all statisticians, and so if you start talking probabilities, some people, if they follow the races you can use probabilities. But they're not so good on probabilities. It takes a little while sometimes to get that probability message across. And so I think they've got to realise what the probability system means, and that's why I think I tend to spend a bit more of the initial stage on to 'likelihood' rather than 'probability'. (Extension officer)




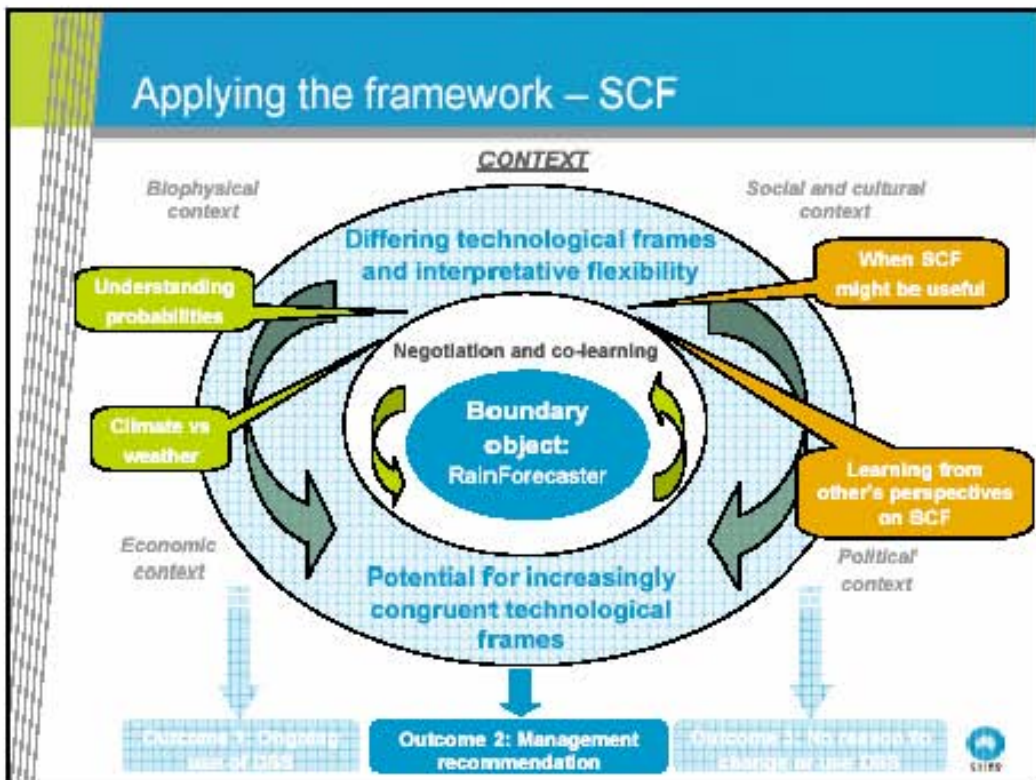
## SCF – Action learning themes

- **Different perceptions of when SCF might be useful**
  - Different perspectives on when and how to apply SCF
  - Learning from other's perspectives
  - Illustrates participants' **technological frames**

One good thing also was, with the other farmers – now they're all in different areas, except for one. He was my next door neighbour. But because we were all in different areas, they were doing things different to what we were doing. I said to myself, "Can I adapt that? Should I adapt that?" ...We started to learn off one another. (Grower)


It's always interesting to see someone else thinking in their line of work which is totally different and you can learn from that. You just look through your own window the whole world and see what other people do. It's interesting so then, I suppose, you can learn from other people's perspectives of what could be done in a sort of adapt, by using SCF. (Grower)





## Implications and future work

- **Reinforces the value of participatory DSS development**
  - Brings together different view points and knowledge (e.g. researchers and growers) to focus on a common issue
  - Co-learning → improved understanding and management
- **Theoretical framework**
  - **Generalises lessons** about participatory DSS development
  - Identifies concepts that **clarify key steps** in participatory DSS development
- **Next steps**
  - **Validate** the framework through further analysis of interview data
  - **Further operationalise** the framework to find ways to make the DSS development process more efficient and effective



### Acknowledgements

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We would also like to thank:  
 Steve Attard, Tony Webster, Jody Biggs, Mike Spillman, Shaun Verall, Rick Beattie, Peter McGuire, Bob Aitken, Maurie Haines, Tony Linedale, Aaron Cauchi, Sarah Jones-Trifelly, Erich Hammer, Peter Lucy and Tom Harney and the other members of our case study groups.

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## Thank you

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**EXPERIENCES OF WORKSHOP PARTICIPANTS****AGENDA III**

Participants were asked to share their knowledge and experiences about adoption processes, models, frameworks and extension programs. The tables that follow summarise the experiences and knowledge of each of the three workshop groups and the context of the application.

**Group 1**

<b>Adoption processes, models, frameworks</b>	<b>Context</b>
PAR	Paddock level
One on one	Paddock level
Action learning	Group work, NRM plans. With/without regulatory imposition.
Commercial incentives and education Commerce	Whole of industry, adoption. Paddock/farm level adoption. Landcare, NRM.
Capacity building, social capital	NRM, farm practice
Commercial rewards for achieved goals (subsidy?)	Outcome oriented payments.
Use of champions	

**Group 2**

<b>Adoption processes, models, frameworks</b>	<b>Context</b>
PAR	Sugarcane farmers (SCF -- climate, farmers, harvesters, whole chain, researchers, extension staff.
On-farm research (question development process)	See above (question development)
Participation – interpretation	Farmers, researchers, consultants, extension officers

**Group 3**

<b>Adoption processes, models, frameworks</b>	<b>Context</b>
Incentive programs - Encourage "slow adopters" - Reward "fast adopters"	- Slow adopters - Progressive thinkers (?)/early adopters
Awareness - Promotion - Outcome demonstrated	- General audience - Whole of industry - Targeted
Facilitated learning groups	CPI meetings
Self-directed trials	SRDC Grower group initiative projects
Benchmarking	
One-on-one demonstration/interaction	
Involve end-user in R&D process	
Training	
Information access	
Removal of alternatives	

**HATS EXERCISE****APPENDIX IV**

Participants used De Bono's six thinking hats as a method for providing feedback on the theoretical framework. The discussion focused on three of the six hats:

- Yellow hat (positive and constructive feedback)
- Black hat (negative assessment) and
- Green hat (creative thinking).

The following tables summarises the responses captured by three working groups in relation to the three coloured hats. Figures A4.1 to A4.3 show the thinking hat groups.



**Figure A4.1:** "Thinking Hat" group – Peter McGuire, Emma Jakku, Yvette Everingham, Bianca Boseley and Jeff Coutts.



**Figure A4.2:** "Thinking Hat" group – Zvi Hochmann, Tony Linedale, Robert Troedson, Peter Thorburn and Jeremy Whish.



**Figure A4.3:** "Thinking Hat" group – Toni Darbas, Peter Stone, Maurie Haynes, Diana Maldonado, Kerri Whittenbury and Steve Attard.

**Group 1**

<b>Yellow Hat</b>	<b>Black Hat</b>	<b>Green Hat</b>
Provide a common framework for dialogue and feedback	Has the framework been tested with anything other than DSS e.g. incentives?	Test framework with other boundary objects other than DSS (e.g. WQIP, Fishery Restrictions, EMS, nutrient management zones, incentive schemes, local government/land planning)
Like the use of boundary object to focus on	I. P. issues -- who owns what?	Existing frameworks exist, e.g. indigenous groups. Could they apply here?
Allows people to <u>build trust</u> (the boundary objects)	How do you ensure everyone understands e.g. language?	Role for facilitators/local gatekeeper - strong local knowledge - background work - development a procedure for checking, formalise
Having research that is applicable	How much concurrency is enough? (When do you reach the threshold?)	Develop tests to examine the degree of congruency with a number of groups and the same boundary object (perhaps a different boundary object). What are the outcomes/evaluate the progress, the process?
Includes multi-disciplinary people (farmers, extension officers, social scientists, physiologists etc)	The model is limited. How to go beyond outcomes 1, 2, 3?	Formally studied diffusion success of ground your objects and/or compare to conventional DSS diffusion success.
Provides for evaluation of effectiveness at different levels	Are there more learnings to provide insights to improve chances adoption? (It's been looked at using cognitive sciences and <u>not</u> social)	
Potential of developing user-friendly technology		
Avoids dichotomous thinking		
Ownership of (the design) of the end product		
No preconceptions that one form of knowledge was better		



**Group 2**

<b>Yellow Hat</b>	<b>Black Hat</b>	<b>Green Hat</b>
Visual schematic helpful	One framework may not suit all	Put some definitions/boundaries around the boundary objects
Structures what has otherwise been thoughts and ideas/loose theories	Doesn't include all possible outcomes e.g. rejection	Consider other frameworks
Nicely grounded	Should we describe outcomes?	Run historic projects through the framework
Good framework for dialogue about the R&D framework	Group must be typical	Have the fourth outcome (rejection)
Good way to share thinking and insights with others	Stops at DSS use rather than benefits	Yes, see if examples all have a currently available outcome
Generalise lessons learnt	Requires some learning	Considered who is appropriate and what the implication is of choosing them
Crystallise steps and processes in PAR activities	Needs a good facilitator	Insert "benefit"/"impact" box under outcome boxes
New perspectives about why a co-learning is important	Provides a conceptual framework not a method	Clear explanations and communication, possibly used examples
Emphasise social component of technology adoption	Does a structure inhibit "blue sky" thinking?	Selection of facilitator needs to be important in the whole process
Simple, clear, insightful	Who is the audience?	Direct people to a toolbox of practical methods e.g. stakeholder analysis, continuous improvement/best practice etc
Sets a common goal	There are many facets of adoption excluded	
Better anticipate roadblocks	If the boundary objects fails, doesn't tell you why	

**Group 3**

<b>Yellow Hat</b>	<b>Black Hat</b>	<b>Green Hat</b>
Extra dimension for interaction	Process is dependent on the selection and presentation of boundary object	Independent evaluation of boundary object prior to process and during
Helps the process of interaction	Process is dependent on the validity of the boundary object	Invest in good facilitation and don't be put off by problems along the way
Helps identify the strengths and weaknesses of an interaction	Facilitation will impact on the degree of congruence	Peer review (preemptive)
Pictorially depicts where individuals are within the process	All the relevant disciplines included? E.g. cognitive psychology	Write up a paper
Integrates different contexts	Has there been a full investigation of learnings of previous efforts with similar boundary objects?	Continued to communicate with other groups
Incorporates understanding of social issues	Bias in structure may affect direction	"Correct" weighting of social versus technical
Illustrates different paths to outcomes	Procrastination may develop	Reflection and reiteration
Has structure and direction	Blurring of focus may occur leading away from objective	Explicit thinking about dealing with partial congruence
Client involvement	Cost/benefit of process	Develop a layman's version of the framework
Recognizes definition of issues	Doesn't deal well partial congruence	Deconstruct Outcome 3
Incorporates flexibility	Uses jargon, so may hinder understanding	
Paradigm shift from DSS to boundary object	Outcome 3 might occur for different reasons	
Recognition of the importance of outside drivers (context)	How to deal with scaling up issues? What happens after the "group"? Moving beyond the group?	
Recognition of three outcomes	Limitations to its relevance?	
Congruence is good	Does it work (is it necessary) with simple technologies?	
Provides a language	Can it really help operationalise a PAR group?	
Helps prepare for a PAR case study	Just because issues are identified doesn't mean that they can be overcome?	
Allows to plan an end game	Is it testable?	
Post case study evaluation		
Shifts the focus from the boundary object		

The participants were asked to identify their level of endorsement of the framework. The facilitator used a line-up approach to capture the responses in a visual way. Participants were asked to line up along the scale of:

- 1 – Lacks rigour, relevance and/or logic, therefore a waste of time to continue development;
- 5 – it has potential although needs quite a bit of time for adaptation and improvement (some rigour, relevance, logic);
- 10 – Has a great deal of potential, logic, relevance, rigour and only needs slight adaptation.

Figure A5.1 shows a picture of the project participants standing on a white line. The individual numerated scores that correspond to the position of the participants on the white line were 8, 8, 8, 8, 8.5, 7.5, 7, 7, 7, 6.5 and 5.5. This produced a median score of 7.5 out of 10 which highlights the potential useability of the theoretical framework.



Figure A5.1: Participants at the CSE009 workshop evaluating the conceptual model.

At the end of the workshop the facilitator asked the participants to write their response to the following three questions: *1. What worked well for you? 2. What didn't work? 3. What did you find most valuable? Key lessons?* We now summarise the participants' responses to each of these questions.

### **1. What worked well for you?**

- Interaction between participants
- Clearly defined agenda
- Use of the Hats Concept
- Structure of the day: gave clear overview of the project from several angles; gave excellent opportunity to evaluate and provide feedback; blend of 'project evaluation / feedback' and 'how to run a feedback / evaluation exercise' was very cleverly done.
- Facilitation of the workshop.
- Interactions of the people.
- Agenda / activities of the workshop.
- Understanding of the framework / presentation of it.
- Outcomes of the project so far / what it has been developed until now.
- Having the diversity of people (skills, industry, background, organisations).
- Attitude of participants
- Articulating the model's development.
- The Six Hats
- Highly structured.
- Ice-breakers / introductions
- The structure and tools used during the day worked well.
- The hats.
- Introductions.
- Hats
- 'Hot potato'
- Strict time management.
- Mixing tables.
- Hats
- Hot potato
- Mixing tables
- Presentations on project
- Workshop process, make-up and diversity of participants.
- Group exercises and feedback e.g. Hot Potato, Hats.
- Application of thinking hats to a specific topic.
- Range of processes that were used.
- Mixed group (organisations, experiences, skills etc)
- Hats
- Time management
- Structure of the presentations, activities
- Mixing up the groups.
- Worked well – All
- Mixing groups.

- Hot potato technique.
- Having a diverse and committed group.
- I liked having a clear agenda.
- Hats.
- The diversity of the group.
- Time spend sharing definitions.
- Emphasis on encouraging constructive dialogue / discussion.
- Structured process (e.g. Six Hats).
- Use of the Three Hats – nice way to critique / get feedback from model.
- Small group work – and mixing them.
- Did enjoy model presentation – and can see immediate application – was a good output from research.

## **2. What didn't work for you?**

- There was some cross interpretation of models being reviewed e.g. DSS or the social framework.
- Not that it didn't work, but it might have been nice to have (time permitting) the project team consider the opportunities arising from discussions and provide feedback to the group on how they'd like to progress.
- Doing some of the very important activities after lunch / afternoon tea i.e. when less fresh (not sure how to overcome this; need green hat).
- Some confusion with the framework being referred to as a model and the DSS being referred to as a model.
- Bit slow in the morning – audience quick to understand; too much time spent before discussing the actual project; adults bore more easily than children – experienced, less likely to find novelty.
- Can't think of anything worth mentioning (5 comments).
- Relationships within framework somewhat unclear.
- No agenda prior to the meeting.
- No project background prior to the meeting.
- I would have liked to have seen practical recommendations from the case studies that could be translated to other projects (more of the framework implementation).
- Improvement: given how well it worked, would have been nice to have a bit more time at the end; could we have asked the group if they were interested in extending the workshop for 30 or 60 minutes?
- Probably would have enjoyed drawing out people's experiences more, as there were parts in there that could have helped to 'validate' the model some more. This actually did work, but maybe we could have got more from it.
- Sometimes difficult to get a sense of priorities regarding the cautions / opportunities discussed in the Six Hats exercise.
- Was a long lead in to get to the model presentation – but can see logic and why...

## **3. What did you find most valuable? Key lessons?**

- Facilitation Techniques: Defining skills and roles of participants to set scene; defining objectives by breaking down key aspects of the workshop objectives.
- Learned an excellent method for conducting constructive project evaluation / feedback.
- Learned some great tips for getting the best out of group interaction (I usually find butcher's paper session a serious waste of time; it was really valuable this time!).

- Understanding of the framework.
- About different views of the people in the workshop.
- Understanding of what could be improved.
- What the limitations of the framework are.
- Clear meaning of terms used.
- Most value: interactions of people / different views of an issue / framework.
- Peers critical review.
- Opportunities to: add value; interact; share; improve.
- The process of engagement between people of diverse perspectives / disciplines / organisations.
- Learning about the framework.
- Using the hats as a way to evaluate / critique a concept.
- Lot of learning about developing a common language.
- Methods of describing processes that we all use but have not reflected upon.
- Procedures to get people to share and build knowledge together; great for interdisciplinary work, for breadth – I don't find this as personally satisfying as the depth achievable with within disciplinary discussion.
- Alternative approach to adoption of complex technology
- Some issues are fundamental to the problem regardless of methodology / framework.
- Possibilities for collaboration with project team.
- Framework concepts.
- Variations to / in group activities.
- Diversity in aspect / approach.
- Value of mixed group (tie in with above).
- Understanding the framework.
- Saw two examples of the application of the framework and how the technology adaptation could continue.
- Adoption process is dependent ultimately on the technology but common issues / factors exist that can be drawn together in a framework.
- All the input from the others attendees (and some specific ones).
- The process employed and where else it could help me.
- Important to define terms / definitions.
- Have now seen the Hats in use – very good tool.
- Better understanding of the framework.
- Meeting new people.
- Opportunities for improving the model.
- Catching up with others and learning about their research.
- Just a really positive day.
- Valuable to get constructive feedback on the model.
- Supportive approach to improving the framework e.g. identifying existing methods / practical approaches to operationalise the framework.
- Very useful conceptual framework for dialogue, planning and evaluating technology development and adoption processes.
- Usefulness of De Bono's hats in this context.
- The 'x-factor'